Annex 19

CLIMATE CHANGE 2023
Synthesis Report

A Report of the Intergovernmental Panel on Climate Change

WMO UNEP

CLIMATE CHANGE 2023

Synthesis Report

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Foreword and Preface

Foreword

This Synthesis Report (SYR) concludes the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC). The SYR synthesizes and integrates materials contained within the three Working Groups Assessment Reports and the Special Reports contributing to the AR6. It addresses a broad range of policy-relevant but policy-neutral questions approved by the Panel.

The SYR is the synthesis of the most comprehensive assessment of climate change undertaken thus far by the IPCC: Climate Change 2021: The Physical Science Basis; Climate Change 2022: Impacts, Adaptation and Vulnerability; and Climate Change 2022: Mitigation of Climate Change. The SYR also draws on the findings of three Special Reports completed as part of the Sixth Assessment – Global Warming of 1.5°C (2018): an IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (SR1.5); Climate Change and Land (2019): an IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems (SRCCL); and The Ocean and Cryosphere in a Changing Climate (2019) (SROCC).

The AR6 SYR confirms that unsustainable and unequal energy and land use as well as more than a century of burning fossil fuels have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850–1900 in 2011–2020. This has led to widespread adverse impacts and related losses and damages to nature and people. The nationally determined contributions (NDCs) committed by 2030 show the temperature will increase by 1.5°C in the first half of the 2030s, and will make it very difficult to control temperature increase by 2.0°C towards the end of 21st century. Every increment of global warming will intensify multiple and concurrent hazards in all regions of the world.

The report points out that limiting human-caused global warming requires net zero CO_2 emissions. Deep, rapid, and sustained mitigation and accelerated implementation of adaptation actions in this decade would reduce projected losses and damages for humans and ecosystems and deliver many co-benefits, especially for air quality and health. Delayed mitigation and adaptation action would lock-in high-emissions infrastructure, raise risks of stranded assets and cost-escalation, reduce feasibility, and increase losses and damages. Near-term actions involve high up-front investments and potentially disruptive changes that can be lessened by a range of enabling policies.

As an intergovernmental body jointly established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP), the IPCC has provided policymakers with the most authoritative and objective scientific and technical assessments in this field. Beginning in 1990, this series of IPCC Assessment Reports, Special Reports, Technical Papers, Methodology Reports, and other products have become standard works of reference.

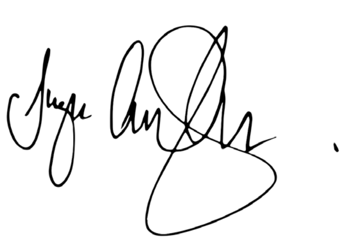
The SYR was made possible thanks to the voluntary work, dedication and commitment of thousands of experts and scientists from around the globe, representing a range of views and disciplines. We would like to express our deep gratitude to all the members of the Core Writing Team of the SYR, members of the Extended Writing Team, Contributing Authors, and the Review Editors, all of whom enthusiastically took on the huge challenge of producing an outstanding SYR on top of the other tasks they had already committed to during the AR6 cycle. We would also like to thank the staff of the Technical Support Unit of the SYR and the IPCC Secretariat for their dedication in organizing the production of this IPCC report.

We also wish to acknowledge and thank the governments of the IPCC member countries for their support of scientists in developing this report, and for their contributions to the IPCC Trust Fund to provide the essentials for participation of experts from developing countries and countries with economies in transition. We would like to express our appreciation to the government of Singapore for hosting the Scoping Meeting of the SYR, to the government of Ireland for hosting the third Core Writing Team meeting of the SYR, and to the government of Switzerland for hosting the 58th Session of the IPCC where the SYR was approved. The generous financial support from the government of the Republic of Korea enabled the smooth operation of the Technical Support Unit of the SYR. This is gratefully acknowledged.

We would particularly like to express our thanks to the IPCC Chair, the IPCC Vice-Chairs and the Co-Chairs for their dedicated work throughout the production of this report.

Petteri Taalas

Secretary-General of the World Meteorological Organization



Inger Andersen

Under-Secretary-General of the United Nations and Executive Director of the UN Environment Programme

Preface

This Synthesis Report (SYR) constitutes the final product of the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC). It summarizes the state of knowledge of climate change, its widespread impacts and risks, and climate change mitigation and adaptation, based on the peer-reviewed scientific, technical, and socio-economic literature since the publication of the IPCC's Fifth Assessment Report (AR5) in 2014.

This SYR distills, synthesizes, and integrates the key findings of the three Working Group contributions – Climate Change 2021: The Physical Science Basis; Climate Change 2022: Impacts, Adaptation and Vulnerability; and Climate Change 2022: Mitigation of Climate Change. The SYR also draws on the findings of three Special Reports completed as part of the Sixth Assessment – Global Warming of 1.5°C (2018): an IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (SR1.5); Climate Change and Land (2019): an IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems (SRCCL); and The Ocean and Cryosphere in a Changing Climate (2019) (SROCC). The SYR, therefore, is a comprehensive, timely compilation of assessments of the most recent scientific, technical, and socio-economic literature dealing with climate change.

Scope of the report

The SYR is a self-contained synthesis of the most policy-relevant material drawn from the scientific, technical, and socio-economic literature assessed during the Sixth Assessment. This report integrates the main findings of the AR6 Working Group reports and the three AR6 Special Reports. It recognizes the interdependence of climate, ecosystems and biodiversity, and human societies; the value of diverse forms of knowledge; and the close linkages between climate adaptation, mitigation, ecosystem health, human well-being, and sustainable development. Building on multiple analytical frameworks, including those from the physical and social sciences, this report identifies opportunities for transformative action which are effective, feasible, just and equitable systems transitions, and climate resilient development pathways. Different regional classification schemes are used for physical, social and economic aspects, reflecting the underlying literature.

The Synthesis Report emphasizes near-term risks and options for addressing them to give policymakers a sense of the urgency required to address global climate change. The report also provides important insights about how climate risks interact with not only one another but non-climate-related risks. It describes the interaction between mitigation and adaptation and how this combination can better confront the climate challenge as well as produce valuable co-benefits. It highlights the strong connection between equity and climate action and why more equitable solutions are vital to addressing climate change. It also emphasizes how growing urbanization provides an opportunity for ambitious climate action to advance climate resilient development and sustainable development for all. And it underscores how restoring and protecting land and ocean ecosystems can bring multiple benefits to biodiversity and other societal goals, just as a failure to do so presents a major risk to ensuring a healthy planet.

Structure

The SYR comprises a Summary for Policymakers (SPM) and a longer report from which the SPM is derived, as well as annexes.

To facilitate access to the findings of the SYR for a wide readership, each part of the SPM carries highlighted headline statements. Taken together, these 18 headline statements provide an overarching summary in simple, non-technical language for easy assimilation by readers from different walks of life.

The SPM follows a structure and sequence like that in the longer report, but some issues covered in more than one section of the longer report are summarized in a single location in the SPM. Each paragraph of the SPM contains references to the supporting text in the longer report. In turn, the longer report contains extensive references to relevant portions of the Working Group Reports or Special Reports mentioned above.

The longer report is structured around three topic headings as mandated by the Panel. A brief Introduction (Section1) is followed by three sections.

Section 2, 'Current Status and Trends', opens with the assessment of observational evidence for our changing climate, historical and current drivers of human-induced climate change, and its impacts. It assesses the current implementation of adaptation and mitigation response options. Section 3, 'Long-Term Climate and Development Futures', provides an assessment of climate change to 2100 and beyond in a broad range of socio-economic futures. It considers long-term impacts, risks and costs in adaptation and mitigation pathways in the context of sustainable development. Section 4, 'Near-Term Responses in a Changing Climate', assesses opportunities for scaling up effective action in the period to 2040, in the context of climate pledges, and commitments, and the pursuit of sustainable development.

Annexes containing a glossary of terms used, list of acronyms, authors, Review Editors, the SYR Scientific Steering Committee, and Expert Reviewers complete the report.

Process

The SYR was prepared in accordance with the procedures of the IPCC. A scoping meeting to develop a detailed outline of the AR6 Synthesis Report was held in Singapore from 21 to 23 October 2019 and the outline produced in that meeting was approved by the Panel at the 52nd IPCC Session from 24 to 28 February 2020 in Paris, France.

In accordance with IPCC procedures, the IPCC Chair, in consultation with the Co-Chairs of the Working Groups, nominated authors for the Core Writing Team (CWT) of the SYR. A total of 30 CWT members and 9 Review Editors were selected and accepted by the IPCC Bureau at its 58th Session on 19 May 2020. In the process of developing the SYR, 7 Extended Writing Team (EWT) authors were selected by the CWT and approved by the Chair and the IPCC Bureau, and 28 Contributing Authors were selected by the CWT with the approval of the Chair. These additional authors were to enhance and deepen the expertise required for the preparation of the Report. The Chair established at the 58th Session of the Bureau an SYR Scientific Steering Committee (SSC) with a mandate to advise the development of the SYR. The SYR SSC comprised the members of the IPCC Bureau, excluding those members who served as Review Editors for the SYR.

Due to the covid pandemic, the first two meetings of the CWT were held virtually from 25 to 29 January 2021 and from 16 to 20 August 2021. The First Order Draft (FOD) was released to experts and governments for review on 10 January 2022 with comments due on 20 March 2022. The CWT met in Dublin from 25 to 28 March 2022 to discuss how best to revise the FOD to address the more than 10,000 comments received. The Review Editors monitored the review process to ensure that all comments received appropriate consideration. The IPCC circulated a final draft of the Summary for Policymakers and a longer report of the SYR to governments for review from 21 November 2022 to 15 January 2023 which resulted in over 6,000 comments. A final SYR draft for approval incorporating the comments from the final government distribution was submitted to the IPCC member governments on 8 March 2023.

The Panel at its 58th Session, held from 13 to 17 March 2023 in Interlaken, Switzerland, approved the SPM line by line and adopted the longer report section by section.

Acknowledgements

The SYR was made possible thanks to the hard work and commitment to excellence shown by the Section Facilitators, members of CWT and EWT, and Contributing Authors. Specific thanks are due to Section Facilitators Kate Calvin, Dipak Dasgupta, Gerhard Krinner, Aditi Mukherji, Peter Thorne, and Christopher Trisos whose work was essential in ensuring a high standard of the longer report sections and the SPM.

We would like to express our appreciation to the IPCC member governments, observer organizations, and expert reviewers for providing constructive comments on the draft reports. We would like to thank the Review Editors Paola Arias, Mercedes Bustamante, Ismail Elgizouli, Gregory Flato, Mark Howden, Steven Rose, Yamina Saheb, Roberto Sánchez, and Cunde Xiao for their work on the treatment of FOD comments, and Gregory Flato, Carlos Méndez, Joy Jacqueline Pereira, Ramón Pichs-Madruga, Diana Ürge-Vorsatz, and Noureddine Yassaa for their work during the approval session, collaborating with author teams to ensure consistency between the SPM and the underlying reports.

We are grateful to the members of the SSC for their thoughtful advice and support for the SYR throughout the process: IPCC Vice-Chairs Ko Barret, Thelma Krug, and Youba Sokona; Co-Chairs of Working Groups (WG) and Task Force on National Greenhouse Gas Inventories (TFI) Valérie Masson-Delmotte, Panmao Zhai, Hans-Otto Pörtner, Debra Roberts, Priyadarshi R. Shukla, Jim Skea, Eduardo Calvo Buendía, and Kiyoto Tanabe; WG Vice-Chairs Edvin Aldrian, Fatima Driouech, Jan Fuglestvedt, Muhammad Tariq, Carolina Vera, Noureddine Yassaa, Andreas Fischlin, Joy Jacqueline Pereira, Sergey Semenov, Pius Yanda, Taha M, Zatari, Amjad Abdulla, Carlo Carraro, Diriba Korecha Dadi, Nagmeldin G.E. Mahmoud, Ramón Pichs-Madruga, Andy Reisinger, and Diana Ürge-Vorsatz. The IPCC Vice-Chairs and WG Co-Chairs served also as members of the CWT and we are grateful for their contributions.

We wish to thank the IPCC Secretariat for their guidance and support for the SYR in preparation, release and publication of the Report: Deputy Secretary Emira Fida, Mudathir Abdallah, Jesbin Baidya, Laura Biagioni, Oksana Ekzarkho, Judith Ewa, Joëlle Fernandez, Emelie Larrode, Jennifer Lew Schneider, Andrej Mahecic, Nina Peeva, Mxolisi Shongwe, Melissa Walsh, and Werani Zabula. Their support for the successful SYR was truly outstanding throughout the entire process.

Our thanks go to José Romero, Head of the SYR Technical Support Unit (SYR TSU) and Jinmi Kim, Director of Administration, and the members of the SYR TSU, Arlene Birt, Meeyoung Ha, Erik Haites, Lance Ignon, Yonghun Jung, Dan Jezreel Orendain, Robert Stavins, Semin Park, and Youngin Park for their hard work to facilitate the development and production of the SYR with deep commitment and dedication to ensure an outstanding SYR. Our thanks also go to Woochong Um and his team at the Asian Development Bank for facilitation of the SYR TSU operation.

We extend our appreciation of the enthusiasm, dedication, and professional contributions of WG TSU members Sarah Connors, Clotilde Péan, and Anna Pirani from WG I, Marlies Craig, Katja Mintenbeck, Elvira Poloczanska, Melinda Tignor from WG II and Roger Fradera, Minal Pathak, Raphael Slade, Shreya Some, and Geninha Gabao Lisboa from WG III, working as a team with the SYR TSU, which contributed to the successful outcome of the Session.

We are appreciative of the member governments of the IPCC who graciously hosted the SYR scoping meeting, a CWT Meeting and the 58th Session of the IPCC: Singapore, Ireland, and Switzerland, respectively. We express our thanks to the IPCC member governments, WMO, UNEP and the UNFCCC for their contributions to the Trust Fund which supported various elements of expenditure. We wish to particularly

thank the Korea Meteorological Administration, Republic of Korea for its generous financial support of the SYR TSU. We acknowledge the support of IPCC's parent organizations, UNEP and WMO, and particularly WMO for hosting the IPCC Secretariat. Finally, may we convey our deep gratitude to the UNFCCC for their cooperation at various stages of this enterprise and for the prominence they give to our work in several fora.

Hoesung Lee
Chairman of the IPCC

Abdalah Mokssit
Secretary of the IPCC

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In the Introduction and Sections of the longer report, the references refer to the contributions of the Working Groups I, II and III (WGI, WGII, WGIII) to the Sixth Assessment Report and other IPCC Reports (in italicized curly brackets), or to other sections of the Synthesis Report itself (in round brackets).

The following abbreviations have been used:
SPM: Summary for Policymakers
TS: Technical Summary
ES: Executive Summary of a chapter
Numbers denote specific chapters and sections of a report.

Other IPCC reports cited in this Synthesis Report:
SR1.5: Global Warming of 1.5°C
SRCCL: Climate Change and Land
SROCC: The Ocean and Cryosphere in a Changing Climate

Climate Change 2023
Synthesis Report
Summary for Policymakers

This Summary for Policymakers should be cited as:
IPCC, 2023: Summary for Policymakers. In: *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 1-34, doi: 10.59327/IPCC/AR6-9789291691647.001

Introduction

This Synthesis Report (SYR) of the IPCC Sixth Assessment Report (AR6) summarises the state of knowledge of climate change, its widespread impacts and risks, and climate change mitigation and adaptation. It integrates the main findings of the Sixth Assessment Report (AR6) based on contributions from the three Working Groups[1], and the three Special Reports[2]. The summary for Policymakers (SPM) is structured in three parts: SPM.A Current Status and Trends, SPM.B Future Climate Change, Risks, and Long-Term Responses, and SPM.C Responses in the Near Term[3].

This report recognizes the interdependence of climate, ecosystems and biodiversity, and human societies; the value of diverse forms of knowledge; and the close linkages between climate change adaptation, mitigation, ecosystem health, human well-being and sustainable development, and reflects the increasing diversity of actors involved in climate action.

Based on scientific understanding, key findings can be formulated as statements of fact or associated with an assessed level of confidence using the IPCC calibrated language[4].

[1] The three Working Group contributions to AR6 are: AR6 Climate Change 2021: The Physical Science Basis; AR6 Climate Change 2022: Impacts, Adaptation and Vulnerability; and AR6 Climate Change 2022: Mitigation of Climate Change. Their assessments cover scientific literature accepted for publication respectively by 31 January 2021, 1 September 2021 and 11 October 2021.

[2] The three Special Reports are: Global Warming of 1.5°C (2018): an IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (SR1.5); Climate Change and Land (2019): an IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems (SRCCL); and The Ocean and Cryosphere in a Changing Climate (2019) (SROCC). The Special Reports cover scientific literature accepted for publication respectively by 15 May 2018, 7 April 2019 and 15 May 2019.

[3] In this report, the near term is defined as the period until 2040. The long term is defined as the period beyond 2040.

[4] Each finding is grounded in an evaluation of underlying evidence and agreement. The IPCC calibrated language uses five qualifiers to express a level of confidence: very low, low, medium, high and very high, and typeset in italics, for example, *medium confidence*. The following terms are used to indicate the assessed likelihood of an outcome or a result: virtually certain 99–100% probability, very likely 90–100%, likely 66–100%, more likely than not >50–100%, about as likely as not 33–66%, unlikely 0–33%, very unlikely 0–10%, exceptionally unlikely 0–1%. Additional terms (extremely likely 95–100%; and extremely unlikely 0–5%) are also used when appropriate. Assessed likelihood is typeset in italics, e.g., *very likely*. This is consistent with AR5 and the other AR6 Reports.

A. Current Status and Trends

Observed Warming and its Causes

A.1 Human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850–1900 in 2011–2020. Global greenhouse gas emissions have continued to increase, with unequal historical and ongoing contributions arising from unsustainable energy use, land use and land-use change, lifestyles and patterns of consumption and production across regions, between and within countries, and among individuals (*high confidence*). {*2.1, Figure 2.1, Figure 2.2*}

A.1.1 Global surface temperature was 1.09 [0.95 to 1.20]°C[5] higher in 2011–2020 than 1850–1900[6], with larger increases over land (1.59 [1.34 to 1.83]°C) than over the ocean (0.88 [0.68 to 1.01]°C). Global surface temperature in the first two decades of the 21st century (2001–2020) was 0.99 [0.84 to 1.10]°C higher than 1850–1900. Global surface temperature has increased faster since 1970 than in any other 50-year period over at least the last 2000 years (*high confidence*). {*2.1.1*, *Figure 2.1*}

A.1.2 The *likely* range of total human-caused global surface temperature increase from 1850–1900 to 2010–2019[7] is 0.8°C to 1.3°C, with a best estimate of 1.07°C. Over this period, it is *likely* that well-mixed greenhouse gases (GHGs) contributed a warming of 1.0°C to 2.0°C[8], and other human drivers (principally aerosols) contributed a cooling of 0.0°C to 0.8°C, natural (solar and volcanic) drivers changed global surface temperature by –0.1°C to +0.1°C, and internal variability changed it by –0.2°C to +0.2°C. {*2.1.1*, *Figure 2.1*}

A.1.3 Observed increases in well-mixed GHG concentrations since around 1750 are unequivocally caused by GHG emissions from human activities over this period. Historical cumulative net CO_2 emissions from 1850 to 2019 were 2400 ± 240 $GtCO_2$ of which more than half (58%) occurred between 1850 and 1989, and about 42% occurred between 1990 and 2019 (*high confidence*). In 2019, atmospheric CO_2 concentrations (410 parts per million) were higher than at any time in at least 2 million years (*high confidence*), and concentrations of methane (1866 parts per billion) and nitrous oxide (332 parts per billion) were higher than at any time in at least 800,000 years (*very high confidence*). {*2.1.1*, *Figure 2.1*}

A.1.4 Global net anthropogenic GHG emissions have been estimated to be 59 ± 6.6 $GtCO_2$-eq[9] in 2019, about 12% (6.5 $GtCO_2$-eq) higher than in 2010 and 54% (21 $GtCO_2$-eq) higher than in 1990, with the largest share and growth in gross GHG emissions occurring in CO_2 from fossil fuels combustion and industrial processes (CO_2-FFI) followed by methane, whereas the highest relative growth occurred in fluorinated gases (F-gases), starting from low levels in 1990. Average annual GHG emissions during 2010–2019 were higher than in any previous decade on record, while the rate of growth between 2010 and 2019 (1.3% yr^{-1}) was lower than that between 2000 and 2009 (2.1% yr^{-1}). In 2019, approximately 79% of global GHG

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5 Ranges given throughout the SPM represent *very likely* ranges (5–95% range) unless otherwise stated.

6 The estimated increase in global surface temperature since AR5 is principally due to further warming since 2003–2012 (0.19 [0.16 to 0.22]°C). Additionally, methodological advances and new datasets have provided a more complete spatial representation of changes in surface temperature, including in the Arctic. These and other improvements have also increased the estimate of global surface temperature change by approximately 0.1°C, but this increase does not represent additional physical warming since AR5.

7 The period distinction with A.1.1 arises because the attribution studies consider this slightly earlier period. The observed warming to 2010–2019 is 1.06 [0.88 to 1.21]°C.

8 Contributions from emissions to the 2010–2019 warming relative to 1850–1900 assessed from radiative forcing studies are: CO_2 0.8 [0.5 to 1.2] °C; methane 0.5 [0.3 to 0.8]°C; nitrous oxide 0.1 [0.0 to 0.2]°C and fluorinated gases 0.1 [0.0 to 0.2]°C. {*2.1.1*}

9 GHG emission metrics are used to express emissions of different greenhouse gases in a common unit. Aggregated GHG emissions in this report are stated in CO_2-equivalents (CO_2-eq) using the Global Warming Potential with a time horizon of 100 years (GWP100) with values based on the contribution of Working Group I to the AR6. The AR6 WGI and WGIII reports contain updated emission metric values, evaluations of different metrics with regard to mitigation objectives, and assess new approaches to aggregating gases. The choice of metric depends on the purpose of the analysis and all GHG emission metrics have limitations and uncertainties, given that they simplify the complexity of the physical climate system and its response to past and future GHG emissions. {*2.1.1*}

emissions came from the sectors of energy, industry, transport, and buildings together and 22%[10] from agriculture, forestry and other land use (AFOLU). Emissions reductions in CO_2-FFI due to improvements in energy intensity of GDP and carbon intensity of energy, have been less than emissions increases from rising global activity levels in industry, energy supply, transport, agriculture and buildings. (*high confidence*) {*2.1.1*}

A.1.5 Historical contributions of CO_2 emissions vary substantially across regions in terms of total magnitude, but also in terms of contributions to CO_2-FFI and net CO_2 emissions from land use, land-use change and forestry (CO_2-LULUCF). In 2019, around 35% of the global population live in countries emitting more than 9 tCO_2-eq per capita[11] (excluding CO_2-LULUCF) while 41% live in countries emitting less than 3 tCO_2-eq per capita; of the latter a substantial share lacks access to modern energy services. Least Developed Countries (LDCs) and Small Island Developing States (SIDS) have much lower per capita emissions (1.7 tCO_2-eq and 4.6 tCO_2-eq, respectively) than the global average (6.9 tCO_2-eq), excluding CO_2-LULUCF. The 10% of households with the highest per capita emissions contribute 34–45% of global consumption-based household GHG emissions, while the bottom 50% contribute 13–15%. (*high confidence*) {*2.1.1, Figure 2.2*}

Observed Changes and Impacts

A.2 Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred. Human-caused climate change is already affecting many weather and climate extremes in every region across the globe. This has led to widespread adverse impacts and related losses and damages to nature and people (*high confidence*). Vulnerable communities who have historically contributed the least to current climate change are disproportionately affected (*high confidence*). {*2.1, Table 2.1, Figure 2.2, Figure 2.3*} (*Figure SPM.1*)

A.2.1 It is unequivocal that human influence has warmed the atmosphere, ocean and land. Global mean sea level increased by 0.20 [0.15 to 0.25] m between 1901 and 2018. The average rate of sea level rise was 1.3 [0.6 to 2.1] mm yr^{-1} between 1901 and 1971, increasing to 1.9 [0.8 to 2.9] mm yr^{-1} between 1971 and 2006, and further increasing to 3.7 [3.2 to 4.2] mm yr^{-1} between 2006 and 2018 (*high confidence*). Human influence was *very likely* the main driver of these increases since at least 1971. Evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has further strengthened since AR5. Human influence has *likely* increased the chance of compound extreme events since the 1950s, including increases in the frequency of concurrent heatwaves and droughts (*high confidence*). {*2.1.2, Table 2.1, Figure 2.3, Figure 3.4*} (*Figure SPM.1*)

A.2.2 Approximately 3.3 to 3.6 billion people live in contexts that are highly vulnerable to climate change. Human and ecosystem vulnerability are interdependent. Regions and people with considerable development constraints have high vulnerability to climatic hazards. Increasing weather and climate extreme events have exposed millions of people to acute food insecurity[12] and reduced water security, with the largest adverse impacts observed in many locations and/or communities in Africa, Asia, Central and South America, LDCs, Small Islands and the Arctic, and globally for Indigenous Peoples, small-scale food producers and low-income households. Between 2010 and 2020, human mortality from floods, droughts and storms was 15 times higher in highly vulnerable regions, compared to regions with very low vulnerability. (*high confidence*) {*2.1.2, 4.4*} (*Figure SPM.1*)

A.2.3 Climate change has caused substantial damages, and increasingly irreversible losses, in terrestrial, freshwater, cryospheric, and coastal and open ocean ecosystems (*high confidence*). Hundreds of local losses of species have been driven by increases in the magnitude of heat extremes (*high confidence*) with mass mortality events recorded on land and in the ocean (*very high confidence*). Impacts on some ecosystems are approaching irreversibility such as the impacts of hydrological changes resulting from the retreat of glaciers, or the changes in some mountain (*medium confidence*) and Arctic ecosystems driven by permafrost thaw (*high confidence*). {*2.1.2, Figure 2.3*} (*Figure SPM.1*)

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[10] GHG emission levels are rounded to two significant digits; as a consequence, small differences in sums due to rounding may occur. {*2.1.1*}

[11] Territorial emissions.

[12] Acute food insecurity can occur at any time with a severity that threatens lives, livelihoods or both, regardless of the causes, context or duration, as a result of shocks risking determinants of food security and nutrition, and is used to assess the need for humanitarian action. {*2.1*}

A.2.4 Climate change has reduced food security and affected water security, hindering efforts to meet Sustainable Development Goals (*high confidence*). Although overall agricultural productivity has increased, climate change has slowed this growth over the past 50 years globally (*medium confidence*), with related negative impacts mainly in mid- and low latitude regions but positive impacts in some high latitude regions (*high confidence*). Ocean warming and ocean acidification have adversely affected food production from fisheries and shellfish aquaculture in some oceanic regions (*high confidence*). Roughly half of the world's population currently experience severe water scarcity for at least part of the year due to a combination of climatic and non-climatic drivers (*medium confidence*). {*2.1.2, Figure 2.3*} (*Figure SPM.1*)

A.2.5 In all regions increases in extreme heat events have resulted in human mortality and morbidity (*very high confidence*). The occurrence of climate-related food-borne and water-borne diseases (*very high confidence*) and the incidence of vector-borne diseases (*high confidence*) have increased. In assessed regions, some mental health challenges are associated with increasing temperatures (*high confidence*), trauma from extreme events (*very high confidence*), and loss of livelihoods and culture (*high confidence*). Climate and weather extremes are increasingly driving displacement in Africa, Asia, North America (*high confidence*), and Central and South America (*medium confidence)*, with small island states in the Caribbean and South Pacific being disproportionately affected relative to their small population size (*high confidence*). {*2.1.2, Figure 2.3*} (*Figure SPM.1*)

A.2.6 Climate change has caused widespread adverse impacts and related losses and damages[13] to nature and people that are unequally distributed across systems, regions and sectors. Economic damages from climate change have been detected in climate-exposed sectors, such as agriculture, forestry, fishery, energy, and tourism. Individual livelihoods have been affected through, for example, destruction of homes and infrastructure, and loss of property and income, human health and food security, with adverse effects on gender and social equity. (*high confidence*) {*2.1.2*} (*Figure SPM.1*)

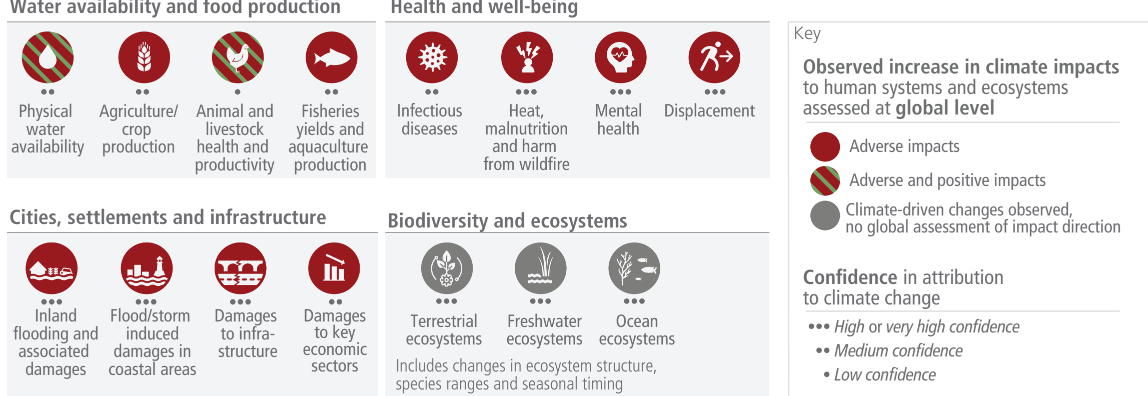
A.2.7 In urban areas, observed climate change has caused adverse impacts on human health, livelihoods and key infrastructure. Hot extremes have intensified in cities. Urban infrastructure, including transportation, water, sanitation and energy systems have been compromised by extreme and slow-onset events[14], with resulting economic losses, disruptions of services and negative impacts to well-being. Observed adverse impacts are concentrated amongst economically and socially marginalised urban residents. (*high confidence*) {*2.1.2*}

[13] In this report, the term 'losses and damages' refers to adverse observed impacts and/or projected risks and can be economic and/or non-economic (see Annex I: Glossary).

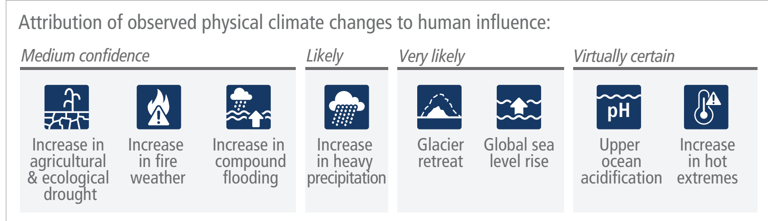
[14] Slow-onset events are described among the climatic-impact drivers of the AR6 WGI and refer to the risks and impacts associated with e.g., increasing temperature means, desertification, decreasing precipitation, loss of biodiversity, land and forest degradation, glacial retreat and related impacts, ocean acidification, sea level rise and salinization. {*2.1.2*}

Adverse impacts from human-caused climate change will continue to intensify

a) Observed widespread and substantial impacts and related losses and damages attributed to climate change



b) Impacts are driven by changes in multiple physical climate conditions, which are increasingly attributed to human influence



c) The extent to which current and future generations will experience a hotter and different world depends on choices now and in the near term

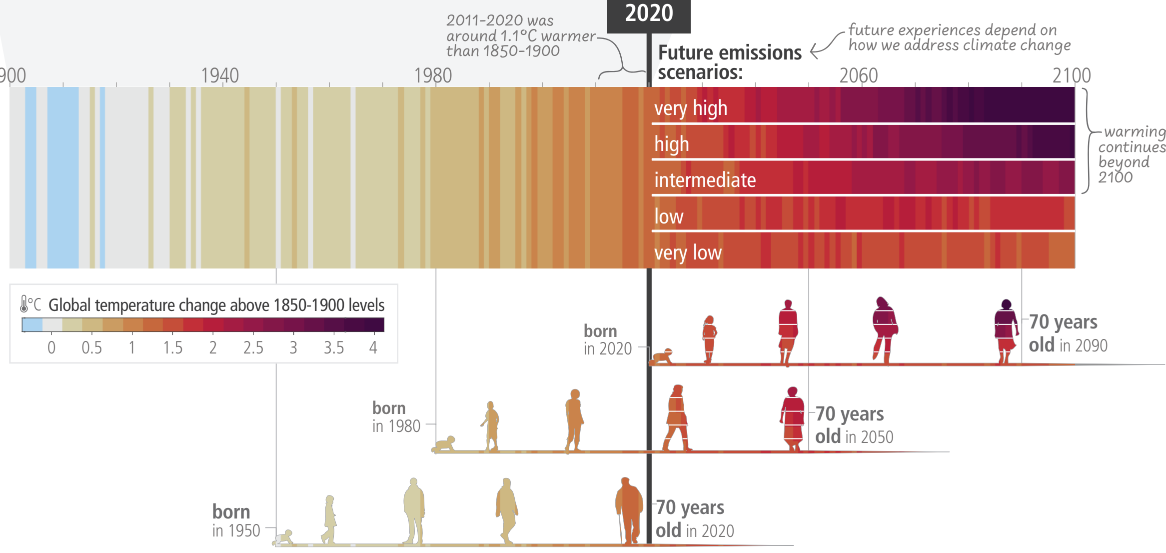


Figure SPM.1: (a) Climate change has already caused widespread impacts and related losses and damages on human systems and altered terrestrial, freshwater and ocean ecosystems worldwide. Physical water availability includes balance of water available from various sources including ground water, water quality and demand for water. Global mental health and displacement assessments reflect only assessed regions. Confidence levels reflect the assessment of attribution of the observed impact to climate change. **(b)** Observed impacts are connected to physical climate changes including many that have been attributed to human influence such as the selected climatic impact-drivers shown. Confidence and likelihood levels reflect the assessment of attribution of the observed climatic impact-driver to human influence. **(c)** Observed (1900–2020) and projected (2021–2100) changes in global surface temperature (relative to 1850-1900), which are linked to changes in climate conditions and impacts, illustrate how the climate has already changed and will change along the lifespan of three

representative generations (born in 1950, 1980 and 2020). Future projections (2021–2100) of changes in global surface temperature are shown for very low (SSP1-1.9), low (SSP1-2.6), intermediate (SSP2-4.5), high (SSP3-7.0) and very high (SSP5-8.5) GHG emissions scenarios. Changes in annual global surface temperatures are presented as 'climate stripes', with future projections showing the human-caused long-term trends and continuing modulation by natural variability (represented here using observed levels of past natural variability). Colours on the generational icons correspond to the global surface temperature stripes for each year, with segments on future icons differentiating possible future experiences. {*2.1*, *2.1.2*, *Figure 2.1*, *Table 2.1*, *Figure 2.3*, *Cross-Section Box.2*, *3.1*, *Figure 3.3*, *4.1*, *4.3*} (*Box SPM.1*)

Current Progress in Adaptation and Gaps and Challenges

A.3 Adaptation planning and implementation has progressed across all sectors and regions, with documented benefits and varying effectiveness. Despite progress, adaptation gaps exist, and will continue to grow at current rates of implementation. Hard and soft limits to adaptation have been reached in some ecosystems and regions. Maladaptation is happening in some sectors and regions. Current global financial flows for adaptation are insufficient for, and constrain implementation of, adaptation options, especially in developing countries (*high confidence*). {*2.2, 2.3*}

A.3.1 Progress in adaptation planning and implementation has been observed across all sectors and regions, generating multiple benefits (*very high confidence*). Growing public and political awareness of climate impacts and risks has resulted in at least 170 countries and many cities including adaptation in their climate policies and planning processes (*high confidence*). {*2.2.3*}

A.3.2 Effectiveness[15] of adaptation in reducing climate risks[16] is documented for specific contexts, sectors and regions (*high confidence*). Examples of effective adaptation options include: cultivar improvements, on-farm water management and storage, soil moisture conservation, irrigation, agroforestry, community-based adaptation, farm and landscape level diversification in agriculture, sustainable land management approaches, use of agroecological principles and practices and other approaches that work with natural processes (*high confidence*). Ecosystem-based adaptation[17] approaches such as urban greening, restoration of wetlands and upstream forest ecosystems have been effective in reducing flood risks and urban heat (*high confidence*). Combinations of non-structural measures like early warning systems and structural measures like levees have reduced loss of lives in case of inland flooding (*medium confidence*). Adaptation options such as disaster risk management, early warning systems, climate services and social safety nets have broad applicability across multiple sectors (*high confidence*). {*2.2.3*}

A.3.3 Most observed adaptation responses are fragmented, incremental[18], sector-specific and unequally distributed across regions. Despite progress, adaptation gaps exist across sectors and regions, and will continue to grow under current levels of implementation, with the largest adaptation gaps among lower income groups. (*high confidence*) {*2.3.2*}

A.3.4 There is increased evidence of maladaptation in various sectors and regions. Maladaptation especially affects marginalised and vulnerable groups adversely. (*high confidence*) {*2.3.2*}

A.3.5 Soft limits to adaptation are currently being experienced by small-scale farmers and households along some low-lying coastal areas (*medium confidence*) resulting from financial, governance, institutional and policy constraints (*high confidence*). Some tropical, coastal, polar and mountain ecosystems have reached hard adaptation limits (*high confidence*). Adaptation does not prevent all losses and damages, even with effective adaptation and before reaching soft and hard limits (*high confidence*). {*2.3.2*}

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[15] Effectiveness refers here to the extent to which an adaptation option is anticipated or observed to reduce climate-related risk. {*2.2.3*}

[16] See Annex I: Glossary. {*2.2.3*}

[17] Ecosystem-based Adaptation (EbA) is recognized internationally under the Convention on Biological Diversity (CBD14/5). A related concept is Nature-based Solutions (NbS), see Annex I: Glossary.

[18] Incremental adaptations to change in climate are understood as extensions of actions and behaviours that already reduce the losses or enhance the benefits of natural variations in extreme weather/climate events. {*2.3.2*}

A.3.6 Key barriers to adaptation are limited resources, lack of private sector and citizen engagement, insufficient mobilization of finance (including for research), low climate literacy, lack of political commitment, limited research and/or slow and low uptake of adaptation science, and low sense of urgency. There are widening disparities between the estimated costs of adaptation and the finance allocated to adaptation (*high confidence*). Adaptation finance has come predominantly from public sources, and a small proportion of global tracked climate finance was targeted to adaptation and an overwhelming majority to mitigation (*very high confidence*). Although global tracked climate finance has shown an upward trend since AR5, current global financial flows for adaptation, including from public and private finance sources, are insufficient and constrain implementation of adaptation options, especially in developing countries (*high confidence*). Adverse climate impacts can reduce the availability of financial resources by incurring losses and damages and through impeding national economic growth, thereby further increasing financial constraints for adaptation, particularly for developing and least developed countries (*medium confidence*). {*2.3.2*, *2.3.3*}

Box SPM.1 The use of scenarios and modelled pathways in the AR6 Synthesis Report

Modelled scenarios and pathways[19] are used to explore future emissions, climate change, related impacts and risks, and possible mitigation and adaptation strategies and are based on a range of assumptions, including socio-economic variables and mitigation options. These are quantitative projections and are neither predictions nor forecasts. Global modelled emission pathways, including those based on cost effective approaches contain regionally differentiated assumptions and outcomes, and have to be assessed with the careful recognition of these assumptions. Most do not make explicit assumptions about global equity, environmental justice or intra-regional income distribution. IPCC is neutral with regard to the assumptions underlying the scenarios in the literature assessed in this report, which do not cover all possible futures.[20] {*Cross-Section Box.2*}

WGI assessed the climate response to five illustrative scenarios based on Shared Socio-economic Pathways (SSPs)[21] that cover the range of possible future development of anthropogenic drivers of climate change found in the literature. High and very high GHG emissions scenarios (SSP3-7.0 and SSP5-8.5[22]) have CO_2 emissions that roughly double from current levels by 2100 and 2050, respectively. The intermediate GHG emissions scenario (SSP2-4.5) has CO_2 emissions remaining around current levels until the middle of the century. The very low and low GHG emissions scenarios (SSP1-1.9 and SSP1-2.6) have CO_2 emissions declining to net zero around 2050 and 2070, respectively, followed by varying levels of net negative CO_2 emissions. In addition, Representative Concentration Pathways (RCPs)[23] were used by WGI and WGII to assess regional climate changes, impacts and risks. In WGIII, a large number of global modelled emissions pathways were assessed, of which 1202 pathways were categorised based on their assessed global warming over the 21st century; categories range from pathways that limit warming to 1.5°C with more than 50% likelihood (noted >50% in this report) with no or limited overshoot (C1) to pathways that exceed 4°C (C8). {*Cross-Section Box.2*} (*Box SPM.1*, *Table 1*)

Global warming levels (GWLs) relative to 1850–1900 are used to integrate the assessment of climate change and related impacts and risks since patterns of changes for many variables at a given GWL are common to all scenarios considered and independent of timing when that level is reached. {*Cross-Section Box.2*}

[19] In the literature, the terms pathways and scenarios are used interchangeably, with the former more frequently used in relation to climate goals. WGI primarily used the term scenarios and WGIII mostly used the term modelled emission and mitigation pathways. The SYR primarily uses scenarios when referring to WGI and modelled emission and mitigation pathways when referring to WGIII.

[20] Around half of all modelled global emission pathways assume cost-effective approaches that rely on least-cost mitigation/abatement options globally. The other half looks at existing policies and regionally and sectorally differentiated actions.

[21] SSP-based scenarios are referred to as SSPx-y, where 'SSPx' refers to the Shared Socioeconomic Pathway describing the socioeconomic trends underlying the scenarios, and 'y' refers to the level of radiative forcing (in watts per square metre, or W m^{-2}) resulting from the scenario in the year 2100. {*Cross-Section Box.2*}

[22] Very high emissions scenarios have become *less likely* but cannot be ruled out. Warming levels >4°C may result from very high emissions scenarios, but can also occur from lower emission scenarios if climate sensitivity or carbon cycle feedbacks are higher than the best estimate. {*3.1.1*}

[23] RCP-based scenarios are referred to as RCPy, where 'y' refers to the level of radiative forcing (in watts per square metre, or W m^{-2}) resulting from the scenario in the year 2100. The SSP scenarios cover a broader range of greenhouse gas and air pollutant futures than the RCPs. They are similar but not identical, with differences in concentration trajectories. The overall effective radiative forcing tends to be higher for the SSPs compared to the RCPs with the same label (*medium confidence*). {*Cross-Section Box.2*}

Box SPM.1, Table 1: Description and relationship of scenarios and modelled pathways considered across AR6 Working Group reports. {*Cross-Section Box.2 Figure 1*}

Category in WGIII	Category description	GHG emissions scenarios (SSPx-y*) in WGI & WGII	RCPy** in WGI & WGII
C1	limit warming to 1.5°C (>50%) with no or limited overshoot***	Very low (SSP1-1.9)	
C2	return warming to 1.5°C (>50%) after a high overshoot***		
C3	limit warming to 2°C (>67%)	Low (SSP1-2.6)	RCP2.6
C4	limit warming to 2°C (>50%)		
C5	limit warming to 2.5°C (>50%)		
C6	limit warming to 3°C (>50%)	Intermediate (SSP2-4.5)	RCP 4.5
C7	limit warming to 4°C (>50%)	High (SSP3-7.0)	
C8	exceed warming of 4°C (>50%)	Very high (SSP5-8.5)	RCP 8.5

* See footnote 21 for the SSPx-y terminology.

** See footnote 23 for the RCPy terminology.

*** Limited overshoot refers to exceeding 1.5°C global warming by up to about 0.1°C, high overshoot by 0.1°C-0.3°C, in both cases for up to several decades.

Current Mitigation Progress, Gaps and Challenges

A.4 Policies and laws addressing mitigation have consistently expanded since AR5. Global GHG emissions in 2030 implied by nationally determined contributions (NDCs) announced by October 2021 make it *likely* that warming will exceed 1.5°C during the 21st century and make it harder to limit warming below 2°C. There are gaps between projected emissions from implemented policies and those from NDCs and finance flows fall short of the levels needed to meet climate goals across all sectors and regions. (*high confidence*) {*2.2, 2.3, Figure 2.5, Table 2.2*}

A.4.1 The UNFCCC, Kyoto Protocol, and the Paris Agreement are supporting rising levels of national ambition. The Paris Agreement, adopted under the UNFCCC, with near universal participation, has led to policy development and target-setting at national and sub-national levels, in particular in relation to mitigation, as well as enhanced transparency of climate action and support (*medium confidence*). Many regulatory and economic instruments have already been deployed successfully (*high confidence*). In many countries, policies have enhanced energy efficiency, reduced rates of deforestation and accelerated technology deployment, leading to avoided and in some cases reduced or removed emissions (*high confidence*). Multiple lines of evidence suggest that mitigation policies have led to several[24] Gt CO_2-eq yr^{-1} of avoided global emissions (*medium confidence*). At least 18 countries have sustained absolute production-based GHG and consumption-based CO_2 reductions[25] for longer than 10 years. These reductions have only partly offset global emissions growth (*high confidence*). {*2.2.1, 2.2.2*}

A.4.2 Several mitigation options, notably solar energy, wind energy, electrification of urban systems, urban green infrastructure, energy efficiency, demand-side management, improved forest and crop / grassland management, and reduced food waste and loss, are technically viable, are becoming increasingly cost effective and are generally supported by the

[24] At least 1.8 $GtCO_2$-eq yr^{-1} can be accounted for by aggregating separate estimates for the effects of economic and regulatory instruments. Growing numbers of laws and executive orders have impacted global emissions and were estimated to result in 5.9 $GtCO_2$-eq yr^{-1} less emissions in 2016 than they otherwise would have been. (*medium confidence*) {*2.2.2*}

[25] Reductions were linked to energy supply decarbonisation, energy efficiency gains, and energy demand reduction, which resulted from both policies and changes in economic structure (*high confidence*). {*2.2.2*}

public. From 2010 to 2019 there have been sustained decreases in the unit costs of solar energy (85%), wind energy (55%), and lithium-ion batteries (85%), and large increases in their deployment, e.g., >10× for solar and >100× for electric vehicles (EVs), varying widely across regions. The mix of policy instruments that reduced costs and stimulated adoption includes public R&D, funding for demonstration and pilot projects, and demand-pull instruments such as deployment subsidies to attain scale. Maintaining emission-intensive systems may, in some regions and sectors, be more expensive than transitioning to low emission systems. (*high confidence*) {*2.2.2, Figure 2.4*}

A.4.3 A substantial 'emissions gap' exists between global GHG emissions in 2030 associated with the implementation of NDCs announced prior to COP26[26] and those associated with modelled mitigation pathways that limit warming to 1.5°C (>50%) with no or limited overshoot or limit warming to 2°C (>67%) assuming immediate action (*high confidence*). This would make it *likely* that warming will exceed 1.5°C during the 21st century (*high confidence*). Global modelled mitigation pathways that limit warming to 1.5°C (>50%) with no or limited overshoot or limit warming to 2°C (>67%) assuming immediate action imply deep global GHG emissions reductions this decade (*high confidence*) (see SPM Box 1, Table 1, B.6)[27]. Modelled pathways that are consistent with NDCs announced prior to COP26 until 2030 and assume no increase in ambition thereafter have higher emissions, leading to a median global warming of 2.8 [2.1 to 3.4] °C by 2100 (*medium confidence*). Many countries have signalled an intention to achieve net zero GHG or net zero CO_2 by around mid-century but pledges differ across countries in terms of scope and specificity, and limited policies are to date in place to deliver on them. {*2.3.1*, *Table 2.2*, *Figure 2.5*, *Table 3.1*, *4.1*}

A.4.4 Policy coverage is uneven across sectors (*high confidence*). Policies implemented by the end of 2020 are projected to result in higher global GHG emissions in 2030 than emissions implied by NDCs, indicating an 'implementation gap' (*high confidence*). Without a strengthening of policies, global warming of 3.2 [2.2 to 3.5]°C is projected by 2100 (*medium confidence*). {*2.2.2*, *2.3.1*, *3.1.1*, *Figure 2.5*} (*Box SPM.1*, *Figure SPM.5*)

A.4.5 The adoption of low-emission technologies lags in most developing countries, particularly least developed ones, due in part to limited finance, technology development and transfer, and capacity (*medium confidence*). The magnitude of climate finance flows has increased over the last decade and financing channels have broadened but growth has slowed since 2018 (*high confidence*). Financial flows have developed heterogeneously across regions and sectors (*high confidence*). Public and private finance flows for fossil fuels are still greater than those for climate adaptation and mitigation (*high confidence*). The overwhelming majority of tracked climate finance is directed towards mitigation, but nevertheless falls short of the levels needed to limit warming to below 2°C or to 1.5°C across all sectors and regions (see C7.2) (*very high confidence*). In 2018, public and publicly mobilised private climate finance flows from developed to developing countries were below the collective goal under the UNFCCC and Paris Agreement to mobilise USD 100 billion per year by 2020 in the context of meaningful mitigation action and transparency on implementation (*medium confidence*). {*2.2.2*, *2.3.1*, *2.3.3*}

[26] Due to the literature cutoff date of WGIII, the additional NDCs submitted after 11 October 2021 are not assessed here. {*Footnote 32 in the Longer Report*}

[27] Projected 2030 GHG emissions are 50 (47–55) $GtCO_2$-eq if all conditional NDC elements are taken into account. Without conditional elements, the global emissions are projected to be approximately similar to modelled 2019 levels at 53 (50–57) $GtCO_2$-eq. {*2.3.1*, *Table 2.2*}

B. Future Climate Change, Risks, and Long-Term Responses

Future Climate Change

B.1 Continued greenhouse gas emissions will lead to increasing global warming, with the best estimate of reaching 1.5°C in the near term in considered scenarios and modelled pathways. Every increment of global warming will intensify multiple and concurrent hazards (*high confidence*). Deep, rapid, and sustained reductions in greenhouse gas emissions would lead to a discernible slowdown in global warming within around two decades, and also to discernible changes in atmospheric composition within a few years (*high confidence*). {*Cross-Section Boxes 1 and 2, 3.1, 3.3, Table 3.1, Figure 3.1, 4.3*} (*Figure SPM.2, Box SPM.1*)

B.1.1 Global warming[28] will continue to increase in the near term (2021–2040) mainly due to increased cumulative CO_2 emissions in nearly all considered scenarios and modelled pathways. In the near term, global warming *is more likely than not* to reach 1.5°C even under the very low GHG emission scenario (SSP1-1.9) and *likely* or *very likely* to exceed 1.5°C under higher emissions scenarios. In the considered scenarios and modelled pathways, the best estimates of the time when the level of global warming of 1.5°C is reached lie in the near term[29]. Global warming declines back to below 1.5°C by the end of the 21st century in some scenarios and modelled pathways (see B.7). The assessed climate response to GHG emissions scenarios results in a best estimate of warming for 2081–2100 that spans a range from 1.4°C for a very low GHG emissions scenario (SSP1-1.9) to 2.7°C for an intermediate GHG emissions scenario (SSP2-4.5) and 4.4°C for a very high GHG emissions scenario (SSP5-8.5)[30], with narrower uncertainty ranges[31] than for corresponding scenarios in AR5. {*Cross-Section Boxes 1 and 2*, *3.1.1*, *3.3.4*, *Table 3.1*, *4.3*} (*Box SPM.1*)

B.1.2 Discernible differences in trends of global surface temperature between contrasting GHG emissions scenarios (SSP1-1.9 and SSP1-2.6 vs. SSP3-7.0 and SSP5-8.5) would begin to emerge from natural variability[32] within around 20 years. Under these contrasting scenarios, discernible effects would emerge within years for GHG concentrations, and sooner for air quality improvements, due to the combined targeted air pollution controls and strong and sustained methane emissions reductions. Targeted reductions of air pollutant emissions lead to more rapid improvements in air quality within years compared to reductions in GHG emissions only, but in the long term, further improvements are projected in scenarios that combine efforts to reduce air pollutants as well as GHG emissions[33]. (*high confidence*) {*3.1.1*} (*Box SPM.1*)

B.1.3 Continued emissions will further affect all major climate system components. With every additional increment of global warming, changes in extremes continue to become larger. Continued global warming is projected to further intensify the global water cycle, including its variability, global monsoon precipitation, and very wet and very dry weather and

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[28] Global warming (see Annex I: Glossary) is here reported as running 20-year averages, unless stated otherwise, relative to 1850–1900. Global surface temperature in any single year can vary above or below the long-term human-caused trend, due to natural variability. The internal variability of global surface temperature in a single year is estimated to be about ±0.25°C (5–95% range, *high confidence*). The occurrence of individual years with global surface temperature change above a certain level does not imply that this global warming level has been reached. {*4.3, Cross-Section Box.2*}

[29] Median five-year interval at which a 1.5°C global warming level is reached (50% probability) in categories of modelled pathways considered in WGIII is 2030–2035. By 2030, global surface temperature in any individual year could exceed 1.5°C relative to 1850–1900 with a probability between 40% and 60%, across the five scenarios assessed in WGI (*medium confidence*). In all scenarios considered in WGI except the very high emissions scenario (SSP5-8.5), the midpoint of the first 20-year running average period during which the assessed average global surface temperature change reaches 1.5°C lies in the first half of the 2030s. In the very high GHG emissions scenario, the midpoint is in the late 2020s. {*3.1.1*, *3.3.1*, *4.3*} (*Box SPM.1*)

[30] The best estimates [and *very likely* ranges] for the different scenarios are: 1.4 [1.0 to 1.8]°C (SSP1-1.9); 1.8 [1.3 to 2.4]°C (SSP1-2.6); 2.7 [2.1 to 3.5]°C (SSP2-4.5); 3.6 [2.8 to 4.6]°C (SSP3-7.0); and 4.4 [3.3 to 5.7]°C (SSP5-8.5). {*3.1.1*} (*Box SPM.1*)

[31] Assessed future changes in global surface temperature have been constructed, for the first time, by combining multi-model projections with observational constraints and the assessed equilibrium climate sensitivity and transient climate response. The uncertainty range is narrower than in the AR5 thanks to improved knowledge of climate processes, paleoclimate evidence and model-based emergent constraints. {*3.1.1*}

[32] See Annex I: Glossary. Natural variability includes natural drivers and internal variability. The main internal variability phenomena include El Niño-Southern Oscillation, Pacific Decadal Variability and Atlantic Multi-decadal Variability. {*4.3*}

[33] Based on additional scenarios.

climate events and seasons (*high confidence*). In scenarios with increasing CO_2 emissions, natural land and ocean carbon sinks are projected to take up a decreasing proportion of these emissions (*high confidence*). Other projected changes include further reduced extents and/or volumes of almost all cryospheric elements[34] (*high confidence)*, further global mean sea level rise (*virtually certain)*, and increased ocean acidification (*virtually certain)* and deoxygenation (*high confidence*). {*3.1.1, 3.3.1, Figure 3.4*} (*Figure SPM.2*)

B.1.4 With further warming, every region is projected to increasingly experience concurrent and multiple changes in climatic impact-drivers. Compound heatwaves and droughts are projected to become more frequent, including concurrent events across multiple locations (*high confidence*). Due to relative sea level rise, current 1-in-100 year extreme sea level events are projected to occur at least annually in more than half of all tide gauge locations by 2100 under all considered scenarios (*high confidence*). Other projected regional changes include intensification of tropical cyclones and/or extratropical storms (*medium confidence*), and increases in aridity and fire weather (*medium* to *high confidence*). {*3.1.1, 3.1.3*}

B.1.5 Natural variability will continue to modulate human-caused climate changes, either attenuating or amplifying projected changes, with little effect on centennial-scale global warming (*high confidence*). These modulations are important to consider in adaptation planning, especially at the regional scale and in the near term. If a large explosive volcanic eruption were to occur[35], it would temporarily and partially mask human-caused climate change by reducing global surface temperature and precipitation for one to three years (*medium confidence*). {*4.3*}

[34] Permafrost, seasonal snow cover, glaciers, the Greenland and Antarctic Ice Sheets, and Arctic sea ice.

[35] Based on 2500-year reconstructions, eruptions with a radiative forcing more negative than –1 W m^{-2}, related to the radiative effect of volcanic stratospheric aerosols in the literature assessed in this report, occur on average twice per century. {*4.3*}

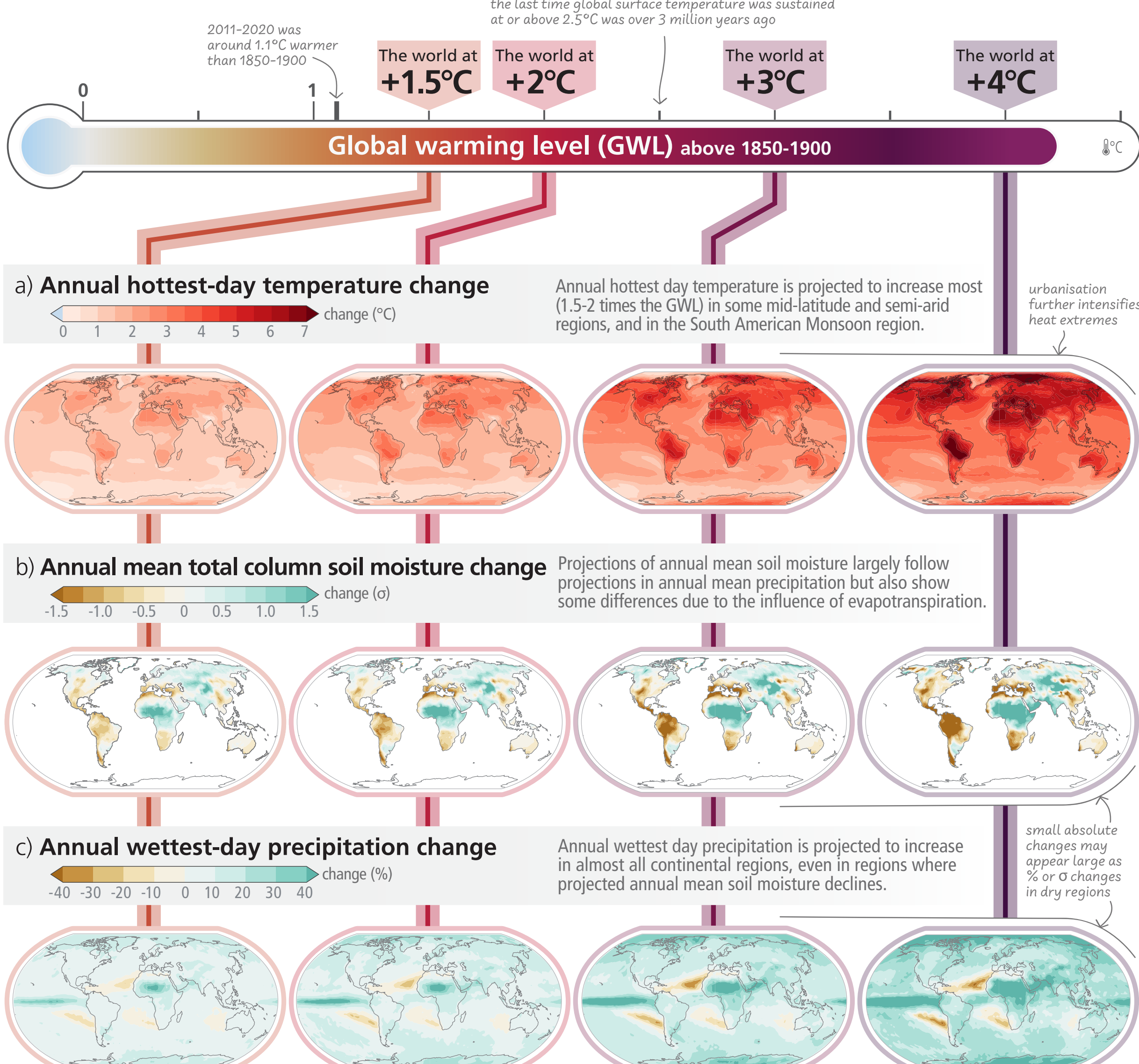


Figure SPM.2: Projected changes of annual maximum daily maximum temperature, annual mean total column soil moisture and annual maximum 1-day precipitation at global warming levels of 1.5°C, 2°C, 3°C, and 4°C relative to 1850–1900. Projected **(a)** annual maximum daily temperature change (°C), **(b)** annual mean total column soil moisture change (standard deviation), **(c)** annual maximum 1-day precipitation change (%). The panels show CMIP6 multi-model median changes. In panels (b) and (c), large positive relative changes in dry regions may correspond to small absolute changes. In panel (b), the unit is the standard deviation of interannual variability in soil moisture during 1850–1900. Standard deviation is a widely used metric in characterising drought severity. A projected reduction in mean soil moisture by one standard deviation corresponds to soil moisture conditions typical of droughts that occurred about once every six years during 1850–1900. The WGI Interactive Atlas (https://interactive-atlas.ipcc.ch/) can be used to explore additional changes in the climate system across the range of global warming levels presented in this figure. {*Figure 3.1, Cross-Section Box.2*}

Climate Change Impacts and Climate-Related Risks

B.2 For any given future warming level, many climate-related risks are higher than assessed in AR5, and projected long-term impacts are up to multiple times higher than currently observed (*high confidence*). Risks and projected adverse impacts and related losses and damages from climate change escalate with every increment of global warming (*very high confidence*). Climatic and non-climatic risks will increasingly interact, creating compound and cascading risks that are more complex and difficult to manage (*high confidence*). {*Cross-Section Box.2, 3.1, 4.3, Figure 3.3, Figure 4.3*} (*Figure SPM.3, Figure SPM.4*)

B.2.1 In the near term, every region in the world is projected to face further increases in climate hazards (*medium* to *high confidence*, depending on region and hazard), increasing multiple risks to ecosystems and humans (*very high confidence*). Hazards and associated risks expected in the near term include an increase in heat-related human mortality and morbidity (*high confidence*), food-borne, water-borne, and vector-borne diseases (*high confidence*), and mental health challenges[36] (*very high confidence*), flooding in coastal and other low-lying cities and regions (*high confidence*), biodiversity loss in land, freshwater and ocean ecosystems (*medium* to *very high confidence*, depending on ecosystem), and a decrease in food production in some regions (*high confidence*). Cryosphere-related changes in floods, landslides, and water availability have the potential to lead to severe consequences for people, infrastructure and the economy in most mountain regions (*high confidence*). The projected increase in frequency and intensity of heavy precipitation (*high confidence*) will increase rain-generated local flooding (*medium confidence*). {*Figure 3.2*, *Figure 3.3*, *4.3*, *Figure 4.3*} (*Figure SPM.3*, *Figure SPM.4*)

B.2.2 Risks and projected adverse impacts and related losses and damages from climate change will escalate with every increment of global warming (*very high confidence*). They are higher for global warming of 1.5°C than at present, and even higher at 2°C (*high confidence*). Compared to the AR5, global aggregated risk levels[37] (Reasons for Concern[38]) are assessed to become high to very high at lower levels of global warming due to recent evidence of observed impacts, improved process understanding, and new knowledge on exposure and vulnerability of human and natural systems, including limits to adaptation (*high confidence*). Due to unavoidable sea level rise (see also B.3), risks for coastal ecosystems, people and infrastructure will continue to increase beyond 2100 (*high confidence*). {*3.1.2*, *3.1.3*, *Figure 3.4*, *Figure 4.3*} (*Figure SPM.3*, *Figure SPM.4*)

B.2.3 With further warming, climate change risks will become increasingly complex and more difficult to manage. Multiple climatic and non-climatic risk drivers will interact, resulting in compounding overall risk and risks cascading across sectors and regions. Climate-driven food insecurity and supply instability, for example, are projected to increase with increasing global warming, interacting with non-climatic risk drivers such as competition for land between urban expansion and food production, pandemics and conflict. (*high confidence*) {*3.1.2*, *4.3*, *Figure 4.3*}

B.2.4 For any given warming level, the level of risk will also depend on trends in vulnerability and exposure of humans and ecosystems. Future exposure to climatic hazards is increasing globally due to socio-economic development trends including migration, growing inequality and urbanisation. Human vulnerability will concentrate in informal settlements and rapidly growing smaller settlements. In rural areas vulnerability will be heightened by high reliance on climate-sensitive livelihoods. Vulnerability of ecosystems will be strongly influenced by past, present, and future patterns of unsustainable consumption and production, increasing demographic pressures, and persistent unsustainable use and management of land, ocean, and water. Loss of ecosystems and their services has cascading and long-term impacts on people globally, especially for Indigenous Peoples and local communities who are directly dependent on ecosystems to meet basic needs. (*high confidence*) {*Cross-Section Box.2 Figure 1c*, *3.1.2*, *4.3*}

[36] In all assessed regions.

[37] Undetectable risk level indicates no associated impacts are detectable and attributable to climate change; moderate risk indicates associated impacts are both detectable and attributable to climate change with at least *medium confidence*, also accounting for the other specific criteria for key risks; high risk indicates severe and widespread impacts that are judged to be high on one or more criteria for assessing key risks; and very high risk level indicates very high risk of severe impacts and the presence of significant irreversibility or the persistence of climate-related hazards, combined with limited ability to adapt due to the nature of the hazard or impacts/risks. {*3.1.2*}

[38] The Reasons for Concern (RFC) framework communicates scientific understanding about accrual of risk for five broad categories. RFC1: Unique and threatened systems: ecological and human systems that have restricted geographic ranges constrained by climate-related conditions and have high endemism or other distinctive properties. RFC2: Extreme weather events: risks/impacts to human health, livelihoods, assets and ecosystems from extreme weather events. RFC3: Distribution of impacts: risks/impacts that disproportionately affect particular groups due to uneven distribution of physical climate change hazards, exposure or vulnerability. RFC4: Global aggregate impacts: impacts to socio-ecological systems that can be aggregated globally into a single metric. RFC5: Large-scale singular events: relatively large, abrupt and sometimes irreversible changes in systems caused by global warming. See also Annex I: Glossary. {*3.1.2*, *Cross-Section Box.2*}

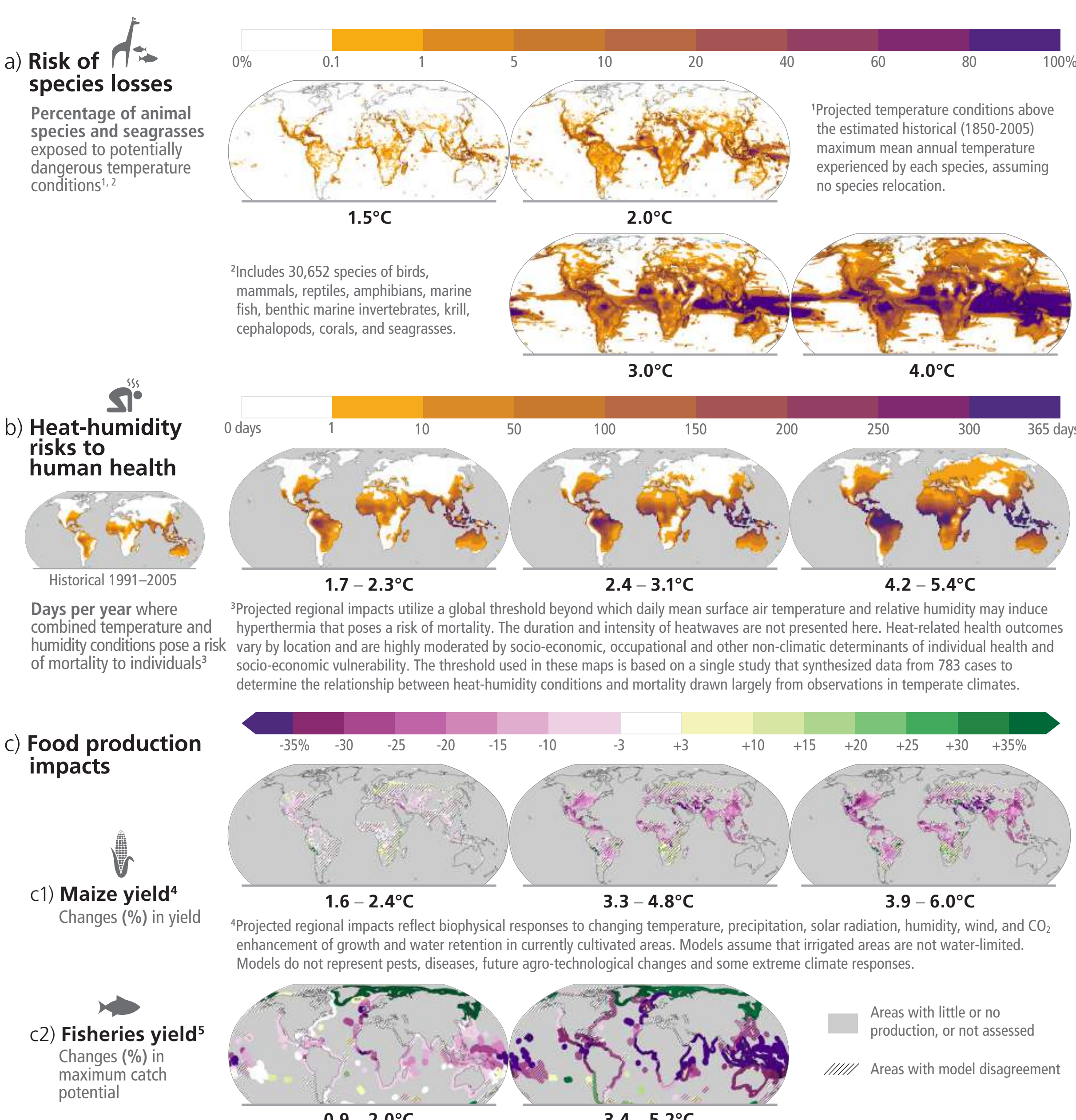
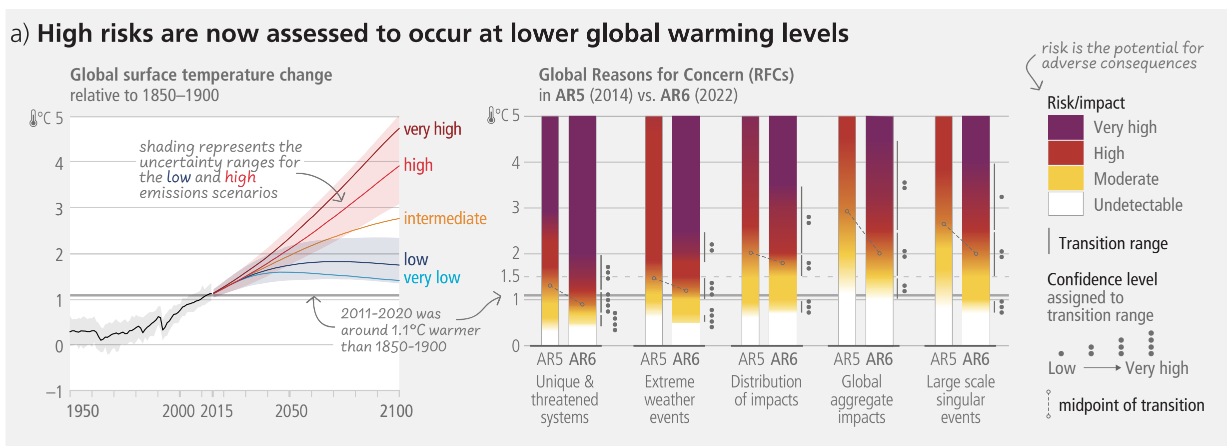
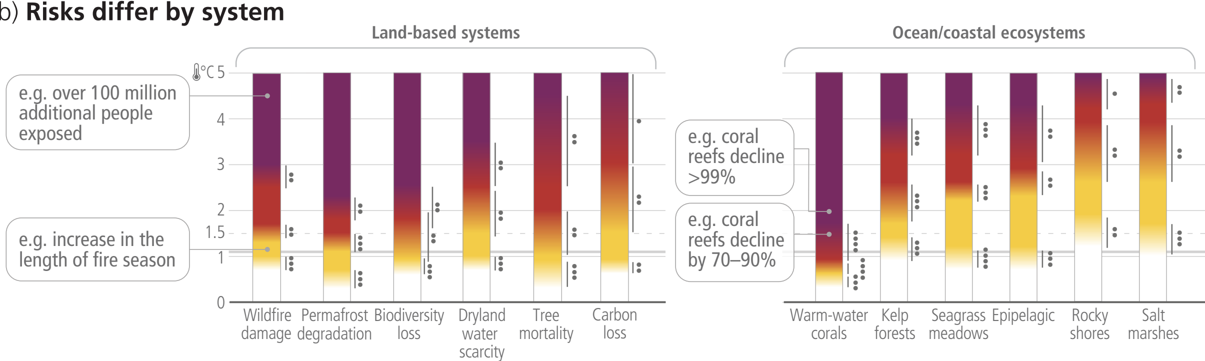


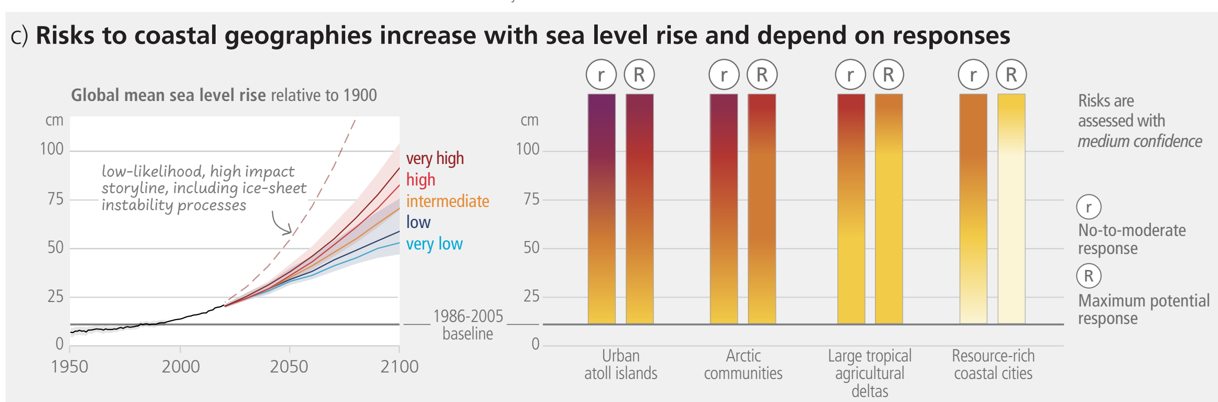
Figure SPM.3: Projected risks and impacts of climate change on natural and human systems at different global warming levels (GWLs) relative to 1850–1900 levels. Projected risks and impacts shown on the maps are based on outputs from different subsets of Earth system and impact models that were used to project each impact indicator without additional adaptation. WGII provides further assessment of the impacts on human and natural systems using these projections and additional lines of evidence. **(a)** Risks of species losses as indicated by the percentage of assessed species exposed to potentially dangerous temperature conditions, as defined by conditions beyond the estimated historical (1850–2005) maximum mean annual temperature experienced by each species, at GWLs of 1.5°C, 2°C, 3°C and 4°C. Underpinning projections of temperature are from 21 Earth system models and do not consider extreme events impacting ecosystems such as the Arctic. **(b)** Risks to human health as indicated by the days per year of population exposure to hyperthermic conditions that pose a risk of mortality from surface air temperature and humidity conditions for historical period (1991–2005) and at GWLs of 1.7°C–2.3°C (mean = 1.9°C; 13 climate models), 2.4°C–3.1°C (2.7°C; 16 climate models) and 4.2°C–5.4°C (4.7°C; 15 climate models). Interquartile ranges of GWLs by 2081–2100 under RCP2.6, RCP4.5 and RCP8.5. The presented index is consistent with common features found in many indices included within WGI and WGII assessments. **(c)** Impacts on food production: (c1) Changes in maize yield by 2080–2099 relative to 1986–2005 at projected GWLs of 1.6°C–2.4°C (2.0°C), 3.3°C–4.8°C (4.1°C) and 3.9°C–6.0°C (4.9°C). Median yield changes from an ensemble of 12 crop models, each driven by bias-adjusted outputs from 5 Earth system models, from the Agricultural Model Intercomparison and Improvement Project (AgMIP) and the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). Maps depict

2080–2099 compared to 1986–2005 for current growing regions (>10 ha), with the corresponding range of future global warming levels shown under SSP1-2.6, SSP3-7.0 and SSP5-8.5, respectively. Hatching indicates areas where <70% of the climate-crop model combinations agree on the sign of impact. (c2) Change in maximum fisheries catch potential by 2081–2099 relative to 1986–2005 at projected GWLs of 0.9°C–2.0°C (1.5°C) and 3.4°C–5.2°C (4.3°C). GWLs by 2081–2100 under RCP2.6 and RCP8.5. Hatching indicates where the two climate-fisheries models disagree in the direction of change. Large relative changes in low yielding regions may correspond to small absolute changes. Biodiversity and fisheries in Antarctica were not analysed due to data limitations. Food security is also affected by crop and fishery failures not presented here. {*3.1.2, Figure 3.2, Cross-Section Box.2*} (*Box SPM.1*)

Risks are increasing with every increment of warming







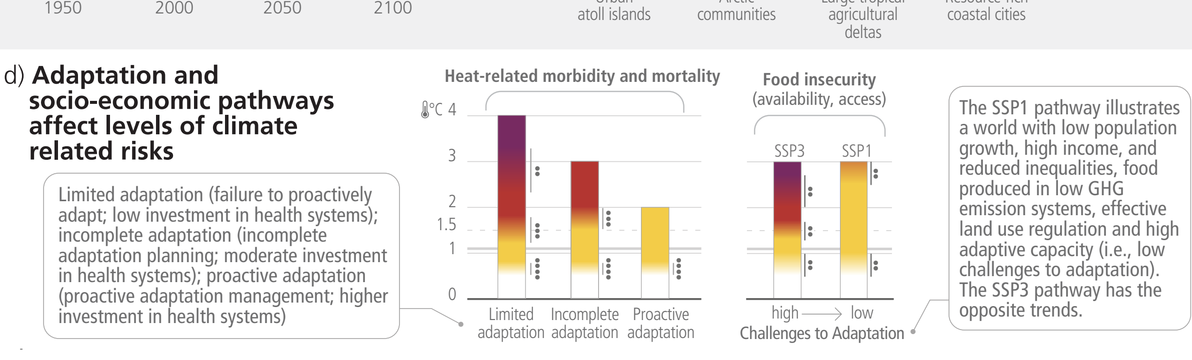


Figure SPM.4: Subset of assessed climate outcomes and associated global and regional climate risks. The burning embers result from a literature based expert elicitation. **Panel (a): Left** – Global surface temperature changes in °C relative to 1850–1900. These changes were obtained by combining CMIP6 model simulations with observational constraints based on past simulated warming, as well as an updated assessment of equilibrium climate sensitivity. *Very likely* ranges are shown for the low and high GHG emissions scenarios (SSP1-2.6 and SSP3-7.0) (Cross-Section Box.2). **Right** – Global Reasons for Concern (RFC), comparing AR6 (thick embers) and AR5 (thin embers) assessments. Risk transitions have generally shifted towards lower temperatures with updated scientific understanding. Diagrams are shown for each RFC, assuming low to no adaptation. Lines connect the midpoints of the transitions from moderate to high risk across AR5 and AR6. **Panel (b)**: Selected global risks for land and ocean ecosystems, illustrating general increase of risk with global warming levels with low to no adaptation. **Panel (c): Left** - Global mean sea level change in centimetres, relative to 1900. The historical changes (black) are observed by tide gauges before 1992 and altimeters afterwards. The future changes to 2100 (coloured lines and shading) are assessed consistently with observational constraints based on emulation of CMIP, ice-sheet, and glacier models, and *likely* ranges are shown for SSP1-2.6 and SSP3-7.0. **Right** - Assessment of the combined risk of coastal flooding, erosion and salinization for four illustrative coastal geographies in 2100, due to changing mean and extreme sea levels, under two response scenarios, with respect to the SROCC baseline period (1986–2005). The assessment does not account for changes in extreme sea level beyond those directly induced by mean sea level rise; risk levels could increase if other changes in extreme sea levels were considered (e.g., due to changes in cyclone intensity). "No-to-moderate response" describes efforts as of today (i.e., no further significant action or new types of actions). "Maximum potential response" represent a combination of responses implemented to their full extent and thus significant additional efforts compared to today, assuming minimal financial, social and political barriers. (In this context, 'today' refers to 2019.) The assessment criteria include exposure and vulnerability, coastal hazards, in-situ responses and planned relocation. Planned relocation refers to managed retreat or resettlements. The term response is used here instead of adaptation because some responses, such as retreat, may or may not be considered to be adaptation. **Panel (d)**: Selected risks under different socio-economic pathways, illustrating how development strategies and challenges to adaptation influence risk. **Left** - Heat-sensitive human health outcomes under three scenarios of adaptation effectiveness. The diagrams are truncated at the nearest whole °C within the range of temperature change in 2100 under three SSP scenarios. **Right** - Risks associated with food security due to climate change and patterns of socio-economic development. Risks to food security include availability and access to food, including population at risk of hunger, food price increases and increases in disability adjusted life years attributable to childhood underweight. Risks are assessed for two contrasted socio-economic pathways (SSP1 and SSP3) excluding the effects of targeted mitigation and adaptation policies. {*Figure 3.3*} (*Box SPM.1*)

Likelihood and Risks of Unavoidable, Irreversible or Abrupt Changes

B.3 Some future changes are unavoidable and/or irreversible but can be limited by deep, rapid, and sustained global greenhouse gas emissions reductions. The likelihood of abrupt and/or irreversible changes increases with higher global warming levels. Similarly, the probability of low-likelihood outcomes associated with potentially very large adverse impacts increases with higher global warming levels. (*high confidence*) {*3.1*}

B.3.1 Limiting global surface temperature does not prevent continued changes in climate system components that have multi-decadal or longer timescales of response (*high confidence*). Sea level rise is unavoidable for centuries to millennia due to continuing deep ocean warming and ice sheet melt, and sea levels will remain elevated for thousands of years (*high confidence*). However, deep, rapid, and sustained GHG emissions reductions would limit further sea level rise acceleration and projected long-term sea level rise commitment. Relative to 1995–2014, the *likely* global mean sea level rise under the SSP1-1.9 GHG emissions scenario is 0.15–0.23 m by 2050 and 0.28–0.55 m by 2100; while for the SSP5-8.5 GHG emissions scenario it is 0.20–0.29 m by 2050 and 0.63–1.01 m by 2100 (*medium confidence)*. Over the next 2000 years, global mean sea level will rise by about 2–3 m if warming is limited to 1.5°C and 2–6 m if limited to 2°C (*low confidence*). {*3.1.3, Figure 3.4*} (*Box SPM.1*)

B.3.2 The likelihood and impacts of abrupt and/or irreversible changes in the climate system, including changes triggered when tipping points are reached, increase with further global warming (*high confidence*). As warming levels increase, so do the risks of species extinction or irreversible loss of biodiversity in ecosystems including forests (*medium confidence)*, coral reefs (*very high confidence*) and in Arctic regions (*high confidence*). At sustained warming levels between 2°C and 3°C, the Greenland and West Antarctic ice sheets will be lost almost completely and irreversibly over multiple millennia, causing several metres of sea level rise (*limited evidence*). The probability and rate of ice mass loss increase with higher global surface temperatures (*high confidence*). {*3.1.2, 3.1.3*}

B.3.3 The probability of low-likelihood outcomes associated with potentially very large impacts increases with higher global warming levels (*high confidence*). Due to deep uncertainty linked to ice-sheet processes, global mean sea level rise above the *likely* range – approaching 2 m by 2100 and in excess of 15 m by 2300 under the very high GHG emissions scenario (SSP5-8.5) (*low confidence*) – cannot be excluded. There is *medium confidence* that the Atlantic Meridional Overturning Circulation will not collapse abruptly before 2100, but if it were to occur, it would *very likely* cause abrupt shifts in regional weather patterns, and large impacts on ecosystems and human activities. {*3.1.3*} (*Box SPM.1*)

Adaptation Options and their Limits in a Warmer World

B.4 Adaptation options that are feasible and effective today will become constrained and less effective with increasing global warming. With increasing global warming, losses and damages will increase and additional human and natural systems will reach adaptation limits. Maladaptation can be avoided by flexible, multi-sectoral, inclusive, long-term planning and implementation of adaptation actions, with co-benefits to many sectors and systems. (*high confidence*) {*3.2, 4.1, 4.2, 4.3*}

B.4.1 The effectiveness of adaptation, including ecosystem-based and most water-related options, will decrease with increasing warming. The feasibility and effectiveness of options increase with integrated, multi-sectoral solutions that differentiate responses based on climate risk, cut across systems and address social inequities. As adaptation options often have long implementation times, long-term planning increases their efficiency. (*high confidence*) {*3.2*, *Figure 3.4*, *4.1*, *4.2*}

B.4.2 With additional global warming, limits to adaptation and losses and damages, strongly concentrated among vulnerable populations, will become increasingly difficult to avoid (*high confidence*). Above 1.5°C of global warming, limited freshwater resources pose potential hard adaptation limits for small islands and for regions dependent on glacier and snow melt (*medium confidence*). Above that level, ecosystems such as some warm-water coral reefs, coastal wetlands, rainforests, and polar and mountain ecosystems will have reached or surpassed hard adaptation limits and as a consequence, some Ecosystem-based Adaptation measures will also lose their effectiveness (*high confidence*). {*2.3.2*, *3.2*, *4.3*}

B.4.3 Actions that focus on sectors and risks in isolation and on short-term gains often lead to maladaptation over the long term, creating lock-ins of vulnerability, exposure and risks that are difficult to change. For example, seawalls effectively reduce impacts to people and assets in the short term but can also result in lock-ins and increase exposure to climate risks in the long term unless they are integrated into a long-term adaptive plan. Maladaptive responses can worsen existing inequities especially for Indigenous Peoples and marginalised groups and decrease ecosystem and biodiversity resilience. Maladaptation can be avoided by flexible, multi-sectoral, inclusive, long-term planning and implementation of adaptation actions, with co-benefits to many sectors and systems. (*high confidence*) {*2.3.2*, *3.2*}

Carbon Budgets and Net Zero Emissions

B.5 Limiting human-caused global warming requires net zero CO_2 emissions. Cumulative carbon emissions until the time of reaching net zero CO_2 emissions and the level of greenhouse gas emission reductions this decade largely determine whether warming can be limited to 1.5°C or 2°C (*high confidence*). Projected CO_2 emissions from existing fossil fuel infrastructure without additional abatement would exceed the remaining carbon budget for 1.5°C (50%) (*high confidence*). {*2.3, 3.1, 3.3, Table 3.1*}

B.5.1 From a physical science perspective, limiting human-caused global warming to a specific level requires limiting cumulative CO_2 emissions, reaching at least net zero CO_2 emissions, along with strong reductions in other greenhouse gas emissions. Reaching net zero GHG emissions primarily requires deep reductions in CO_2, methane, and other GHG emissions, and implies net negative CO_2 emissions[39]. Carbon dioxide removal (CDR) will be necessary to achieve net negative CO_2 emissions (see B.6). Net zero GHG emissions, if sustained, are projected to result in a gradual decline in global surface temperatures after an earlier peak. (*high confidence*) {*3.1.1*, *3.3.1*, *3.3.2*, *3.3.3*, *Table 3.1*, *Cross-Section Box.1*}

B.5.2 For every 1000 $GtCO_2$ emitted by human activity, global surface temperature rises by 0.45°C (best estimate, with a *likely* range from 0.27°C to 0.63°C). The best estimates of the remaining carbon budgets from the beginning of 2020 are 500 $GtCO_2$ for a 50% likelihood of limiting global warming to 1.5°C and 1150 $GtCO_2$ for a 67% likelihood of limiting warming to 2°C[40]. The stronger the reductions in non-CO_2 emissions, the lower the resulting temperatures are for a given remaining carbon budget or the larger remaining carbon budget for the same level of temperature change[41]. {*3.3.1*}

[39] Net zero GHG emissions defined by the 100-year global warming potential. See footnote 9.

[40] Global databases make different choices about which emissions and removals occurring on land are considered anthropogenic. Most countries report their anthropogenic land CO_2 fluxes including fluxes due to human-caused environmental change (e.g., CO_2 fertilisation) on 'managed' land in their national GHG inventories. Using emissions estimates based on these inventories, the remaining carbon budgets must be correspondingly reduced. {*3.3.1*}

[41] For example, remaining carbon budgets could be 300 or 600 $GtCO_2$ for 1.5°C (50%), respectively for high and low non-CO_2 emissions, compared to 500 $GtCO_2$ in the central case. {*3.3.1*}

B.5.3 If the annual CO_2 emissions between 2020–2030 stayed, on average, at the same level as 2019, the resulting cumulative emissions would almost exhaust the remaining carbon budget for 1.5°C (50%), and deplete more than a third of the remaining carbon budget for 2°C (67%). Estimates of future CO_2 emissions from existing fossil fuel infrastructures without additional abatement[42] already exceed the remaining carbon budget for limiting warming to 1.5°C (50%) (*high confidence*). Projected cumulative future CO_2 emissions over the lifetime of existing and planned fossil fuel infrastructure, if historical operating patterns are maintained and without additional abatement[43], are approximately equal to the remaining carbon budget for limiting warming to 2°C with a likelihood of 83%[44] (*high confidence*). {*2.3.1*, *3.3.1*, *Figure 3.5*}

B.5.4 Based on central estimates only, historical cumulative net CO_2 emissions between 1850 and 2019 amount to about four fifths[45] of the total carbon budget for a 50% probability of limiting global warming to 1.5°C (central estimate about 2900 $GtCO_2$), and to about two thirds[46] of the total carbon budget for a 67% probability to limit global warming to 2°C (central estimate about 3550 $GtCO_2$). {*3.3.1*, *Figure 3.5*}

Mitigation Pathways

B.6 All global modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot, and those that limit warming to 2°C (>67%), involve rapid and deep and, in most cases, immediate greenhouse gas emissions reductions in all sectors this decade. Global net zero CO_2 emissions are reached for these pathway categories, in the early 2050s and around the early 2070s, respectively. (*high confidence*) {*3.3, 3.4, 4.1, 4.5, Table 3.1*} (*Figure SPM.5, Box SPM.1*)

B.6.1 Global modelled pathways provide information on limiting warming to different levels; these pathways, particularly their sectoral and regional aspects, depend on the assumptions described in Box SPM.1. Global modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot or limit warming to 2°C (>67%) are characterized by deep, rapid, and, in most cases, immediate GHG emissions reductions. Pathways that limit warming to 1.5°C (>50%) with no or limited overshoot reach net zero CO_2 in the early 2050s, followed by net negative CO_2 emissions. Those pathways that reach net zero GHG emissions do so around the 2070s. Pathways that limit warming to 2°C (>67%) reach net zero CO_2 emissions in the early 2070s. Global GHG emissions are projected to peak between 2020 and at the latest before 2025 in global modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot and in those that limit warming to 2°C (>67%) and assume immediate action. (*high confidence*) {*3.3.2*, *3.3.4*, *4.1*, *Table 3.1*, *Figure 3.6*} (*Table SPM.1*)

[42] Abatement here refers to human interventions that reduce the amount of greenhouse gases that are released from fossil fuel infrastructure to the atmosphere.

[43] Ibid.

[44] WGI provides carbon budgets that are in line with limiting global warming to temperature limits with different likelihoods, such as 50%, 67% or 83%. {*3.3.1*}

[45] Uncertainties for total carbon budgets have not been assessed and could affect the specific calculated fractions.

[46] Ibid.

Table SPM.1: Greenhouse gas and CO_2 emission reductions from 2019, median and 5-95 percentiles. {*3.3.1*, *4.1*, *Table 3.1*, *Figure 2.5*, *Box SPM.1*}

		Reductions from 2019 emission levels (%)			
		2030	2035	2040	2050
Limit warming to1.5°C (>50%) with no or limited overshoot	GHG	43 [34-60]	60 [49-77]	69 [58-90]	84 [73-98]
	CO_2	48 [36-69]	65 [50-96]	80 [61-109]	99 [79-119]
Limit warming to 2°C (>67%)	GHG	21 [1-42]	35 [22-55]	46 [34-63]	64 [53-77]
	CO_2	22 [1-44]	37 [21-59]	51 [36-70]	73 [55-90]

B.6.2 Reaching net zero CO_2 or GHG emissions primarily requires deep and rapid reductions in gross emissions of CO_2, as well as substantial reductions of non-CO_2 GHG emissions (*high confidence*). For example, in modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot, global methane emissions are reduced by 34 [21–57]% by 2030 relative to 2019. However, some hard-to-abate residual GHG emissions (e.g., some emissions from agriculture, aviation, shipping, and industrial processes) remain and would need to be counterbalanced by deployment of CDR methods to achieve net zero CO_2 or GHG emissions *(high confidence)*. As a result, net zero CO_2 is reached earlier than net zero GHGs (*high confidence*). {*3.3.2*, *3.3.3*, *Table 3.1*, *Figure 3.5*} (*Figure SPM.5*)

B.6.3 Global modelled mitigation pathways reaching net zero CO_2 and GHG emissions include transitioning from fossil fuels without carbon capture and storage (CCS) to very low- or zero-carbon energy sources, such as renewables or fossil fuels with CCS, demand-side measures and improving efficiency, reducing non-CO_2 GHG emissions, and CDR[47]. In most global modelled pathways, land-use change and forestry (via reforestation and reduced deforestation) and the energy supply sector reach net zero CO_2 emissions earlier than the buildings, industry and transport sectors. (*high confidence*) {*3.3.3, 4.1, 4.5, Figure 4.1*} (*Figure SPM.5, Box SPM.1*)

B.6.4 Mitigation options often have synergies with other aspects of sustainable development, but some options can also have trade-offs. There are potential synergies between sustainable development and, for instance, energy efficiency and renewable energy. Similarly, depending on the context[48], biological CDR methods like reforestation, improved forest management, soil carbon sequestration, peatland restoration and coastal blue carbon management can enhance biodiversity and ecosystem functions, employment and local livelihoods. However, afforestation or production of biomass crops can have adverse socio-economic and environmental impacts, including on biodiversity, food and water security, local livelihoods and the rights of Indigenous Peoples, especially if implemented at large scales and where land tenure is insecure. Modelled pathways that assume using resources more efficiently or that shift global development towards sustainability include fewer challenges, such as less dependence on CDR and pressure on land and biodiversity. (*high confidence*) {*3.4.1*}

[47] CCS is an option to reduce emissions from large-scale fossil-based energy and industry sources provided geological storage is available. When CO_2 is captured directly from the atmosphere (DACCS), or from biomass (BECCS), CCS provides the storage component of these CDR methods. CO_2 capture and subsurface injection is a mature technology for gas processing and enhanced oil recovery. In contrast to the oil and gas sector, CCS is less mature in the power sector, as well as in cement and chemicals production, where it is a critical mitigation option. The technical geological storage capacity is estimated to be on the order of 1000 $GtCO_2$, which is more than the CO_2 storage requirements through 2100 to limit global warming to 1.5°C, although the regional availability of geological storage could be a limiting factor. If the geological storage site is appropriately selected and managed, it is estimated that the CO_2 can be permanently isolated from the atmosphere. Implementation of CCS currently faces technological, economic, institutional, ecological-environmental and socio-cultural barriers. Currently, global rates of CCS deployment are far below those in modelled pathways limiting global warming to 1.5°C to 2°C. Enabling conditions such as policy instruments, greater public support and technological innovation could reduce these barriers. (*high confidence*) {*3.3.3*}

[48] The impacts, risks, and co-benefits of CDR deployment for ecosystems, biodiversity and people will be highly variable depending on the method, site-specific context, implementation and scale (*high confidence*).

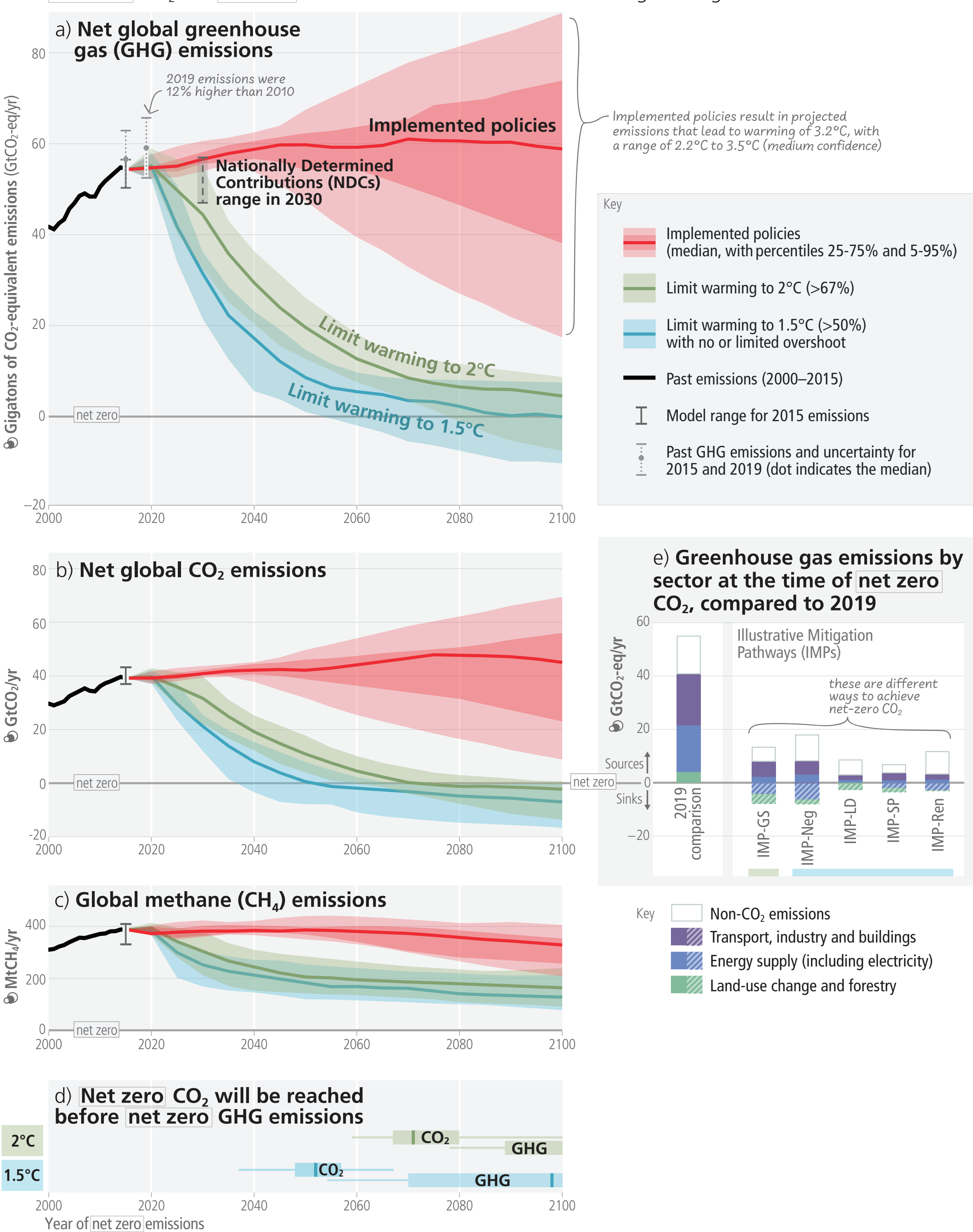

Limiting warming to 1.5°C and 2°C involves rapid, deep and in most cases immediate greenhouse gas emission reductions
Net zero CO2 and net zero GHG emissions can be achieved through strong reductions across all sectors
a) Net global greenhouse gas (GHG) emissions
Gigatons of CO2-equivalent emissions (GtCO2-eq/yr)
2019 emissions were 12% higher than 2010
Implemented policies
Nationally Determined Contributions (NDCs) range in 2030
Limit warming to 2°C
Limit warming to 1.5°C
net zero
Implemented policies result in projected emissions that lead to warming of 3.2°C, with a range of 2.2°C to 3.5°C (medium confidence)
Key
Implemented policies (median, with percentiles 25-75% and 5-95%)
Limit warming to 2°C (>67%)
Limit warming to 1.5°C (>50%) with no or limited overshoot
Past emissions (2000–2015)
Model range for 2015 emissions
Past GHG emissions and uncertainty for 2015 and 2019 (dot indicates the median)
b) Net global CO2 emissions
GtCO2/yr
c) Global methane (CH4) emissions
MtCH4/yr
d) Net zero CO2 will be reached before net zero GHG emissions
2°C
1.5°C
CO2
GHG
Year of net zero emissions
e) Greenhouse gas emissions by sector at the time of net zero CO2, compared to 2019
GtCO2-eq/yr
Illustrative Mitigation Pathways (IMPs)
these are different ways to achieve net-zero CO2
Sources
Sinks
2019 comparison
IMP-GS
IMP-Neg
IMP-LD
IMP-SP
IMP-Ren
Key
Non-CO2 emissions
Transport, industry and buildings
Energy supply (including electricity)
Land-use change and forestry

Figure SPM.5: Global emissions pathways consistent with implemented policies and mitigation strategies. Panels (a), (b) and **(c)** show the development of global GHG, CO_2 and methane emissions in modelled pathways, while **panel (d)** shows the associated timing of when GHG and CO_2 emissions reach net zero. Coloured ranges denote the 5th to 95th percentile across the global modelled pathways falling within a given category as described in Box SPM.1. The red ranges depict emissions pathways assuming policies that were implemented by the end of 2020. Ranges of modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot are shown in light blue (category C1) and pathways that limit warming to 2°C (>67%) are shown in green (category C3). Global emission pathways that would limit warming to 1.5°C (>50%) with no or limited overshoot and also reach net zero GHG in the second half of the century do so between 2070–2075. **Panel (e)** shows the sectoral contributions of CO_2 and non-CO_2 emissions sources and sinks at the time when net zero CO_2 emissions are reached in illustrative mitigation pathways (IMPs) consistent with limiting warming to 1.5°C with a high reliance on net negative emissions (IMP-Neg) ("high overshoot"), high resource efficiency (IMP-LD), a focus on sustainable development (IMP-SP), renewables (IMP-Ren) and limiting warming to 2°C with less rapid mitigation initially followed by a gradual strengthening (IMP-GS). Positive and negative emissions for different IMPs are compared to GHG emissions from the year 2019. Energy supply (including electricity) includes bioenergy with carbon dioxide capture and storage and direct air carbon dioxide capture and storage. CO_2 emissions from land-use change and forestry can only be shown as a net number as many models do not report emissions and sinks of this category separately. {*Figure 3.6, 4.1*} (*Box SPM.1*)

Overshoot: Exceeding a Warming Level and Returning

B.7 If warming exceeds a specified level such as 1.5°C, it could gradually be reduced again by achieving and sustaining net negative global CO_2 emissions. This would require additional deployment of carbon dioxide removal, compared to pathways without overshoot, leading to greater feasibility and sustainability concerns. Overshoot entails adverse impacts, some irreversible, and additional risks for human and natural systems, all growing with the magnitude and duration of overshoot. (*high confidence*) {*3.1, 3.3, 3.4, Table 3.1, Figure 3.6*}

B.7.1 Only a small number of the most ambitious global modelled pathways limit global warming to 1.5°C (>50%) by 2100 without exceeding this level temporarily. Achieving and sustaining net negative global CO_2 emissions, with annual rates of CDR greater than residual CO_2 emissions, would gradually reduce the warming level again (*high confidence*). Adverse impacts that occur during this period of overshoot and cause additional warming via feedback mechanisms, such as increased wildfires, mass mortality of trees, drying of peatlands, and permafrost thawing, weakening natural land carbon sinks and increasing releases of GHGs would make the return more challenging (*medium confidence*). {*3.3.2, 3.3.4*, *Table 3.1*, *Figure 3.6*} (*Box SPM.1*)

B.7.2 The higher the magnitude and the longer the duration of overshoot, the more ecosystems and societies are exposed to greater and more widespread changes in climatic impact-drivers, increasing risks for many natural and human systems. Compared to pathways without overshoot, societies would face higher risks to infrastructure, low-lying coastal settlements, and associated livelihoods. Overshooting 1.5°C will result in irreversible adverse impacts on certain ecosystems with low resilience, such as polar, mountain, and coastal ecosystems, impacted by ice-sheet melt, glacier melt, or by accelerating and higher committed sea level rise. (*high confidence*) {*3.1.2*, *3.3.4*}

B.7.3 The larger the overshoot, the more net negative CO_2 emissions would be needed to return to 1.5°C by 2100. Transitioning towards net zero CO_2 emissions faster and reducing non-CO_2 emissions such as methane more rapidly would limit peak warming levels and reduce the requirement for net negative CO_2 emissions, thereby reducing feasibility and sustainability concerns, and social and environmental risks associated with CDR deployment at large scales. (*high confidence*) {*3.3.3*, *3.3.4*, *3.4.1*, *Table 3.1*}

C. Responses in the Near Term

Urgency of Near-Term Integrated Climate Action

C.1 Climate change is a threat to human well-being and planetary health (*very high confidence*). There is a rapidly closing window of opportunity to secure a liveable and sustainable future for all (*very high confidence*). Climate resilient development integrates adaptation and mitigation to advance sustainable development for all, and is enabled by increased international cooperation including improved access to adequate financial resources, particularly for vulnerable regions, sectors and groups, and inclusive governance and coordinated policies (*high confidence*). The choices and actions implemented in this decade will have impacts now and for thousands of years (*high confidence*). {*3.1, 3.3, 4.1, 4.2, 4.3, 4.4, 4.7, 4.8, 4.9, Figure 3.1, Figure 3.3, Figure 4.2*} (*Figure SPM.1, Figure SPM.6*)

C.1.1 Evidence of observed adverse impacts and related losses and damages, projected risks, levels and trends in vulnerability and adaptation limits, demonstrate that worldwide climate resilient development action is more urgent than previously assessed in AR5. Climate resilient development integrates adaptation and GHG mitigation to advance sustainable development for all. Climate resilient development pathways have been constrained by past development, emissions and climate change and are progressively constrained by every increment of warming, in particular beyond 1.5°C. (*very high confidence*) {*3.4, 3.4.2, 4.1*}

C.1.2 Government actions at sub-national, national and international levels, with civil society and the private sector, play a crucial role in enabling and accelerating shifts in development pathways towards sustainability and climate resilient development (*very high confidence*). Climate resilient development is enabled when governments, civil society and the private sector make inclusive development choices that prioritize risk reduction, equity and justice, and when decision-making processes, finance and actions are integrated across governance levels, sectors, and timeframes (*very high confidence*). Enabling conditions are differentiated by national, regional and local circumstances and geographies, according to capabilities, and include: political commitment and follow-through, coordinated policies, social and international cooperation, ecosystem stewardship, inclusive governance, knowledge diversity, technological innovation, monitoring and evaluation, and improved access to adequate financial resources, especially for vulnerable regions, sectors and communities (*high confidence*). {*3.4, 4.2, 4.4, 4.5, 4.7, 4.8*} (*Figure SPM.6*)

C.1.3 Continued emissions will further affect all major climate system components, and many changes will be irreversible on centennial to millennial time scales and become larger with increasing global warming. Without urgent, effective, and equitable mitigation and adaptation actions, climate change increasingly threatens ecosystems, biodiversity, and the livelihoods, health and well-being of current and future generations. (*high confidence*) {*3.1.3, 3.3.3, 3.4.1, Figure 3.4, 4.1, 4.2, 4.3, 4.4*} (*Figure SPM.1, Figure SPM.6*)

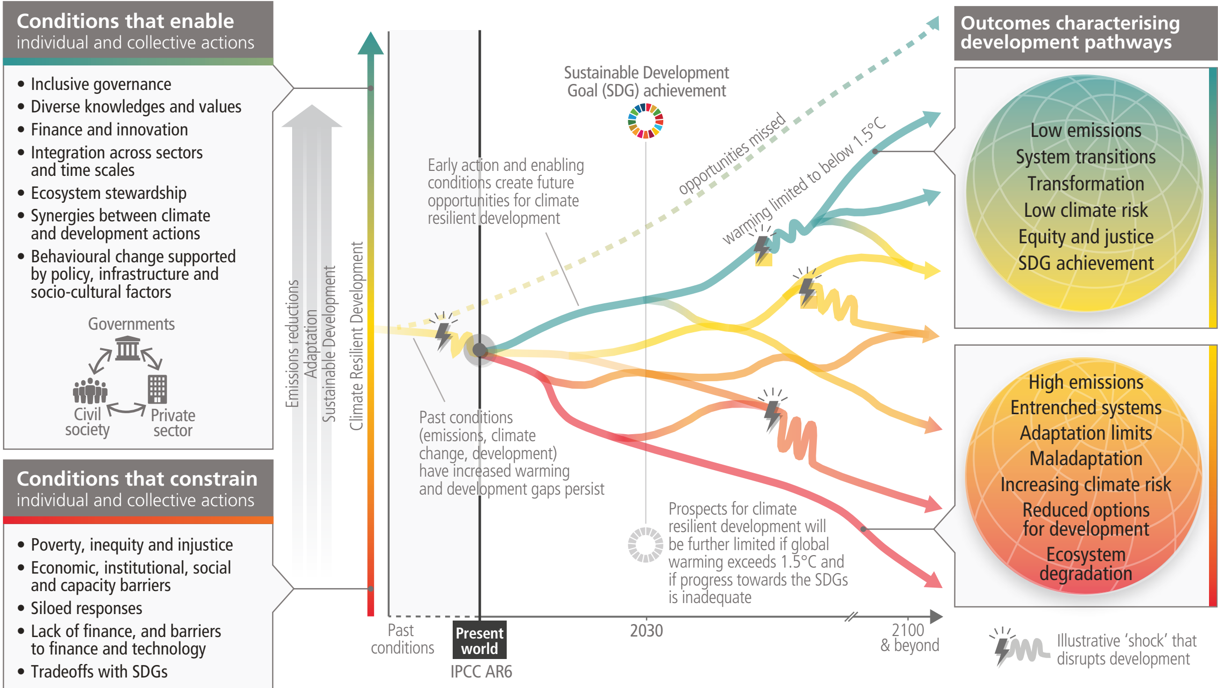


Figure SPM.6: The illustrative development pathways (red to green) and associated outcomes (right panel) show that there is a rapidly narrowing window of opportunity to secure a liveable and sustainable future for all. Climate resilient development is the process of implementing greenhouse gas mitigation and adaptation measures to support sustainable development. Diverging pathways illustrate that interacting choices and actions made by diverse government, private sector and civil society actors can advance climate resilient development, shift pathways towards sustainability, and enable lower emissions and adaptation. Diverse knowledge and values include cultural values, Indigenous Knowledge, local knowledge, and scientific knowledge. Climatic and non-climatic events, such as droughts, floods or pandemics, pose more severe shocks to pathways with lower climate resilient development (red to yellow) than to pathways with higher climate resilient development (green). There are limits to adaptation and adaptive capacity for some human and natural systems at global warming of 1.5°C, and with every increment of warming, losses and damages will increase. The development pathways taken by countries at all stages of economic development impact GHG emissions and mitigation challenges and opportunities, which vary across countries and regions. Pathways and opportunities for action are shaped by previous actions (or inactions and opportunities missed; dashed pathway) and enabling and constraining conditions (left panel), and take place in the context of climate risks, adaptation limits and development gaps. The longer emissions reductions are delayed, the fewer effective adaptation options. {*Figure 4.2, 3.1, 3.2, 3.4, 4.2, 4.4, 4.5, 4.6, 4.9*}

The Benefits of Near-Term Action

C.2 Deep, rapid, and sustained mitigation and accelerated implementation of adaptation actions in this decade would reduce projected losses and damages for humans and ecosystems (*very high confidence*), and deliver many co-benefits, especially for air quality and health (*high confidence*). Delayed mitigation and adaptation action would lock in high-emissions infrastructure, raise risks of stranded assets and cost-escalation, reduce feasibility, and increase losses and damages (*high confidence*). Near-term actions involve high up-front investments and potentially disruptive changes that can be lessened by a range of enabling policies (*high confidence*). {*2.1, 2.2, 3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8*}

C.2.1 Deep, rapid, and sustained mitigation and accelerated implementation of adaptation actions in this decade would reduce future losses and damages related to climate change for humans and ecosystems (*very high confidence*). As adaptation options often have long implementation times, accelerated implementation of adaptation in this decade is important to close adaptation gaps (*high confidence*). Comprehensive, effective, and innovative responses integrating adaptation and mitigation can harness synergies and reduce trade-offs between adaptation and mitigation (*high confidence*). {*4.1, 4.2, 4.3*}

C.2.2 Delayed mitigation action will further increase global warming and losses and damages will rise and additional human and natural systems will reach adaptation limits. Challenges from delayed adaptation and mitigation actions include the risk of cost escalation, lock-in of infrastructure, stranded assets, and reduced feasibility and effectiveness of adaptation and mitigation options. Without rapid, deep and sustained mitigation and accelerated adaptation actions, losses and damages will continue to increase, including projected adverse impacts in Africa, LDCs, SIDS, Central and South America[49], Asia and the Arctic, and will disproportionately affect the most vulnerable populations. (*high confidence*) {*2.1.2*, *3.1.2*, *3.2*, *3.3.1*, *3.3.3*, *4.1*, *4.2*, *4.3*} (*Figure SPM.3*, *Figure SPM.4*)

C.2.3 Accelerated climate action can also provide co-benefits (see also C.4) (*high confidence*). Many mitigation actions would have benefits for health through lower air pollution, active mobility (e.g., walking, cycling), and shifts to sustainable healthy diets (*high confidence*). Strong, rapid and sustained reductions in methane emissions can limit near-term warming and improve air quality by reducing global surface ozone (*high confidence*). Adaptation can generate multiple additional benefits such as improving agricultural productivity, innovation, health and well-being, food security, livelihood, and biodiversity conservation (*very high confidence*). {*4.2, 4.5.4, 4.5.5, 4.6*}

C.2.4 Cost-benefit analysis remains limited in its ability to represent all avoided damages from climate change (*high confidence*). The economic benefits for human health from air quality improvement arising from mitigation action can be of the same order of magnitude as mitigation costs, and potentially even larger (*medium confidence*). Even without accounting for all the benefits of avoiding potential damages, the global economic and social benefit of limiting global warming to 2°C exceeds the cost of mitigation in most of the assessed literature (*medium confidence*)[50]. More rapid climate change mitigation, with emissions peaking earlier, increases co-benefits and reduces feasibility risks and costs in the long-term, but requires higher up-front investments (*high confidence*). {*3.4.1*, *4.2*}

C.2.5 Ambitious mitigation pathways imply large and sometimes disruptive changes in existing economic structures, with significant distributional consequences within and between countries. To accelerate climate action, the adverse consequences of these changes can be moderated by fiscal, financial, institutional and regulatory reforms and by integrating climate actions with macroeconomic policies through (i) economy-wide packages, consistent with national circumstances, supporting sustainable low-emission growth paths; (ii) climate resilient safety nets and social protection; and (iii) improved access to finance for low-emissions infrastructure and technologies, especially in developing countries. (*high confidence*) {*4.2*, *4.4*, *4.7*, *4.8.1*}

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[49] The southern part of Mexico is included in the climatic subregion South Central America (SCA) for WGI. Mexico is assessed as part of North America for WGII. The climate change literature for the SCA region occasionally includes Mexico, and in those cases WGII assessment makes reference to Latin America. Mexico is considered part of Latin America and the Caribbean for WGIII.

[50] The evidence is too limited to make a similar robust conclusion for limiting warming to 1.5°C. Limiting global warming to 1.5°C instead of 2°C would increase the costs of mitigation, but also increase the benefits in terms of reduced impacts and related risks, and reduced adaptation needs (*high confidence*).

There are multiple opportunities for scaling up climate action

a) **Feasibility of climate responses and adaptation, and potential of mitigation options in the near term**

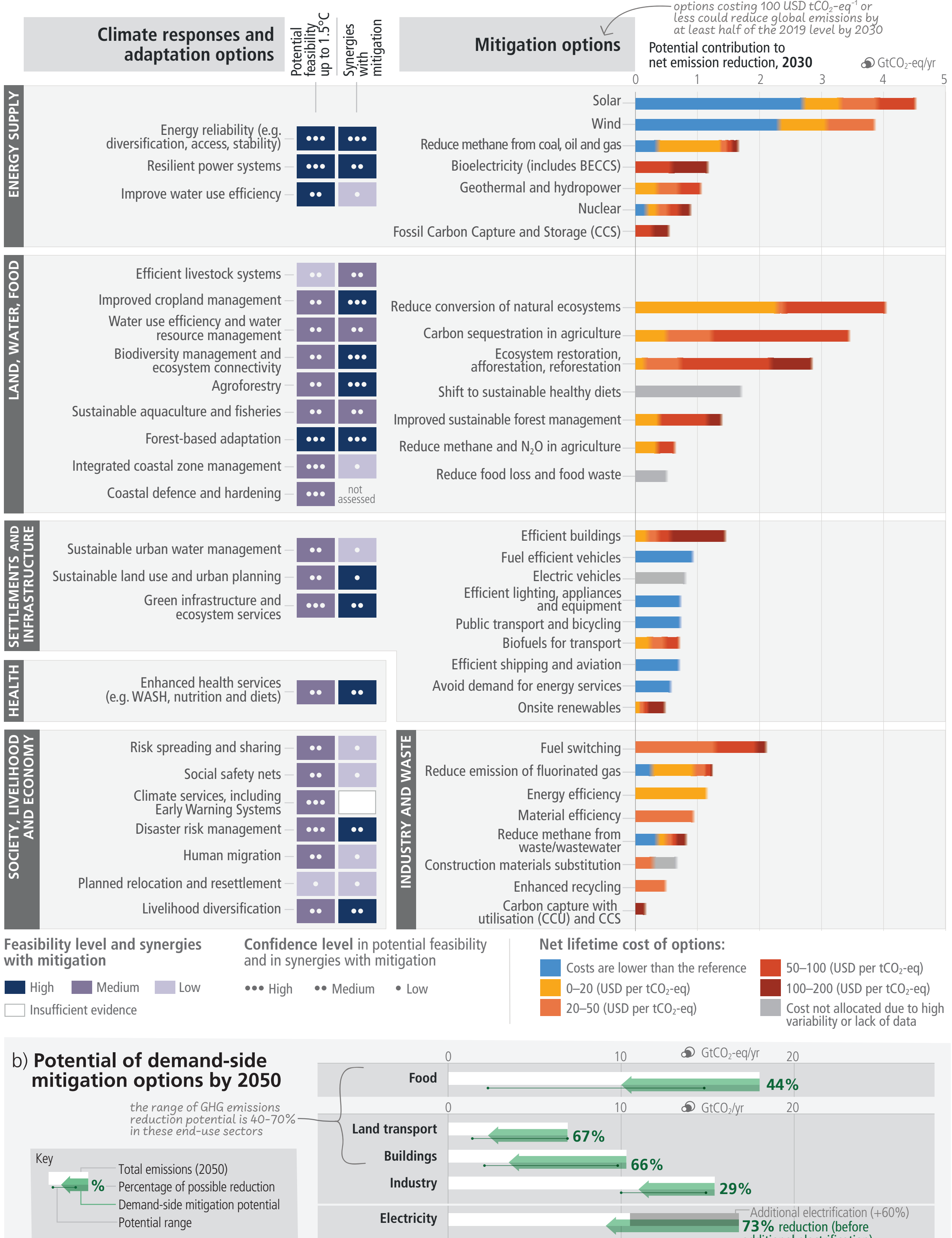

Figure SPM.7: Multiple Opportunities for scaling up climate action. Panel (a) presents selected mitigation and adaptation options across different systems. The left-hand side of panel a shows climate responses and adaptation options assessed for their multidimensional feasibility at global scale, in the near term and up to 1.5°C global warming. As literature above 1.5°C is limited, feasibility at higher levels of warming may change, which is currently not possible to assess robustly. The term response is used here in addition to adaptation because some responses, such as migration, relocation and resettlement may or may not be considered to be adaptation. Forest based adaptation includes sustainable forest management, forest conservation and restoration, reforestation

and afforestation. WASH refers to water, sanitation and hygiene. Six feasibility dimensions (economic, technological, institutional, social, environmental and geophysical) were used to calculate the potential feasibility of climate responses and adaptation options, along with their synergies with mitigation. For potential feasibility and feasibility dimensions, the figure shows high, medium, or low feasibility. Synergies with mitigation are identified as high, medium, and low. The right-hand side of Panel a provides an overview of selected mitigation options and their estimated costs and potentials in 2030. Costs are net lifetime discounted monetary costs of avoided GHG emissions calculated relative to a reference technology. Relative potentials and costs will vary by place, context and time and in the longer term compared to 2030. The potential (horizontal axis) is the net GHG emission reduction (sum of reduced emissions and/or enhanced sinks) broken down into cost categories (coloured bar segments) relative to an emission baseline consisting of current policy (around 2019) reference scenarios from the AR6 scenarios database. The potentials are assessed independently for each option and are not additive. Health system mitigation options are included mostly in settlement and infrastructure (e.g., efficient healthcare buildings) and cannot be identified separately. Fuel switching in industry refers to switching to electricity, hydrogen, bioenergy and natural gas. Gradual colour transitions indicate uncertain breakdown into cost categories due to uncertainty or heavy context dependency. The uncertainty in the total potential is typically 25–50%. **Panel (b)** displays the indicative potential of demand-side mitigation options for 2050. Potentials are estimated based on approximately 500 bottom-up studies representing all global regions. The baseline (white bar) is provided by the sectoral mean GHG emissions in 2050 of the two scenarios (IEA-STEPS and IP_ModAct) consistent with policies announced by national governments until 2020. The green arrow represents the demand-side emissions reductions potentials. The range in potential is shown by a line connecting dots displaying the highest and the lowest potentials reported in the literature. Food shows demand-side potential of socio-cultural factors and infrastructure use, and changes in land-use patterns enabled by change in food demand. Demand-side measures and new ways of end-use service provision can reduce global GHG emissions in end-use sectors (buildings, land transport, food) by 40–70% by 2050 compared to baseline scenarios, while some regions and socioeconomic groups require additional energy and resources. The last row shows how demand-side mitigation options in other sectors can influence overall electricity demand. The dark grey bar shows the projected increase in electricity demand above the 2050 baseline due to increasing electrification in the other sectors. Based on a bottom-up assessment, this projected increase in electricity demand can be avoided through demand-side mitigation options in the domains of infrastructure use and socio-cultural factors that influence electricity usage in industry, land transport, and buildings (green arrow). {*Figure 4.4*}

Mitigation and Adaptation Options across Systems

C.3 Rapid and far-reaching transitions across all sectors and systems are necessary to achieve deep and sustained emissions reductions and secure a liveable and sustainable future for all. These system transitions involve a significant upscaling of a wide portfolio of mitigation and adaptation options. Feasible, effective, and low-cost options for mitigation and adaptation are already available, with differences across systems and regions. (*high confidence*) {*4.1, 4.5, 4.6*} (*Figure SPM.7*)

C.3.1 The systemic change required to achieve rapid and deep emissions reductions and transformative adaptation to climate change is unprecedented in terms of scale, but not necessarily in terms of speed (*medium confidence*). Systems transitions include: deployment of low- or zero-emission technologies; reducing and changing demand through infrastructure design and access, socio-cultural and behavioural changes, and increased technological efficiency and adoption; social protection, climate services or other services; and protecting and restoring ecosystems (*high confidence*). Feasible, effective, and low-cost options for mitigation and adaptation are already available (*high confidence*). The availability, feasibility and potential of mitigation and adaptation options in the near term differs across systems and regions (*very high confidence*). {*4.1, 4.5.1 to 4.5.6*} (*Figure SPM.7*)

Energy Systems

C.3.2 Net zero CO_2 energy systems entail: a substantial reduction in overall fossil fuel use, minimal use of unabated fossil fuels[51], and use of carbon capture and storage in the remaining fossil fuel systems; electricity systems that emit no net CO_2; widespread electrification; alternative energy carriers in applications less amenable to electrification; energy conservation and efficiency; and greater integration across the energy system (*high confidence*). Large contributions to emissions reductions with costs less than USD 20 $tCO_2\text{-eq}^{-1}$ come from solar and wind energy, energy efficiency improvements, and methane emissions reductions (coal mining, oil and gas, waste) (*medium confidence*). There are feasible adaptation options that support infrastructure resilience, reliable power systems and efficient water use for existing and new energy generation systems (*very high confidence*). Energy generation diversification (e.g., via wind, solar, small scale hydropower) and demand-side management (e.g., storage and energy efficiency improvements) can increase energy reliability and reduce vulnerabilities to climate change (*high confidence*). Climate responsive energy markets, updated design standards on energy assets according to current and projected climate change, smart-grid technologies, robust transmission systems and improved capacity to respond to supply deficits have high feasibility in the medium to long term, with mitigation co-benefits (*very high confidence*). {*4.5.1*} (*Figure SPM.7*)

[51] In this context, 'unabated fossil fuels' refers to fossil fuels produced and used without interventions that substantially reduce the amount of GHG emitted throughout the life cycle; for example, capturing 90% or more CO_2 from power plants, or 50–80% of fugitive methane emissions from energy supply.

Industry and Transport

C.3.3 Reducing industry GHG emissions entails coordinated action throughout value chains to promote all mitigation options, including demand management, energy and materials efficiency, circular material flows, as well as abatement technologies and transformational changes in production processes (*high confidence*). In transport, sustainable biofuels, low-emissions hydrogen, and derivatives (including ammonia and synthetic fuels) can support mitigation of CO_2 emissions from shipping, aviation, and heavy-duty land transport but require production process improvements and cost reductions (*medium confidence*). Sustainable biofuels can offer additional mitigation benefits in land-based transport in the short and medium term (*medium confidence*). Electric vehicles powered by low-GHG emissions electricity have large potential to reduce land-based transport GHG emissions, on a life cycle basis (*high confidence*). Advances in battery technologies could facilitate the electrification of heavy-duty trucks and compliment conventional electric rail systems (*medium confidence*). The environmental footprint of battery production and growing concerns about critical minerals can be addressed by material and supply diversification strategies, energy and material efficiency improvements, and circular material flows (*medium confidence*). {*4.5.2, 4.5.3*} (*Figure SPM.7*)

Cities, Settlements and Infrastructure

C.3.4 Urban systems are critical for achieving deep emissions reductions and advancing climate resilient development (*high confidence*). Key adaptation and mitigation elements in cities include considering climate change impacts and risks (e.g., through climate services) in the design and planning of settlements and infrastructure; land use planning to achieve compact urban form, co-location of jobs and housing; supporting public transport and active mobility (e.g., walking and cycling); the efficient design, construction, retrofit, and use of buildings; reducing and changing energy and material consumption; sufficiency[52]; material substitution; and electrification in combination with low emissions sources (*high confidence*). Urban transitions that offer benefits for mitigation, adaptation, human health and well-being, ecosystem services, and vulnerability reduction for low-income communities are fostered by inclusive long-term planning that takes an integrated approach to physical, natural and social infrastructure (*high confidence*). Green/natural and blue infrastructure supports carbon uptake and storage and either singly or when combined with grey infrastructure can reduce energy use and risk from extreme events such as heatwaves, flooding, heavy precipitation and droughts, while generating co-benefits for health, well-being and livelihoods (*medium confidence*). {*4.5.3*}

Land, Ocean, Food, and Water

C.3.5 Many agriculture, forestry, and other land use (AFOLU) options provide adaptation and mitigation benefits that could be upscaled in the near term across most regions. Conservation, improved management, and restoration of forests and other ecosystems offer the largest share of economic mitigation potential, with reduced deforestation in tropical regions having the highest total mitigation potential. Ecosystem restoration, reforestation, and afforestation can lead to trade-offs due to competing demands on land. Minimizing trade-offs requires integrated approaches to meet multiple objectives including food security. Demand-side measures (shifting to sustainable healthy diets[53] and reducing food loss/waste) and sustainable agricultural intensification can reduce ecosystem conversion, and methane and nitrous oxide emissions, and free up land for reforestation and ecosystem restoration. Sustainably sourced agricultural and forest products, including long-lived wood products, can be used instead of more GHG-intensive products in other sectors. Effective adaptation options include cultivar improvements, agroforestry, community-based adaptation, farm and landscape diversification, and urban agriculture. These AFOLU response options require integration of biophysical, socioeconomic and other enabling factors. Some options, such as conservation of high-carbon ecosystems (e.g., peatlands, wetlands, rangelands, mangroves and forests), deliver immediate benefits, while others, such as restoration of high-carbon ecosystems, take decades to deliver measurable results. (*high confidence*) {*4.5.4*} (*Figure SPM.7*)

C.3.6 Maintaining the resilience of biodiversity and ecosystem services at a global scale depends on effective and equitable conservation of approximately 30% to 50% of Earth's land, freshwater and ocean areas, including currently near-natural ecosystems (*high confidence*). Conservation, protection and restoration of terrestrial, freshwater, coastal and

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[52] A set of measures and daily practices that avoid demand for energy, materials, land, and water while delivering human well-being for all within planetary boundaries. {*4.5.3*}

[53] 'Sustainable healthy diets' promote all dimensions of individuals' health and well-being; have low environmental pressure and impact; are accessible, affordable, safe and equitable; and are culturally acceptable, as described in FAO and WHO. The related concept of 'balanced diets' refers to diets that feature plant-based foods, such as those based on coarse grains, legumes, fruits and vegetables, nuts and seeds, and animal-sourced food produced in resilient, sustainable and low-GHG emission systems, as described in SRCCL.

ocean ecosystems, together with targeted management to adapt to unavoidable impacts of climate change reduces the vulnerability of biodiversity and ecosystem services to climate change (*high confidence*), reduces coastal erosion and flooding (*high confidence*), and could increase carbon uptake and storage if global warming is limited (*medium confidence*). Rebuilding overexploited or depleted fisheries reduces negative climate change impacts on fisheries *(medium confidence)* and supports food security, biodiversity, human health and well-being (*high confidence*). Land restoration contributes to climate change mitigation and adaptation with synergies via enhanced ecosystem services and with economically positive returns and co-benefits for poverty reduction and improved livelihoods (*high confidence*). Cooperation, and inclusive decision making, with Indigenous Peoples and local communities, as well as recognition of inherent rights of Indigenous Peoples, is integral to successful adaptation and mitigation across forests and other ecosystems (*high confidence*). {*4.5.4, 4.6*} (*Figure SPM.7*)

Health and Nutrition

C.3.7 Human health will benefit from integrated mitigation and adaptation options that mainstream health into food, infrastructure, social protection, and water policies (*very high confidence*). Effective adaptation options exist to help protect human health and well-being, including: strengthening public health programs related to climate-sensitive diseases, increasing health systems resilience, improving ecosystem health, improving access to potable water, reducing exposure of water and sanitation systems to flooding, improving surveillance and early warning systems, vaccine development (*very high confidence*), improving access to mental healthcare, and Heat Health Action Plans that include early warning and response systems (*high confidence*). Adaptation strategies which reduce food loss and waste or support balanced, sustainable healthy diets contribute to nutrition, health, biodiversity and other environmental benefits (*high confidence*). {*4.5.5*} (*Figure SPM.7*)

Society, Livelihoods, and Economies

C.3.8 Policy mixes that include weather and health insurance, social protection and adaptive social safety nets, contingent finance and reserve funds, and universal access to early warning systems combined with effective contingency plans, can reduce vulnerability and exposure of human systems. Disaster risk management, early warning systems, climate services and risk spreading and sharing approaches have broad applicability across sectors. Increasing education including capacity building, climate literacy, and information provided through climate services and community approaches can facilitate heightened risk perception and accelerate behavioural changes and planning. (*high confidence*) {*4.5.6*}

Synergies and Trade-Offs with Sustainable Development

C.4 Accelerated and equitable action in mitigating and adapting to climate change impacts is critical to sustainable development. Mitigation and adaptation actions have more synergies than trade-offs with Sustainable Development Goals. Synergies and trade-offs depend on context and scale of implementation. (*high confidence*) {*3.4, 4.2, 4.4, 4.5, 4.6, 4.9, Figure 4.5*}

C.4.1 Mitigation efforts embedded within the wider development context can increase the pace, depth and breadth of emission reductions (*medium confidence*). Countries at all stages of economic development seek to improve the well-being of people, and their development priorities reflect different starting points and contexts. Different contexts include but are not limited to social, economic, environmental, cultural, political circumstances, resource endowment, capabilities, international environment, and prior development (*high confidence*). In regions with high dependency on fossil fuels for, among other things, revenue and employment generation, mitigating risk for sustainable development requires policies that promote economic and energy sector diversification and considerations of just transitions principles, processes and practices (*high confidence*). Eradicating extreme poverty, energy poverty, and providing decent living standards in low-emitting countries / regions in the context of achieving sustainable development objectives, in the near term, can be achieved without significant global emissions growth (*high confidence*). {*4.4, 4.6, Annex I: Glossary*}

C.4.2 Many mitigation and adaptation actions have multiple synergies with Sustainable Development Goals (SDGs) and sustainable development generally, but some actions can also have trade-offs. Potential synergies with SDGs exceed potential trade-offs; synergies and trade-offs depend on the pace and magnitude of change and the development context including inequalities with consideration of climate justice. Trade-offs can be evaluated and minimised by giving emphasis to capacity building, finance, governance, technology transfer, investments, development, context specific gender-based and other social equity considerations with meaningful participation of Indigenous Peoples, local communities and vulnerable populations. (*high confidence*) {*3.4.1, 4.6, Figure 4.5, 4.9*}

C.4.3 Implementing both mitigation and adaptation actions together and taking trade-offs into account supports co-benefits and synergies for human health and well-being. For example, improved access to clean energy sources and technologies generates health benefits especially for women and children; electrification combined with low-GHG energy, and shifts to active mobility and public transport can enhance air quality, health, employment, and can elicit energy security and deliver equity. (*high confidence*) {*4.2*, *4.5.3*, *4.5.5*, *4.6*, *4.9*}

Equity and Inclusion

C.5 Prioritising equity, climate justice, social justice, inclusion and just transition processes can enable adaptation and ambitious mitigation actions and climate resilient development. Adaptation outcomes are enhanced by increased support to regions and people with the highest vulnerability to climatic hazards. Integrating climate adaptation into social protection programs improves resilience. Many options are available for reducing emission-intensive consumption, including through behavioural and lifestyle changes, with co-benefits for societal well-being. (*high confidence*) {*4.4, 4.5*}

C.5.1 Equity remains a central element in the UN climate regime, notwithstanding shifts in differentiation between states over time and challenges in assessing fair shares. Ambitious mitigation pathways imply large and sometimes disruptive changes in economic structure, with significant distributional consequences, within and between countries. Distributional consequences within and between countries include shifting of income and employment during the transition from high- to low-emissions activities. (*high confidence*) {*4.4*}

C.5.2 Adaptation and mitigation actions that prioritise equity, social justice, climate justice, rights-based approaches, and inclusivity, lead to more sustainable outcomes, reduce trade-offs, support transformative change and advance climate resilient development. Redistributive policies across sectors and regions that shield the poor and vulnerable, social safety nets, equity, inclusion and just transitions, at all scales can enable deeper societal ambitions and resolve trade-offs with sustainable development goals. Attention to equity and broad and meaningful participation of all relevant actors in decision making at all scales can build social trust which builds on equitable sharing of benefits and burdens of mitigation that deepen and widen support for transformative changes. (*high confidence*) {*4.4*}

C.5.3 Regions and people (3.3 to 3.6 billion in number) with considerable development constraints have high vulnerability to climatic hazards (see A.2.2). Adaptation outcomes for the most vulnerable within and across countries and regions are enhanced through approaches focusing on equity, inclusivity and rights-based approaches. Vulnerability is exacerbated by inequity and marginalisation linked to e.g., gender, ethnicity, low incomes, informal settlements, disability, age, and historical and ongoing patterns of inequity such as colonialism, especially for many Indigenous Peoples and local communities. Integrating climate adaptation into social protection programs, including cash transfers and public works programs, is highly feasible and increases resilience to climate change, especially when supported by basic services and infrastructure. The greatest gains in well-being in urban areas can be achieved by prioritising access to finance to reduce climate risk for low-income and marginalised communities including people living in informal settlements. (*high confidence*) {*4.4*, *4.5.3*, *4.5.5*, *4.5.6*}

C.5.4 The design of regulatory instruments and economic instruments and consumption-based approaches, can advance equity. Individuals with high socio-economic status contribute disproportionately to emissions, and have the highest potential for emissions reductions. Many options are available for reducing emission-intensive consumption while improving societal well-being. Socio-cultural options, behaviour and lifestyle changes supported by policies, infrastructure, and technology can help end-users shift to low-emissions-intensive consumption, with multiple co-benefits. A substantial share of the population in low-emitting countries lack access to modern energy services. Technology development, transfer, capacity building and financing can support developing countries / regions leapfrogging or transitioning to low-emissions transport systems thereby providing multiple co-benefits. Climate resilient development is advanced when actors work in equitable, just and inclusive ways to reconcile divergent interests, values and worldviews, toward equitable and just outcomes. (*high confidence*) {*2.1*, *4.4*}

Summary for Policymakers

Governance and Policies

C.6 Effective climate action is enabled by political commitment, well-aligned multilevel governance, institutional frameworks, laws, policies and strategies and enhanced access to finance and technology. Clear goals, coordination across multiple policy domains, and inclusive governance processes facilitate effective climate action. Regulatory and economic instruments can support deep emissions reductions and climate resilience if scaled up and applied widely. Climate resilient development benefits from drawing on diverse knowledge. (*high confidence*) {*2.2, 4.4, 4.5, 4.7*}

C.6.1 Effective climate governance enables mitigation and adaptation. Effective governance provides overall direction on setting targets and priorities and mainstreaming climate action across policy domains and levels, based on national circumstances and in the context of international cooperation. It enhances monitoring and evaluation and regulatory certainty, prioritising inclusive, transparent and equitable decision-making, and improves access to finance and technology (see C.7). (*high confidence*) {*2.2.2, 4.7*}

C.6.2 Effective local, municipal, national and subnational institutions build consensus for climate action among diverse interests, enable coordination and inform strategy setting but require adequate institutional capacity. Policy support is influenced by actors in civil society, including businesses, youth, women, labour, media, Indigenous Peoples, and local communities. Effectiveness is enhanced by political commitment and partnerships between different groups in society. (*high confidence*) {*2.2, 4.7*}

C.6.3 Effective multilevel governance for mitigation, adaptation, risk management, and climate resilient development is enabled by inclusive decision processes that prioritise equity and justice in planning and implementation, allocation of appropriate resources, institutional review, and monitoring and evaluation. Vulnerabilities and climate risks are often reduced through carefully designed and implemented laws, policies, participatory processes, and interventions that address context specific inequities such as those based on gender, ethnicity, disability, age, location and income. (*high confidence*) {*4.4, 4.7*}

C.6.4 Regulatory and economic instruments could support deep emissions reductions if scaled up and applied more widely (*high confidence*). Scaling up and enhancing the use of regulatory instruments can improve mitigation outcomes in sectoral applications, consistent with national circumstances (*high confidence*). Where implemented, carbon pricing instruments have incentivized low-cost emissions reduction measures but have been less effective, on their own and at prevailing prices during the assessment period, to promote higher-cost measures necessary for further reductions (*medium confidence*). Equity and distributional impacts of such carbon pricing instruments, e.g., carbon taxes and emissions trading, can be addressed by using revenue to support low-income households, among other approaches. Removing fossil fuel subsidies would reduce emissions[54] and yield benefits such as improved public revenue, macroeconomic and sustainability performance; subsidy removal can have adverse distributional impacts, especially on the most economically vulnerable groups which, in some cases can be mitigated by measures such as redistributing revenue saved, all of which depend on national circumstances (*high confidence*). Economy-wide policy packages, such as public spending commitments and pricing reforms, can meet short-term economic goals while reducing emissions and shifting development pathways towards sustainability (*medium confidence*). Effective policy packages would be comprehensive, consistent, balanced across objectives, and tailored to national circumstances (*high confidence*). {*2.2.2, 4.7*}

C.6.5 Drawing on diverse knowledges and cultural values, meaningful participation and inclusive engagement processes—including Indigenous Knowledge, local knowledge, and scientific knowledge—facilitates climate resilient development, builds capacity and allows locally appropriate and socially acceptable solutions. (*high confidence*) {*4.4, 4.5.6, 4.7*}

[54] Fossil fuel subsidy removal is projected by various studies to reduce global CO_2 emission by 1 to 4%, and GHG emissions by up to 10% by 2030, varying across regions (*medium confidence*).

Finance, Technology and International Cooperation

C.7 Finance, technology and international cooperation are critical enablers for accelerated climate action. If climate goals are to be achieved, both adaptation and mitigation financing would need to increase many-fold. There is sufficient global capital to close the global investment gaps but there are barriers to redirect capital to climate action. Enhancing technology innovation systems is key to accelerate the widespread adoption of technologies and practices. Enhancing international cooperation is possible through multiple channels. (*high confidence*) {*2.3, 4.8*}

C.7.1 Improved availability of and access to finance[55] would enable accelerated climate action (*very high confidence*). Addressing needs and gaps and broadening equitable access to domestic and international finance, when combined with other supportive actions, can act as a catalyst for accelerating adaptation and mitigation, and enabling climate resilient development (*high confidence*). If climate goals are to be achieved, and to address rising risks and accelerate investments in emissions reductions, both adaptation and mitigation finance would need to increase many-fold (*high confidence*). {*4.8.1*}

C.7.2 Increased access to finance can build capacity and address soft limits to adaptation and avert rising risks, especially for developing countries, vulnerable groups, regions and sectors (*high confidence*). Public finance is an important enabler of adaptation and mitigation, and can also leverage private finance (*high confidence*). Average annual modelled mitigation investment requirements for 2020 to 2030 in scenarios that limit warming to 2°C or 1.5°C are a factor of three to six greater than current levels[56], and total mitigation investments (public, private, domestic and international) would need to increase across all sectors and regions (*medium confidence*). Even if extensive global mitigation efforts are implemented, there will be a need for financial, technical, and human resources for adaptation (*high confidence*). {*4.3, 4.8.1*}

C.7.3 There is sufficient global capital and liquidity to close global investment gaps, given the size of the global financial system, but there are barriers to redirect capital to climate action both within and outside the global financial sector and in the context of economic vulnerabilities and indebtedness facing developing countries. Reducing financing barriers for scaling up financial flows would require clear signalling and support by governments, including a stronger alignment of public finances in order to lower real and perceived regulatory, cost and market barriers and risks and improving the risk-return profile of investments. At the same time, depending on national contexts, financial actors, including investors, financial intermediaries, central banks and financial regulators can shift the systemic underpricing of climate-related risks, and reduce sectoral and regional mismatches between available capital and investment needs. (*high confidence*) {*4.8.1*}

C.7.4 Tracked financial flows fall short of the levels needed for adaptation and to achieve mitigation goals across all sectors and regions. These gaps create many opportunities and the challenge of closing gaps is largest in developing countries. Accelerated financial support for developing countries from developed countries and other sources is a critical enabler to enhance adaptation and mitigation actions and address inequities in access to finance, including its costs, terms and conditions, and economic vulnerability to climate change for developing countries. Scaled-up public grants for mitigation and adaptation funding for vulnerable regions, especially in Sub-Saharan Africa, would be cost-effective and have high social returns in terms of access to basic energy. Options for scaling up mitigation in developing countries include: increased levels of public finance and publicly mobilised private finance flows from developed to developing countries in the context of the USD 100 billion-a-year goal; increased use of public guarantees to reduce risks and leverage private flows at lower cost; local capital markets development; and building greater trust in international cooperation processes. A coordinated effort to make the post-pandemic recovery sustainable over the longer-term can accelerate climate action, including in developing regions and countries facing high debt costs, debt distress and macroeconomic uncertainty. (*high confidence*) {*4.8.1*}

C.7.5 Enhancing technology innovation systems can provide opportunities to lower emissions growth, create social and environmental co-benefits, and achieve other SDGs. Policy packages tailored to national contexts and technological characteristics have been effective in supporting low-emission innovation and technology diffusion. Public policies can

[55] Finance originates from diverse sources: public or private, local, national or international, bilateral or multilateral, and alternative sources. It can take the form of grants, technical assistance, loans (concessional and non-concessional), bonds, equity, risk insurance and financial guarantees (of different types).

[56] These estimates rely on scenario assumptions.

support training and R&D, complemented by both regulatory and market-based instruments that create incentives and market opportunities. Technological innovation can have trade-offs such as new and greater environmental impacts, social inequalities, overdependence on foreign knowledge and providers, distributional impacts and rebound effects[57], requiring appropriate governance and policies to enhance potential and reduce trade-offs. Innovation and adoption of low-emission technologies lags in most developing countries, particularly least developed ones, due in part to weaker enabling conditions, including limited finance, technology development and transfer, and capacity building. (*high confidence*) {*4.8.3*}

C.7.6 International cooperation is a critical enabler for achieving ambitious climate change mitigation, adaptation, and climate resilient development (*high confidence*). Climate resilient development is enabled by increased international cooperation including mobilising and enhancing access to finance, particularly for developing countries, vulnerable regions, sectors and groups and aligning finance flows for climate action to be consistent with ambition levels and funding needs (*high confidence*). Enhancing international cooperation on finance, technology and capacity building can enable greater ambition and can act as a catalyst for accelerating mitigation and adaptation, and shifting development pathways towards sustainability (*high confidence*). This includes support to NDCs and accelerating technology development and deployment (*high confidence*). Transnational partnerships can stimulate policy development, technology diffusion, adaptation and mitigation, though uncertainties remain over their costs, feasibility and effectiveness (*medium confidence*). International environmental and sectoral agreements, institutions and initiatives are helping, and in some cases may help, to stimulate low GHG emissions investments and reduce emissions (*medium confidence*). {*2.2.2, 4.8.2*}

[57] Leading to lower net emission reductions or even emission increases.

Climate Change 2023
Synthesis Report

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Section 1
Introduction

1. Introduction

This Synthesis Report (SYR) of the IPCC Sixth Assessment Report (AR6) summarises the state of knowledge of climate change, its widespread impacts and risks, and climate change mitigation and adaptation, based on the peer-reviewed scientific, technical and socio-economic literature since the publication of the IPCC's Fifth Assessment Report (AR5) in 2014.

The assessment is undertaken within the context of the evolving international landscape, in particular, developments in the UN Framework Convention on Climate Change (UNFCCC) process, including the outcomes of the Kyoto Protocol and the adoption of the Paris Agreement. It reflects the increasing diversity of those involved in climate action.

This report integrates the main findings of the AR6 Working Group reports[58] and the three AR6 Special Reports[59]. It recognizes the interdependence of climate, ecosystems and biodiversity, and human societies; the value of diverse forms of knowledge; and the close linkages between climate change adaptation, mitigation, ecosystem health, human well-being and sustainable development. Building on multiple analytical frameworks, including those from the physical and social sciences, this report identifies opportunities for transformative action which are effective, feasible, just and equitable using concepts of systems transitions and resilient development pathways[60]. Different regional classification schemes[61] are used for physical, social and economic aspects, reflecting the underlying literature.

After this introduction, Section 2, '*Current Status and Trends*', opens with the assessment of observational evidence for our changing climate, historical and current drivers of human-induced climate change, and its impacts. It assesses the current implementation of adaptation and mitigation response options. Section 3, '*Long-Term Climate and Development Futures*', provides a long-term assessment of climate change to 2100 and beyond in a broad range of socio-economic futures. It considers long-term characteristics, impacts, risks and costs in adaptation and mitigation pathways in the context of sustainable development. Section 4, '*Near- Term Responses in a Changing Climate*', assesses opportunities for scaling up effective action in the period up to 2040, in the context of climate pledges, and commitments, and the pursuit of sustainable development.

Based on scientific understanding, key findings can be formulated as statements of fact or associated with an assessed level of confidence using the IPCC calibrated language[62]. The scientific findings are drawn from the underlying reports and arise from their Summary for Policymakers (hereafter SPM), Technical Summary (hereafter TS), and underlying chapters and are indicated by {} brackets. Figure 1.1 shows the Synthesis Report Figures Key, a guide to visual icons that are used across multiple figures within this report.

[58] The three Working Group contributions to AR6 are: Climate Change 2021: The Physical Science Basis; Climate Change 2022: Impacts, Adaptation and Vulnerability; and Climate Change 2022: Mitigation of Climate Change, respectively. Their assessments cover scientific literature accepted for publication respectively by 31 January 2021, 1 September 2021 and 11 October 2021.

[59] The three Special Reports are : Global Warming of 1.5°C (2018): an IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (SR1.5); Climate Change and Land (2019): an IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems (SRCCL); and The Ocean and Cryosphere in a Changing Climate (2019) (SROCC). The Special Reports cover scientific literature accepted for publication respectively by 15 May 2018, 7 April 2019 and 15 May 2019.

[60] The Glossary (Annex I) includes definitions of these, and other terms and concepts used in this report drawn from the AR6 joint Working Group Glossary.

[61] Depending on the climate information context, geographical regions in AR6 may refer to larger areas, such as sub-continents and oceanic regions, or to typological regions, such as monsoon regions, coastlines, mountain ranges or cities. A new set of standard AR6 WGI reference land and ocean regions have been defined. WGIII allocates countries to geographical regions, based on the UN Statistics Division Classification {*WGI 1.4.5, WGI 10.1, WGI 11.9, WGI 12.1–12.4, WGI Atlas.1.3.3–1.3.4*}.

[62] Each finding is grounded in an evaluation of underlying evidence and agreement. A level of confidence is expressed using five qualifiers: very low, low, medium, high and very high, and typeset in italics, for example, *medium confidence*. The following terms have been used to indicate the assessed likelihood of an outcome or result: virtually certain 99–100% probability; very likely 90–100%; likely 66–100%; more likely than not >50-100%; about as likely as not 33–66%; unlikely 0–33%; very unlikely 0–10%; and exceptionally unlikely 0–1%. Additional terms (extremely likely 95–100% and extremely unlikely 0–5%) are also used when appropriate. Assessed likelihood also is typeset in italics: for example, very likely. This is consistent with AR5. In this Report, unless stated otherwise, square brackets [x to y] are used to provide the assessed *very likely* range, or 90% interval.

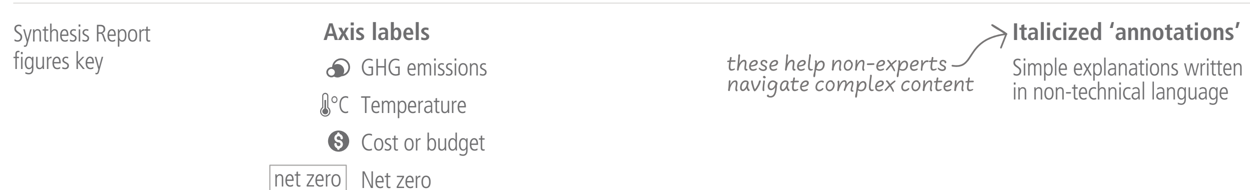


Figure 1.1: The Synthesis Report figures key.

Section 2
Current Status and Trends

Section 2: Current Status and Trends

2.1 Observed Changes, Impacts and Attribution

Human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850–1900 in 2011–2020. Global greenhouse gas emissions have continued to increase over 2010–2019, with unequal historical and ongoing contributions arising from unsustainable energy use, land use and land-use change, lifestyles and patterns of consumption and production across regions, between and within countries, and between individuals (*high confidence*). Human-caused climate change is already affecting many weather and climate extremes in every region across the globe. This has led to widespread adverse impacts on food and water security, human health and on economies and society and related losses and damages[63] to nature and people (*high confidence*). Vulnerable communities who have historically contributed the least to current climate change are disproportionately affected (*high confidence*).

2.1.1. Observed Warming and its Causes

Global surface temperature was around 1.1°C above 1850–1900 in 2011–2020 (1.09 [0.95 to 1.20]°C)[64], with larger increases over land (1.59 [1.34 to 1.83]°C) than over the ocean (0.88 [0.68 to 1.01]°C)[65]. Observed warming is human-caused, with warming from greenhouse gases (GHG), dominated by CO_2 and methane (CH_4), partly masked by aerosol cooling (Figure 2.1). Global surface temperature in the first two decades of the 21st century (2001–2020) was 0.99 [0.84 to 1.10]°C higher than 1850–1900. Global surface temperature has increased faster since 1970 than in any other 50-year period over at least the last 2000 years (*high confidence*). The *likely* range of total human-caused global surface temperature increase from 1850–1900 to 2010–2019[66] is 0.8°C to 1.3°C, with a best estimate of 1.07°C. It is *likely* that well-mixed GHGs[67] contributed a warming of 1.0°C to 2.0°C, and other human drivers (principally aerosols) contributed a cooling of 0.0°C to 0.8°C, natural (solar and volcanic) drivers changed global surface temperature by ±0.1°C and internal variability changed it by ±0.2°C. {*WGI SPM A.1, WGI SPM A.1.2, WGI SPM A.1.3, WGI SPM A.2.2, WGI Figure SPM.2; SRCCL TS.2*}

Observed increases in well-mixed GHG concentrations since around 1750 are unequivocally caused by GHG emissions from human activities. Land and ocean sinks have taken up a near-constant proportion (globally about 56% per year) of CO_2 emissions from human activities over the past six decades, with regional differences (*high confidence*). In 2019, atmospheric CO_2 concentrations reached 410 parts per million (ppm), CH_4 reached 1866 parts per billion (ppb) and nitrous oxide (N_2O) reached 332 ppb[68]. Other major contributors to warming are tropospheric ozone (O_3) and halogenated gases. Concentrations of CH_4 and N_2O have increased to levels unprecedented in at least 800,000 years (*very high confidence*), and there is *high confidence* that current CO_2 concentrations are higher than at any time over at least the past two million years. Since 1750, increases in CO_2 (47%) and CH_4 (156%) concentrations far exceed – and increases in N_2O (23%) are similar to – the natural multi-millennial changes between glacial and interglacial periods over at least the past 800,000 years (*very high confidence*). The net cooling effect which arises from anthropogenic aerosols peaked in the late 20th century (*high confidence*). {*WGI SPM A1.1, WGI SPM A1.3, WGI SPM A.2.1, WGI Figure SPM.2, WGI TS 2.2, WGI 2ES, WGI Figure 6.1*}

[63] In this report, the term 'losses and damages' refers to adverse observed impacts and/or projected risks and can be economic and/or non-economic. (See Annex I: Glossary)

[64] The estimated increase in global surface temperature since AR5 is principally due to further warming since 2003–2012 (+0.19 [0.16 to 0.22]°C). Additionally, methodological advances and new datasets have provided a more complete spatial representation of changes in surface temperature, including in the Arctic. These and other improvements have also increased the estimate of global surface temperature change by approximately 0.1°C, but this increase does not represent additional physical warming since AR5 {*WGI SPM A1.2 and footnote 10*}

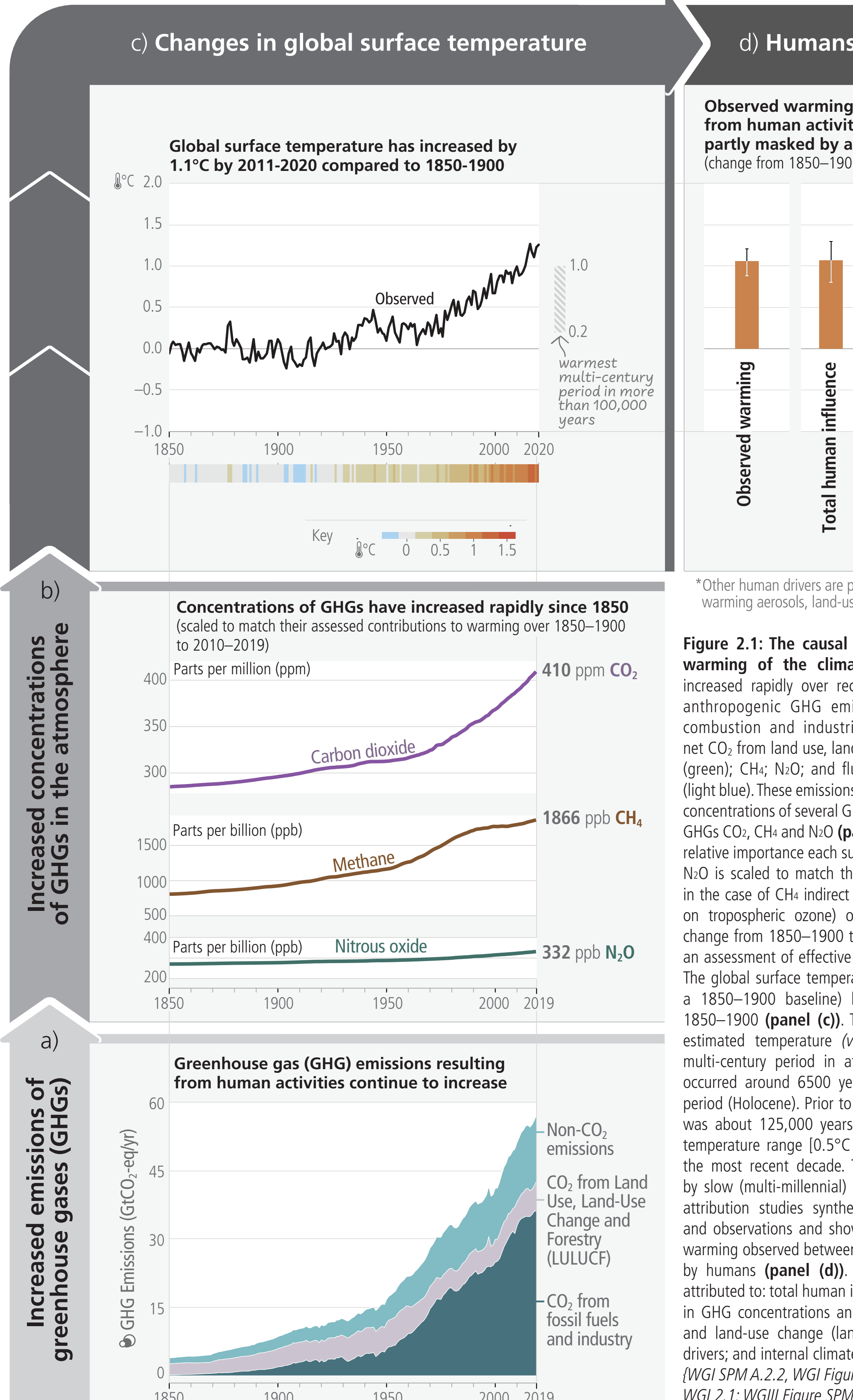
[65] For 1850–1900 to 2013–2022 the updated calculations are 1.15 [1.00 to 1.25]°C for global surface temperature, 1.65 [1.36 to 1.90]°C for land temperatures and 0.93 [0.73 to 1.04]°C for ocean temperatures above 1850–1900 using the exact same datasets (updated by 2 years) and methods as employed in WGI.

[66] The period distinction with the observed assessment arises because the attribution studies consider this slightly earlier period. The observed warming to 2010–2019 is 1.06 [0.88 to 1.21]°C. {*WGI SPM footnote 11*}

[67] Contributions from emissions to the 2010–2019 warming relative to 1850–1900 assessed from radiative forcing studies are: CO_2 0.8 [0.5 to 1.2]°C; methane 0.5 [0.3 to 0.8]°C; nitrous oxide 0.1 [0.0 to 0.2]°C and fluorinated gases 0.1 [0.0 to 0.2]°C.

[68] For 2021 (the most recent year for which final numbers are available) concentrations using the same observational products and methods as in AR6 WGI are: 415 ppm CO_2; 1896 ppb CH_4; and 335 ppb N_2O. Note that the CO_2 is reported here using the WMO-CO_2-X2007 scale to be consistent with WGI. Operational CO_2 reporting has since been updated to use the WMO-CO_2-X2019 scale.

Human activities are responsible for global warming



*Other human drivers are predominantly cooling aerosols, but also warming aerosols, land-use change (land-use reflectance) and ozone.

Figure 2.1: The causal chain from emissions to resulting warming of the climate system. Emissions of GHG have increased rapidly over recent decades **(panel (a))**. Global net anthropogenic GHG emissions include CO_2 from fossil fuel combustion and industrial processes (CO_2-FFI) (dark green); net CO_2 from land use, land-use change and forestry (CO_2-LULUCF) (green); CH_4; N_2O; and fluorinated gases (HFCs, PFCs, SF_6, NF_3) (light blue). These emissions have led to increases in the atmospheric concentrations of several GHGs including the three major well-mixed GHGs CO_2, CH_4 and N_2O **(panel (b)**, annual values). To indicate their relative importance each subpanel's vertical extent for CO_2, CH_4 and N_2O is scaled to match the assessed individual direct effect (and, in the case of CH_4 indirect effect via atmospheric chemistry impacts on tropospheric ozone) of historical emissions on temperature change from 1850–1900 to 2010–2019. This estimate arises from an assessment of effective radiative forcing and climate sensitivity. The global surface temperature (shown as annual anomalies from a 1850–1900 baseline) has increased by around 1.1°C since 1850–1900 **(panel (c))**. The vertical bar on the right shows the estimated temperature *(very likely range)* during the warmest multi-century period in at least the last 100,000 years, which occurred around 6500 years ago during the current interglacial period (Holocene). Prior to that, the next most recent warm period was about 125,000 years ago, when the assessed multi-century temperature range [0.5°C to 1.5°C] overlaps the observations of the most recent decade. These past warm periods were caused by slow (multi-millennial) orbital variations. Formal detection and attribution studies synthesise information from climate models and observations and show that the best estimate is that all the warming observed between 1850–1900 and 2010–2019 is caused by humans **(panel (d))**. The panel shows temperature change attributed to: total human influence; its decomposition into changes in GHG concentrations and other human drivers (aerosols, ozone and land-use change (land-use reflectance)); solar and volcanic drivers; and internal climate variability. Whiskers show *likely* ranges. *{WGI SPM A.2.2, WGI Figure SPM.1, WGI Figure SPM.2, WGI TS2.2, WGI 2.1; WGIII Figure SPM.1, WGIII A.III.II.2.5.1}*

Average annual GHG emissions during 2010–2019 were higher than in any previous decade, but the rate of growth between 2010 and 2019 (1.3% yr^{-1}) was lower than that between 2000 and 2009 (2.1% yr^{-1})[69]**.** Historical cumulative net CO_2 emissions from 1850 to 2019 were 2400 ±240 $GtCO_2$. Of these, more than half (58%) occurred between 1850 and 1989 [1400 ±195 $GtCO_2$], and about 42% between 1990 and 2019 [1000 ±90 $GtCO_2$]. Global net anthropogenic GHG emissions have been estimated to be 59±6.6 $GtCO_2$-eq in 2019, about 12% (6.5 $GtCO_2$-eq) higher than in 2010 and 54% (21 $GtCO_2$-eq) higher than in 1990. By 2019, the largest growth in gross emissions occurred in CO_2 from fossil fuels and industry (CO_2-FFI) followed by CH_4, whereas the highest relative growth occurred in fluorinated gases (F-gases), starting from low levels in 1990. (*high confidence*) {*WGIII SPM B1.1*, *WGIII SPM B.1.2*, *WGIII SPM B.1.3*, *WGIII Figure SPM.1*, *WGIII Figure SPM.2*}

Regional contributions to global human-caused GHG emissions continue to differ widely. Historical contributions of CO_2 emissions vary substantially across regions in terms of total magnitude, but also in terms of contributions to CO_2-FFI (1650 ± 73 $GtCO_2$-eq) and net CO_2-LULUCF (760 ± 220 $GtCO_2$-eq) emissions (Figure 2.2). Variations in regional and national per capita emissions partly reflect different development stages, but they also vary widely at similar income levels. Average per capita net anthropogenic GHG emissions in 2019 ranged from 2.6 tCO_2-eq to 19 tCO_2-eq across regions (Figure 2.2). Least Developed Countries (LDCs) and Small Island Developing States (SIDS) have much lower per capita emissions (1.7 tCO_2-eq and 4.6 tCO_2-eq, respectively) than the global average (6.9 tCO_2-eq), excluding CO_2-LULUCF. Around 48% of the global population in 2019 lives in countries emitting on average more than 6 tCO_2-eq per capita, 35% of the global population live in countries emitting more than 9 tCO_2-eq per capita[70] (excluding CO_2-LULUCF) while another 41% live in countries emitting less than 3 tCO_2-eq per capita. A substantial share of the population in these low-emitting countries lack access to modern energy services. (*high confidence*) {*WGIII SPM B.3*, *WGIII SPM B3.1*, *WGIII SPM B.3.2*, *WGIII SPM B.3.3*}

Net GHG emissions have increased since 2010 across all major sectors (*high confidence*). In 2019, approximately 34% (20 $GtCO_2$-eq) of net global GHG emissions came from the energy sector, 24% (14 $GtCO_2$-eq) from industry, 22% (13 $GtCO_2$-eq) from AFOLU, 15% (8.7 $GtCO_2$-eq) from transport and 6% (3.3 $GtCO_2$-eq) from buildings[71] (*high confidence*). Average annual GHG emissions growth between 2010 and 2019 slowed compared to the previous decade in energy supply (from 2.3% to 1.0%) and industry (from 3.4% to 1.4%) but remained roughly constant at about 2% yr^{-1} in the transport sector (*high confidence*). About half of total net AFOLU emissions are from CO_2 LULUCF, predominantly from deforestation (*medium confidence*). Land overall constituted a net sink of –6.6 (±4.6) $GtCO_2$ yr^{-1} for the period 2010–2019[72] (*medium confidence*). {*WGIII SPM B.2*, *WGIII SPM B.2.1*, *WGIII SPM B.2.2*, *WGIII TS 5.6.1*}

Human-caused climate change is a consequence of more than a century of net GHG emissions from energy use, land-use and land use change, lifestyle and patterns of consumption, and production. Emissions reductions in CO_2 from fossil fuels and industrial processes (CO_2-FFI), due to improvements in energy intensity of GDP and carbon intensity of energy, have been less than emissions increases from rising global activity levels in industry, energy supply, transport, agriculture and buildings. The 10% of households with the highest per capita emissions contribute 34–45% of global consumption-based household GHG emissions, while the middle 40% contribute 40–53%, and the bottom 50% contribute 13–15%. An increasing share of emissions can be attributed to urban areas (a rise from about 62% to 67–72% of the global share between 2015 and 2020). The drivers of urban GHG emissions[73] are complex and include population size, income, state of urbanisation and urban form. (*high confidence*) {*WGIII SPM B.2*, *WGIII SPM B.2.3*, *WGIII SPM B.3.4*, *WGIII SPM D.1.1*}

[69] GHG emission metrics are used to express emissions of different GHGs in a common unit. Aggregated GHG emissions in this report are stated in CO_2-equivalents (CO_2-eq) using the Global Warming Potential with a time horizon of 100 years (GWP100) with values based on the contribution of Working Group I to the AR6. The AR6 WGI and WGIII reports contain updated emission metric values, evaluations of different metrics with regard to mitigation objectives, and assess new approaches to aggregating gases. The choice of metric depends on the purpose of the analysis and all GHG emission metrics have limitations and uncertainties, given that they simplify the complexity of the physical climate system and its response to past and future GHG emissions. {*WGI SPM D.1.8*, *WGI 7.6; WGIII SPM B.1*, *WGIII Cross-Chapter Box 2.2*} (*Annex I: Glossary*)

[70] Territorial emissions

[71] GHG emission levels are rounded to two significant digits; as a consequence, small differences in sums due to rounding may occur. {*WGIII SPM footnote 8*}

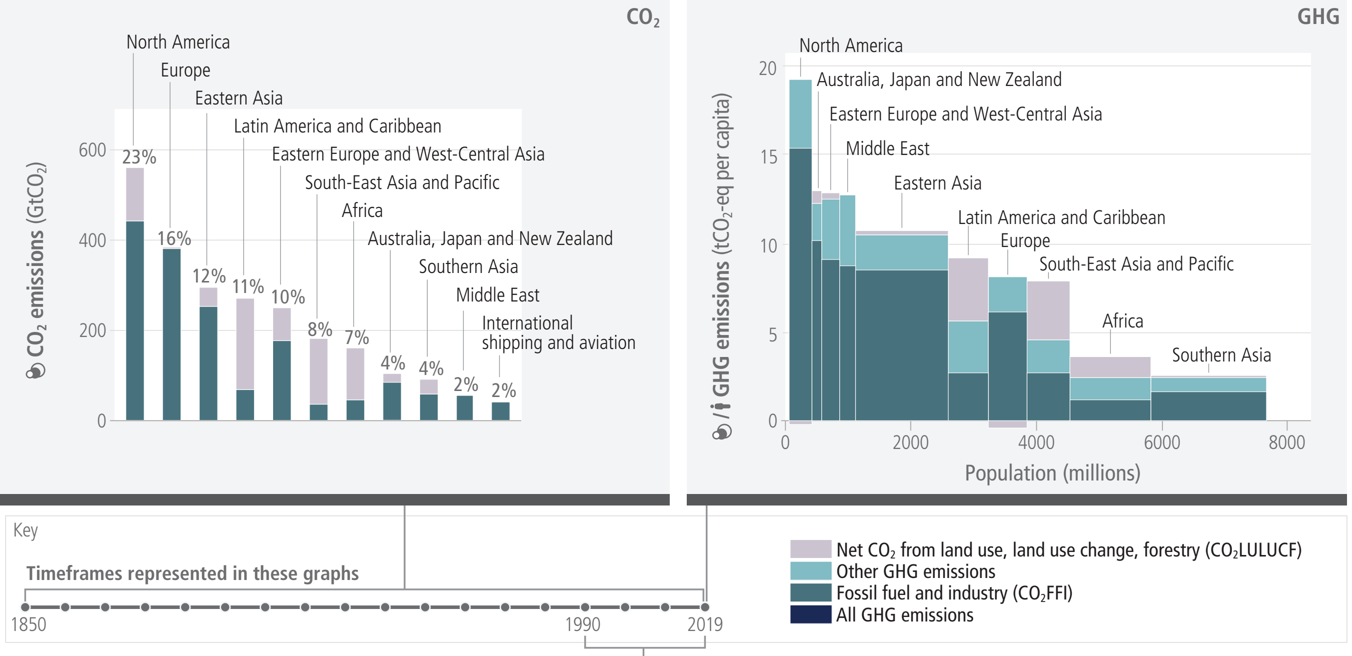
[72] Comprising a gross sink of -12.5 (±3.2) $GtCO_2$ yr^{-1} resulting from responses of all land to both anthropogenic environmental change and natural climate variability, and net anthropogenic CO_2-LULUCF emissions +5.9 (±4.1) $GtCO_2$ yr^{-1} based on book-keeping models. {*WGIII SPM Footnote 14*}

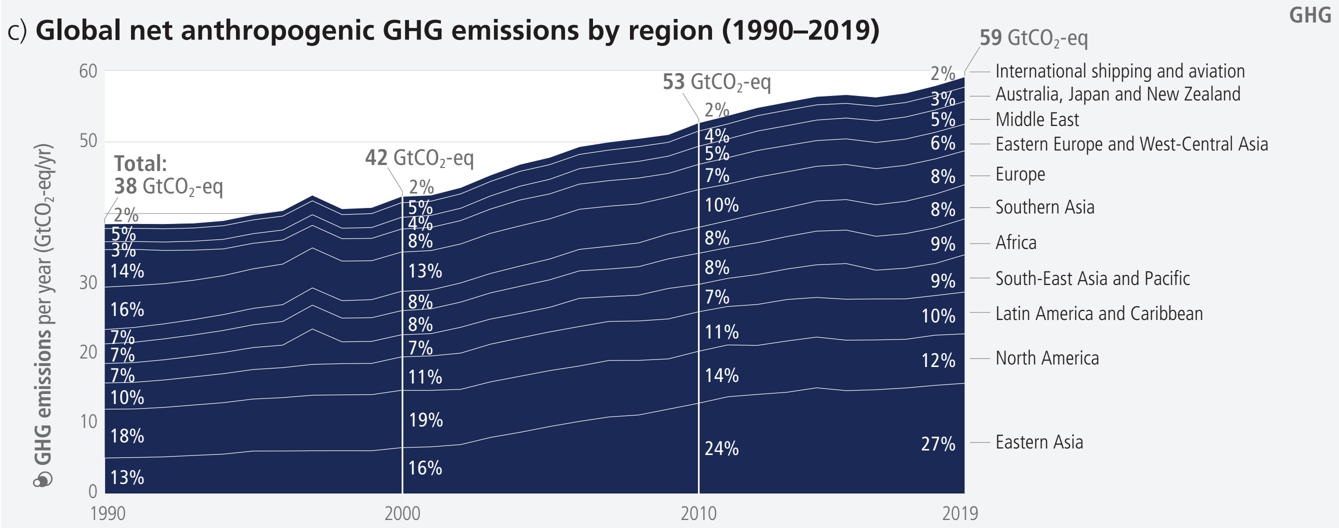
[73] This estimate is based on consumption-based accounting, including both direct emissions from within urban areas, and indirect emissions from outside urban areas related to the production of electricity, goods and services consumed in cities. These estimates include all CO_2 and CH_4 emission categories except for aviation and marine bunker fuels, land-use change, forestry and agriculture. {*WGIII SPM footnote 15*}

Emissions have grown in most regions but are distributed unevenly, both in the present day and cumulatively since 1850

a) **Historical cumulative net anthropogenic CO_2 emissions per region (1850–2019)**

b) **Net anthropogenic GHG emissions per capita and for total population, per region (2019)**





d) **Regional indicators (2019) and regional production vs consumption accounting (2018)**

	Africa	Australia, Japan, New Zealand	Eastern Asia	Eastern Europe, West-Central Asia	Europe	Latin America and Caribbean	Middle East	North America	South-East Asia and Pacific	Southern Asia
Population (million persons, 2019)	1292	157	1471	291	620	646	252	366	674	1836
GDP per capita ($USD1000_{PPP}$ 2017 per person) [1]	5.0	43	17	20	43	15	20	61	12	6.2
Net GHG 2019 [2] (production basis)										
GHG emissions intensity (tCO_2-eq / $USD1000_{PPP}$ 2017)	0.78	0.30	0.62	0.64	0.18	0.61	0.64	0.31	0.65	0.42
GHG per capita (tCO_2-eq per person)	3.9	13	11	13	7.8	9.2	13	19	7.9	2.6
CO_2FFI, 2018, per person										
Production-based emissions (tCO_2FFI per person, based on 2018 data)	1.2	10	8.4	9.2	6.5	2.8	8.7	16	2.6	1.6
Consumption-based emissions (tCO_2FFI per person, based on 2018 data)	0.84	11	6.7	6.2	7.8	2.8	7.6	17	2.5	1.5

[1] GDP per capita in 2019 in USD2017 currency purchasing power basis.
[2] Includes CO_2FFI, $CO_2LULUCF$ and Other GHGs, excluding international aviation and shipping.

The regional groupings used in this figure are for statistical purposes only and are described in WGIII Annex II, Part I.

Figure 2.2: Regional GHG emissions, and the regional proportion of total cumulative production-based CO_2 emissions from 1850 to 2019. Panel (a) shows the share of historical cumulative net anthropogenic CO_2 emissions per region from 1850 to 2019 in $GtCO_2$. This includes CO_2-FFI and CO_2-LULUCF. Other GHG emissions are not included. CO_2-LULUCF emissions are subject to high uncertainties, reflected by a global uncertainty estimate of ±70% (90% confidence interval). **Panel (b)** shows the distribution of regional GHG emissions in tonnes CO_2-eq per capita by region in 2019. GHG emissions are categorised into: CO_2-FFI; net CO_2-LULUCF; and other GHG emissions (CH_4, N_2O, fluorinated gases, expressed in CO_2-eq using GWP100-AR6). The height of each rectangle shows per capita emissions, the width shows the population of the region, so that the area of the rectangles refers to the total emissions for each region. Emissions from international aviation and shipping are not included. In the case of two regions, the area for CO_2-LULUCF is below the axis, indicating net CO_2 removals rather than emissions. **Panel (c)** shows global net anthropogenic GHG emissions by region (in $GtCO_2$-eq yr^{-1} (GWP100-AR6)) for the time period 1990–2019. Percentage values refer to the contribution of each region to total GHG emissions in each respective time period. The single-year peak of emissions in 1997 was due to higher CO_2-LULUCF emissions from a forest and peat fire event in South East Asia. Regions are as grouped in Annex II of WGIII. **Panel (d)** shows population, gross domestic product (GDP) per person, emission indicators by region in 2019 for total GHG per person, and total GHG emissions intensity, together with production-based and consumption-based CO_2-FFI data, which is assessed in this report up to 2018. Consumption-based emissions are emissions released to the atmosphere in order to generate the goods and services consumed by a certain entity (e.g., region). Emissions from international aviation and shipping are not included. *{WGIII Figure SPM.2}*

2.1.2. Observed Climate System Changes and Impacts to Date

It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred (Table 2.1). The scale of recent changes across the climate system as a whole and the present state of many aspects of the climate system are unprecedented over many centuries to many thousands of years. It is *very likely* that GHG emissions were the main driver[74] of tropospheric warming and *extremely likely* that human-caused stratospheric ozone depletion was the main driver of stratospheric cooling between 1979 and the mid-1990s. It is *virtually certain* that the global upper ocean (0-700m) has warmed since the 1970s and *extremely likely* that human influence is the main driver. Ocean warming accounted for 91% of the heating in the climate system, with land warming, ice loss and atmospheric warming accounting for about 5%, 3% and 1%, respectively (*high confidence*). Global mean sea level increased by 0.20 [0.15 to 0.25] m between 1901 and 2018. The average rate of sea level rise was 1.3 [0.6 to 2.1]mm yr^{-1} between 1901 and 1971, increasing to 1.9 [0.8 to 2.9] mm yr^{-1} between 1971 and 2006, and further increasing to 3.7 [3.2 to –4.2] mm yr^{-1} between 2006 and 2018 (*high confidence*). Human influence was *very likely* the main driver of these increases since at least 1971 (Figure 3.4). Human influence is *very likely* the main driver of the global retreat of glaciers since the 1990s and the decrease in Arctic sea ice area between 1979–1988 and 2010–2019. Human influence has also *very likely* contributed to decreased Northern Hemisphere spring snow cover and surface melting of the Greenland ice sheet. It is *virtually* certain that human-caused CO_2 emissions are the main driver of current global acidification of the surface open ocean. {*WGI SPM A.1, WGI SPM A.1.3, WGI SPM A.1.5, WGI SPM A.1.6, WG1 SPM A1.7, WGI SPM A.2, WG1.SPM A.4.2; SROCC SPM.A.1, SROCC SPM A.2*}

Human-caused climate change is already affecting many weather and climate extremes in every region across the globe. Evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has strengthened since AR5 (Figure 2.3). It is *virtually* certain that hot extremes (including heatwaves) have become more frequent and more intense across most land regions since the 1950s (Figure 2.3), while cold extremes (including cold waves) have become less frequent and less severe, with *high confidence* that human-caused climate change is the main driver of these changes. Marine heatwaves have approximately doubled in frequency since the 1980s (*high confidence*), and human influence has *very likely* contributed to most of them since at least 2006. The frequency and intensity of heavy precipitation events have increased since the 1950s over most land areas for which observational data are sufficient for trend analysis (*high confidence*), and human-caused climate change is *likely* the main driver (Figure 2.3). Human-caused climate change has contributed to increases in agricultural and ecological droughts in some regions due to increased land evapotranspiration (*medium confidence*) (Figure 2.3). It is *likely* that the global proportion of major (Category 3–5) tropical cyclone occurrence has increased over the last four decades. {*WGI SPM A.3, WGI SPM A3.1, WGI SPM A3.2; WGI SPM A3.4; SRCCL SPM.A.2.2; SROCC SPM. A.2*}

Climate change has caused substantial damages, and increasingly irreversible[75] losses, in terrestrial, freshwater, cryospheric and coastal and open ocean ecosystems (*high confidence*). The extent and magnitude of climate change impacts are larger than estimated in previous assessments (*high confidence*). Approximately half of the species assessed globally have shifted polewards or, on land, also to higher elevations (*very high confidence*). Biological responses including changes in geographic placement and shifting seasonal timing are often not sufficient to cope with recent climate change (*very high confidence*). Hundreds of local losses of species have been driven by increases in the magnitude of heat extremes (*high confidence*) and mass mortality events on land and in the ocean (*very high confidence*). Impacts on some ecosystems are approaching irreversibility such as the impacts of hydrological changes resulting from the retreat of glaciers, or the changes in some mountain (*medium confidence*) and Arctic ecosystems driven by permafrost thaw (*high confidence*). Impacts in ecosystems from slow-onset processes such as ocean acidification, sea level rise or regional decreases in precipitation have also been attributed to human-caused climate change (*high confidence*). Climate change has contributed to desertification and exacerbated land degradation, particularly in low lying coastal areas, river deltas, drylands and in permafrost areas (*high confidence*). Nearly 50% of coastal wetlands have been lost over the last 100 years, as a result of the combined effects of localised human pressures, sea level rise, warming and extreme climate events (*high confidence*). {*WGII SPM B.1.1, WGII SPM B.1.2, WGII Figure SPM.2.A, WGII TS.B.1; SRCCL SPM A.1.5, SRCCL SPM A.2, SRCCL SPM A.2.6, SRCCL Figure SPM.1; SROCC SPM A.6.1, SROCC SPM, A.6.4, SROCC SPM A.7*}

[74] 'Main driver' means responsible for more than 50% of the change. {*WGI SPM footnote 12*}

[75] See Annex I: Glossary.

Table 2.1: Assessment of observed changes in large-scale indicators of mean climate across climate system components, and their attribution to human influence. The colour coding indicates the assessed confidence in / likelihood[76] of the observed change and the human contribution as a driver or main driver (specified in that case) where available (see colour key). Otherwise, explanatory text is provided. {*WGI Table TS.1*}

Change in indicator		Observed change assessment	Human contribution assessment
Atmosphere and water cycle	Warming of global mean surface air temperature since 1850-1900		*likely* range of human contribution ([0.8-1.3°C]) encompasses the very likely range of observed warming ([0.9-1.2°C])
	Warming of the troposphere since 1979		Main driver
	Cooling of the lower stratosphere since the mid-20th century		Main driver 1979 - mid-1990s
	Large-scale precipitation and upper troposphere humidity changes since 1979		
	Expansion of the zonal mean Hadley Circulation since the 1980s		Southern Hemisphere
Ocean	Ocean heat content increase since the 1970s		Main driver
	Salinity changes since the mid-20th century		
	Global mean sea level rise since 1970		Main driver
Cryosphere	Arctic sea ice loss since 1979		Main driver
	Reduction in Northern Hemisphere springtime snow cover since 1950		
	Greenland ice sheet mass loss since 1990s		
	Antarctic ice sheet mass loss since 1990s		*Limited evidence & medium agreement*
	Retreat of glaciers		Main driver
Carbon cycle	Increased amplitude of the seasonal cycle of atmospheric CO_2 since the early 1960s		Main driver
	Acidification of the global surface ocean		Main driver
Land climate	Mean surface air temperature over land (about 40% larger than global mean warming)		Main driver
Synthesis	Warming of the global climate system since preindustrial times		

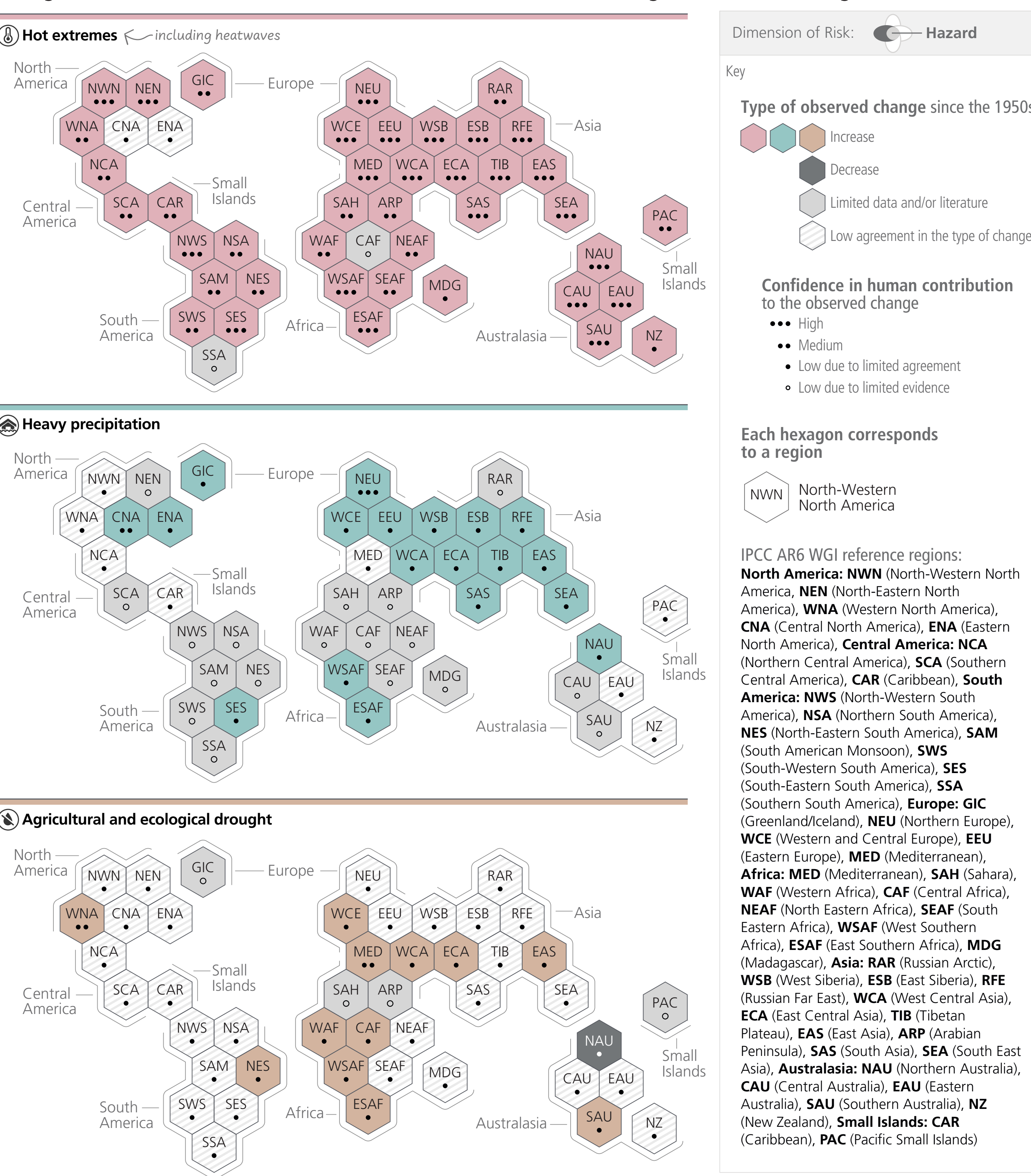
Key: *medium confidence* | *likely / high confidence* | *very likely* | *extremely likely* | *virtually certain* | fact

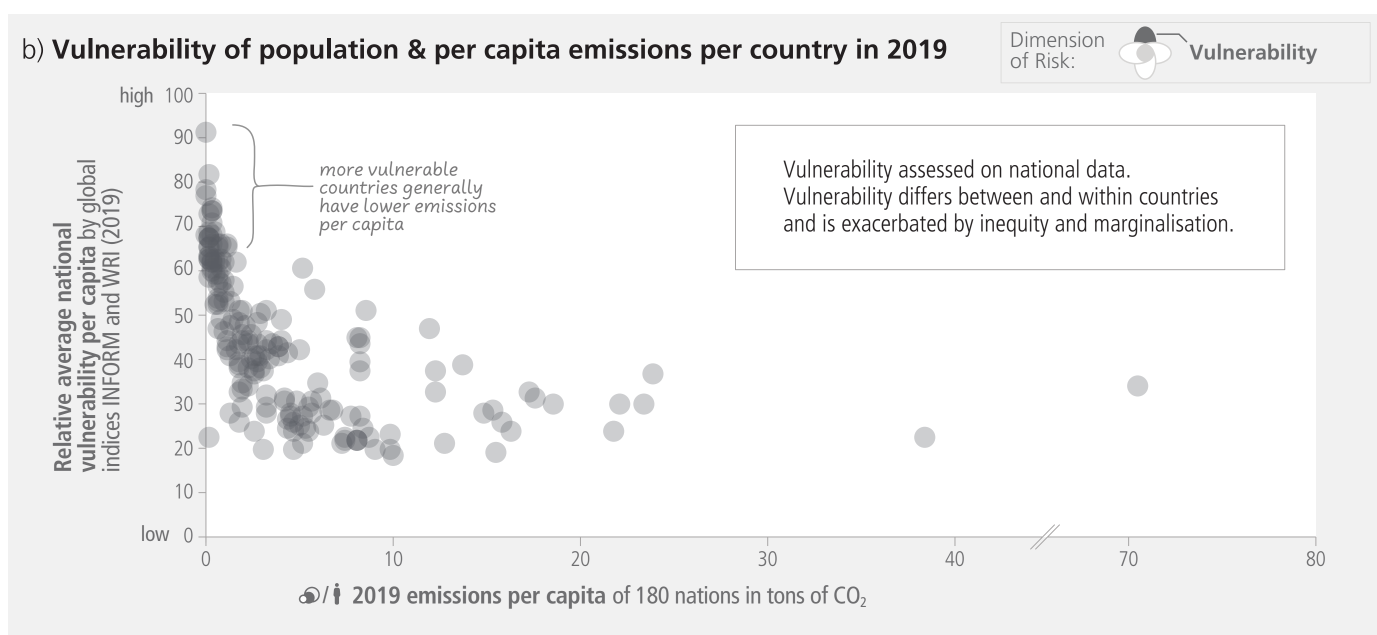
Section 2

[76] Based on scientific understanding, key findings can be formulated as statements of fact or associated with an assessed level of confidence indicated using the IPCC calibrated language.

Climate change has impacted human and natural systems across the world with those who have generally least contributed to climate change being most vulnerable

a) **Synthesis of assessment of observed change in hot extremes, heavy precipitation and drought, and confidence in human contribution to the observed changes in the world's regions**





c) Observed impacts and related losses and damages of climate change

			Global	Africa	Asia	Australasia	Central & South America	Europe	North America	Small Islands
HUMAN SYSTEMS	Water availability and food production	Physical water availability	•• (adverse and positive)	••	•• (adverse and positive)	• (adverse and positive)	• (adverse and positive)	•• (adverse and positive)	•• (adverse and positive)	•••
		Agriculture/crop production	••	•••	••• (adverse and positive)	•••	••	••• (adverse and positive)	••• (adverse and positive)	••
		Animal and livestock health and productivity	• (adverse and positive)	•	•	•• (adverse and positive)	•• (adverse and positive)	••	•	••
		Fisheries yields and aquaculture production	••	••	••	••	••	•• (adverse and positive)	•• (adverse and positive)	•••
	Health and wellbeing	Infectious diseases	••	•••	••	•	••	••	•••	•
		Heat, malnutrition and harm from wildfire	•••	•••	•••	••	••	••	•••	•••
		Mental health	•••	–	•••	••	/	•••	•••	–
		Displacement	•••	•••	•••	/	••	•	•••	••
	Cities, settlements and infrastructure	Inland flooding and associated damages	•••	••	•	•	••	••	••	•••
		Flood/storm induced damages in coastal areas	•••	••	•••	•••	•	•	•••	•••
		Damages to infrastructure	•••	••	••	•••	••	••	•••	•••
		Damages to key economic sectors	••	•••	••	•••	••	••	•••	•••
ECOSYSTEMS	Changes in ecosystem structure	Terrestrial	•••	•••	•••	•••	•••	•••	•••	•••
		Freshwater	•••	•••	••	–	•••	•••	•••	•••
		Ocean	•••	•••	•••	•••	•••	•••	•••	•••
	Species range shifts	Terrestrial	•••	•••	•	•••	•••	•••	•••	•••
		Freshwater	•••	–	••	–	•••	•••	•••	•••
		Ocean	•••	•••	–	•••	•••	•••	•••	•••
	Changes in seasonal timing (phenology)	Terrestrial	•••	–	•	•••	–	•••	•••	•••
		Freshwater	•••	•	•	–	–	•••	•••	–
		Ocean	•••	•	••	•	•	•••	•••	••

Dimension of Risk: Impact

Key

Increased climate impacts

HUMAN SYSTEMS
- Adverse impacts
- Adverse and positive impacts

ECOSYSTEMS
- Climate-driven changes observed, no assessment of impact direction

Confidence in attribution to climate change
- ••• *High or very high*
- •• *Medium*
- • *Low*
- – Evidence limited, insufficient
- / Not assessed

Figure 2.3: Both vulnerability to current climate extremes and historical contribution to climate change are highly heterogeneous with many of those who have least contributed to climate change to date being most vulnerable to its impacts. Panel (a) The IPCC AR6 WGI inhabited regions are displayed as hexagons with identical size in their approximate geographical location (see legend for regional acronyms). All assessments are made for each region as a whole and for the 1950s to the present. Assessments made on different time scales or more local spatial scales might differ from what is shown in the figure. The colours in each panel represent the four outcomes of the assessment on observed changes. Striped hexagons (white and light-grey) are used where there is *low agreement* in the type of change for the region as a whole, and grey hexagons are used when there is limited data and/or literature that prevents an assessment of the region as a whole. Other colours indicate at least *medium confidence* in the observed change. The confidence level for the human influence on these observed changes is based on assessing trend detection and attribution and event attribution literature, and it is indicated by the number of dots: three dots for *high confidence*, two dots for *medium confidence* and one dot for *low confidence* (single, filled dot: *limited agreement*; single, empty dot: *limited evidence*). For hot extremes, the evidence is mostly drawn from changes in metrics based on daily maximum temperatures; regional studies using other indices (heatwave duration, frequency and intensity) are used in addition. For heavy precipitation, the evidence is mostly drawn from changes in indices based on one-day or five-day precipitation amounts using global and regional studies. Agricultural and ecological droughts are assessed based on observed and simulated changes in total column soil moisture, complemented by evidence on changes in surface soil moisture, water balance (precipitation minus evapotranspiration) and indices driven by precipitation and atmospheric evaporative demand. **Panel (b)** shows the average level of vulnerability amongst a country's population against 2019 CO_2-FFI emissions per- capita per country for the 180 countries for which both sets of metrics are available. Vulnerability information is based on two global indicator systems, namely INFORM and World Risk Index. Countries with a relatively low average vulnerability often have groups with high vulnerability within their population and vice versa. The underlying data includes, for example, information on poverty, inequality, health care infrastructure or insurance coverage. **Panel (c)** Observed impacts on ecosystems and human systems attributed to climate change at global and regional scales. Global assessments focus on large studies, multi-species, meta-analyses and large reviews. Regional assessments consider evidence on impacts across an entire region and do not focus on any country in particular. For human systems, the direction of impacts is assessed and both adverse and positive impacts have been observed e.g., adverse impacts in one area or food item may occur with positive impacts in another area or food item (for more details and methodology see WGII SMTS.1). Physical water availability includes balance of water available from various sources including ground water, water quality and demand for water. Global mental health and displacement assessments reflect only assessed regions. Confidence levels reflect the assessment of attribution of the observed impact to climate change. *{WGI Figure SPM.3, Table TS.5, Interactive Atlas; WGII Figure SPM.2, WGII SMTS.1, WGII 8.3.1, Figure 8.5; ; WGIII 2.2.3}*

Climate change has reduced food security and affected water security due to warming, changing precipitation patterns, reduction and loss of cryospheric elements, and greater frequency and intensity of climatic extremes, thereby hindering efforts to meet Sustainable Development Goals (*high confidence*). Although overall agricultural productivity has increased, climate change has slowed this growth in agricultural productivity over the past 50 years globally (*medium confidence*), with related negative crop yield impacts mainly recorded in mid- and low latitude regions, and some positive impacts in some high latitude regions (*high confidence*). Ocean warming in the 20th century and beyond has contributed to an overall decrease in maximum catch potential (*medium confidence*), compounding the impacts from overfishing for some fish stocks (*high confidence*). Ocean warming and ocean acidification have adversely affected food production from shellfish aquaculture and fisheries in some oceanic regions (*high confidence*). Current levels of global warming are associated with moderate risks from increased dryland water scarcity (*high confidence*). Roughly half of the world's population currently experiences severe water scarcity for at least some part of the year due to a combination of climatic and non-climatic drivers (*medium confidence*) (Figure 2.3). Unsustainable agricultural expansion, driven in part by unbalanced diets[77], increases ecosystem and human vulnerability and leads to competition for land and/or water resources (*high confidence*). Increasing weather and climate extreme events have exposed millions of people to acute food insecurity[78] and reduced water security, with the largest impacts observed in many locations and/or communities in Africa, Asia, Central and South America, LDCs, Small Islands and the Arctic, and for small-scale food producers, low-income households and Indigenous Peoples globally (*high confidence*). {*WGII SPM B.1.3, WGII SPM.B.2.3, WGII Figure SPM.2, WGII TS B.2.3, WGII TS Figure TS. 6; SRCCL SPM A.2.8, SRCCL SPM A.5.3; SROCC SPM A.5.4., SROCC SPM A.7.1, SROCC SPM A.8.1, SROCC Figure SPM.2*}

In urban settings, climate change has caused adverse impacts on human health, livelihoods and key infrastructure (*high confidence*). Hot extremes including heatwaves have intensified in cities (*high confidence*), where they have also worsened air pollution events (*medium confidence*) and limited functioning of key infrastructure (*high confidence*). Urban infrastructure, including transportation, water, sanitation and energy systems have been compromised by extreme and slow-onset events[79], with resulting economic losses, disruptions of services and impacts to well-being (*high confidence*). Observed impacts are concentrated amongst economically and socially marginalised urban residents, e.g., those living in informal settlements (*high confidence*). Cities intensify human-caused warming locally (*very high confidence*), while urbanisation also increases mean and heavy precipitation over and/or downwind of cities (*medium confidence*) and resulting runoff intensity (*high confidence*). {*WGI SPM C.2.6; WGII SPM B.1.5, WGII Figure TS.9, WGII 6 ES*}

Climate change has adversely affected human physical health globally and mental health in assessed regions (*very high confidence*), and is contributing to humanitarian crises where climate hazards interact with high vulnerability (*high confidence*). In all regions increases in extreme heat events have resulted in human mortality and morbidity (*very high confidence*). The occurrence of climate-related food-borne and water-borne diseases has increased (*very high confidence*). The incidence of vector-borne diseases has increased from range expansion and/or increased reproduction of disease vectors (*high confidence*). Animal and human diseases, including zoonoses, are emerging in new areas (*high confidence*). In assessed regions, some mental health challenges are associated with increasing temperatures (*high confidence*), trauma from extreme events (*very high confidence*), and loss of livelihoods and culture

[77] Balanced diets feature plant-based foods, such as those based on coarse grains, legumes fruits and vegetables, nuts and seeds, and animal-source foods produced in resilient, sustainable and low-GHG emissions systems, as described in SRCCL. {*WGII SPM Footnote 32*}

[78] Acute food insecurity can occur at any time with a severity that threatens lives, livelihoods or both, regardless of the causes, context or duration, as a result of shocks risking determinants of food security and nutrition, and is used to assess the need for humanitarian action. {*WGII SPM, footnote 30*}

[79] Slow-onset events are described among the climatic-impact drivers of the AR6 WGI and refer to the risks and impacts associated with e.g., increasing temperature means, desertification, decreasing precipitation, loss of biodiversity, land and forest degradation, glacial retreat and related impacts, ocean acidification, sea level rise and salinization. {*WGII SPM footnote 29*}

(*high confidence*) (Figure 2.3). Climate change impacts on health are mediated through natural and human systems, including economic and social conditions and disruptions (*high confidence*). Climate and weather extremes are increasingly driving displacement in Africa, Asia, North America (*high confidence*), and Central and South America (*medium confidence*) (Figure 2.3), with small island states in the Caribbean and South Pacific being disproportionately affected relative to their small population size (*high confidence*). Through displacement and involuntary migration from extreme weather and climate events, climate change has generated and perpetuated vulnerability (*medium confidence*). {*WGII SPM B.1.4, WGII SPM B.1.7*}

Human influence has *likely* increased the chance of compound extreme events[80] since the 1950s. Concurrent and repeated climate hazards have occurred in all regions, increasing impacts and risks to health, ecosystems, infrastructure, livelihoods and food (*high confidence*). Compound extreme events include increases in the frequency of concurrent heatwaves and droughts (*high confidence*); fire weather in some regions (*medium confidence*); and compound flooding in some locations (*medium confidence*). Multiple risks interact, generating new sources of vulnerability to climate hazards, and compounding overall risk (*high confidence*). Compound climate hazards can overwhelm adaptive capacity and substantially increase damage (*high confidence*)*)*. {*WGI SPM A.3.5; WGII SPM. B.5.1, WGII TS.C.11.3*}

Economic impacts attributable to climate change are increasingly affecting peoples' livelihoods and are causing economic and societal impacts across national boundaries (*high confidence*). Economic damages from climate change have been detected in climate-exposed sectors, with regional effects to agriculture, forestry, fishery, energy, and tourism, and through outdoor labour productivity (*high confidence*) with some exceptions of positive impacts in regions with low energy demand and comparative advantages in agricultural markets and tourism (*high confidence*). Individual livelihoods have been affected through changes in agricultural productivity, impacts on human health and food security, destruction of homes and infrastructure, and loss of property and income, with adverse effects on gender and social equity (*high confidence*). Tropical cyclones have reduced economic growth in the short-term (*high confidence*). Event attribution studies and physical understanding indicate that human-caused climate change increases heavy precipitation associated with tropical cyclones (*high confidence*). Wildfires in many regions have affected built assets, economic activity, and health (*medium* to *high confidence*). In cities and settlements, climate impacts to key infrastructure are leading to losses and damages across water and food systems, and affect economic activity, with impacts extending beyond the area directly impacted by the climate hazard (*high confidence*). {*WGI SPM A.3.4; WGII SPM B.1.6, WGII SPM B.5.2, WGII SPM B.5.3*}

Climate change has caused widespread adverse impacts and related losses and damages to nature and people (*high confidence*). Losses and damages are unequally distributed across systems, regions and sectors (*high confidence*). Cultural losses, related to tangible and intangible heritage, threaten adaptive capacity and may result in irrevocable losses of sense of belonging, valued cultural practices, identity and home, particularly for Indigenous Peoples and those more directly reliant on the environment for subsistence (*medium confidence*). For example, changes in snow cover, lake and river ice, and permafrost in many Arctic regions, are harming the livelihoods and cultural identity of Arctic residents including Indigenous populations (*high confidence*). Infrastructure, including transportation, water, sanitation and energy systems have been compromised by extreme and slow-onset events, with resulting economic losses, disruptions of services and impacts to well-being (*high confidence*). {*WGII SPM B.1, WGII SPM B.1.2, WGII SPM.B.1.5, WGII SPM C.3.5, WGII TS.B.1.6; SROCC SPM A.7.1*}

Across sectors and regions, the most vulnerable people and systems have been disproportionately affected by the impacts of climate change (*high confidence*). LDCs and SIDS who have much lower per capita emissions (1.7 tCO_2-eq, 4.6 tCO_2-eq, respectively) than the global average (6.9 tCO_2-eq) excluding CO_2-LULUCF, also have high vulnerability to climatic hazards, with global hotspots of high human vulnerability observed in West-, Central- and East Africa, South Asia, Central and South America, SIDS and the Arctic (*high confidence*). Regions and people with considerable development constraints have high vulnerability to climatic hazards (*high confidence*). Vulnerability is higher in locations with poverty, governance challenges and limited access to basic services and resources, violent conflict and high levels of climate-sensitive livelihoods (e.g., smallholder farmers, pastoralists, fishing communities) (*high confidence*). Vulnerability at different spatial levels is exacerbated by inequity and marginalisation linked to gender, ethnicity, low income or combinations thereof (*high confidence*), especially for many Indigenous Peoples and local communities (*high confidence*). Approximately 3.3 to 3.6 billion people live in contexts that are highly vulnerable to climate change (*high confidence*). Between 2010 and 2020, human mortality from floods, droughts and storms was 15 times higher in highly vulnerable regions, compared to regions with very low vulnerability (*high confidence*). In the Arctic and in some high mountain regions, negative impacts of cryosphere change have been especially felt among Indigenous Peoples (*high confidence*). Human and ecosystem vulnerability are interdependent (*high confidence*). Vulnerability of ecosystems and people to climate change differs substantially among and within regions (*very high confidence*), driven by patterns of intersecting socio-economic development, unsustainable ocean and land use, inequity, marginalisation, historical and ongoing patterns of inequity such as colonialism, and governance[81] (*high confidence*). {*WGII SPM B.1, WGII SPM B.2, WGII SPM B.2.4; WGIII SPM B.3.1; SROCC SPM A.7.1, SROCC SPM A.7.2*}

[80] See Annex 1: Glossary.

[81] Governance: The structures, processes and actions through which private and public actors interact to address societal goals. This includes formal and informal institutions and the associated norms, rules, laws and procedures for deciding, managing, implementing and monitoring policies and measures at any geographic or political scale, from global to local. {*WGII SPM Footnote 31*}

2.2 Responses Undertaken to Date

International climate agreements, rising national ambitions for climate action, along with rising public awareness are accelerating efforts to address climate change at multiple levels of governance. Mitigation policies have contributed to a decrease in global energy and carbon intensity, with several countries achieving GHG emission reductions for over a decade. Low-emission technologies are becoming more affordable, with many low or zero emissions options now available for energy, buildings, transport, and industry. Adaptation planning and implementation progress has generated multiple benefits, with effective adaptation options having the potential to reduce climate risks and contribute to sustainable development. Global tracked finance for mitigation and adaptation has seen an upward trend since AR5, but falls short of needs. (*high confidence*)

2.2.1. Global Policy Setting

The United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol, and Paris Agreement are supporting rising levels of national ambition and encouraging the development and implementation of climate policies at multiple levels of governance (*high confidence*). The Kyoto Protocol led to reduced emissions in some countries and was instrumental in building national and international capacity for GHG reporting, accounting and emissions markets (*high confidence*). The Paris Agreement, adopted under the UNFCCC, with near universal participation, has led to policy development and target-setting at national and sub-national levels, particularly in relation to mitigation but also for adaptation, as well as enhanced transparency of climate action and support (*medium confidence*). Nationally Determined Contributions (NDCs), required under the Paris Agreement, have required countries to articulate their priorities and ambition with respect to climate action. {*WGII 17.4, WGII TS D.1.1; WGIII SPM B.5.1, WGIII SPM E.6*}

Loss & Damage[82] was formally recognized in 2013 through establishment of the Warsaw International Mechanism on Loss and Damage (WIM), and in 2015, Article 8 of the Paris Agreement provided a legal basis for the WIM. There is improved understanding of both economic and non-economic losses and damages, which is informing international climate policy and which has highlighted that losses and damages are not comprehensively addressed by current financial, governance and institutional arrangements, particularly in vulnerable developing countries (*high confidence*). {*WGII SPM C.3.5, WGII Cross-Chapter Box LOSS*}

Other recent global agreements that influence responses to climate change include the Sendai Framework for Disaster Risk Reduction (2015-2030), the finance-oriented Addis Ababa Action Agenda (2015) and the New Urban Agenda (2016), and the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer (2016), among others. In addition, the 2030 Agenda for Sustainable Development, adopted in 2015 by UN member states, sets out 17 Sustainable Development Goals (SDGs) and seeks to align efforts globally to prioritise ending extreme poverty, protect the planet and promote more peaceful, prosperous and inclusive societies. If achieved, these agreements would reduce climate change, and the impacts on health, well-being, migration, and conflict, among others (*very high confidence*). {*WGII TS.A.1, WGII 7 ES*}

Since AR5, rising public awareness and an increasing diversity of actors, have overall helped accelerate political commitment and global efforts to address climate change (*medium confidence*). Mass social movements have emerged as catalysing agents in some regions, often building on prior movements including Indigenous Peoples-led movements, youth movements, human rights movements, gender activism, and climate litigation, which is raising awareness and, in some cases, has influenced the outcome and ambition of climate governance (*medium confidence*). Engaging Indigenous Peoples and local communities using just-transition and rights-based decision-making approaches, implemented through collective and participatory decision-making processes has enabled deeper ambition and accelerated action in different ways, and at all scales, depending on national circumstances (*medium confidence*). The media helps shape the public discourse about climate change. This can usefully build public support to accelerate climate action (*medium evidence, high agreement*). In some instances, public discourses of media and organised counter movements have impeded climate action, exacerbating helplessness and disinformation and fuelling polarisation, with negative implications for climate action (*medium confidence*). {*WGII SPM C.5.1, WGII SPM D.2, WGII TS.D.9, WGII TS.D.9.7, WGII TS.E.2.1, WGII 18.4; WGIII SPM D.3.3, WGIII SPM E.3.3, WGIII TS.6.1, WGIII 6.7, WGIII 13 ES, WGIII Box.13.7*}

2.2.2. Mitigation Actions to Date

There has been a consistent expansion of policies and laws addressing mitigation since AR5 (*high confidence*). Climate governance supports mitigation by providing frameworks through which diverse actors interact, and a basis for policy development and implementation (*medium confidence*). Many regulatory and economic instruments have already been deployed successfully (*high confidence*). By 2020, laws primarily focussed on reducing GHG emissions existed in 56 countries covering 53% of global emissions (*medium confidence*). The application of diverse policy instruments for mitigation at the national and sub-national levels has grown consistently across a range of sectors (*high confidence*). Policy coverage is uneven across sectors and remains limited for emissions from agriculture, and from industrial materials and feedstocks (*high confidence*). {*WGIII SPM B.5, WGIII SPM B.5.2, WGIII SPM E.3, WGIII SPM E.4*}

Practical experience has informed economic instrument design and helped to improve predictability, environmental effectiveness, economic efficiency, alignment with distributional goals, and social acceptance (*high confidence*). Low-emission technological innovation is strengthened through the combination of technology-push policies, together with policies that create incentives for behaviour change and market opportunities (*high confidence*) (Section 4.8.3). Comprehensive and consistent policy packages have been found to be more effective

[82] See Annex I: Glossary.

than single policies (*high confidence*). Combining mitigation with policies to shift development pathways, policies that induce lifestyle or behaviour changes, for example, measures promoting walkable urban areas combined with electrification and renewable energy can create health co-benefits from cleaner air and enhanced active mobility (*high confidence*). Climate governance enables mitigation by providing an overall direction, setting targets, mainstreaming climate action across policy domains and levels, based on national circumstances and in the context of international cooperation. Effective governance enhances regulatory certainty, creating specialised organisations and creating the context to mobilise finance (*medium confidence*). These functions can be promoted by climate-relevant laws, which are growing in number, or climate strategies, among others, based on national and sub-national context (*medium confidence*). Effective and equitable climate governance builds on engagement with civil society actors, political actors, businesses, youth, labour, media, Indigenous Peoples and local communities (*medium confidence*). {*WGIII SPM E.2.2, WGIII SPM E.3, WGIII SPM E.3.1, WGIII SPM E.4.2, WGIII SPM E.4.3, WGIII SPM E.4.4*}

The unit costs of several low-emission technologies, including solar, wind and lithium-ion batteries, have fallen consistently since 2010 (Figure 2.4). Design and process innovations in combination with the use of digital technologies have led to near-commercial availability of many low or zero emissions options in buildings, transport and industry. From 2010-2019, there have been sustained decreases in the unit costs of solar energy (by 85%), wind energy (by 55%), and lithium-ion batteries (by 85%), and large increases in their deployment, e.g., >10× for solar and >100× for electric vehicles (EVs), albeit varying widely across regions (Figure 2.4). Electricity from PV and wind is now cheaper than electricity from fossil sources in many regions, electric vehicles are increasingly competitive with internal combustion engines, and large-scale battery storage on electricity grids is increasingly viable. In comparison to modular small-unit size technologies, the empirical record shows that multiple large-scale mitigation technologies, with fewer opportunities for learning, have seen minimal cost reductions and their adoption has grown slowly. Maintaining emission-intensive systems may, in some regions and sectors, be more expensive than transitioning to low emission systems. (*high confidence*) {*WGIII SPM B.4, WGIII SPM B.4.1, WGIII SPM C.4.2, WGIII SPM C.5.2, WGIII SPM C.7.2, WGIII SPM C.8, WGIII Figure SPM.3, WGIII Figure SPM.3*}

For almost all basic materials – primary metals, building materials and chemicals – many low- to zero-GHG intensity production processes are at the pilot to near-commercial and in some cases commercial stage but they are not yet established industrial practice. Integrated design in construction and retrofit of buildings has led to increasing examples of zero energy or zero carbon buildings. Technological innovation made possible the widespread adoption of LED lighting. Digital technologies including sensors, the internet of things, robotics, and artificial intelligence can improve energy management in all sectors; they can increase energy efficiency, and promote the adoption of many low-emission technologies, including decentralised renewable energy, while creating economic opportunities. However, some of these climate change mitigation gains can be reduced or counterbalanced by growth in demand for goods and services due to the use of digital devices. Several mitigation options, notably solar energy, wind energy, electrification of urban systems, urban green infrastructure, energy efficiency, demand side management, improved forest- and crop/grassland management, and reduced food waste and loss, are technically viable, are becoming increasingly cost effective and are generally supported by the public, and this enables expanded deployment in many regions. (*high confidence*) {*WGIII SPM B.4.3, WGIII SPM C.5.2, WGIII SPM C.7.2, WGIII SPM E.1.1, WGIII TS.6.5*}

The magnitude of global climate finance flows has increased and financing channels have broadened (*high confidence*). Annual tracked total financial flows for climate mitigation and adaptation increased by up to 60% between 2013/14 and 2019/20, but average growth has slowed since 2018 (*medium confidence*) and most climate finance stays within national borders (*high confidence*). Markets for green bonds, environmental, social and governance and sustainable finance products have expanded significantly since AR5 (*high confidence*). Investors, central banks, and financial regulators are driving increased awareness of climate risk to support climate policy development and implementation (*high confidence*). Accelerated international financial cooperation is a critical enabler of low-GHG and just transitions (*high confidence*). {*WGIII SPM B.5.4, WGIII SPM E.5, WGIII TS.6.3, WGIII TS.6.4*}

Economic instruments have been effective in reducing emissions, complemented by regulatory instruments mainly at the national and also sub-national and regional level (*high confidence*). By 2020, over 20% of global GHG emissions were covered by carbon taxes or emissions trading systems, although coverage and prices have been insufficient to achieve deep reductions (*medium confidence*). Equity and distributional impacts of carbon pricing instruments can be addressed by using revenue from carbon taxes or emissions trading to support low-income households, among other approaches (*high confidence*). The mix of policy instruments which reduced costs and stimulated adoption of solar energy, wind energy and lithium-ion batteries includes public R&D, funding for demonstration and pilot projects, and demand-pull instruments such as deployment subsidies to attain scale (*high confidence*) (Figure 2.4). {*WGIII SPM B.4.1, WGIII SPM B.5.2, WGIII SPM E.4.2, WG III TS.3*}

Mitigation actions, supported by policies, have contributed to a decrease in global energy and carbon intensity between 2010 and 2019, with a growing number of countries achieving absolute GHG emission reductions for more than a decade (*high confidence*). While global net GHG emissions have increased since 2010, global energy intensity (total primary energy per unit GDP) decreased by 2% yr^{-1} between 2010 and 2019. Global carbon intensity (CO_2-FFI per unit primary energy) also decreased by 0.3% yr^{-1}, mainly due to fuel switching from coal to gas, reduced expansion of coal capacity, and increased use of renewables, and with large regional variations over the same period. In many countries, policies have enhanced energy efficiency, reduced rates of deforestation and accelerated technology deployment, leading to avoided and in some cases reduced or removed emissions (*high confidence*). At least 18 countries have sustained production-based CO_2 and GHG and consumption-based CO_2 absolute emission reductions for longer than 10 years since 2005 through energy supply decarbonization, energy efficiency gains, and energy demand reduction, which resulted from both policies and changes in economic structure (*high confidence*). Some countries have reduced production-based GHG emissions by a third or more since peaking, and some have achieved reduction rates of around 4% yr^{-1} for several years consecutively (*high confidence*). Multiple lines of evidence suggest that mitigation policies have led to avoided global emissions of several $GtCO_2$-eq yr^{-1} (*medium confidence*).

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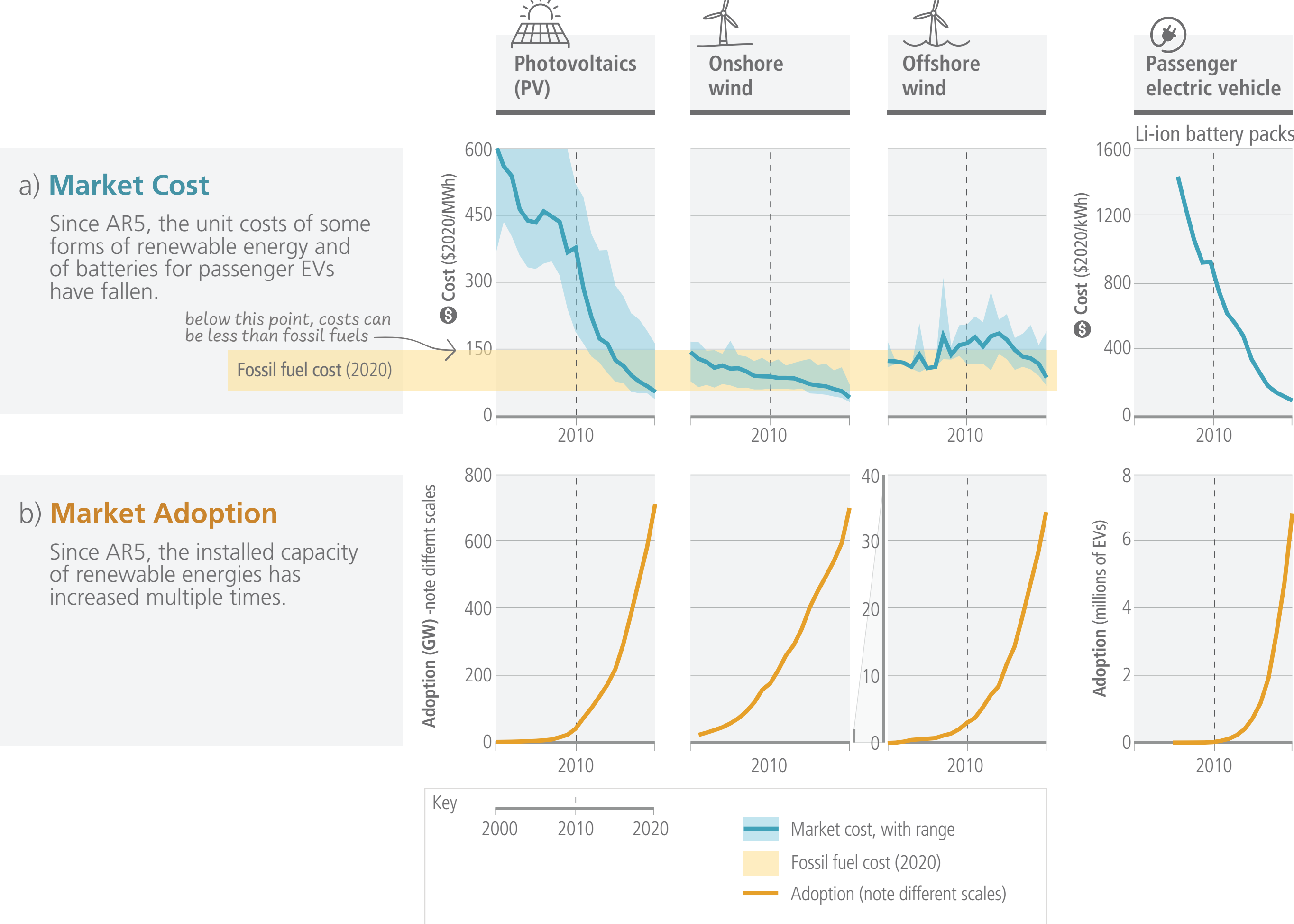

Figure 2.4: Unit cost reductions and use in some rapidly changing mitigation technologies. The **top panel (a)** shows global costs per unit of energy (USD per MWh) for some rapidly changing mitigation technologies. Solid blue lines indicate average unit cost in each year. Light blue shaded areas show the range between the 5th and 95th percentiles in each year. Yellow shading indicates the range of unit costs for new fossil fuel (coal and gas) power in 2020 (corresponding to USD 55 to 148 per MWh). In 2020, the levelised costs of energy (LCOE) of the three renewable energy technologies could compete with fossil fuels in many places. For batteries, costs shown are for 1 kWh of battery storage capacity; for the others, costs are LCOE, which includes installation, capital, operations, and maintenance costs per MWh of electricity produced. The literature uses LCOE because it allows consistent comparisons of cost trends across a diverse set of energy technologies to be made. However, it does not include the costs of grid integration or climate impacts. Further, LCOE does not take into account other environmental and social externalities that may modify the overall (monetary and non-monetary) costs of technologies and alter their deployment. The **bottom panel (b)** shows cumulative global adoption for each technology, in GW of installed capacity for renewable energy and in millions of vehicles for battery-electric vehicles. A vertical dashed line is placed in 2010 to indicate the change over the past decade. The electricity production share reflects different capacity factors; for example, for the same amount of installed capacity, wind produces about twice as much electricity as solar PV. Renewable energy and battery technologies were selected as illustrative examples because they have recently shown rapid changes in costs and adoption, and because consistent data are available. Other mitigation options assessed in the WGIII report are not included as they do not meet these criteria. {*WGIII Figure SPM.3*, *WGIII 2.5, 6.4*}

At least 1.8 $GtCO_2$-eq yr^{-1} of avoided emissions can be accounted for by aggregating separate estimates for the effects of economic and regulatory instruments (*medium confidence*). Growing numbers of laws and executive orders have impacted global emissions and are estimated to have resulted in 5.9 $GtCO_2$-eq yr^{-1} of avoided emissions in 2016 *(medium confidence)*. These reductions have only partly offset global emissions growth (*high confidence*). {*WGIII SPM B.1, WGIII SPM B.2.4, WGIII SPM B.3.5, WGIII SPM B.5.1, WGIII SPM B.5.3, WGIII 1.3.2, WGIII 2.2.3*}

2.2.3. Adaptation Actions to Date

Progress in adaptation planning and implementation has been observed across all sectors and regions, generating multiple benefits (*very high confidence*). The ambition, scope and progress on adaptation have risen among governments at the local, national and international levels, along with businesses, communities and civil society (*high confidence*). Various tools, measures and processes are available that can enable, accelerate and sustain adaptation implementation (*high confidence*). Growing public and political awareness of climate impacts and risks has resulted in at least 170 countries and many cities including adaptation in their climate policies and planning processes (*high confidence*). Decision support tools and climate services are increasingly being used (*very high confidence*) and pilot projects and local experiments are being implemented in different sectors (*high confidence*). {*WGII SPM C.1, WGII SPM.C.1.1, WGII TS.D.1.3, WGII TS.D.10*}

Adaptation to water-related risks and impacts make up the majority (~60%) of all documented[83] adaptation (*high confidence*). A large number of these adaptation responses are in the agriculture sector and these include on-farm water management, water storage, soil moisture conservation, and irrigation. Other adaptations in agriculture include cultivar improvements, agroforestry, community-based adaptation and farm and landscape diversification among others (*high confidence*). For inland flooding, combinations of non-structural measures like early warning systems, enhancing natural water retention such as by restoring wetlands and rivers, and land use planning such as no build zones or upstream forest management, can reduce flood risk (*medium confidence*). Some land-related adaptation actions such as sustainable food production, improved and sustainable forest management, soil organic carbon management, ecosystem conservation and land restoration, reduced deforestation and degradation, and reduced food loss and waste are being undertaken, and can have mitigation co-benefits (*high confidence*). Adaptation actions that increase the resilience of biodiversity and ecosystem services to climate change include responses like minimising additional stresses or disturbances, reducing fragmentation, increasing natural habitat extent, connectivity and heterogeneity, and protecting small-scale refugia where microclimate conditions can allow species to persist (*high confidence*). Most innovations in urban adaptation have occurred through advances in disaster risk management, social safety nets and green/blue infrastructure (*medium confidence*). Many adaptation measures that benefit health and well-being are found in other sectors (e.g., food, livelihoods, social protection, water and sanitation, infrastructure) (*high confidence*). {*WGII SPM C.2.1, WGII SPM C.2.2, WGII TS.D.1.2, WGII TS.D.1.4, WGII TS.D.4.2, WGII TS.D.8.3, WGII 4 ES; SRCCL SPM B.1.1*}

Adaptation can generate multiple additional benefits such as improving agricultural productivity, innovation, health and well-being, food security, livelihood, and biodiversity conservation as well as reduction of risks and damages (*very high confidence*). {*WGII SPM C1.1*}

Globally tracked adaptation finance has shown an upward trend since AR5, but represents only a small portion of total climate finance, is uneven and has developed heterogeneously across regions and sectors (*high confidence*). Adaptation finance has come predominantly from public sources, largely through grants, concessional and non-concessional instruments (*very high confidence*). Globally, private-sector financing of adaptation from a variety of sources such as commercial financial institutions, institutional investors, other private equity, non-financial corporations, as well as communities and households has been limited, especially in developing countries (*high confidence*). Public mechanisms and finance can leverage private sector finance for adaptation by addressing real and perceived regulatory, cost and market barriers, for example via public-private partnerships (*high confidence*). Innovations in adaptation and resilience finance, such as forecast-based/anticipatory financing systems and regional risk insurance pools, have been piloted and are growing in scale (*high confidence*). {*WGII SPM C.3.2, WGII SPM C.5.4; WGII TS.D.1.6, WGII Cross-Chapter Box FINANCE; WGIII SPM E.5.4*}

There are adaptation options which are effective[84] in reducing climate risks[85] for specific contexts, sectors and regions and contribute positively to sustainable development and other societal goals. In the agriculture sector, cultivar improvements, on-farm water management and storage, soil moisture conservation, irrigation[86], agroforestry, community-based adaptation, and farm and landscape level diversification, and sustainable land management approaches, provide multiple benefits and reduce climate risks. Reduction of food loss and waste, and adaptation measures in support of balanced diets contribute to nutrition, health, and biodiversity benefits. (*high confidence*) {*WGII SPM C.2, WGII SPM C.2.1, WGII SPM C.2.2; SRCCL B.2, SRCCL SPM C.2.1*}

Ecosystem-based Adaptation[87] approaches such as urban greening, restoration of wetlands and upstream forest ecosystems reduce a range of climate change risks, including flood risks, urban heat and provide multiple co-benefits. Some land-based adaptation options provide immediate benefits (e.g., conservation of peatlands,

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[83] Documented adaptation refers to published literature on adaptation policies, measures and actions that has been implemented and documented in peer reviewed literature, as opposed to adaptation that may have been planned, but not implemented.

[84] Effectiveness refers here to the extent to which an adaptation option is anticipated or observed to reduce climate-related risk.

[85] See Annex I: Glossary.

[86] Irrigation is effective in reducing drought risk and climate impacts in many regions and has several livelihood benefits, but needs appropriate management to avoid potential adverse outcomes, which can include accelerated depletion of groundwater and other water sources and increased soil salinization (*medium confidence*).

[87] EbA is recognised internationally under the Convention on Biological Diversity (CBD14/5). A related concept is Nature-based Solutions (NbS), see Annex I: Glossary.

wetlands, rangelands, mangroves and forests); while afforestation and reforestation, restoration of high-carbon ecosystems, agroforestry, and the reclamation of degraded soils take more time to deliver measurable results. Significant synergies exist between adaptation and mitigation, for example through sustainable land management approaches. Agroecological principles and practices and other approaches that work with natural processes support food security, nutrition, health and well-being, livelihoods and biodiversity, sustainability and ecosystem services. (*high confidence*) {*WGII SPM C.2.1*, *WGII SPM C.2.2*, *WGII SPM C.2.5*, *WGII TS.D.4.1; SRCCL SPM B.1.2, SRCCL SPM.B.6.1; SROCC SPM C.2*}

Combinations of non-structural measures like early warning systems and structural measures like levees have reduced loss of lives in case of inland flooding (*medium confidence*) and early warning systems along with flood-proofing of buildings have proven to be cost-effective in the context of coastal flooding under current sea level rise (*high confidence*). Heat Health Action Plans that include early warning and response systems are effective adaptation options for extreme heat (*high confidence*). Effective adaptation options for water, food and vector-borne diseases include improving access to potable water, reducing exposure of water and sanitation systems to extreme weather events, and improved early warning systems, surveillance, and vaccine development (*very high confidence*). Adaptation options such as disaster risk management, early warning systems, climate services and social safety nets have broad applicability across multiple sectors (*high confidence*). {*WGII SPM C.2.1*, *WGII SPM C.2.5*, *WGII SPM C.2.9*, *WGII SPM C.2.11*, *WGII SPM C.2.13; SROCC SPM C.3.2*}

Integrated, multi-sectoral solutions that address social inequities, differentiate responses based on climate risk and cut across systems, increase the feasibility and effectiveness of adaptation in multiple sectors (*high confidence*). {*WGII SPM C.2*}

2.3 Current Mitigation and Adaptation Actions and Policies are not Sufficient

At the time of the present assessment[88] there are gaps between global ambitions and the sum of declared national ambitions. These are further compounded by gaps between declared national ambitions and current implementation for all aspects of climate action. For mitigation, global GHG emissions in 2030 implied by NDCs announced by October 2021 would make it *likely* that warming will exceed 1.5°C during the 21st century and would make it harder to limit warming below 2°C.[89] Despite progress, adaptation gaps[90] persist, with many initiatives prioritising short-term risk reduction, hindering transformational adaptation. Hard and soft limits to adaptation are being reached in some sectors and regions, while maladaptation is also increasing and disproportionately affecting vulnerable groups. Systemic barriers such as funding, knowledge, and practice gaps, including lack of climate literacy and data hinders adaptation progress. Insufficient financing, especially for adaptation, constraints climate action in particular in developing countries. (*high confidence*)

2.3.1. The Gap Between Mitigation Policies, Pledges and Pathways that Limit Warming to 1.5°C or Below 2°C

Global GHG emissions in 2030 associated with the implementation of NDCs announced prior to COP26[91] would make it *likely* that warming will exceed 1.5°C during the 21st century and would make it harder to limit warming below 2°C – if no additional commitments are made or actions taken (Figure 2.5, Table 2.2). A substantial 'emissions gap' exists as global GHG emissions in 2030 associated with the implementation of NDCs announced prior to COP26 would be similar to or only slightly below 2019 emission levels and higher than those associated with modelled mitigation pathways that limit warming to 1.5°C (>50%) with no or limited overshoot or to 2°C (>67%), assuming immediate action, which implies deep, rapid, and sustained global GHG emission reductions this decade (*high confidence*) (Table 2.2, Table 3.1, 4.1).[92] The magnitude of the emissions gap depends on the global warming level considered and whether only unconditional or also conditional elements of NDCs[93] are considered (*high confidence*) (Table 2.2). Modelled pathways that are consistent with NDCs announced prior to COP26 until 2030 and assume no increase in ambition thereafter have higher emissions, leading to a median global warming of 2.8 [2.1 to 3.4]°C by 2100 (*medium confidence*). If the 'emission gap' is not reduced, global GHG emissions in 2030 consistent with NDCs announced prior to COP26 make it *likely* that warming will exceed 1.5°C during the 21st century, while limiting warming to 2°C (>67%) would imply an unprecedented acceleration of mitigation efforts during 2030–2050 (*medium confidence*) (see Section 4.1, Cross-Section Box.2). {*WGIII SPM B.6*, *WGIII SPM B.6.1*, *WGIII SPM B.6.3*, *WGIII SPM B.6.4*, *WGIII SPM C.1.1*}

Policies implemented by the end of 2020 are projected to result in higher global GHG emissions in 2030 than those implied by NDCs, indicating an 'implementation gap[94]' (*high confidence*) (Table 2.2, Figure 2.5). Projected global emissions implied by policies implemented by the end of 2020 are 57 (52–60) $GtCO_2$-eq in 2030 (Table 2.2). This points to an implementation gap compared with the NDCs of 4 to 7 $GtCO_2$-eq in 2030 (Table 2.2); without a strengthening of policies, emissions are projected to rise, leading to a median global warming of 2.2°C to 3.5°C (*very likely range*) by 2100 (*medium confidence*) (see Section 3.1.1). {*WGIII SPM B.6.1*, *WGIII SPM C.1*}

[88] The timing of various cut-offs for assessment differs by WG report and the aspect assessed. See footnote 58 in Section 1.

[89] See CSB.2 for a discussion of scenarios and pathways.

[90] See Annex I: Glossary.

[91] NDCs announced prior to COP26 refer to the most recent NDCs submitted to the UNFCCC up to the literature cut-off date of the WGIII report, 11 October 2021, and revised NDCs announced by China, Japan and the Republic of Korea prior to October 2021 but only submitted thereafter. 25 NDC updates were submitted between 12 October 2021 and the start of COP26. {*WGIII SPM footnote 24*}

[92] Immediate action in modelled global pathways refers to the adoption between 2020 and at latest before 2025 of climate policies intended to limit global warming to a given level. Modelled pathways that limit warming to 2°C (>67%) based on immediate action are summarised in category C3a in Table 3.1. All assessed modelled global pathways that limit warming to 1.5°C (>50%) with no or limited overshoot assume immediate action as defined here (Category C1 in Table 3.1). {*WGIII SPM footnote 26*}

[93] In this report, 'unconditional' elements of NDCs refer to mitigation efforts put forward without any conditions. 'Conditional' elements refer to mitigation efforts that are contingent on international cooperation, for example bilateral and multilateral agreements, financing or monetary and/or technological transfers. This terminology is used in the literature and the UNFCCC's NDC Synthesis Reports, not by the Paris Agreement. {*WGIII SPM footnote 27*}

[94] Implementation gaps refer to how far currently enacted policies and actions fall short of reaching the pledges. The policy cut-off date in studies used to project GHG emissions of 'policies implemented by the end of 2020' varies between July 2019 and November 2020. {*WGIII Table 4.2*, *WGIII SPM footnote 25*}

Projected cumulative future CO_2 emissions over the lifetime of existing fossil fuel infrastructure without additional abatement[95] exceed the total cumulative net CO_2 emissions in pathways that limit warming to 1.5°C (>50%) with no or limited overshoot. They are approximately equal to total cumulative net CO_2 emissions in pathways that limit warming to 2°C with a likelihood of 83%[96] (see Figure 3.5). Limiting warming to 2°C (>67%) or lower will result in stranded assets. About 80% of coal, 50% of gas, and 30% of oil reserves cannot be burned and emitted if warming is limited to 2°C. Significantly more reserves are expected to remain unburned if warming is limited to 1.5°C. (*high confidence*) {*WGIII SPM B.7, WGIII Box 6.3*}

Table 2.2 Projected global emissions in 2030 associated with policies implemented by the end of 2020 and NDCs announced prior to COP26, and associated emissions gaps. Emissions projections for 2030 and gross differences in emissions are based on emissions of 52–56 $GtCO_2$-eq yr–1 in 2019 as assumed in underlying model studies[97]. (*medium confidence*) {*WGIII Table SPM.1*} (*Table 3.1, Cross-Section Box.2*)

Emission and implementation gaps associated with projected global emissions in 2030 under Nationally Determined Contributions (NDCs) and implemented policies

	Implied by policies implemented by the end of 2020 ($GtCO_2$-eq/yr)	Implied by Nationally Determined Contributions (NDCs) announced prior to COP26	
		Unconditional elements ($GtCO_2$-eq/yr)	Including conditional elements ($GtCO_2$-eq/yr)
Median projected global emissions (min–max)*	57 [52–60]	53 [50–57]	50 [47–55]
Implementation gap between implemented policies and NDCs (median)	–	4	7
Emissions gap between NDCs and pathways that limit warming to 2°C (>67%) with immediate action	–	10–16	6–14
Emissions gap between NDCs and pathways that limit warming to 1.5°C (>50%) with no or limited overshoot with immediate action	–	19–26	16–23

*Emissions projections for 2030 and gross differences in emissions are based on emissions of 52–56 $GtCO_2$-eq/yr in 2019 as assumed in underlying model studies. (*medium confidence*)

[95] Abatement here refers to human interventions that reduce the amount of GHGs that are released from fossil fuel infrastructure to the atmosphere. {*WGIII SPM footnote 34*}

[96] WGI provides carbon budgets that are in line with limiting global warming to temperature limits with different likelihoods, such as 50%, 67% or 83%. {*WGI Table SPM.2*}

[97] The 2019 range of harmonised GHG emissions across the pathways [53–58 $GtCO_2$-eq] is within the uncertainty ranges of 2019 emissions assessed in WGIII Chapter 2 [53–66 $GtCO_2$-eq].

Projected global GHG emissions from NDCs announced prior to COP26 would make it *likely* that warming will exceed 1.5°C and also make it harder after 2030 to limit warming to below 2°C

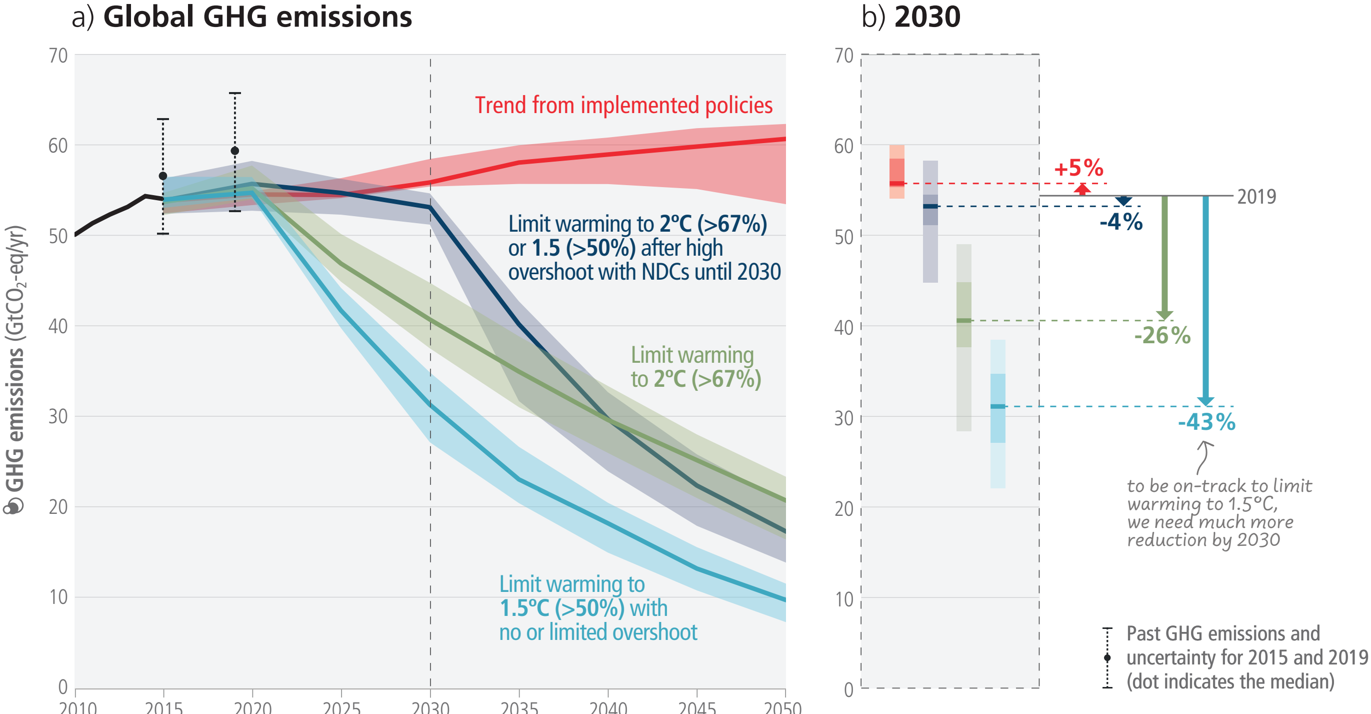

Figure 2.5 Global GHG emissions of modelled pathways (funnels in Panel a), and projected emission outcomes from near-term policy assessments for 2030 (Panel b). Panel a shows global GHG emissions over 2015-2050 for four types of assessed modelled global pathways:

- Trend from implemented policies: Pathways with projected near-term GHG emissions in line with policies implemented until the end of 2020 and extended with comparable ambition levels beyond 2030 (29 scenarios across categories C5–C7, WGIII Table SPM.2).
- Limit to 2°C (>67%) or return warming to 1.5°C (>50%) after a high overshoot, NDCs until 2030: Pathways with GHG emissions until 2030 associated with the implementation of NDCs announced prior to COP26, followed by accelerated emissions reductions *likely* to limit warming to 2°C (C3b, WGIII Table SPM.2) or to return warming to 1.5°C with a probability of 50% or greater after high overshoot (subset of 42 scenarios from C2, WGIII Table SPM.2).
- Limit to 2°C (>67%) with immediate action: Pathways that limit warming to 2°C (>67%) with immediate action after 2020 (C3a, WGIII Table SPM.2).
- Limit to 1.5°C (>50%) with no or limited overshoot: Pathways limiting warming to 1.5°C with no or limited overshoot (C1, WGIII Table SPM.2 C1).

All these pathways assume immediate action after 2020. Past GHG emissions for 2010-2015 used to project global warming outcomes of the modelled pathways are shown by a black line. **Panel b** shows a snapshot of the GHG emission ranges of the modelled pathways in 2030 and projected emissions outcomes from near-term policy assessments in 2030 from WGIII Chapter 4.2 (Tables 4.2 and 4.3; median and full range). GHG emissions are CO_2-equivalent using GWP100 from AR6 WGI. {*WGIII Figure SPM.4, WGIII 3.5, 4.2, Table 4.2, Table 4.3, Cross-Chapter Box 4 in Chapter 4*} (*Table 3.1, Cross-Section Box.2*)

Cross-Section Box.1: Understanding Net Zero CO_2 and Net Zero GHG Emissions

Limiting human-caused global warming to a specific level requires limiting cumulative CO_2 emissions, reaching net zero or net negative CO_2 emissions, along with strong reductions in other GHG emissions (see 3.3.2). Future additional warming will depend on future emissions, with total warming dominated by past and future cumulative CO_2 emissions. {*WGI SPM D.1.1, WGI Figure SPM.4; SR1.5 SPM A.2.2*}

Reaching net zero CO_2 emissions is different from reaching net zero GHG emissions. The timing of net zero for a basket of GHGs depends on the emissions metric, such as global warming potential over a 100-year period, chosen to convert non-CO_2 emissions into CO_2-equivalent (*high confidence*). However, for a given emissions pathway, the physical climate response is independent of the metric chosen (*high confidence*). {*WGI SPM D.1.8; WGIII Box TS.6, WGIII Cross-Chapter Box 2*}

Achieving global net zero GHG emissions requires all remaining CO_2 and metric-weighted[98] non-CO_2 GHG emissions to be counterbalanced by durably stored CO_2 removals (*high confidence*). Some non-CO_2 emissions, such as CH_4 and N_2O from agriculture, cannot be fully eliminated using existing and anticipated technical measures. {*WGIII SPM C.2.4, WGIII SPM C.11.4, WGIII Cross-Chapter Box 3*}

Global net zero CO_2 or GHG emissions can be achieved even if some sectors and regions are net emitters, provided that others reach net negative emissions (see Figure 4.1). The potential and cost of achieving net zero or even net negative emissions vary by sector and region. If and when net zero emissions for a given sector or region are reached depends on multiple factors, including the potential to reduce GHG emissions and undertake carbon dioxide removal, the associated costs, and the availability of policy mechanisms to balance emissions and removals between sectors and countries. (*high confidence*) {*WGIII Box TS.6, WGIII Cross-Chapter Box 3*}

The adoption and implementation of net zero emission targets by countries and regions also depend on equity and capacity considerations (*high confidence*). The formulation of net zero pathways by countries will benefit from clarity on scope, plans-of-action, and fairness. Achieving net zero emission targets relies on policies, institutions, and milestones against which to track progress. Least-cost global modelled pathways have been shown to distribute the mitigation effort unevenly, and the incorporation of equity principles could change the country-level timing of net zero (*high confidence*). The Paris Agreement also recognizes that peaking of emissions will occur later in developing countries than developed countries (Article 4.1). {*WGIII Box TS.6, WGIII Cross-Chapter Box 3, WGIII 14.3*}

More information on country-level net zero pledges is provided in Section 2.3.1, on the timing of global net zero emissions in Section 3.3.2, and on sectoral aspects of net zero in Section 4.1.

[98] See footnote 12 above.

Many countries have signalled an intention to achieve net zero GHG or net zero CO_2 emissions by around mid-century (Cross-Section Box.1). More than 100 countries have either adopted, announced or are discussing net zero GHG or net zero CO_2 emissions commitments, covering more than two-thirds of global GHG emissions. A growing number of cities are setting climate targets, including net zero GHG targets. Many companies and institutions have also announced net zero emissions targets in recent years. The various net zero emission pledges differ across countries in terms of scope and specificity, and limited policies are to date in place to deliver on them. {*WGIII SPM C.6.4, WGIII TS.4.1*, *WGIII Table TS.1*, *WGIII 13.9*, *WGIII 14.3*, *WGIII 14.5*}

All mitigation strategies face implementation challenges, including technology risks, scaling, and costs (*high confidence*). Almost all mitigation options also face institutional barriers that need to be addressed to enable their application at scale (*medium confidence*). Current development pathways may create behavioural, spatial, economic and social barriers to accelerated mitigation at all scales (*high confidence*). Choices made by policymakers, citizens, the private sector and other stakeholders influence societies' development pathways (*high confidence*). Structural factors of national circumstances and capabilities (e.g., economic and natural endowments, political systems and cultural factors and gender considerations) affect the breadth and depth of climate governance (*medium confidence*). The extent to which civil society actors, political actors, businesses, youth, labour, media, Indigenous Peoples, and local communities are engaged influences political support for climate change mitigation and eventual policy outcomes (*medium confidence*). {*WGIII SPM C.3.6*, *WGIII SPM E.1.1*, *WGIII SPM E.2.1*, *WGIII SPM E.3.3*}

The adoption of low-emission technologies lags in most developing countries, particularly least developed ones, due in part to weaker enabling conditions, including limited finance, technology development and transfer, and capacity (*medium confidence*). In many countries, especially those with limited institutional capacity, several adverse side-effects have been observed as a result of diffusion of low-emission technology, e.g., low-value employment, and dependency on foreign knowledge and suppliers (*medium confidence*). Low-emission innovation along with strengthened enabling conditions can reinforce development benefits, which can, in turn, create feedbacks towards greater public support for policy (*medium confidence*). Persistent and region-specific barriers also continue to hamper the economic and political feasibility of deploying AFOLU mitigation options (*medium confidence*). Barriers to implementation of AFOLU mitigation include insufficient institutional and financial support, uncertainty over long-term additionality and trade-offs, weak governance, insecure land ownership, low incomes and the lack of access to alternative sources of income, and the risk of reversal (*high confidence*). {*WGIII SPM B.4.2*, *WGIII SPM C.9.1*, *WGIII SPM C.9.3*}

2.3.2. Adaptation Gaps and Barriers

Despite progress, adaptation gaps exist between current levels of adaptation and levels needed to respond to impacts and reduce climate risks (*high confidence*). While progress in adaptation implementation is observed across all sectors and regions *(very high confidence)*, many adaptation initiatives prioritise immediate and near-term climate risk reduction, e.g., through hard flood protection, which reduces the opportunity for transformational adaptation[99] (*high confidence*). Most observed adaptation is fragmented, small in scale, incremental, sector-specific, and focused more on planning rather than implementation (*high confidence*). Further, observed adaptation is unequally distributed across regions and the largest adaptation gaps exist among lower population income groups (*high confidence*). In the urban context, the largest adaptation gaps exist in projects that manage complex risks, for example in the food–energy–water–health nexus or the inter-relationships of air quality and climate risk (*high confidence*). Many funding, knowledge and practice gaps remain for effective implementation, monitoring and evaluation and current adaptation efforts are not expected to meet existing goals (*high confidence*). At current rates of adaptation planning and implementation the adaptation gap will continue to grow (*high confidence*). {*WGII SPM C.1*, *WGII SPM C.1.2*, *WGII SPM C.4.1*, *WGII TS.D.1.3*, *WGII TS.D.1.4*}

Soft and hard adaptation limits[100] have already been reached in some sectors and regions, in spite of adaptation having buffered some climate impacts (*high confidence*). Ecosystems already reaching hard adaptation limits include some warm water coral reefs, some coastal wetlands, some rainforests, and some polar and mountain ecosystems (*high confidence*). Individuals and households in low lying coastal areas in Australasia and Small Islands and smallholder farmers in Central and South America, Africa, Europe and Asia have reached soft limits (*medium confidence*), resulting from financial, governance, institutional and policy constraints and can be overcome by addressing these constraints (*high confidence*). Transitioning from incremental to transformational adaptation can help overcome soft adaptation limits (*high confidence*). {*WGII SPM C.3*, *WGII SPM C.3.1*, *WGII SPM C.3.2*, *WGII SPM C.3.3*, *WGII SPM.C.3.4*, *WGII 16 ES*}

Adaptation does not prevent all losses and damages, even with effective adaptation and before reaching soft and hard limits. Losses and damages are unequally distributed across systems, regions and sectors and are not comprehensively addressed by current financial, governance and institutional arrangements, particularly in vulnerable developing countries. (*high confidence*) {*WGII SPM.C.3.5*}

There is increased evidence of maladaptation[101] in various sectors and regions. Examples of maladaptation are observed in urban areas (e.g., new urban infrastructure that cannot be adjusted easily or affordably), agriculture (e.g., using high-cost irrigation in areas projected to have more intense drought conditions), ecosystems (e.g. fire suppression in naturally

[99] See Annex I: Glossary.

[100] Adaptation limit: The point at which an actor's objectives (or system needs) cannot be secured from intolerable risks through adaptive actions. Hard adaptation limit - No adaptive actions are possible to avoid intolerable risks. Soft adaptation limit - Options are currently not available to avoid intolerable risks through adaptive action.

[101] Maladaptation refers to actions that may lead to increased risk of adverse climate-related outcomes, including via increased greenhouse gas emissions, increased or shifted vulnerability to climate change, more inequitable outcomes, or diminished welfare, now or in the future. Most often, maladaptation is an unintended consequence. See Annex I: Glossary.

fire-adapted ecosystems, or hard defences against flooding) and human settlements (e.g. stranded assets and vulnerable communities that cannot afford to shift away or adapt and require an increase in social safety nets). Maladaptation especially affects marginalised and vulnerable groups adversely (e.g., Indigenous Peoples, ethnic minorities, low-income households, people living in informal settlements), reinforcing and entrenching existing inequities. Maladaptation can be avoided by flexible, multi-sectoral, inclusive and long-term planning and implementation of adaptation actions with benefits to many sectors and systems. (*high confidence*) {*WGII SPM C.4, WGII SPM C.4.3, WGII TS.D.3.1*}

Systemic barriers constrain the implementation of adaptation options in vulnerable sectors, regions and social groups (*high confidence*). Key barriers include limited resources, lack of private-sector and civic engagement, insufficient mobilisation of finance, lack of political commitment, limited research and/or slow and low uptake of adaptation science and a low sense of urgency. Inequity and poverty also constrain adaptation, leading to soft limits and resulting in disproportionate exposure and impacts for most vulnerable groups (*high confidence*). The largest adaptation gaps exist among lower income population groups (*high confidence*). As adaptation options often have long implementation times, long-term planning and accelerated implementation, particularly in this decade, is important to close adaptation gaps, recognising that constraints remain for some regions (*high confidence*). Prioritisation of options and transitions from incremental to transformational adaptation are limited due to vested interests, economic lock-ins, institutional path dependencies and prevalent practices, cultures, norms and belief systems (*high confidence*). Many funding, knowledge and practice gaps remain for effective implementation, monitoring and evaluation of adaptation (*high confidence*), including, lack of climate literacy at all levels and limited availability of data and information (*medium confidence*); for example for Africa, severe climate data constraints and inequities in research funding and leadership reduce adaptive capacity (*very high confidence*). {*WGII SPM C.1.2, WGII SPM C.3.1, WGII TS.D.1.3, WGII TS.D.1.5, WGII TS.D.2.4*}

2.3.3. Lack of Finance as a Barrier to Climate Action

Insufficient financing, and a lack of political frameworks and incentives for finance, are key causes of the implementation gaps for both mitigation and adaptation (*high confidence*). Financial flows remained heavily focused on mitigation, are uneven, and have developed heterogeneously across regions and sectors (*high confidence*). In 2018, public and publicly mobilised private climate finance flows from developed to developing countries were below the collective goal under the UNFCCC and Paris Agreement to mobilise USD 100 billion per year by 2020 in the context of meaningful mitigation action and transparency on implementation (*medium confidence*). Public and private finance flows for fossil fuels are still greater than those for climate adaptation and mitigation (*high confidence*). The overwhelming majority of tracked climate finance is directed towards mitigation (*very high confidence*). Nevertheless, average annual modelled investment requirements for 2020 to 2030 in scenarios that limit warming to 2°C or 1.5°C are a factor of three to six greater than current levels, and total mitigation investments (public, private, domestic and international) would need to increase across all sectors and regions (*medium confidence*). Challenges remain for green bonds and similar products, in particular around integrity and additionality, as well as the limited applicability of these markets to many developing countries (*high confidence*). {*WGII SPM C.3.2, WGII SPM C.5.4; WGIII SPM B.5.4, WGIII SPM E.5.1*}

Current global financial flows for adaptation including from public and private finance sources, are insufficient for and constrain implementation of adaptation options, especially in developing countries (*high confidence*). There are widening disparities between the estimated costs of adaptation and the documented finance allocated to adaptation (*high confidence*). Adaptation finance needs are estimated to be higher than those assessed in AR5, and the enhanced mobilisation of and access to financial resources are essential for implementation of adaptation and to reduce adaptation gaps (*high confidence*). Annual finance flows targeting adaptation for Africa, for example, are billions of USD less than the lowest adaptation cost estimates for near-term climate change (*high confidence*). Adverse climate impacts can further reduce the availability of financial resources by causing losses and damages and impeding national economic growth, thereby further increasing financial constraints for adaptation particularly for developing countries and LDCs (*medium confidence*). {*WGII SPM C.1.2, WGII SPM C.3.2, WGII SPM C.5.4, WGII TS.D.1.6*}

Without effective mitigation and adaptation, losses and damages will continue to disproportionately affect the poorest and most vulnerable populations. Accelerated financial support for developing countries from developed countries and other sources is a critical enabler to enhance mitigation action {WGIII SPM. E.5.3}. Many developing countries lack comprehensive data at the scale needed and lack adequate financial resources needed for adaptation for reducing associated economic and non-economic losses and damages. (*high confidence*) {*WGII Cross-Chapter Box LOSS, WGII SPM C.3.1, WGII SPM C.3.2, WGII TS.D.1.3, WGII TS.D.1.5; WGIII SPM E.5.3*}

There are barriers to redirecting capital towards climate action both within and outside the global financial sector. These barriers include: the inadequate assessment of climate-related risks and investment opportunities, regional mismatch between available capital and investment needs, home bias factors, country indebtedness levels, economic vulnerability, and limited institutional capacities. Challenges from outside the financial sector include: limited local capital markets; unattractive risk-return profiles, in particular due to missing or weak regulatory environments that are inconsistent with ambition levels; limited institutional capacity to ensure safeguards; standardisation, aggregation, scalability and replicability of investment opportunities and financing models; and, a pipeline ready for commercial investments. (*high confidence*) {*WGII SPM C.5.4; WGIII SPM E.5.2; SR1.5 SPM D.5.2*}

Cross-Section Box.2: Scenarios, Global Warming Levels, and Risks

Modelled scenarios and pathways[102] are used to explore future emissions, climate change, related impacts and risks, and possible mitigation and adaptation strategies and are based on a range of assumptions, including socio-economic variables and mitigation options. These are quantitative projections and are neither predictions nor forecasts. Global modelled emission pathways, including those based on cost effective approaches contain regionally differentiated assumptions and outcomes, and have to be assessed with the careful recognition of these assumptions. Most do not make explicit assumptions about global equity, environmental justice or intra-regional income distribution. IPCC is neutral with regard to the assumptions underlying the scenarios in the literature assessed in this report, which do not cover all possible futures[103]. {*WGI Box SPM.1; WGII Box SPM.1; WGIII Box SPM.1; SROCC Box SPM.1; SRCCL Box SPM.1*}

Socio-economic Development, Scenarios, and Pathways

The five Shared Socio-economic Pathways (SSP1 to SSP5) were designed to span a range of challenges to climate change mitigation and adaptation. For the assessment of climate impacts, risk and adaptation, the SSPs are used for future exposure, vulnerability and challenges to adaptation. Depending on levels of GHG mitigation, modelled emissions scenarios based on the SSPs can be consistent with low or high warming levels[104]. There are many different mitigation strategies that could be consistent with different levels of global warming in 2100 (see Figure 4.1). {*WGI Box SPM.1; WGII Box SPM.1; WGIII Box SPM.1, WGIII Box TS.5, WGIII Annex III; SRCCL Box SPM.1, SRCCL Figure SPM.2*}

WGI assessed the climate response to five illustrative scenarios based on SSPs[105] that cover the range of possible future development of anthropogenic drivers of climate change found in the literature. These scenarios combine socio-economic assumptions, levels of climate mitigation, land use and air pollution controls for aerosols and non-CH_4 ozone precursors. The high and very high GHG emissions scenarios (SSP3-7.0 and SSP5-8.5) have CO_2 emissions that roughly double from current levels by 2100 and 2050, respectively[106]. The intermediate GHG emissions scenario (SSP2-4.5) has CO_2 emissions remaining around current levels until the middle of the century. The very low and low GHG emissions scenarios (SSP1-1.9 and SSP1-2.6) have CO_2 emissions declining to net zero around 2050 and 2070, respectively, followed by varying levels of net negative CO_2 emissions. In addition, Representative Concentration Pathways (RCPs)[107] were used by WGI and WGII to assess regional climate changes, impacts and risks. {*WGI Box SPM.1*} (*Cross-Section Box.2 Figure 1*)

In WGIII, a large number of global modelled emissions pathways were assessed, of which 1202 pathways were categorised based on their projected global warming over the 21st century, with categories ranging from pathways that limit warming to 1.5°C with more than 50% likelihood[108] with no or limited overshoot (C1) to pathways that exceed 4°C (C8). Methods to project global warming associated with the modelled pathways were updated to ensure consistency with the AR6 WGI assessment of the climate system response[109]. {*WGIII Box SPM.1, WGIII Table 3.1*} (*Table 3.1, Cross-Section Box.2 Figure 1*)

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[102] In the literature, the terms pathways and scenarios are used interchangeably, with the former more frequently used in relation to climate goals. WGI primarily used the term scenarios and WGIII mostly used the term modelled emissions and mitigation pathways. The SYR primarily uses scenarios when referring to WGI and modelled emissions and mitigation pathways when referring to WGIII. {*WGI Box SPM.1; WGIII footnote 44*}

[103] Around half of all modelled global emissions pathways assume cost-effective approaches that rely on least-cost mitigation/abatement options globally. The other half look at existing policies and regionally and sectorally differentiated actions. The underlying population assumptions range from 8.5 to 9.7 billion in 2050 and 7.4 to 10.9 billion in 2100 (5–95th percentile) starting from 7.6 billion in 2019. The underlying assumptions on global GDP growth range from 2.5 to 3.5% per year in the 2019–2050 period and 1.3 to 2.1% per year in the 2050–2100 (5–95th percentile). {*WGIII Box SPM.1*}

[104] High mitigation challenges, for example, due to assumptions of slow technological change, high levels of global population growth, and high fragmentation as in the Shared Socio-economic Pathway SSP3, may render modelled pathways that limit warming to 2°C (> 67%) or lower infeasible (*medium confidence*). {*WGIII SPM C.1.4; SRCCL Box SPM.1*}

[105] SSP-based scenarios are referred to as SSPx-y, where 'SSPx' refers to the Shared Socio-economic Pathway describing the socioeconomic trends underlying the scenarios, and 'y' refers to the level of radiative forcing (in watts per square metre, or Wm^{-2}) resulting from the scenario in the year 2100. {*WGI SPM footnote 22*}

[106] Very high emission scenarios have become less *likely* but cannot be ruled out. Temperature levels > 4°C may result from very high emission scenarios, but can also occur from lower emission scenarios if climate sensitivity or carbon cycle feedbacks are higher than the best estimate. {*WGIII SPM C.1.3*}

[107] RCP-based scenarios are referred to as RCPy, where 'y' refers to the approximate level of radiative forcing (in watts per square metre, or Wm^{-2}) resulting from the scenario in the year 2100. {*WGII SPM footnote 21*}

[108] Denoted '>50%' in this report.

[109] The climate response to emissions is investigated with climate models, paleoclimatic insights and other lines of evidence. The assessment outcomes are used to categorise thousands of scenarios via simple physically-based climate models (emulators). {*WGI TS.1.2.2*}

Global Warming Levels (GWLs)

For many climate and risk variables, the geographical patterns of changes in climatic impact-drivers[110] and climate impacts for a level of global warming[111] are common to all scenarios considered and independent of timing when that level is reached. This motivates the use of GWLs as a dimension of integration. {*WGI Box SPM.1.4*, *WGI TS.1.3.2; WGII Box SPM.1*} (*Figure 3.1*, *Figure 3.2*)

Risks

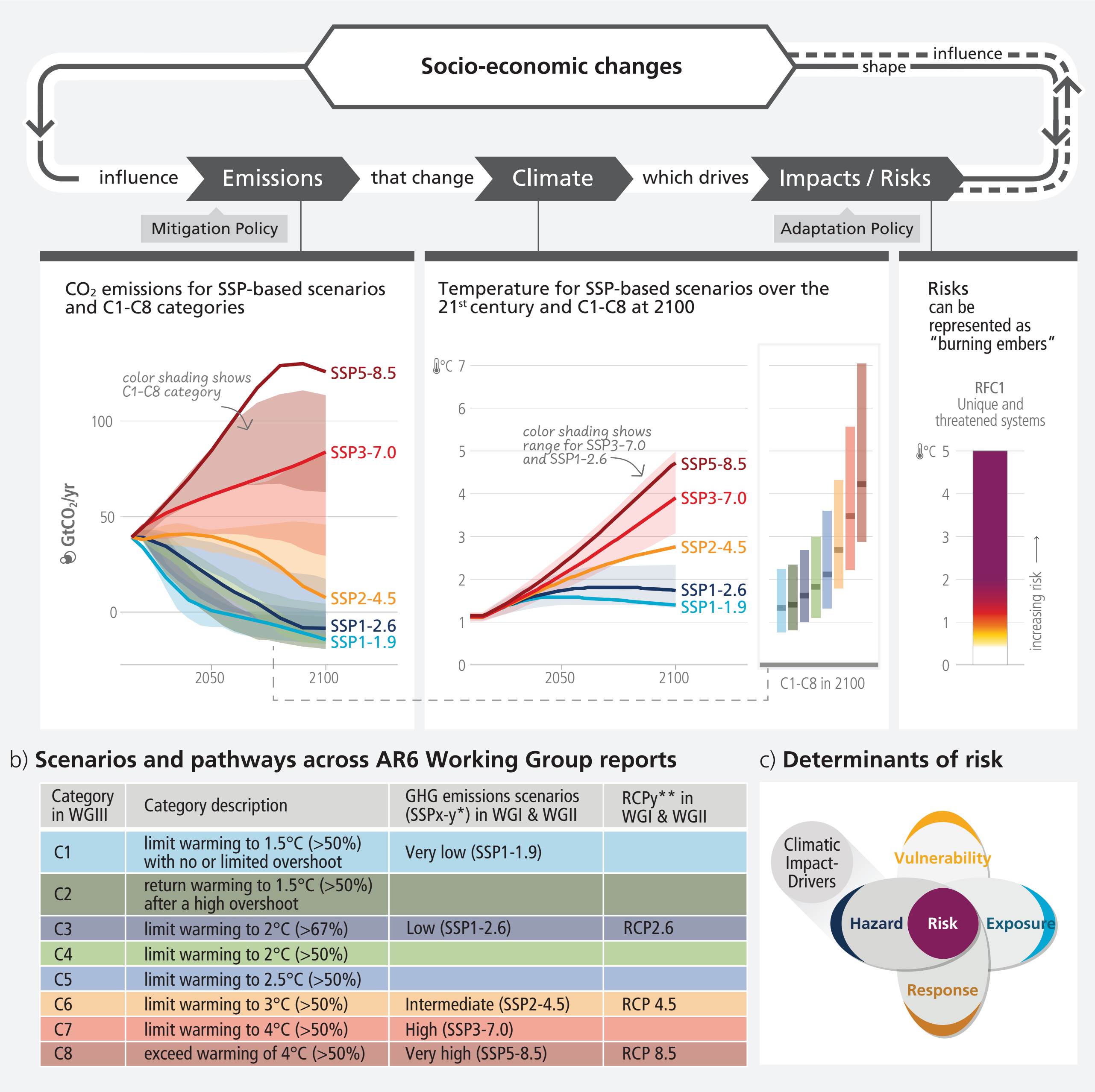
Dynamic interactions between climate-related hazards, exposure and vulnerability of the affected human society, species, or ecosystems result in risks arising from climate change. AR6 assesses key risks across sectors and regions as well as providing an updated assessment of the Reasons for Concern (RFCs) – five globally aggregated categories of risk that evaluate risk accrual with increasing global surface temperature. Risks can also arise from climate change mitigation or adaptation responses when the response does not achieve its intended objective, or when it results in adverse effects for other societal objectives. {*WGII SPM A*, *WGII Figure SPM.3*, *WGII Box TS.1*, *WGII Figure TS.4; SR1.5 Figure SPM.2; SROCC Errata Figure SPM.3; SRCCL Figure SPM.2*} (*3.1.2*, *Cross-Section Box.2 Figure 1*, *Figure 3.3*)

[110] See Annex I: Glossary

[111] See Annex I: Glossary. Here, global warming is the 20-year average global surface temperature relative to 1850–1900. The assessed time of when a certain global warming level is reached under a particular scenario is defined here as the mid-point of the first 20-year running average period during which the assessed average global surface temperature change exceeds the level of global warming. {*WGI SPM footnote 26*, *Cross-Section Box TS.1*}

Scenarios and warming levels structure our understanding across the cause-effect chain from emissions to climate change and risks

a) **AR6 integrated assessment framework on future climate, impacts and mitigation**



b) **Scenarios and pathways across AR6 Working Group reports**

Category in WGIII	Category description	GHG emissions scenarios (SSPx-y*) in WGI & WGII	RCPy** in WGI & WGII
C1	limit warming to 1.5°C (>50%) with no or limited overshoot	Very low (SSP1-1.9)	
C2	return warming to 1.5°C (>50%) after a high overshoot		
C3	limit warming to 2°C (>67%)	Low (SSP1-2.6)	RCP2.6
C4	limit warming to 2°C (>50%)		
C5	limit warming to 2.5°C (>50%)		
C6	limit warming to 3°C (>50%)	Intermediate (SSP2-4.5)	RCP 4.5
C7	limit warming to 4°C (>50%)	High (SSP3-7.0)	
C8	exceed warming of 4°C (>50%)	Very high (SSP5-8.5)	RCP 8.5

c) **Determinants of risk**

* The terminology SSPx-y is used, where 'SSPx' refers to the Shared Socio-economic Pathway or 'SSP' describing the socio-economic trends underlying the scenario, and 'y' refers to the approximate level of radiative forcing (in watts per square metre, or Wm^{-2}) resulting from the scenario in the year 2100.

** The AR5 scenarios (RCPy), which partly inform the AR6 WGI and WGII assessments, are indexed to a similar set of approximate 2100 radiative forcing levels (in W m^{-2}). The SSP scenarios cover a broader range of GHG and air pollutant futures than the RCPs. They are similar but not identical, with differences in concentration trajectories for different GHGs. The overall radiative forcing tends to be higher for the SSPs compared to the RCPs with the same label (*medium confidence*). {*WGI TS.1.3.1*}

*** Limited overshoot refers to exceeding 1.5°C global warming by up to about 0.1°C, high overshoot by 0.1°C-0.3°C, in both cases for up to several decades.

Cross-Section Box.2 Figure 1: Schematic of the AR6 framework for assessing future greenhouse gas emissions, climate change, risks, impacts and mitigation. Panel (a) The integrated framework encompasses socio-economic development and policy, emissions pathways and global surface temperature responses to the five scenarios considered by WGI (SSP1-1.9, SSP1-2.6, SSP2-4.5, SSP3-7.0, and SSP5-8.5) and eight global mean temperature change categorisations (C1–C8) assessed by WGIII, and the WGII risk assessment. The dashed arrow indicates that the influence from impacts/risks to socio-economic changes is not yet considered in the scenarios assessed in the AR6. Emissions include GHGs, aerosols, and ozone precursors. CO_2 emissions are shown as an example on the left. The assessed global surface temperature changes across the 21st century relative to 1850-1900 for the five GHG emissions scenarios are shown as an example in the centre. *Very likely* ranges are shown for SSP1-2.6 and SSP3-7.0. Projected temperature outcomes at 2100 relative to 1850-1900 are shown for C1 to C8 categories with median (line) and the combined *very likely* range across scenarios (bar). On the right, future risks due to increasing warming are represented by an example 'burning ember' figure (see 3.1.2 for the definition of RFC1). **Panel (b)** Description and relationship of scenarios considered across AR6 Working Group reports. **Panel (c)** Illustration of risk arising from the interaction of hazard (driven by changes in climatic impact-drivers) with vulnerability, exposure and response to climate change. {*WGI TS1.4, Figure 4.11; WGII Figure 1.5, WGII Figure 14.8; WGIII Table SPM.2, WGIII Figure 3.11*}

Section 3
Long-Term Climate and Development Futures

Section 3: Long-Term Climate and Development Futures

3.1 Long-Term Climate Change, Impacts and Related Risks

Future warming will be driven by future emissions and will affect all major climate system components, with every region experiencing multiple and co-occurring changes. Many climate-related risks are assessed to be higher than in previous assessments, and projected long-term impacts are up to multiple times higher than currently observed. Multiple climatic and non-climatic risks will interact, resulting in compounding and cascading risks across sectors and regions. Sea level rise, as well as other irreversible changes, will continue for thousands of years, at rates depending on future emissions. (*high confidence*)

3.1.1. Long-term Climate Change

The uncertainty range on assessed future changes in global surface temperature is narrower than in the AR5. For the first time in an IPCC assessment cycle, multi-model projections of global surface temperature, ocean warming and sea level are constrained using observations and the assessed climate sensitivity. The *likely* range of equilibrium climate sensitivity has been narrowed to 2.5°C to 4.0°C (with a best estimate of 3.0°C) based on multiple lines of evidence[112], including improved understanding of cloud feedbacks. For related emissions scenarios, this leads to narrower uncertainty ranges for long-term projected global temperature change than in AR5. {*WGI A.4*, *WGI Box SPM.1*, *WGI TS.3.2*, *WGI 4.3*}

Future warming depends on future GHG emissions, with cumulative net CO_2 dominating. The assessed best estimates and *very likely* ranges of warming for 2081-2100 with respect to 1850–1900 vary from 1.4 [1.0 to 1.8]°C in the very low GHG emissions scenario (SSP1-1.9) to 2.7 [2.1 to 3.5]°C in the intermediate GHG emissions scenario (SSP2-4.5) and 4.4 [3.3 to 5.7]°C in the very high GHG emissions scenario (SSP5-8.5)[113]. {*WGI SPM B.1.1*, *WGI Table SPM.1*, *WGI Figure SPM.4*} (*Cross-Section Box.2 Figure 1*)

Modelled pathways consistent with the continuation of policies implemented by the end of 2020 lead to global warming of 3.2 [2.2 to 3.5]°C (5–95% range) by 2100 (*medium confidence*) (see also Section 2.3.1). Pathways of >4°C (≥50%) by 2100 would imply a reversal of current technology and/or mitigation policy trends (*medium confidence*). However, such warming could occur in emissions pathways consistent with policies implemented by the end of 2020 if climate sensitivity or carbon cycle feedbacks are higher than the best estimate (*high confidence*). {*WGIII SPM C.1.3*}

Global warming will continue to increase in the near term in nearly all considered scenarios and modelled pathways. Deep, rapid, and sustained GHG emissions reductions, reaching net zero CO_2 emissions and including strong emissions reductions of other GHGs, in particular CH_4, are necessary to limit warming to 1.5°C (>50%) or less than 2°C (>67%) by the end of century (*high confidence*). The best estimate of reaching 1.5°C of global warming lies in the first half of the 2030s in most of the considered scenarios and modelled pathways[114]. In the very low GHG emissions scenario (SSP1-1.9), CO_2 emissions reach net zero around 2050 and the best-estimate end-of-century warming is 1.4°C, after a temporary overshoot (see Section 3.3.4) of no more than 0.1°C above 1.5°C global warming. Global warming of 2°C will be exceeded during the 21st century unless deep reductions in CO_2 and other GHG emissions occur in the coming decades. Deep, rapid, and sustained reductions in GHG emissions would lead to improvements in air quality within a few years, to reductions in trends of global surface temperature discernible after around 20 years, and over longer time periods for many other climate impact-drivers[115] (*high confidence*). Targeted reductions of air pollutant emissions lead to more rapid improvements in air quality compared to reductions in GHG emissions only, but in the long term, further improvements are projected in scenarios that combine efforts to reduce air pollutants as well as GHG emissions (*high confidence*)[116]. {*WGI SPM B.1*, *WGI SPM B.1.3*, *WGI SPM D.1*, *WGI SPM D.2*, *WGI Figure SPM.4*, *WGI Table SPM.1*, *WGI Cross-Section Box TS.1; WGIII SPM C.3*, *WGIII Table SPM.2*, *WGIII Figure SPM.5*, *WGIII Box SPM.1 Figure 1*, *WGIII Table 3.2*} (*Table 3.1*, *Cross-Section Box.2 Figure 1*)

Changes in short-lived climate forcers (SLCF) resulting from the five considered scenarios lead to an additional net global warming in the near and long term (*high confidence*). Simultaneous stringent climate change mitigation and air pollution control

[112] Understanding of climate processes, the instrumental record, paleoclimates and model-based emergent constraints (see Annex I: Glossary). {*WGI SPM footnote 21*}

[113] The best estimates [and *very likely* ranges] for the different scenarios are: 1.4 [1.0 to 1.8]°C (SSP1-1.9); 1.8 [1.3 to 2.4]°C (SSP1-2.6); 2.7 [2.1 to 3.5]°C (SSP2-4.5); 3.6 [2.8 to 4.6]°C (SSP3-7.0); and 4.4 [3.3 to 5.7]°C (SSP5-8.5). {*WGI Table SPM.1*} (*Cross-Section Box.2*)

[114] In the near term (2021–2040), the 1.5°C global warming level is *very likely* to be exceeded under the very high GHG emissions scenario (SSP5-8.5), *likely* to be exceeded under the intermediate and high GHG emissions scenarios (SSP2-4.5, SSP3-7.0), *more likely than not* to be exceeded under the low GHG emissions scenario (SSP1-2.6) and *more likely than not* to be reached under the very low GHG emissions scenario (SSP1-1.9). In all scenarios considered by WGI except the very high emissions scenario, the midpoint of the first 20-year running average period during which the assessed global warming reaches 1.5°C lies in the first half of the 2030s. In the very high GHG emissions scenario, this mid-point is in the late 2020s. The median five-year interval at which a 1.5°C global warming level is reached (50% probability) in categories of modelled pathways considered in WGIII is 2030–2035. {*WGI SPM B.1.3*, *WGI Cross-Section Box TS.1*, *WGIII Table 3.2*} (*Cross-Section Box.2*)

[115] See Cross-Section Box.2.

[116] Based on additional scenarios.

policies limit this additional warming and lead to strong benefits for air quality (*high confidence*). In high and very high GHG emissions scenarios (SSP3-7.0 and SSP5-8.5), combined changes in SLCF emissions, such as CH_4, aerosol and ozone precursors, lead to a net global warming by 2100 of *likely* 0.4°C to 0.9°C relative to 2019. This is due to projected increases in atmospheric concentration of CH_4, tropospheric ozone, hydrofluorocarbons and, when strong air pollution control is considered, reductions of cooling aerosols. In low and very low GHG emissions scenarios (SSP1-1.9 and SSP1-2.6), air pollution control policies, reductions in CH_4 and other ozone precursors lead to a net cooling, whereas reductions in anthropogenic cooling aerosols lead to a net warming (*high confidence*). Altogether, this causes a *likely* net warming of 0.0°C to 0.3°C due to SLCF changes in 2100 relative to 2019 and strong reductions in global surface ozone and particulate matter (*high confidence*). {*WGI SPM D.1.7, WGI Box TS.7*} (*Cross-Section Box.2*)

Continued GHG emissions will further affect all major climate system components, and many changes will be irreversible on centennial to millennial time scales. Many changes in the climate system become larger in direct relation to increasing global warming. With every additional increment of global warming, changes in extremes continue to become larger. Additional warming will lead to more frequent and intense marine heatwaves and is projected to further amplify permafrost thawing and loss of seasonal snow cover, glaciers, land ice and Arctic sea ice (*high confidence*). Continued global warming is projected to further intensify the global water cycle, including its variability, global monsoon precipitation[117], and very wet and very dry weather and climate events and seasons (*high confidence*). The portion of global land experiencing detectable changes in seasonal mean precipitation is projected to increase (*medium confidence*) with more variable precipitation and surface water flows over most land regions within seasons (*high confidence*) and from year to year (*medium confidence*). Many changes due to past and future GHG emissions are irreversible[118] on centennial to millennial time scales, especially in the ocean, ice sheets and global sea level (see 3.1.3). Ocean acidification (*virtually certain*), ocean deoxygenation (*high confidence*) and global mean sea level (*virtually certain*) will continue to increase in the 21st century, at rates dependent on future emissions. {*WGI SPM B.2, WGI SPM B.2.2, WGI SPM B.2.3, WGI SPM B.2.5, WGI SPM B.3, WGI SPM B.3.1, WGI SPM B.3.2, WGI SPM B.4, WGI SPM B.5, WGI SPM B.5.1, WGI SPM B.5.3, WGI Figure SPM.8*} (*Figure 3.1*)

With further global warming, every region is projected to increasingly experience concurrent and multiple changes in climatic impact-drivers. Increases in hot and decreases in cold climatic impact-drivers, such as temperature extremes, are projected in all regions (*high confidence*). At 1.5°C global warming, heavy precipitation and flooding events are projected to intensify and become more frequent in most regions in Africa, Asia (*high confidence*), North America (*medium* to *high confidence*) and Europe (*medium confidence*). At 2°C or above, these changes expand to more regions and/or become more significant (*high confidence*), and more frequent and/or severe agricultural and ecological droughts are projected in Europe, Africa, Australasia and North, Central and South America (*medium* to *high confidence*). Other projected regional changes include intensification of tropical cyclones and/or extratropical storms (*medium confidence*), and increases in aridity and fire weather[119] (*medium* to *high confidence*). Compound heatwaves and droughts become *likely* more frequent, including concurrently at multiple locations (*high confidence*). {*WGI SPM C.2, WGI SPM C.2.1, WGI SPM C.2.2, WGI SPM C.2.3, WGI SPM C.2.4, WGI SPM C.2.7*}

117 Particularly over South and South East Asia, East Asia and West Africa apart from the far west Sahel. {*WGI SPM B.3.3*}

118 See Annex I: Glossary.

119 See Annex I: Glossary.

With every increment of global warming, regional changes in mean climate and extremes become more widespread and pronounced

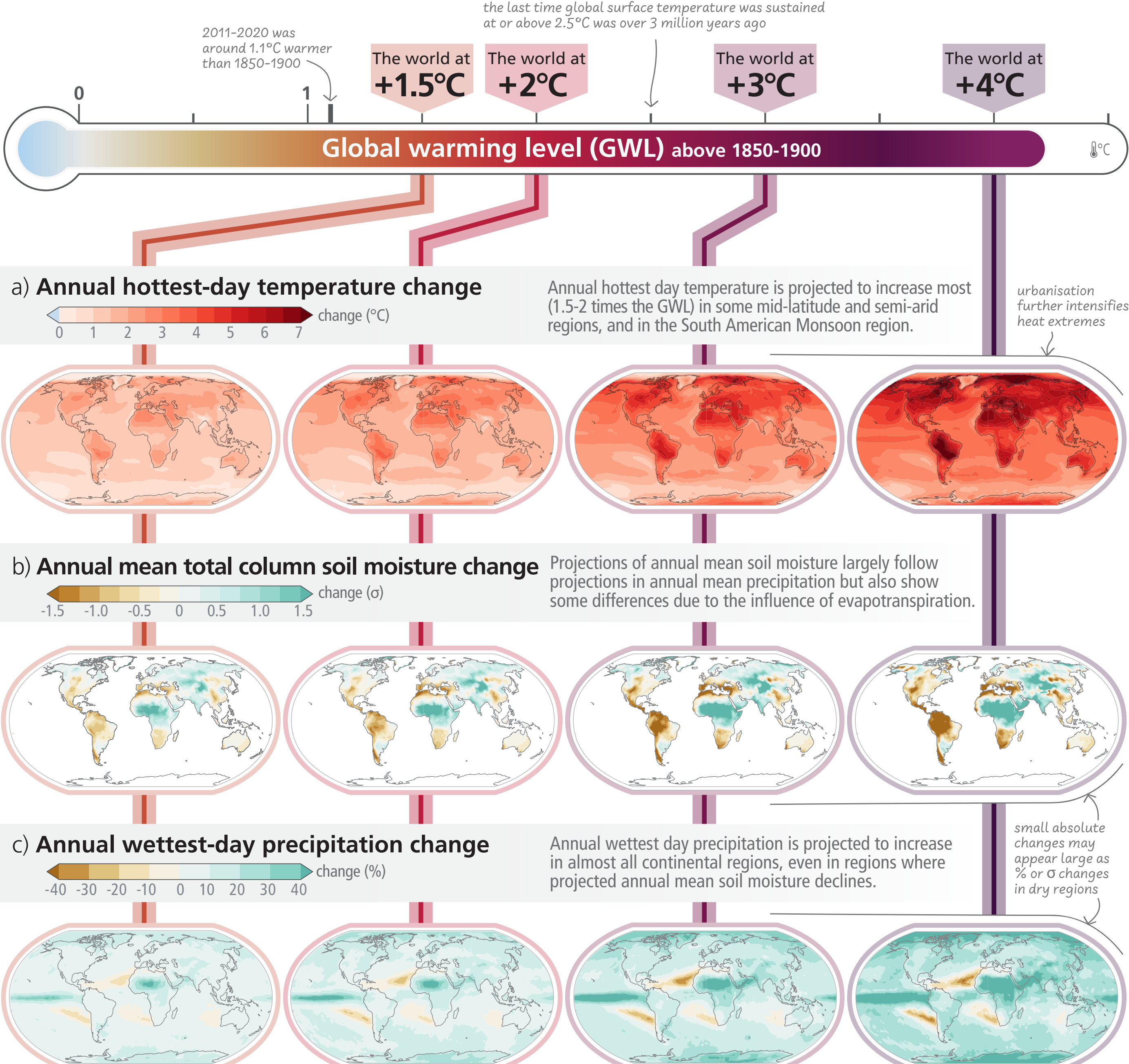


Figure 3.1: Projected changes of annual maximum daily temperature, annual mean total column soil moisture CMIP and annual maximum daily precipitation at global warming levels of 1.5°C, 2°C, 3°C, and 4°C relative to 1850-1900. Simulated (a) annual maximum temperature change (°C), **(b)** annual mean total column soil moisture (standard deviation), **(c)** annual maximum daily precipitation change (%). Changes correspond to CMIP6 multi-model median changes. In panels (b) and (c), large positive relative changes in dry regions may correspond to small absolute changes. In panel (b), the unit is the standard deviation of interannual variability in soil moisture during 1850-1900. Standard deviation is a widely used metric in characterising drought severity. A projected reduction in mean soil moisture by one standard deviation corresponds to soil moisture conditions typical of droughts that occurred about once every six years during 1850-1900. The WGI Interactive Atlas (https://interactive-atlas.ipcc.ch/) can be used to explore additional changes in the climate system across the range of global warming levels presented in this figure. {*WGI Figure SPM.5, WGI Figure TS.5, WGI Figure 11.11, WGI Figure 11.16, WGI Figure 11.19*} (*Cross-Section Box.2*)

3.1.2 Impacts and Related Risks

For a given level of warming, many climate-related risks are assessed to be higher than in AR5 (*high confidence*). Levels of risk[120] for all Reasons for Concern[121] (RFCs) are assessed to become high to very high at lower global warming levels compared to what was assessed in AR5 (*high confidence*). This is based upon recent evidence of observed impacts, improved process understanding, and new knowledge on exposure and vulnerability of human and natural systems, including limits to adaptation. Depending on the level of global warming, the assessed long-term impacts will be up to multiple times higher than currently observed (*high confidence*) for 127 identified key risks, e.g., in terms of the number of affected people and species. Risks, including cascading risks (see 3.1.3) and risks from overshoot (see 3.3.4), are projected to become increasingly severe with every increment of global warming (*very high confidence*). {*WGII SPM B.3.3, WGII SPM B.4, WGII SPM B.5, WGII 16.6.3; SRCCL SPM A5.3*} (*Figure 3.2*, *Figure 3.3*)

Climate-related risks for natural and human systems are higher for global warming of 1.5°C than at present (1.1°C) but lower than at 2°C (*high confidence*) (see Section 2.1.2). Climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth are projected to increase with global warming of 1.5°C. In terrestrial ecosystems, 3 to 14% of the tens of thousands of species assessed will *likely* face a very high risk of extinction at a GWL of 1.5°C. Coral reefs are projected to decline by a further 70–90% at 1.5°C of global warming (*high confidence*). At this GWL, many low-elevation and small glaciers around the world would lose most of their mass or disappear within decades to centuries (*high confidence*). Regions at disproportionately higher risk include Arctic ecosystems, dryland regions, small island developing states and Least Developed Countries (*high confidence*). {*WGII SPM B.3, WGII SPM B.4.1, WGII TS.C.4.2; SR1.5 SPM A.3, SR1.5 SPM B.4.2, SR1.5 SPM B.5, SR1.5 SPM B.5.1*} (*Figure 3.3*)

At 2°C of global warming, overall risk levels associated with the unequal distribution of impacts (RFC3), global aggregate impacts (RFC4) and large-scale singular events (RFC5) would be transitioning to high (*medium confidence*), those associated with extreme weather events (RFC2) would be transitioning to very high (*medium confidence*), and those associated with unique and threatened systems (RFC1) would be very high (*high confidence*) (Figure 3.3, panel a). With about 2°C warming, climate-related changes in food availability and diet quality are estimated to increase nutrition-related diseases and the number of undernourished people, affecting tens (under low vulnerability and low warming) to hundreds of millions of people (under high vulnerability and high warming), particularly among low-income households in low- and middle-income countries in sub-Saharan Africa, South Asia and Central America (*high confidence*). For example, snowmelt water availability for irrigation is projected to decline in some snowmelt dependent river basins by up to 20% (*medium confidence*). Climate change risks to cities, settlements and key infrastructure will rise sharply in the mid and long term with further global warming, especially in places already exposed to high temperatures, along coastlines, or with high vulnerabilities (*high confidence*). {*WGII SPM B.3.3, WGII SPM B.4.2, WGII SPM B.4.5, WGII TS C.3.3, WGII TS.C.12.2*} (*Figure 3.3*)

At global warming of 3°C, additional risks in many sectors and regions reach high or very high levels, implying widespread systemic impacts, irreversible change and many additional adaptation limits (see Section 3.2) (*high confidence*). For example, very high extinction risk for endemic species in biodiversity hotspots is projected to increase at least tenfold if warming rises from 1.5°C to 3°C (*medium confidence*). Projected increases in direct flood damages are higher by 1.4 to 2 times at 2°C and 2.5 to 3.9 times at 3°C, compared to 1.5°C global warming without adaptation (*medium confidence*). {*WGII SPM B.4.1*, *WGII SPM B.4.2*, *WGII Figure SPM.3, WGII TS Appendix AII, WGII Appendix I Global to Regional Atlas Figure AI.46*} (*Figure 3.2*, *Figure 3.3*)

Global warming of 4°C and above is projected to lead to far-reaching impacts on natural and human systems (*high confidence*). Beyond 4°C of warming, projected impacts on natural systems include local extinction of ~50% of tropical marine species (*medium confidence*) and biome shifts across 35% of global land area (*medium confidence*). At this level of warming, approximately 10% of the global land area is projected to face both increasing high and decreasing low extreme streamflow, affecting, without additional adaptation, over 2.1 billion people (*medium confidence*) and about 4 billion people are projected to experience water scarcity (*medium confidence*). At 4°C of warming, the global burned area is projected to increase by 50 to 70% and the fire frequency by ~30% compared to today (*medium confidence*). {*WGII SPM B.4.1*, *WGII SPM B.4.2*, *WGII TS.C.1.2*, *WGII TS.C.2.3*, *WGII TS.C.4.1*, *WGII TS.C.4.4*} (*Figure 3.2, Figure 3.3*)

[120] Undetectable risk level indicates no associated impacts are detectable and attributable to climate change; moderate risk indicates associated impacts are both detectable and attributable to climate change with at least *medium confidence*, also accounting for the other specific criteria for key risks; high risk indicates severe and widespread impacts that are judged to be high on one or more criteria for assessing key risks; and very high risk level indicates very high risk of severe impacts and the presence of significant irreversibility or the persistence of climate-related hazards, combined with limited ability to adapt due to the nature of the hazard or impacts/risks. {*WGII Figure SPM.3*}

[121] The Reasons for Concern (RFC) framework communicates scientific understanding about accrual of risk for five broad categories (WGII Figure SPM.3). RFC1: Unique and threatened systems: ecological and human systems that have restricted geographic ranges constrained by climate-related conditions and have high endemism or other distinctive properties. Examples include coral reefs, the Arctic and its Indigenous Peoples, mountain glaciers and biodiversity hotspots. RFC2: Extreme weather events: risks/impacts to human health, livelihoods, assets and ecosystems from extreme weather events such as heatwaves, heavy rain, drought and associated wildfires, and coastal flooding. RFC3: Distribution of impacts: risks/impacts that disproportionately affect particular groups due to uneven distribution of physical climate change hazards, exposure or vulnerability. RFC4: Global aggregate impacts: impacts to socio-ecological systems that can be aggregated globally into a single metric, such as monetary damages, lives affected, species lost or ecosystem degradation at a global scale. RFC5: Large-scale singular events: relatively large, abrupt and sometimes irreversible changes in systems caused by global warming, such as ice sheet instability or thermohaline circulation slowing. Assessment methods include a structured expert elicitation based on the literature described in WGII SM16.6 and are identical to AR5 but are enhanced by a structured approach to improve robustness and facilitate comparison between AR5 and AR6. For further explanations of global risk levels and Reasons for Concern, see WGII TS.AII. {*WGII Figure SPM.3*}

Projected adverse impacts and related losses and damages from climate change escalate with every increment of global warming (*very high confidence*), but they will also strongly depend on socio-economic development trajectories and adaptation actions to reduce vulnerability and exposure (*high confidence*). For example, development pathways with higher demand for food, animal feed, and water, more resource-intensive consumption and production, and limited technological improvements result in higher risks from water scarcity in drylands, land degradation and food insecurity (*high confidence*). Changes in, for example, demography or investments in health systems have effect on a variety of health-related outcomes including heat-related morbidity and mortality (Figure 3.3 Panel d). {*WGII SPM B.3, WGII SPM B.4, WGII Figure SPM.3; SRCCL SPM A.6*}

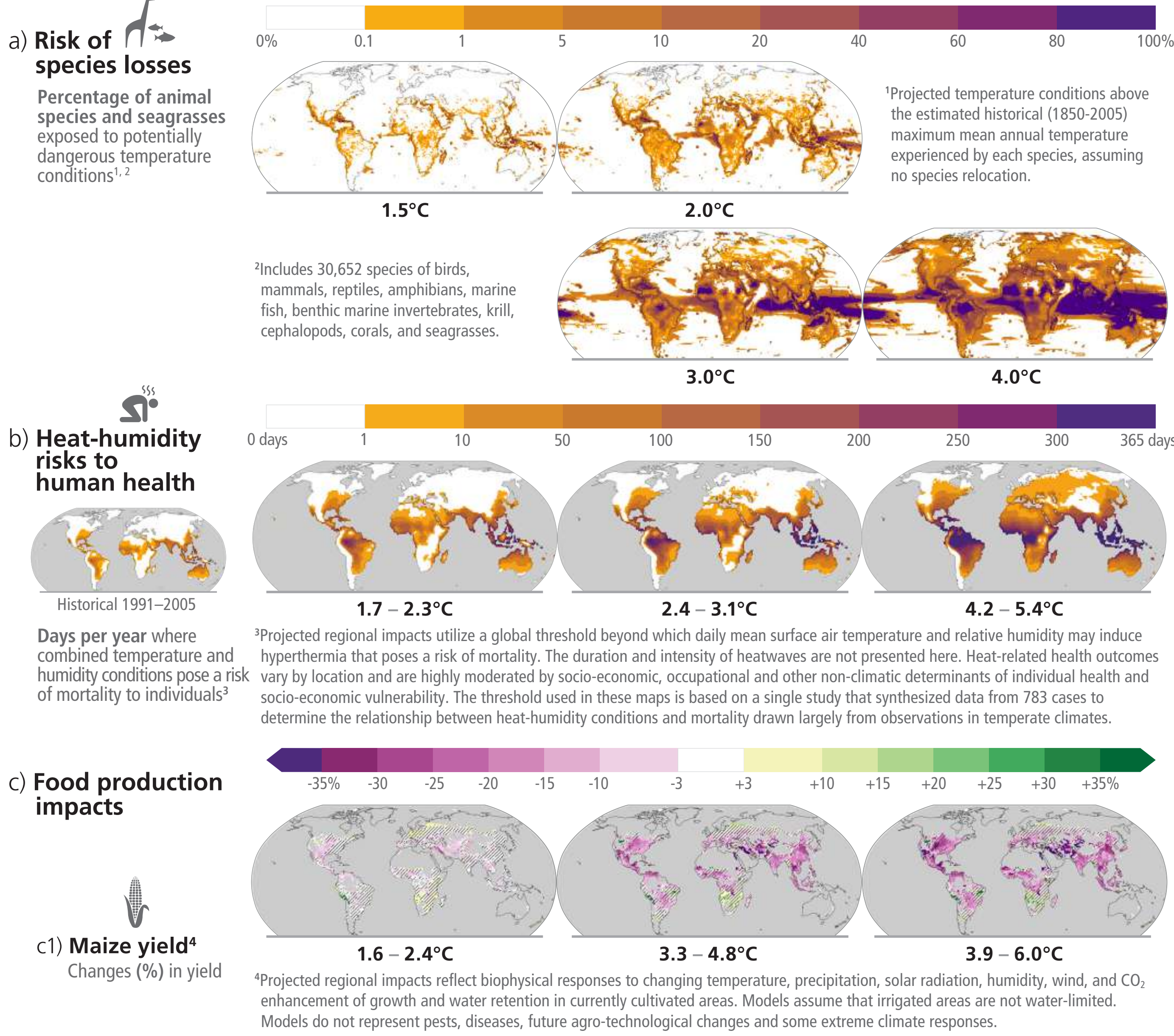
With every increment of warming, climate change impacts and risks will become increasingly complex and more difficult to manage. Many regions are projected to experience an increase in the probability of compound events with higher global warming, such as concurrent heatwaves and droughts, compound flooding and fire weather. In addition, multiple climatic and non-climatic risk drivers such as biodiversity loss or violent conflict will interact, resulting in compounding overall risk and risks cascading across sectors and regions. Furthermore, risks can arise from some responses that are intended to reduce the risks of climate change, e.g., adverse side effects of some emission reduction and carbon dioxide removal (CDR) measures (see 3.4.1). (*high confidence*) {*WGI SPM C.2.7, WGI Figure SPM.6, WGI TS.4.3; WGII SPM B.1.7, WGII B.2.2, WGII SPM B.5, WGII SPM B.5.4, WGII SPM C.4.2, WGII SPM B.5, WGII CCB2*}

Solar Radiation Modification (SRM) approaches, if they were to be implemented, introduce a widespread range of new risks to people and ecosystems, which are not well understood. SRM has the potential to offset warming within one or two decades and ameliorate some climate hazards but would not restore climate to a previous state, and substantial residual or overcompensating climate change would occur at regional and seasonal scales (*high confidence*). Effects of SRM would depend on the specific approach used[122], and a sudden and sustained termination of SRM in a high CO_2 emissions scenario would cause rapid climate change (*high confidence*). SRM would not stop atmospheric CO_2 concentrations from increasing nor reduce resulting ocean acidification under continued anthropogenic emissions (*high confidence*). Large uncertainties and knowledge gaps are associated with the potential of SRM approaches to reduce climate change risks. Lack of robust and formal SRM governance poses risks as deployment by a limited number of states could create international tensions. {*WGI 4.6; WGII SPM B.5.5; WGIII 14.4.5.1; WGIII 14 Cross-Working Group Box Solar Radiation Modification; SR1.5 SPM C.1.4*}

[122] Several SRM approaches have been proposed, including stratospheric aerosol injection, marine cloud brightening, ground-based albedo modifications, and ocean albedo change. See Annex I: Glossary.

Future climate change is projected to increase the severity of impacts across natural and human systems and will increase regional differences

Examples of impacts without additional adaptation



c2) **Fisheries yield**[5]
Changes (%) in maximum catch potential

0.9 – 2.0°C

3.4 – 5.2°C

Areas with little or no production, or not assessed

Areas with model disagreement

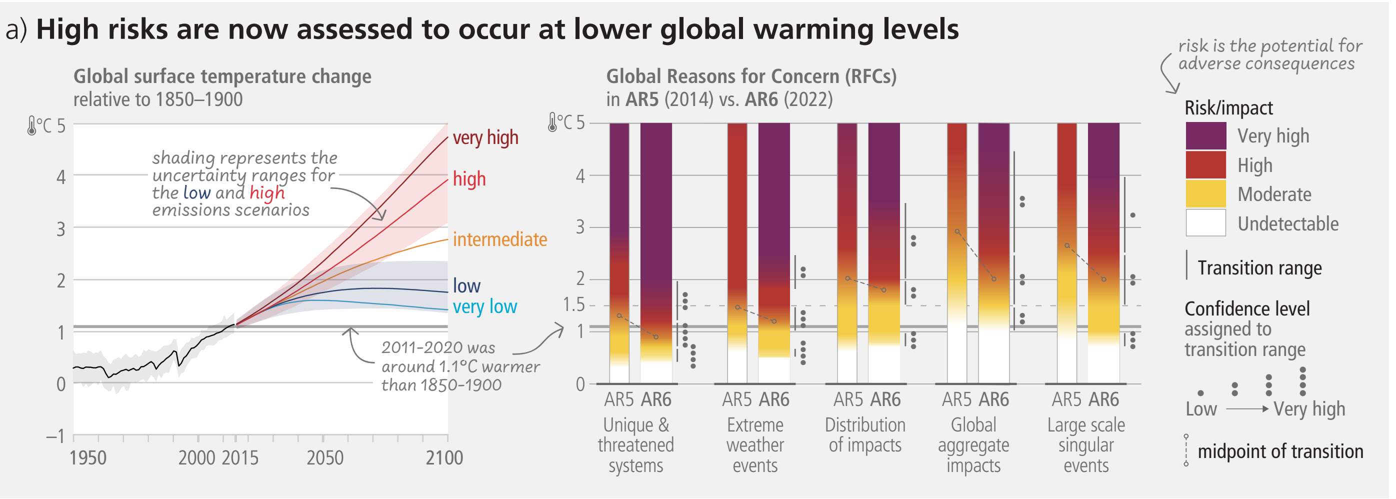
[5]Projected regional impacts reflect fisheries and marine ecosystem responses to ocean physical and biogeochemical conditions such as temperature, oxygen level and net primary production. Models do not represent changes in fishing activities and some extreme climatic conditions. Projected changes in the Arctic regions have low confidence due to uncertainties associated with modelling multiple interacting drivers and ecosystem responses.

Section 3

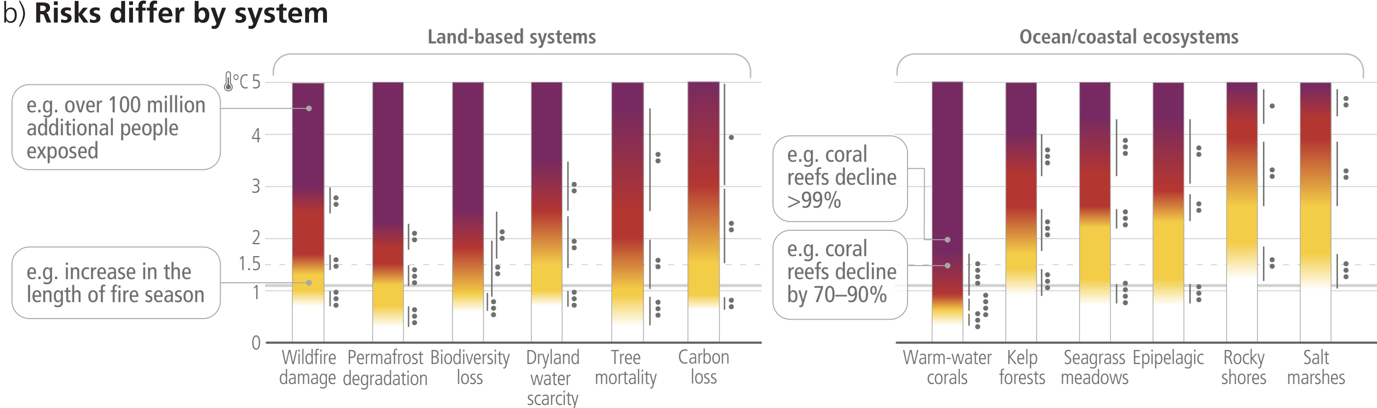
Figure 3.2: Projected risks and impacts of climate change on natural and human systems at different global warming levels (GWLs) relative to 1850-1900 levels. Projected risks and impacts shown on the maps are based on outputs from different subsets of Earth system models that were used to project each impact indicator without additional adaptation. WGII provides further assessment of the impacts on human and natural systems using these projections and additional lines of evidence. **(a)** Risks of species losses as indicated by the percentage of assessed species exposed to potentially dangerous temperature conditions, as defined by conditions beyond the estimated historical (1850–2005) maximum mean annual temperature experienced by each species, at GWLs of 1.5°C, 2°C, 3°C and 4°C. Underpinning projections of temperature are from 21 Earth system models and do not consider extreme events impacting ecosystems such as the Arctic. **(b)** Risk to human health as indicated by the days per year of population exposure to hypothermic conditions that pose a risk of mortality from surface air temperature and humidity conditions for historical period (1991–2005) and at GWLs of 1.7°C to 2.3°C (mean = 1.9°C; 13 climate models), 2.4°C to 3.1°C (2.7°C; 16 climate models) and 4.2°C to 5.4°C (4.7°C; 15 climate models). Interquartile ranges of WGLs by 2081–2100 under RCP2.6, RCP4.5 and RCP8.5. The presented index is consistent with common features found in many indices included within WGI and WGII assessments. **(c)** Impacts on food production: (c1) Changes in maize yield at projected GWLs of 1.6°C to 2.4°C (2.0°C), 3.3°C to 4.8°C (4.1°C) and 3.9°C to 6.0°C (4.9°C). Median yield changes from an ensemble of 12 crop models, each driven by bias-adjusted outputs from 5 Earth system models from the Agricultural Model Intercomparison and Improvement Project (AgMIP) and the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). Maps depict 2080–2099 compared to 1986–2005 for current growing regions (>10 ha), with the corresponding range of future global warming levels shown under SSP1-2.6, SSP3-7.0 and SSP5-8.5, respectively. Hatching indicates areas where <70% of the climate-crop model combinations agree on the sign of impact. (c2) Changes in maximum fisheries catch potential by 2081–2099 relative to 1986-2005 at projected GWLs of 0.9°C to 2.0°C (1.5°C) and 3.4°C to 5.2°C (4.3°C). GWLs by 2081–2100 under RCP2.6 and RCP8.5. Hatching indicates where the two climate-fisheries models disagree in the direction of change. Large relative changes in low yielding regions may correspond to small absolute changes. Biodiversity and fisheries in Antarctica were not analysed due to data limitations. Food security is also affected by crop and fishery failures not presented here. {*WGII Fig. TS.5, WGII Fig TS.9, WGII Annex I: Global to Regional Atlas Figure AI.15, Figure AI.22, Figure AI.23, Figure AI.29; WGII 7.3.1.2, 7.2.4.1, SROCC Figure SPM.3*} (*3.1.2, Cross-Section Box.2*)

Risks are increasing with every increment of warming

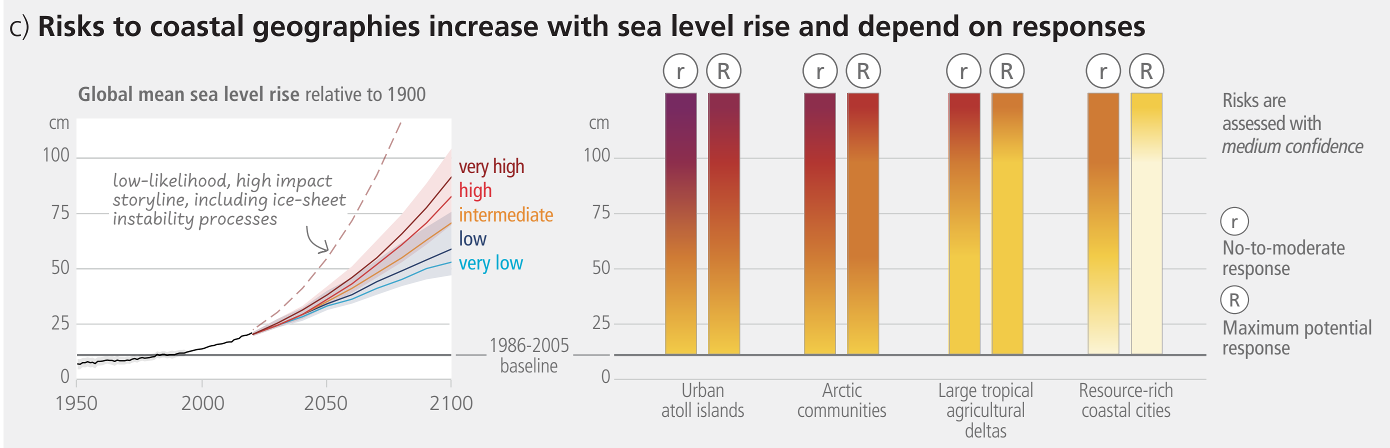
a) High risks are now assessed to occur at lower global warming levels



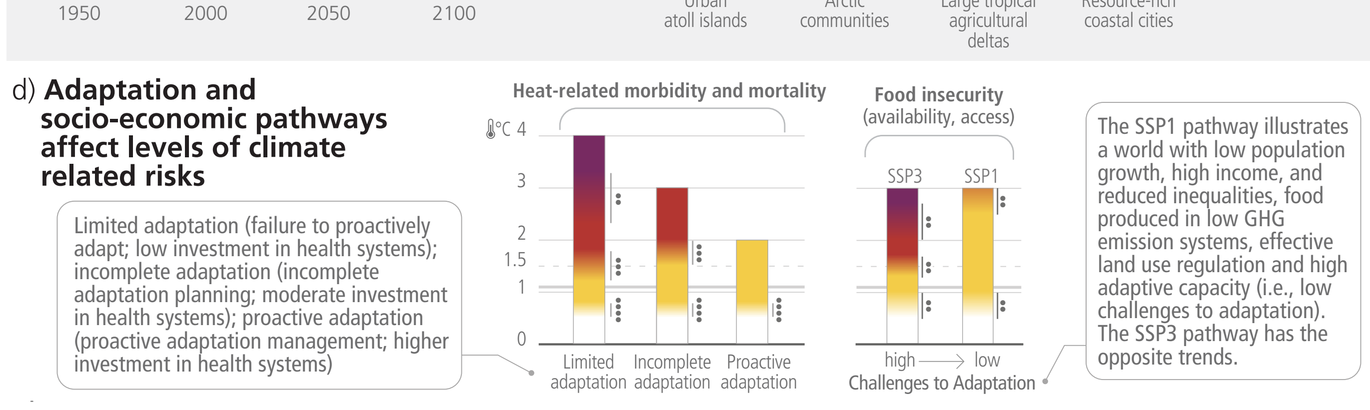
b) Risks differ by system



c) Risks to coastal geographies increase with sea level rise and depend on responses



d) Adaptation and socio-economic pathways affect levels of climate related risks



e) Examples of key risks in different regions

Absence of risk diagrams does not imply absence of risks within a region. The development of synthetic diagrams for Small Islands, Asia and Central and South America was limited due to the paucity of adequately downscaled climate projections, with uncertainty in the direction of change, the diversity of climatologies and socioeconomic contexts across countries within a region, and the resulting few numbers of impact and risk projections for different warming levels.

The risks listed are of at least *medium confidence* level:

Small Islands
- Loss of terrestrial, marine and coastal biodiversity and ecosystem services
- Loss of lives and assets, risk to food security and economic disruption due to destruction of settlements and infrastructure
- Economic decline and livelihood failure of fisheries, agriculture, tourism and from biodiversity loss from traditional agroecosystems
- Reduced habitability of reef and non-reef islands leading to increased displacement
- Risk to water security in almost every small island

North America
- Climate-sensitive mental health outcomes, human mortality and morbidity due to increasing average temperature, weather and climate extremes, and compound climate hazards
- Risk of degradation of marine, coastal and terrestrial ecosystems, including loss of biodiversity, function, and protective services
- Risk to freshwater resources with consequences for ecosystems, reduced surface water availability for irrigated agriculture, other human uses, and degraded water quality
- Risk to food and nutritional security through changes in agriculture, livestock, hunting, fisheries, and aquaculture productivity and access
- Risks to well-being, livelihoods and economic activities from cascading and compounding climate hazards, including risks to coastal cities, settlements and infrastructure from sea level rise

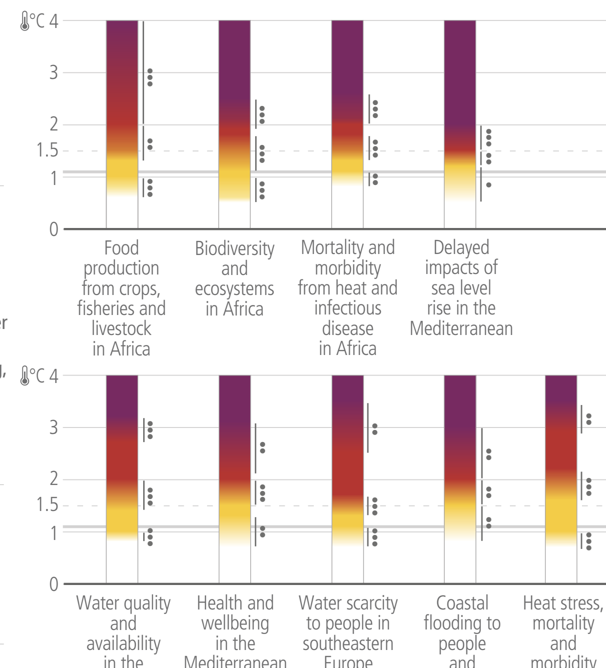
Europe
- Risks to people, economies and infrastructures due to coastal and inland flooding
- Stress and mortality to people due to increasing temperatures and heat extremes
- Marine and terrestrial ecosystems disruptions
- Water scarcity to multiple interconnected sectors
- Losses in crop production, due to compound heat and dry conditions, and extreme weather

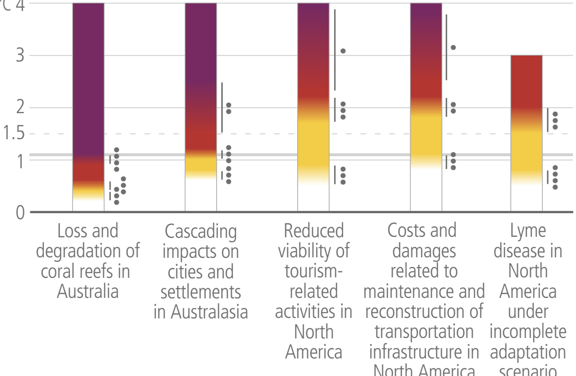
Central and South America
- Risk to water security
- Severe health effects due to increasing epidemics, in particular vector-borne diseases
- Coral reef ecosystems degradation due to coral bleaching
- Risk to food security due to frequent/extreme droughts
- Damages to life and infrastructure due to floods, landslides, sea level rise, storm surges and coastal erosion

Australasia
- Degradation of tropical shallow coral reefs and associated biodiversity and ecosystem service values
- Loss of human and natural systems in low-lying coastal areas due to sea level rise
- Impact on livelihoods and incomes due to decline in agricultural production
- Increase in heat-related mortality and morbidity for people and wildlife
- Loss of alpine biodiversity in Australia due to less snow

Asia
- Urban infrastructure damage and impacts on human well-being and health due to flooding, especially in coastal cities and settlements
- Biodiversity loss and habitat shifts as well as associated disruptions in dependent human systems across freshwater, land, and ocean ecosystems
- More frequent, extensive coral bleaching and subsequent coral mortality induced by ocean warming and acidification, sea level rise, marine heat waves and resource extraction
- Decline in coastal fishery resources due to sea level rise, decrease in precipitation in some parts and increase in temperature
- Risk to food and water security due to increased temperature extremes, rainfall variability and drought

Africa
- Species extinction and reduction or irreversible loss of ecosystems and their services, including freshwater, land and ocean ecosystems
- Risk to food security, risk of malnutrition (micronutrient deficiency), and loss of livelihood due to reduced food production from crops, livestock and fisheries
- Risks to marine ecosystem health and to livelihoods in coastal communities
- Increased human mortality and morbidity due to increased heat and infectious diseases (including vector-borne and diarrhoeal diseases)
- Reduced economic output and growth, and increased inequality and poverty rates
- Increased risk to water and energy security due to drought and heat





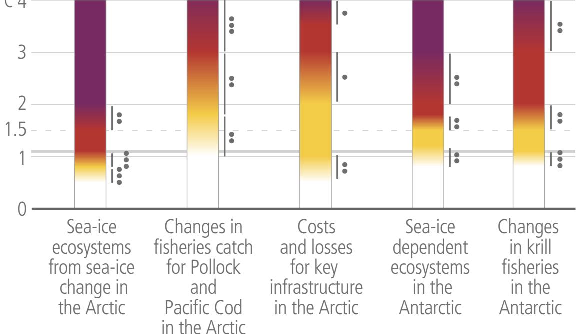


Figure 3.3: Synthetic risk diagrams of global and sectoral assessments and examples of regional key risks. The burning embers result from a literature based expert elicitation. **Panel (a): Left** - Global surface temperature changes in °C relative to 1850–1900. These changes were obtained by combining CMIP6 model simulations with observational constraints based on past simulated warming, as well as an updated assessment of equilibrium climate sensitivity. *Very likely* ranges are shown for the low and high GHG emissions scenarios (SSP1-2.6 and SSP3-7.0). **Right** - Global Reasons for Concern, comparing AR6 (thick embers) and AR5 (thin embers) assessments. Diagrams are shown for each RFC, assuming low to no adaptation (i.e., adaptation is fragmented, localised and comprises incremental adjustments to existing practices). However, the transition to a very high-risk level has an emphasis on irreversibility and adaptation limits. The horizontal line denotes the present global warming of 1.1°C which is used to separate the observed, past impacts below the line from the future projected risks above it. Lines connect the midpoints of the transition from moderate to high risk across AR5 and AR6. **Panel (b)**: Risks for land-based systems and ocean/coastal ecosystems. Diagrams shown for each risk assume low to no adaptation. Text bubbles indicate examples of impacts at a given warming level. **Panel (c): Left -** Global mean sea level change in centimetres, relative to 1900. The historical changes (black) are observed by tide gauges before 1992 and altimeters afterwards. The future changes to 2100 (coloured lines and shading) are assessed consistently with observational constraints based on emulation of CMIP, ice-sheet, and glacier models, and *likely* ranges are shown for SSP1-2.6 and SSP3-7.0. **Right** - Assessment of the combined risk of coastal flooding, erosion and salinization for four illustrative coastal geographies in 2100, due to changing mean and extreme sea levels, under two response scenarios, with respect to the SROCC baseline period (1986–2005) and indicating the IPCC AR6 baseline period (1995–2014). The assessment does not account for changes in extreme sea level beyond those directly induced by mean sea level rise; risk levels could increase if other changes in extreme sea levels were considered (e.g., due to changes in cyclone intensity). "No-to-moderate response" describes efforts as of today (i.e., no further significant action or new types of actions). "Maximum potential response" represents a combination of responses implemented to their full extent and thus significant additional efforts compared to today, assuming minimal financial, social and political barriers. The assessment criteria include exposure and vulnerability (density of assets, level of degradation of terrestrial and marine buffer ecosystems), coastal hazards (flooding, shoreline erosion, salinization), in-situ responses (hard engineered coastal defences, ecosystem restoration or creation of new natural buffers areas, and subsidence management) and planned relocation. Planned relocation refers to managed retreat or resettlement. Forced displacement is not considered in this assessment. The term response is used here instead of adaptation because some responses, such as retreat, may or may not be considered to be adaptation. **Panel (d): Left** - Heat-sensitive human health outcomes under three scenarios of adaptation effectiveness. The diagrams are truncated at the nearest whole ºC within the range of temperature change in 2100 under three SSP scenarios. **Right** - Risks associated with food security due to climate change and patterns of socio-economic development. Risks to food security include availability and access to food, including population at risk of hunger, food price increases and increases in disability adjusted life years attributable to childhood underweight. Risks are assessed for two contrasted socio-economic pathways (SSP1 and SSP3) excluding the effects of targeted mitigation and adaptation policies. **Panel (e)**: Examples of regional key risks. Risks identified are of at least *medium confidence* level. Key risks are identified based on the magnitude of adverse consequences (pervasiveness of the consequences, degree of change, irreversibility of consequences, potential for impact thresholds or tipping points, potential for cascading effects beyond system boundaries); likelihood of adverse consequences; temporal characteristics of the risk; and ability to respond to the risk, e.g., by adaptation. {*WGI Figure SPM.8; WGII SPM B.3.3, WGII Figure SPM.3, WGII SM 16.6, WGII SM 16.7.4; SROCC Figure SPM.3d, SROCC SPM.5a, SROCC 4SM; SRCCL Figure SPM.2, SRCCL 7.3.1, SRCCL 7 SM*} (*Cross-Section Box.2*)

3.1.3 The Likelihood and Risks of Abrupt and Irreversible Change

The likelihood of abrupt and irreversible changes and their impacts increase with higher global warming levels (*high confidence*). As warming levels increase, so do the risks of species extinction or irreversible loss of biodiversity in ecosystems such as forests (*medium confidence*), coral reefs (*very high confidence*) and in Arctic regions (*high confidence*). Risks associated with large-scale singular events or tipping points, such as ice sheet instability or ecosystem loss from tropical forests, transition to high risk between 1.5°C to 2.5°C (*medium confidence*) and to very high risk between 2.5°C to 4°C (*low confidence*). The response of biogeochemical cycles to anthropogenic perturbations can be abrupt at regional scales and irreversible on decadal to century time scales (*high confidence*). The probability of crossing uncertain regional thresholds increases with further warming (*high confidence*). {*WGI SPM C.3.2, WGI Box TS.9, WGI TS.2.6; WGII Figure SPM.3, WGII SPM B.3.1, WGII SPM B.4.1, WGII SPM B.5.2, WGII Table TS.1, WGII TS.C.1, WGII TS.C.13.3; SROCC SPM B.4*}

Sea level rise is unavoidable for centuries to millennia due to continuing deep ocean warming and ice sheet melt, and sea levels will remain elevated for thousands of years (*high confidence*). Global mean sea level rise will continue in the 21st century (*virtually certain*), with projected regional relative sea level rise within 20% of the global mean along two-thirds of the global coastline (*medium confidence*). The magnitude, the rate, the timing of threshold exceedances, and the long-term commitment of sea level rise depend on emissions, with higher emissions leading to greater and faster rates of sea level rise. Due to relative sea level rise, extreme sea level events that occurred once per century in the recent past are projected to occur at least annually at more than half of all tide gauge locations by 2100 and risks for coastal ecosystems, people and infrastructure will continue to increase beyond 2100 (*high confidence*). At sustained warming levels between 2°C and 3°C, the Greenland and West Antarctic ice sheets will be lost almost completely and irreversibly over multiple millennia (*limited evidence*). The probability and rate of ice mass loss increase with higher global surface temperatures (*high confidence*). Over the next 2000 years, global mean sea level will rise by about 2 to 3 m if warming is limited to 1.5°C and 2 to 6 m if limited to 2°C (*low confidence*). Projections of multi-millennial global mean sea level rise are consistent with reconstructed levels during past warm climate periods: global mean sea level was *very likely* 5 to 25 m higher than today roughly 3 million years ago, when global temperatures were 2.5°C to 4°C higher than 1850–1900 (*medium confidence*). Further examples of unavoidable changes in the climate system due to multi-decadal or longer response timescales include continued glacier melt (*very high confidence*) and permafrost carbon loss (*high confidence*). {*WGI SPM B.5.2, WGI SPM B.5.3, WGI SPM B.5.4, WGI SPM C.2.5, WGI Box TS.4, WGI Box TS.9, WGI 9.5.1; WGII TS C.5; SROCC SPM B.3, SROCC SPM B.6, SROCC SPM B.9*} (*Figure 3.4*)

The probability of low-likelihood outcomes associated with potentially very large impacts increases with higher global warming levels (*high confidence*). Warming substantially above the assessed *very likely* range for a given scenario cannot be ruled out, and there is *high confidence* this would lead to regional changes greater than assessed in many aspects of the climate system. Low-likelihood, high-impact outcomes could occur at regional scales even for global warming within the *very likely* assessed range for a given GHG emissions scenario. Global mean sea level rise above the *likely* range – approaching 2 m by 2100 and in excess of 15 m by 2300 under a very high GHG emissions scenario (SSP5-8.5) (*low confidence*) – cannot be ruled out due to deep uncertainty in ice-sheet processes[123] and would have severe

[123] This outcome is characterised by deep uncertainty: Its likelihood defies quantitative assessment but is considered due to its high potential impact. {*WGI Box TS.1; WGII Cross-Chapter Box DEEP*}

impacts on populations in low elevation coastal zones. If global warming increases, some compound extreme events[124] will become more frequent, with higher likelihood of unprecedented intensities, durations or spatial extent (*high confidence*). The Atlantic Meridional Overturning Circulation is *very likely* to weaken over the 21st century for all considered scenarios (*high confidence*), however an abrupt collapse is not expected before 2100 (*medium confidence*). If such a low probability event were to occur, it would *very likely* cause abrupt shifts in regional weather patterns and water cycle, such as a southward shift in the tropical rain belt, and large impacts on ecosystems and human activities. A sequence of large explosive volcanic eruptions within decades, as have occurred in the past, is a low-likelihood high-impact event that would lead to substantial cooling globally and regional climate perturbations over several decades. {*WGI SPM B.5.3, WGI SPM C.3, WGI SPM C.3.1, WGI SPM C.3.2, WGI SPM C.3.3, WGI SPM C.3.4, WGI SPM C.3.5, WGI Figure SPM.8, WGI Box TS.3, WGI Figure TS.6, WGI Box 9.4; WGII SPM B.4.5, WGII SPM C.2.8; SROCC SPM B.2.7*} (*Figure 3.4, Cross-Section Box.2*)

3.2 Long-term Adaptation Options and Limits

With increasing warming, adaptation options will become more constrained and less effective. At higher levels of warming, losses and damages will increase, and additional human and natural systems will reach adaptation limits. Integrated, cross-cutting multi-sectoral solutions increase the effectiveness of adaptation. Maladaptation can create lock-ins of vulnerability, exposure and risks but can be avoided by long-term planning and the implementation of adaptation actions that are flexible, multi-sectoral and inclusive. (*high confidence*)

The effectiveness of adaptation to reduce climate risk is documented for specific contexts, sectors and regions and will decrease with increasing warming (*high confidence*)[125]. For example, common adaptation responses in agriculture – adopting improved cultivars and agronomic practices, and changes in cropping patterns and crop systems – will become less effective from 2°C to higher levels of warming (*high confidence*). The effectiveness of most water-related adaptation options to reduce projected risks declines with increasing warming (*high confidence*). Adaptations for hydropower and thermo-electric power generation are effective in most regions up to 1.5°C to 2°C, with decreasing effectiveness at higher levels of warming (*medium confidence*). Ecosystem-based Adaptation is vulnerable to climate change impacts, with effectiveness declining with increasing global warming (*high confidence*). Globally, adaptation options related to agroforestry and forestry have a sharp decline in effectiveness at 3°C, with a substantial increase in residual risk (*medium confidence*). {*WGII SPM C.2, WGII SPM C.2.1, WGII SPM C.2.5, WGII SPM C.2.10, WGII Figure TS.6 Panel (e), 4.7.2*}

With increasing global warming, more limits to adaptation will be reached and losses and damages, strongly concentrated among the poorest vulnerable populations, will increase (*high confidence*). Already below 1.5°C, autonomous and evolutionary adaptation responses by terrestrial and aquatic ecosystems will increasingly face hard limits (*high confidence*) (Section 2.1.2). Above 1.5°C, some ecosystem-based adaptation measures will lose their effectiveness in providing benefits to people as these ecosystems will reach hard adaptation limits (*high confidence*). Adaptation to address the risks of heat stress, heat mortality and reduced capacities for outdoor work for humans face soft and hard limits across regions that become significantly more severe at 1.5°C, and are particularly relevant for regions with warm climates (*high confidence*). Above 1.5°C global warming level, limited freshwater resources pose potential hard limits for small islands and for regions dependent on glacier and snow melt (*medium confidence*). By 2°C, soft limits are projected for multiple staple crops, particularly in tropical regions (*high confidence*). By 3°C, soft limits are projected for some water management measures for many regions, with hard limits projected for parts of Europe (*medium confidence*). {*WGII SPM C.3, WGII SPM C.3.3, WGII SPM C.3.4, WGII SPM C.3.5, WGII TS.D.2.2, WGII TS.D.2.3; SR1.5 SPM B.6; SROCC SPM C.1*}

Integrated, cross-cutting multi-sectoral solutions increase the effectiveness of adaptation. For example, inclusive, integrated and long-term planning at local, municipal, sub-national and national scales, together with effective regulation and monitoring systems and financial and technological resources and capabilities foster urban and rural system transition. There are a range of cross-cutting adaptation options, such as disaster risk management, early warning systems, climate services and risk spreading and sharing that have broad applicability across sectors and provide greater benefits to other adaptation options when combined. Transitioning from incremental to transformational adaptation, and addressing a range of constraints, primarily in the financial, governance, institutional and policy domains, can help overcome soft adaptation limits. However, adaptation does not prevent all losses and damages, even with effective adaptation and before reaching soft and hard limits. (*high confidence*) {*WGII SPM C.2, WGII SPM C.2.6, WGII SPM.C.2.13, WGII SPM C.3.1, WGII SPM.C.3.4, WGII SPM C.3.5, WGII Figure TS.6 Panel (e)*}

Maladaptive responses to climate change can create lock-ins of vulnerability, exposure and risks that are difficult and expensive to change and exacerbate existing inequalities. Actions that focus on sectors and risks in isolation and on short-term gains often lead to maladaptation. Adaptation options can become maladaptive due to their environmental impacts that constrain ecosystem services and decrease biodiversity and ecosystem resilience to climate change or by causing adverse outcomes for different groups, exacerbating inequity. Maladaptation can be avoided by flexible, multi-sectoral, inclusive and

[124] See Annex I: Glossary. Examples of compound extreme events are concurrent heatwaves and droughts or compound flooding. {*WGI SPM Footnote 18*}

[125] There are limitations to assessing the full scope of adaptation options available in the future since not all possible future adaptation responses can be incorporated in climate impact models, and projections of future adaptation depend on currently available technologies or approaches. {*WGII 4.7.2*}

long-term planning and implementation of adaptation actions with benefits to many sectors and systems. (*high confidence*) {*WGII SPM C.4, WGII SPM.C.4.1, WGII SPM C.4.2, WGII SPM C.4.3*}

Sea level rise poses a distinctive and severe adaptation challenge as it implies both dealing with slow onset changes and increases in the frequency and magnitude of extreme sea level events (*high confidence*). Such adaptation challenges would occur much earlier under high rates of sea level rise (*high confidence*). Responses to ongoing sea level rise and land subsidence include protection, accommodation, advance and planned relocation (*high confidence*). These responses are more effective if combined and/or sequenced, planned well ahead, aligned with sociocultural values and underpinned by inclusive community engagement processes (*high confidence*). Ecosystem-based solutions such as wetlands provide co-benefits for the environment and climate mitigation, and reduce costs for flood defences (*medium confidence)*, but have site-specific physical limits, at least above 1.5°C of global warming (*high confidence*) and lose effectiveness at high rates of sea level rise beyond 0.5 to 1 cm yr^{-1} (*medium confidence*). Seawalls can be maladaptive as they effectively reduce impacts in the short term but can also result in lock-ins and increase exposure to climate risks in the long term unless they are integrated into a long-term adaptive plan (*high confidence*). {*WGI SPM C.2.5; WGII SPM C.2.8, WGII SPM C.4.1; WGII 13.10, WGII Cross-Chapter Box SLR; SROCC SPM B.9, SROCC SPM C.3.2, SROCC Figure SPM.4, SROCC Figure SPM.5c*} (*Figure 3.4*)

Sea level rise will continue for millennia, but how fast and how much depends on future emissions

a) **Sea level rise: observations and projections 2020-2100, 2150, 2300** (relative to 1900)

Sea level rise greater than 15m cannot be ruled out with very high emissions

Unavoidable sea level rise will cause:

this can be chronic high tide flooding and extreme flooding during storms

Losses of coastal ecosystems and ecosystem services

Groundwater salinisation

Flooding and damages to coastal infrastructure

These cascade into risks to: livelihoods, settlements, health, well-being, food and water security and cultural values.

By 2050:

1 billion people exposed

Extreme sea level events that occured once per century will be **20-30 times** more frequent

Observed

sea level rise by 2100 depends on the emissions scenario

very high
high
intermediate
low
very low

likely ranges of sea level rise

low emissions scenario range

very high emissions scenario range

Global sea level rise in meters relative to 1900

0
1m
2m
3m
4m
5m
6m
7m
15m

1900 1950 2000 2020 2050 2100 2150 2300

Low-likelihood, high-impact storyline, including ice sheet instability processes under the very high emissions scenario

Responding to sea level rise requires long-term planning

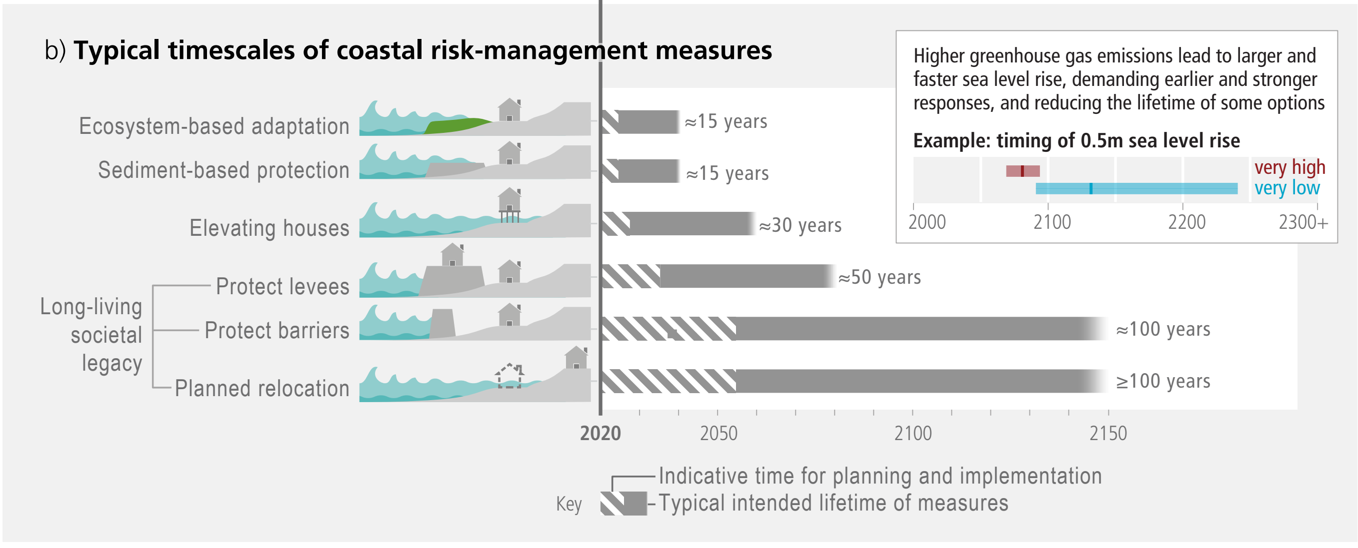


Figure 3.4: Observed and projected global mean sea level change and its impacts, and time scales of coastal risk management. Panel (a): Global mean sea level change in metres relative to 1900. The historical changes (black) are observed by tide gauges before 1992 and altimeters afterwards. The future changes to 2100 and for 2150 (coloured lines and shading) are assessed consistently with observational constraints based on emulation of CMIP, ice-sheet, and glacier models, and median values and *likely* ranges are shown for the considered scenarios. Relative to 1995-2014, the *likely* global mean sea level rise by 2050 is between 0.15 to 0.23 m in the very low GHG emissions scenario (SSP1-1.9) and 0.20 to 0.29 m in the very high GHG emissions scenario (SSP5-8.5); by 2100 between 0.28 to 0.55 m under SSP1-1.9 and 0.63 to 1.01 m under SSP5-8.5; and by 2150 between 0.37 to 0.86 m under SSP1-1.9 and 0.98 to 1.88 m under SSP5-8.5 *(medium confidence)*. Changes relative to 1900 are calculated by adding 0.158 m (observed global mean sea level rise from 1900 to 1995-2014) to simulated changes relative to 1995-2014. The future changes to 2300 (bars) are based on literature assessment, representing the 17th–83rd percentile range for SSP1-2.6 (0.3 to 3.1 m) and SSP5-8.5 (1.7 to 6.8 m). Red dashed lines: Low-likelihood, high-impact storyline, including ice sheet instability processes. These indicate the potential impact of deeply uncertain processes, and show the 83rd percentile of SSP5-8.5 projections that include low-likelihood, high-impact processes that cannot be ruled out; because of *low confidence* in projections of these processes, this is not part of a *likely* range. IPCC AR6 global and regional sea level projections are hosted at https://sealevel.nasa.gov/ipcc-ar6-sea-level-projection-tool. The low-lying coastal zone is currently home to around 896 million people (nearly 11% of the 2020 global population), projected to reach more than one billion by 2050 across all five SSPs. **Panel (b):** Typical time scales for the planning, implementation (dashed bars) and operational lifetime of current coastal risk-management measures (blue bars). Higher rates of sea level rise demand earlier and stronger responses and reduce the lifetime of measures (inset). As the scale and pace of sea level rise accelerates beyond 2050, long-term adjustments may in some locations be beyond the limits of current adaptation options and for some small islands and low-lying coasts could be an existential risk. {*WGI SPM B.5*, *WGI C.2.5*, *WGI Figure SPM.8*, *WGI 9.6; WGII SPM B.4.5*, *WGII B.5.2*, *WGII C.2.8*, *WGII D.3.3*, *WGII TS.D.7*, *WGII Cross-Chapter Box SLR*} (*Cross-Section Box.2*)

3.3 Mitigation Pathways

Limiting human-caused global warming requires net zero anthropogenic CO_2 emissions. Pathways consistent with 1.5°C and 2°C carbon budgets imply rapid, deep, and in most cases immediate GHG emission reductions in all sectors (*high confidence*). Exceeding a warming level and returning (i.e. overshoot) implies increased risks and potential irreversible impacts; achieving and sustaining global net negative CO_2 emissions would reduce warming (*high confidence*).

3.3.1 Remaining Carbon Budgets

Limiting global temperature increase to a specific level requires limiting cumulative net CO_2 emissions to within a finite carbon budget[126], along with strong reductions in other GHGs. For every 1000 $GtCO_2$ emitted by human activity, global mean temperature rises by *likely* 0.27°C to 0.63°C (best estimate of 0.45°C). This relationship implies that there is a finite carbon budget that cannot be exceeded in order to limit warming to any given level. {*WGI SPM D.1, WGI SPM D.1.1; SR1.5 SPM C.1.3*} (*Figure 3.5*)

The best estimates of the remaining carbon budget (RCB) from the beginning of 2020 for limiting warming to 1.5°C with a 50% likelihood[127] is estimated to be 500 $GtCO_2$; for 2°C (67% likelihood) this is 1150 $GtCO_2$.[128] Remaining carbon budgets have been quantified based on the assessed value of TCRE and its uncertainty, estimates of historical warming, climate system feedbacks such as emissions from thawing permafrost, and the global surface temperature change after global anthropogenic CO_2 emissions reach net zero, as well as variations in projected warming from non-CO_2 emissions due in part to mitigation action. The stronger the reductions in non-CO_2 emissions the lower the resulting temperatures are for a given RCB or the larger RCB for the same level of temperature change. For instance, the RCB for limiting warming to 1.5°C with a 50% likelihood could vary between 300 to 600 $GtCO_2$ depending on non-CO_2 warming[129]. Limiting warming to 2°C with a 67% (or 83%) likelihood would imply a RCB of 1150 (900) $GtCO_2$ from the beginning of 2020. To stay below 2°C with a 50% likelihood, the RCB is higher, i.e., 1350 $GtCO_2$[130]. {*WGI SPM D.1.2, WGI Table SPM.2; WGIII Box SPM.1, WGIII Box 3.4; SR1.5 SPM C.1.3*}

If the annual CO_2 emissions between 2020–2030 stayed, on average, at the same level as 2019, the resulting cumulative emissions would almost exhaust the remaining carbon budget for 1.5°C (50%), and exhaust more than a third of the remaining carbon budget for 2°C (67%) (Figure 3.5). Based on central estimates only, historical cumulative net CO_2 emissions between 1850 and 2019 (2400 ±240 $GtCO_2$) amount to about four-fifths[131] of the total carbon budget for a 50% probability of limiting global warming to 1.5°C (central estimate about 2900 $GtCO_2$) and to about two-thirds[132] of the total carbon budget for a 67% probability to limit global warming to 2°C (central estimate about 3550 $GtCO_2$). {*WGI Table SPM.2; WGIII SPM B.1.3, WGIII Table 2.1*}

In scenarios with increasing CO_2 emissions, the land and ocean carbon sinks are projected to be less effective at slowing the accumulation of CO_2 in the atmosphere (*high confidence*). While natural land and ocean carbon sinks are projected to take up, in absolute terms, a progressively larger amount of CO_2 under higher compared to lower CO_2 emissions scenarios, they become less effective, that is, the proportion of emissions taken up by land and ocean decreases with increasing cumulative net CO_2 emissions (*high confidence*). Additional ecosystem responses to warming not yet fully included in climate models, such as GHG fluxes from wetlands, permafrost thaw, and wildfires, would further increase concentrations of these gases in the atmosphere (*high confidence*). In scenarios where CO_2 concentrations peak and decline during the 21st century, the land and ocean begin to take up less carbon in response to declining atmospheric CO_2 concentrations (*high confidence*) and turn into a weak net source by 2100 in the very low GHG emissions scenario (*medium confidence*)[133]. {*WGI SPM B.4, WGI SPM B.4.1, WGI SPM B.4.2, WGI SPM B.4.3*}

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[126] See Annex I: Glossary.

[127] This likelihood is based on the uncertainty in transient climate response to cumulative net CO_2 emissions and additional Earth system feedbacks and provides the probability that global warming will not exceed the temperature levels specified. {*WGI Table SPM.1*}

[128] Global databases make different choices about which emissions and removals occurring on land are considered anthropogenic. Most countries report their anthropogenic land CO_2 fluxes including fluxes due to human-caused environmental change (e.g., CO_2 fertilisation) on 'managed' land in their National GHG inventories. Using emissions estimates based on these inventories, the remaining carbon budgets must be correspondingly reduced. {*WGIII SPM Footnote 9, WGIII TS.3, WGIII Cross-Chapter Box 6*}

[129] The central case RCB assumes future non-CO_2 warming (the net additional contribution of aerosols and non-CO_2 GHG) of around 0.1°C above 2010–2019 in line with stringent mitigation scenarios. If additional non-CO_2 warming is higher, the RCB for limiting warming to 1.5°C with a 50% likelihood shrinks to around 300 $GtCO_2$. If, however, additional non-CO_2 warming is limited to only 0.05°C (via stronger reductions of CH_4 and N_2O through a combination of deep structural and behavioural changes, e.g., dietary changes), the RCB could be around 600 $GtCO_2$ for 1.5°C warming. {*WGI Table SPM.2, WGI Box TS.7; WGIII Box 3.4*}

[130] When adjusted for emissions since previous reports, these RCB estimates are similar to SR1.5 but larger than AR5 values due to methodological improvements. {*WGI SPM D.1.3*}

[131] Uncertainties for total carbon budgets have not been assessed and could affect the specific calculated fractions.

[132] See footnote 131.

[133] These projected adjustments of carbon sinks to stabilisation or decline of atmospheric CO_2 concentrations are accounted for in calculations of remaining carbon budgets. {*WGI SPM footnote 32*}

Remaining carbon budgets to limit warming to 1.5°C could soon be exhausted, and those for 2°C largely depleted

Remaining carbon budgets are similar to emissions from use of existing and planned fossil fuel infrastructure, without additional abatement

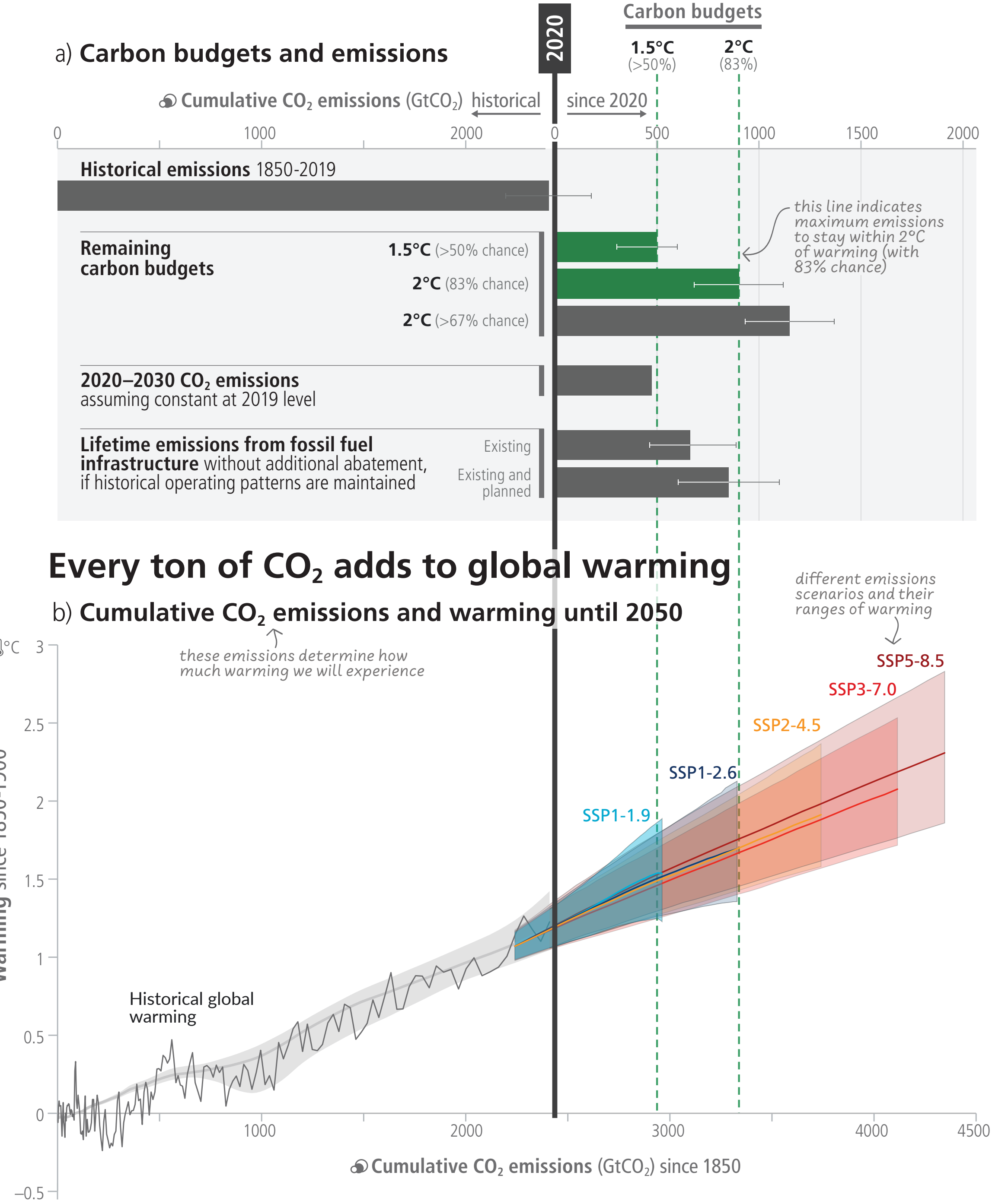

Figure 3.5: Cumulative past, projected, and committed emissions, and associated global temperature changes. Panel (a) Assessed remaining carbon budgets to limit warming *more likely than not* to 1.5°C, to 2°C with a 83% and 67% likelihood, compared to cumulative emissions corresponding to constant 2019 emissions until 2030, existing and planned fossil fuel infrastructures (in $GtCO_2$). For remaining carbon budgets, thin lines indicate the uncertainty due to the contribution of non-CO_2 warming. For lifetime emissions from fossil fuel infrastructure, thin lines indicate the assessed sensitivity range. **Panel (b)** Relationship between cumulative CO_2 emissions and the increase in global surface temperature. Historical data (thin black line) shows historical CO_2 emissions versus observed global surface temperature increase relative to the period 1850-1900. The grey range with its central line shows a corresponding estimate of the human-caused share of historical warming. Coloured areas show the assessed *very likely* range of global surface temperature projections, and thick coloured central lines show the median estimate as a function of cumulative CO_2 emissions for the selected scenarios SSP1-1.9, SSP1-2.6, SSP2-4.5, SSP3-7.0, and SSP5-8.5. Projections until 2050 use the cumulative CO_2 emissions of each respective scenario, and the projected global warming includes the contribution from all anthropogenic forcers. {*WGI SPM D.1, WGI Figure SPM.10, WGI Table SPM.2; WGIII SPM B.1, WGIII SPM B.7, WGIII 2.7; SR1.5 SPM C.1.3*}

Table 3.1: Key characteristics of the modelled global emissions pathways. Summary of projected CO_2 and GHG emissions, projected net zero timings and the resulting global warming outcomes. Pathways are categorised (columns), according to their likelihood of limiting warming to different peak warming levels (if peak temperature occurs before 2100) and 2100 warming levels. Values shown are for the median [p50] and 5–95th percentiles [p5–p95], noting that not all pathways achieve net zero CO_2 or GHGs. {*WGIII Table SPM.2*}

p50 [p5-p95] (1)	Category (2) [# pathways]	Modelled global emissions pathways categorised by projected global warming levels (GWL). Detailed likelihood definitions are provided in SPM Box1. The five illustrative scenarios (SSPx-yy) considered by AR6 WGI and the Illustrative (Mitigation) Pathways assessed in WGIII are aligned with the temperature categories and are indicated in a separate column. Global emission pathways contain regionally differentiated information. This assessment focuses on their global characteristics.	C1 [97]	C1a [50]	C1b [47]	C2 [133]	C3 [311]	C3a [204]	C3b [97]	C4 [159]	C5 [212]	C6 [97]
	Category/ subset label		limit warming to 1.5°C (>50%) with no or limited overshoot	… with net zero GHGs	… without net zero GHGs	return warming to 1.5°C (>50%) after a high overshoot	limit warming to 2°C (>67%)	… with action starting in 2020	… NDCs until 2030	limit warming to 2°C (>50%)	limit warming to 2.5°C (>50%)	limit warming to 3°C (>50%)
GHG emissions reductions from 2019 (%) (3)	2030	Projected median GHG emissions reductions of pathways in the year across the scenarios compared to modelled 2019, with the 5th-95th percentile in brackets. Negative numbers indicate increase in emissions compared to 2019	43 [34-60]	41 [31-59]	48 [35-61]	23 [0-44]	21 [1-42]	27 [13-45]	5 [0-14]	10 [0-27]	6 [-1 to 18]	2 [-10 to 11]
	2040		69 [58-90]	66 [58-89]	70 [62-87]	55 [40-71]	46 [34-63]	47 [35-63]	46 [34-63]	31 [20-5]	18 [4-33]	3 [-14 to 14]
	2050		84 [73-98]	85 [72-100]	84 [76-93]	75 [62-91]	64 [53-77]	63 [52-76]	68 [56-83]	49 [35-65]	29 [11-48]	5 [-2 to 18]
Emissions milestones (4)	Net zero CO_2 (% net zero pathways)	Median 5-year intervals at which projected CO_2 & GHG emissions of pathways in this category reach net-zero, with the 5th-95th percentile interval in square brackets. Percentage of net zero pathways is denoted in round brackets. Three dots (…) denotes net zero not reached for that percentile.	2050-2055 (100%) [2035-2070]			2055-2060 (100%) [2045-2070]	2070-2075 (93%) [2055-…]	2070-2075 (91%) [2055-…]	2065-2070 (97%) [2055-2090]	2080-2085 (86%) [2065-…]	…-… (41%) [2080-…]	no net-zero
	Net zero GHGs (5) (% net zero pathways)		2095-2100 (52%) [2050-…]	2070-2075 (100%) [2050-2090]	…-… (0%) […-…]	2070-2075 (87%) [2055-…]	…-… (30%) [2075-…]	…-… (24%) [2080-…]	…-… (41%) [2075-…]	…-… (31%) [2075-…]	…-… (12%) [2090-…]	no net-zero
Cumulative CO_2 emissions [Gt CO_2] (6)	2020 to net zero CO_2	Median cumulative net CO_2 emissions across the projected scenarios in this category until reaching net-zero or until 2100, with the 5th-95th percentile interval in square brackets.	510 [330-710]	550 [340-760]	460 [320-590]	720 [530-930]	890 [640-1160]	860 [640-1180]	910 [720-1150]	1210 [970-1490]	1780 [1400-2360]	no net-zero
	2020–2100		320 [-210-570]	160 [-220-620]	360 [10-540]	400 [-90-620]	800 [510-1140]	790 [480-1150]	800 [560-1050]	1160 [700-1490]	1780 [1260-2360]	2790 [2440-3520]
Global mean temperature changes 50% probability (°C)	at peak warming	Projected temperature change of pathways in this category (50% probability across the range of climate uncertainties), relative to 1850-1900, at peak warming and in 2100, for the median value across the scenarios and the 5th-95th percentile interval in square brackets.	1.6 [1.4-1.6]	1.6 [1.4-1.6]	1.6 [1.5-1.6]	1.7 [1.5-1.8]	1.7 [1.6-1.8]	1.7 [1.6-1.8]	1.8 [1.6-1.8]	1.9 [1.7-2.0]	2.2 [1.9-2.5]	no peaking by 2100
	2100		1.3 [1.1-1.5]	1.2 [1.1-1.4]	1.4 [1.3-1.5]	1.4 [1.2-1.5]	1.6 [1.5-1.8]	1.6 [1.5-1.8]	1.6 [1.5-1.7]	1.8 [1.5-2.0]	2.1 [1.9-2.5]	2.7 [2.4-2.9]
Likelihood of peak global warming staying below (%)	<1.5°C	Median likelihood that the projected pathways in this category stay below a given global warming level, with the 5th-95th percentile interval in square brackets.	38 [33-58]	38 [34-60]	37 [33-56]	24 [15-42]	20 [13-41]	21 [14-42]	17 [12-35]	11 [7-22]	4 [0-10]	0 [0-0]
	<2.0°C		90 [86-97]	90 [85-97]	89 [87-96]	82 [71-93]	76 [68-91]	78 [69-91]	73 [67-87]	59 [50-77]	37 [18-59]	8 [2-18]
	<3.0°C		100 [99-100]	100 [99-100]	100 [99-100]	100 [99-100]	99 [98-100]	100 [98-100]	99 [98-99]	98 [95-99]	91 [83-98]	71 [53-88]

1 Detailed explanations on the Table are provided in WGIII Box SPM.1 and WGIII Table SPM.2. The relationship between the temperature categories and SSP/RCPs is discussed in Cross-Section Box.2. Values in the table refer to the 50th and [5–95th] percentile values across the pathways falling within a given category as defined in WGIII Box SPM.1. The three dots (…) sign denotes that the value cannot be given (as the value is after 2100 or, for net zero, net zero is not reached). Based on the assessment of climate emulators in AR6 WG I (Chapter 7, Box 7.1), two climate emulators were used for the probabilistic assessment of the resulting warming of the pathways. For the 'Temperature Change' and 'Likelihood' columns, the non-bracketed values represent the 50th percentile across the pathways in that category and the median [50th percentile] across the warming estimates of the probabilistic MAGICC climate model emulator. For the bracketed ranges in the "likelihood" column, the median warming for every pathway in that category is calculated for each of the two climate model emulators (MAGICC and FaIR). These ranges cover both the uncertainty of the emissions pathways as well as the climate emulators' uncertainty. All global warming levels are relative to 1850-1900.
2 C3 pathways are sub-categorised according to the timing of policy action to match the emissions pathways in WGIII Figure SPM.4.
3 Global emission reductions in mitigation pathways are reported on a pathway-by-pathway basis relative to harmonised modelled global emissions in 2019 rather than

the global emissions reported in WGIII SPM Section B and WGIII Chapter 2; this ensures internal consistency in assumptions about emission sources and activities, as well as consistency with temperature projections based on the physical climate science assessment by WGI (see WGIII SPM Footnote 49). Negative values (e.g., in C5, C6) represent an increase in emissions. The modelled GHG emissions in 2019 are 55 [53–58] $GtCO_2$-eq, thus within the uncertainty ranges of estimates for 2019 emissions [53-66] $GtCO_2$-eq (see 2.1.1).

4 Emissions milestones are provided for 5-year intervals in order to be consistent with the underlying 5-year time-step data of the modelled pathways. Ranges in square brackets underneath refer to the range across the pathways, comprising the lower bound of the 5th percentile 5-year interval and the upper bound of the 95th percentile 5-year interval. Numbers in round brackets signify the fraction of pathways that reach specific milestones over the 21st century. Percentiles reported across all pathways in that category include those that do not reach net zero before 2100.

5 For cases where models do not report all GHGs, missing GHG species are infilled and aggregated into a Kyoto basket of GHG emissions in CO_2-eq defined by the 100-year global warming potential. For each pathway, reporting of CO_2, CH_4, and N_2O emissions was the minimum required for the assessment of the climate response and the assignment to a climate category. Emissions pathways without climate assessment are not included in the ranges presented here. See WGIII Annex III.II.5.

6 Cumulative emissions are calculated from the start of 2020 to the time of net zero and 2100, respectively. They are based on harmonised net CO_2 emissions, ensuring consistency with the WG I assessment of the remaining carbon budget. {*WGIII Box 3.4, WGIII SPM Footnote 50*}

3.3.2 Net Zero Emissions: Timing and Implications

From a physical science perspective, limiting human-caused global warming to a specific level requires limiting cumulative CO_2 emissions, reaching net zero or net negative CO_2 emissions, along with strong reductions of other GHG emissions (see Cross-Section Box.1). Global modelled pathways that reach and sustain net zero GHG emissions are projected to result in a gradual decline in surface temperature (*high confidence*). Reaching net zero GHG emissions primarily requires deep reductions in CO_2, methane, and other GHG emissions, and implies net negative CO_2 emissions.[134] Carbon dioxide removal (CDR) will be necessary to achieve net negative CO_2 emissions[135]. Achieving global net zero CO_2 emissions, with remaining anthropogenic CO_2 emissions balanced by durably stored CO_2 from anthropogenic removal, is a requirement to stabilise CO_2-induced global surface temperature increase (see 3.3.3) (*high confidence*). This is different from achieving net zero GHG emissions, where metric-weighted anthropogenic GHG emissions (see Cross-Section Box.1) equal CO_2 removal (*high confidence*). Emissions pathways that reach and sustain net zero GHG emissions defined by the 100-year global warming potential imply net negative CO_2 emissions and are projected to result in a gradual decline in surface temperature after an earlier peak (*high confidence*). While reaching net zero CO_2 or net zero GHG emissions requires deep and rapid reductions in gross emissions, the deployment of CDR to counterbalance hard-to-abate residual emissions (e.g., some emissions from agriculture, aviation, shipping, and industrial processes) is unavoidable (*high confidence*). {*WGI SPM D.1, WGI SPM D.1.1, WGI SPM D.1.8; WGIII SPM C.2, WGIII SPM C.3, WGIII SPM C.11, WGIII Box TS.6; SR1.5 SPM A.2.2*}

In modelled pathways, the timing of net zero CO_2 emissions, followed by net zero GHG emissions, depends on several variables, including the desired climate outcome, the mitigation strategy and the gases covered (*high confidence*). Global net zero CO_2 emissions are reached in the early 2050s in pathways that limit warming to 1.5°C (>50%) with no or limited overshoot, and around the early 2070s in pathways that limit warming to 2°C (>67%). While non-CO_2 GHG emissions are strongly reduced in all pathways that limit warming to 2°C (>67%) or lower, residual emissions of CH_4 and N_2O and F-gases of about 8 [5–11] $GtCO_2$-eq yr^{-1} remain at the time of net zero GHG, counterbalanced by net negative CO_2 emissions. As a result, net zero CO_2 would be reached before net zero GHGs (*high confidence*). {*WGIII SPM C.2, WGIII SPM C.2.3, WGIII SPM C.2.4, WGIII Table SPM.2, WGIII 3.3*} *(Figure 3.6)*

[134] Net zero GHG emissions defined by the 100-year global warming potential. See footnote 70.

[135] See Section 3.3.3 and 3.4.1.

Global modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot reach net zero CO_2 emissions around 2050

Total greenhouse gases (GHG) reach net zero later

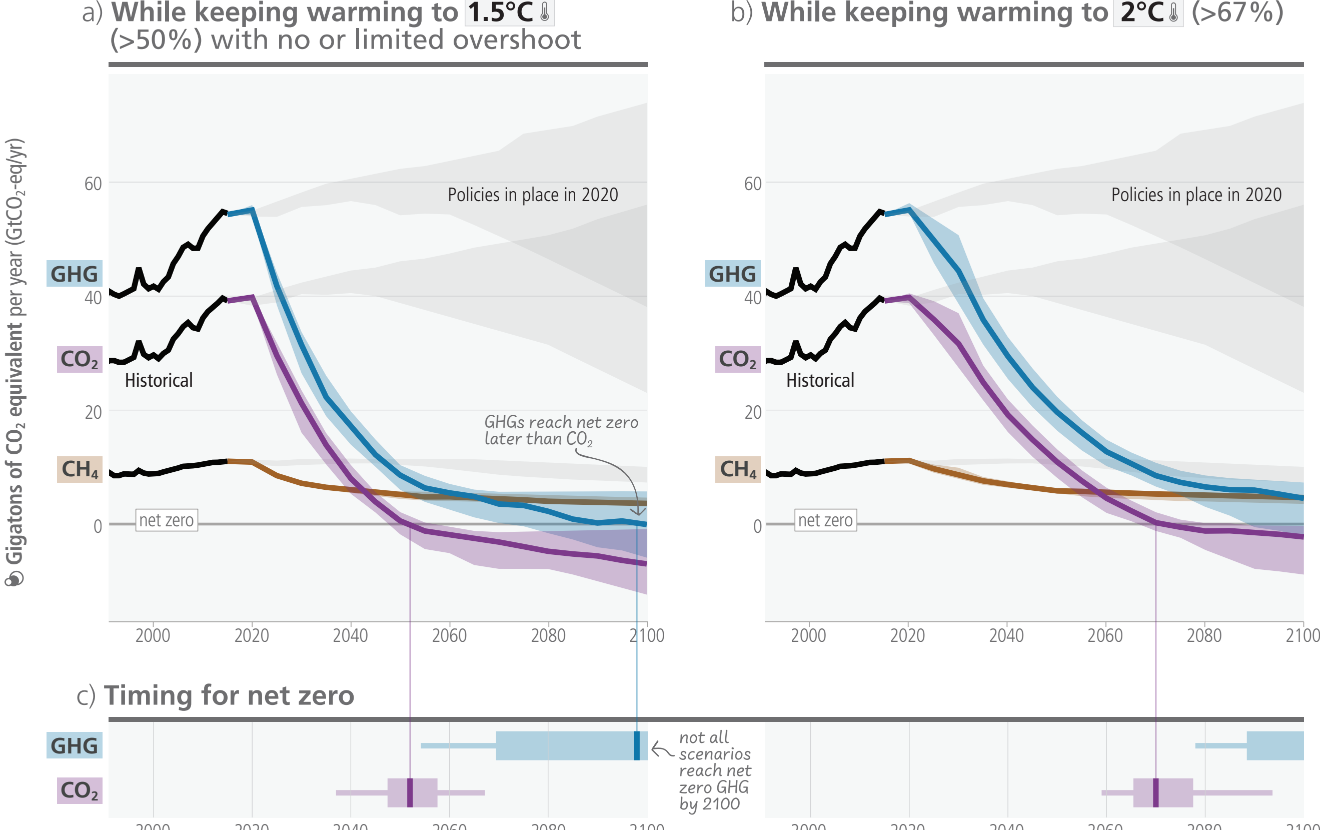

Figure 3.6: Total GHG, CO_2 and CH_4 emissions and timing of reaching net zero in different mitigation pathways. Top row: GHG, CO_2 and CH_4 emissions over time (in $GtCO_2eq$) with historical emissions, projected emissions in line with policies implemented until the end of 2020 (grey), and pathways consistent with temperature goals in colour (blue, purple, and brown, respectively). **Panel (a) (left)** shows pathways that limit warming to 1.5°C (>50%) with no or limited overshoot (C1) and **Panel (b) (right)** shows pathways that limit warming to 2°C (>67%) (C3). **Bottom row: Panel (c)** shows median (vertical line), *likely* (bar) and *very likely* (thin lines) timing of reaching net zero GHG and CO_2 emissions for global modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot (C1) (left) or 2°C (>67%) (C3) (right). {*WGIII Figure SPM.5*}

3.3.3 Sectoral Contributions to Mitigation

All global modelled pathways that limit warming to 2°C (>67%) or lower by 2100 involve rapid and deep and in most cases immediate GHG emissions reductions in all sectors (see also 4.1, 4.5). Reductions in GHG emissions in industry, transport, buildings, and urban areas can be achieved through a combination of energy efficiency and conservation and a transition to low-GHG technologies and energy carriers (see also 4.5, Figure 4.4). Socio-cultural options and behavioural change can reduce global GHG emissions of end-use sectors, with most of the potential in developed countries, if combined with improved infrastructure design and access. (*high confidence*) {*WGIII SPM C.3, WGIII SPM C.5, WGIII SPM C.6, WGIII SPM C.7.3, WGIII SPM C.8, WGIII SPM C.10.2*}

Global modelled mitigation pathways reaching net zero CO_2 and GHG emissions include transitioning from fossil fuels without carbon capture and storage (CCS) to very low- or zero-carbon energy sources, such as renewables or fossil fuels with CCS, demand-side measures and improving efficiency, reducing non-CO_2 GHG emissions, and CDR[136]. In global modelled pathways that limit warming to 2°C or below, almost all electricity is supplied

[136] CCS is an option to reduce emissions from large-scale fossil-based energy and industry sources provided geological storage is available. When CO_2 is captured directly from the atmosphere (DACCS), or from biomass (BECCS), CCS provides the storage component of these CDR methods. CO_2 capture and subsurface injection is a mature technology for gas processing and enhanced oil recovery. In contrast to the oil and gas sector, CCS is less mature in the power sector, as well as in cement and chemicals production, where it is a critical mitigation option. The technical geological storage capacity is estimated to be on the order of 1000 $GtCO_2$, which is more than the CO_2 storage requirements through 2100 to limit global warming to 1.5°C, although the regional availability of geological storage could be a limiting factor. If the geological storage site is appropriately selected and managed, it is estimated that the CO_2 can be permanently isolated from the atmosphere. Implementation of CCS currently faces technological, economic, institutional, ecological environmental and socio-cultural barriers. Currently, global rates of CCS deployment are far below those in modelled pathways limiting global warming to 1.5°C to 2°C. Enabling conditions such as policy instruments, greater public support and technological innovation could reduce these barriers. *(high confidence)* {*WGIII SPM C.4.6*}

from zero or low-carbon sources in 2050, such as renewables or fossil fuels with CO_2 capture and storage, combined with increased electrification of energy demand. Such pathways meet energy service demand with relatively low energy use, through e.g., enhanced energy efficiency and behavioural changes and increased electrification of energy end use. Modelled global pathways limiting global warming to 1.5°C (>50%) with no or limited overshoot generally implement such changes faster than pathways limiting global warming to 2°C (>67%). (*high confidence*) {*WGIII SPM C.3, WGIII SPM C.3.2, WGIII SPM C.4, WGIII TS.4.2; SR1.5 SPM C.2.2*}

AFOLU mitigation options, when sustainably implemented, can deliver large-scale GHG emission reductions and enhanced CO_2 removal; however, barriers to implementation and trade-offs may result from the impacts of climate change, competing demands on land, conflicts with food security and livelihoods, the complexity of land ownership and management systems, and cultural aspects (see 3.4.1). All assessed modelled pathways that limit warming to 2°C (>67%) or lower by 2100 include land-based mitigation and land-use change, with most including different combinations of reforestation, afforestation, reduced deforestation, and bioenergy. However, accumulated carbon in vegetation and soils is at risk from future loss (or sink reversal) triggered by climate change and disturbances such as flood, drought, fire, or pest outbreaks, or future poor management. (*high confidence*) {*WGI SPM B.4.3; WGII SPM B.2.3, WGII SPM B.5.4; WGIII SPM C.9, WGIII SPM C.11.3, WGIII SPM D.2.3, WGIII TS.4.2, 3.4; SR1.5 SPM C.2.5; SRCCL SPM B.1.4, SRCCL SPM B.3, SRCCL SPM B.7*}

In addition to deep, rapid, and sustained emission reductions, CDR can fulfil three complementary roles: lowering net CO_2 or net GHG emissions in the near term; counterbalancing 'hard-to-abate' residual emissions (e.g., some emissions from agriculture, aviation, shipping, industrial processes) to help reach net zero CO_2 or GHG emissions, and achieving net negative CO_2 or GHG emissions if deployed at levels exceeding annual residual emissions (*high confidence*). CDR methods vary in terms of their maturity, removal process, time scale of carbon storage, storage medium, mitigation potential, cost, co-benefits, impacts and risks, and governance requirements (*high confidence*). Specifically, maturity ranges from lower maturity (e.g., ocean alkalinisation) to higher maturity (e.g., reforestation); removal and storage potential ranges from lower potential (<1 Gt CO_2 yr^{-1}, e.g., blue carbon management) to higher potential (>3 Gt CO_2 yr^{-1}, e.g., agroforestry); costs range from lower cost (e.g., –45 to 100 USD tCO_2^{-1} for soil carbon sequestration) to higher cost (e.g., 100 to 300 USD tCO_2^{-1} for direct air carbon dioxide capture and storage) (*medium confidence*). Estimated storage timescales vary from decades to centuries for methods that store carbon in vegetation and through soil carbon management, to ten thousand years or more for methods that store carbon in geological formations (*high confidence*). Afforestation, reforestation, improved forest management, agroforestry and soil carbon sequestration are currently the only widely practiced CDR methods (*high confidence*). Methods and levels of CDR deployment in global modelled mitigation pathways vary depending on assumptions about costs, availability and constraints (*high confidence*). {*WGIII SPM C.3.5, WGIII SPM C.11.1, WGIII SPM C.11.4*}

3.3.4 Overshoot Pathways: Increased Risks and Other Implications

Exceeding a specific remaining carbon budget results in higher global warming. Achieving and sustaining net negative global CO_2 emissions could reverse the resulting temperature exceedance (*high confidence*). Continued reductions in emissions of short-lived climate forcers, particularly methane, after peak temperature has been reached, would also further reduce warming (*high confidence*). Only a small number of the most ambitious global modelled pathways limit global warming to 1.5°C (>50%) without overshoot. {*WGI SPM D.1.1, WGI SPM D.1.6, WGI SPM D.1.7; WGIII TS.4.2*}

Overshoot of a warming level results in more adverse impacts, some irreversible, and additional risks for human and natural systems compared to staying below that warming level, with risks growing with the magnitude and duration of overshoot (*high confidence*). Compared to pathways without overshoot, societies and ecosystems would be exposed to greater and more widespread changes in climatic impact-drivers, such as extreme heat and extreme precipitation, with increasing risks to infrastructure, low-lying coastal settlements, and associated livelihoods (*high confidence*). Overshooting 1.5°C will result in irreversible adverse impacts on certain ecosystems with low resilience, such as polar, mountain, and coastal ecosystems, impacted by ice-sheet melt, glacier melt, or by accelerating and higher committed sea level rise (*high confidence*). Overshoot increases the risks of severe impacts, such as increased wildfires, mass mortality of trees, drying of peatlands, thawing of permafrost and weakening natural land carbon sinks; such impacts could increase releases of GHGs making temperature reversal more challenging (*medium confidence*). {*WGI SPM C.2, WGI SPM C.2.1, WGI SPM C.2.3; WGII SPM B.6, WGII SPM B.6.1, WGII SPM B.6.2; SR1.5 3.6*}

The larger the overshoot, the more net negative CO_2 emissions needed to return to a given warming level (*high confidence*). Reducing global temperature by removing CO_2 would require net negative emissions of 220 $GtCO_2$ (best estimate, with a *likely* range of 160 to 370 $GtCO_2$) for every tenth of a degree (*medium confidence*). Modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot reach median values of cumulative net negative emissions of 220 $GtCO_2$ by 2100, pathways that return warming to 1.5°C (>50%) after high overshoot reach median values of 360 $GtCO_2$ (*high confidence*).[137] More rapid reduction in CO_2 and non-CO_2 emissions, particularly methane, limits peak warming levels and reduces the requirement for net negative CO_2 emissions and CDR, thereby reducing feasibility and sustainability concerns, and social and environmental risks (*high confidence*). {*WGI SPM D.1.1; WGIII SPM B.6.4, WGIII SPM C.2, WGIII SPM C.2.2, WGIII Table SPM.2*}

[137] Limited overshoot refers to exceeding 1.5°C global warming by up to about 0.1°C, high overshoot by 0.1°C to 0.3°C, in both cases for up to several decades. {*WGIII Box SPM.1*}

3.4 Long-Term Interactions Between Adaptation, Mitigation and Sustainable Development

Mitigation and adaptation can lead to synergies and trade-offs with sustainable development (*high confidence*). Accelerated and equitable mitigation and adaptation bring benefits from avoiding damages from climate change and are critical to achieving sustainable development (*high confidence).* Climate resilient development[138] pathways are progressively constrained by every increment of further warming (*very high confidence*). There is a rapidly closing window of opportunity to secure a liveable and sustainable future for all (*very high confidence*).

3.4.1 Synergies and trade-offs, costs and benefits

Mitigation and adaptation options can lead to synergies and trade-offs with other aspects of sustainable development (see also Section 4.6, Figure 4.4). Synergies and trade-offs depend on the pace and magnitude of changes and the development context including inequalities, with consideration of climate justice. The potential or effectiveness of some adaptation and mitigation options decreases as climate change intensifies (see also Sections 3.2, 3.3.3, 4.5). (*high confidence*) {*WGII SPM C.2, WGII Figure SPM.4b; WGIII SPM D.1, WGIII SPM D.1.2, WGIII TS.5.1, WGIII Figure SPM.8; SR1.5 SPM D.3, SR1.5 SPM D.4; SRCCL SPM B.2, SRCCL SPM B.3, SRCCL SPM D.3.2, SRCCL Figure SPM.3*}

In the energy sector, transitions to low-emission systems will have multiple co-benefits, including improvements in air quality and health. There are potential synergies between sustainable development and, for instance, energy efficiency and renewable energy. (*high confidence*) {*WGIII SPM C.4.2, WGIII SPM D.1.3*}

For agriculture, land, and food systems, many land management options and demand-side response options (e.g., dietary choices, reduced post-harvest losses, reduced food waste) can contribute to eradicating poverty and eliminating hunger while promoting good health and well-being, clean water and sanitation, and life on land (*medium confidence)*. In contrast, certain adaptation options that promote intensification of production, such as irrigation, may have negative effects on sustainability (e.g., for biodiversity, ecosystem services, groundwater depletion, and water quality) (*high confidence*). {*WGII TS.D.5.5; WGIII SPM D.10; SRCCL SPM B.2.3*}

Reforestation, improved forest management, soil carbon sequestration, peatland restoration and coastal blue carbon management are examples of CDR methods that can enhance biodiversity and ecosystem functions, employment and local livelihoods, depending on context[139]. However, afforestation or production of biomass crops for bioenergy with carbon dioxide capture and storage or biochar can have adverse socio-economic and environmental impacts, including on biodiversity, food and water security, local livelihoods and the rights of Indigenous Peoples, especially if implemented at large scales and where land tenure is insecure. (*high confidence*) {*WGII SPM B.5.4, WGII SPM C.2.4; WGIII SPM C.11.2; SR1.5 SPM C.3.4, SR1.5 SPM C.3.5; SRCCL SPM B.3, SRCCL SPM B.7.3, SRCCL Figure SPM.3*}

Modelled pathways that assume using resources more efficiently or shift global development towards sustainability include fewer challenges, such as dependence on CDR and pressure on land and biodiversity, and have the most pronounced synergies with respect to sustainable development (*high confidence*). {*WGIII SPM C.3.6; SR1.5 SPM D.4.2*}

Strengthening climate change mitigation action entails more rapid transitions and higher up-front investments, but brings benefits from avoiding damages from climate change and reduced adaptation costs. The aggregate effects of climate change mitigation on global GDP (excluding damages from climate change and adaptation costs) are small compared to global projected GDP growth. Projected estimates of global aggregate net economic damages and the costs of adaptation generally increase with global warming level. (*high confidence*) {*WGII SPM B.4.6, WGII TS.C.10; WGIII SPM C.12.2, WGIII SPM C.12.3*}

Cost-benefit analysis remains limited in its ability to represent all damages from climate change, including non-monetary damages, or to capture the heterogeneous nature of damages and the risk of catastrophic damages (*high confidence*). Even without accounting for these factors or for the co-benefits of mitigation, the global benefits of limiting warming to 2°C exceed the cost of mitigation (*medium confidence*). This finding is robust against a wide range of assumptions about social preferences on inequalities and discounting over time (*medium confidence*). Limiting global warming to 1.5°C instead of 2°C would increase the costs of mitigation, but also increase the benefits in terms of reduced impacts and related risks (see 3.1.1, 3.1.2) and reduced adaptation needs (*high confidence*)[140]. {*WGII SPM B.4, WGII SPM B.6; WGIII SPM C.12, WGIII SPM C.12.2, WGIII SPM C.12.3 WGIII Box TS.7; SR1.5 SPM B.3, SR1.5 SPM B.5, SR1.5 SPM B.6*}

Considering other sustainable development dimensions, such as the potentially strong economic benefits on human health from air quality improvement, may enhance the estimated benefits of mitigation (*medium confidence*). The economic effects of strengthened mitigation action vary across regions and countries, depending notably on economic structure, regional emissions reductions, policy design and level of international cooperation (*high confidence*). Ambitious mitigation pathways imply large and sometimes disruptive changes in economic structure, with implications for near-term actions (Section 4.2), equity (Section 4.4), sustainability (Section 4.6), and finance (Section 4.8) (*high confidence*). {*WGIII SPM C.12.2, WGIII SPM D.3.2, WGIII TS.4.2*}

[138] See Annex I: Glossary.

[139] The impacts, risks, and co-benefits of CDR deployment for ecosystems, biodiversity and people will be highly variable depending on the method, site-specific context, implementation and scale (*high confidence*). {*WGIII SPM C.11.2*}

[140] The evidence is too limited to make a similar robust conclusion for limiting warming to 1.5°C. {*WGIII SPM footnote 68*}

3.4.2 Advancing Integrated Climate Action for Sustainable Development

An inclusive, equitable approach to integrating adaptation, mitigation and development can advance sustainable development in the long term (*high confidence*). Integrated responses can harness synergies for sustainable development and reduce trade-offs (*high confidence*). Shifting development pathways towards sustainability and advancing climate resilient development is enabled when governments, civil society and the private sector make development choices that prioritise risk reduction, equity and justice, and when decision-making processes, finance and actions are integrated across governance levels, sectors and timeframes (*very high confidence*) (see also Figure 4.2). Inclusive processes involving local knowledge and Indigenous Knowledge increase these prospects (*high confidence*). However, opportunities for action differ substantially among and within regions, driven by historical and ongoing patterns of development (*very high confidence*). Accelerated financial support for developing countries is critical to enhance mitigation and adaptation action (*high confidence*). {*WGII SPM C.5.4, WGII SPM D.1, WGII SPM D.1.1, WGII SPM D.1.2, WGII SPM D.2, WGII SPM D.3, WGII SPM D.5, WGII SPM D.5.1, WGII SPM D.5.2; WGIII SPM D.1, WGIII SPM D.2, WGIII SPM D.2.4, WGIII SPM E.2.2, WGIII SPM E.2.3, WGIII SPM E.5.3, WGIII Cross-Chapter Box 5*}

Policies that shift development pathways towards sustainability can broaden the portfolio of available mitigation and adaptation responses (*medium confidence*). Combining mitigation with action to shift development pathways, such as broader sectoral policies, approaches that induce lifestyle or behaviour changes, financial regulation, or macroeconomic policies can overcome barriers and open up a broader range of mitigation options (*high confidence*). Integrated, inclusive planning and investment in everyday decision-making about urban infrastructure can significantly increase the adaptive capacity of urban and rural settlements. Coastal cities and settlements play an important role in advancing climate resilient development due to the high number of people living in the Low Elevation Coastal Zone, the escalating and climate compounded risk that they face, and their vital role in national economies and beyond (*high confidence*). {*WGII SPM.D.3, WGII SPM D.3.3; WGIII SPM E.2, WGIII SPM E.2.2; SR1.5 SPM D.6*}

Observed adverse impacts and related losses and damages, projected risks, trends in vulnerability, and adaptation limits demonstrate that transformation for sustainability and climate resilient development action is more urgent than previously assessed (*very high confidence*). Climate resilient development integrates adaptation and GHG mitigation to advance sustainable development for all. Climate resilient development pathways have been constrained by past development, emissions and climate change and are progressively constrained by every increment of warming, in particular beyond 1.5°C (*very high confidence*). Climate resilient development will not be possible in some regions and sub-regions if global warming exceeds 2°C (*medium confidence*). Safeguarding biodiversity and ecosystems is fundamental to climate resilient development, but biodiversity and ecosystem services have limited capacity to adapt to increasing global warming levels, making climate resilient development progressively harder to achieve beyond 1.5°C warming (*very high confidence*). {*WGII SPM D.1, WGII SPM D.1.1, WGII SPM D.4, WGII SPM D.4.3, WGII SPM D.5.1; WGIII SPM D.1.1*}

The cumulative scientific evidence is unequivocal: climate change is a threat to human well-being and planetary health (*very high confidence*). Any further delay in concerted anticipatory global action on adaptation and mitigation will miss a brief and rapidly closing window of opportunity to secure a liveable and sustainable future for all (*very high confidence*). Opportunities for near-term action are assessed in the following section. {*WGII SPM D.5.3; WGIII SPM D.1.1*}

Section 4
Near-Term Responses in a Changing Climate

Section 4 : Near-Term Responses in a Changing Climate

4.1 The Timing and Urgency of Climate Action

Deep, rapid, and sustained mitigation and accelerated implementation of adaptation reduces the risks of climate change for humans and ecosystems. In modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot and in those that limit warming to 2°C (>67%) and assume immediate action, global GHG emissions are projected to peak in the early 2020s followed by rapid and deep reductions. As adaptation options often have long implementation times, accelerated implementation of adaptation, particularly in this decade, is important to close adaptation gaps. (*high confidence*)

The magnitude and rate of climate change and associated risks depend strongly on near-term mitigation and adaptation actions (*very high confidence*). Global warming is *more likely than not* to reach 1.5°C between 2021 and 2040 even under the very low GHG emission scenarios (SSP1-1.9), and *likely* or *very likely* to exceed 1.5°C under higher emissions scenarios[141]. Many adaptation options have medium or high feasibility up to 1.5°C (*medium* to *high confidence*, depending on option), but hard limits to adaptation have already been reached in some ecosystems and the effectiveness of adaptation to reduce climate risk will decrease with increasing warming (*high confidence*). Societal choices and actions implemented in this decade determine the extent to which medium- and long-term pathways will deliver higher or lower climate resilient development (*high confidence*). Climate resilient development prospects are increasingly limited if current greenhouse gas emissions do not rapidly decline, especially if 1.5°C global warming is exceeded in the near term (*high confidence*). Without urgent, effective and equitable adaptation and mitigation actions, climate change increasingly threatens the health and livelihoods of people around the globe, ecosystem health, and biodiversity, with severe adverse consequences for current and future generations (*high confidence*). {*WGI SPM B.1.3, WGI SPM B.5.1, WGI SPM B.5.2; WGII SPM A, WGII SPM B.4, WGII SPM C.2, WGII SPM C.3.3, WGII Figure SPM.4, WGII SPM D.1, WGII SPM D.5, WGIII SPM D.1.1 SR1.5 SPM D.2.2*}. (*Cross-Section Box.2, Figure 2.1, Figure 2.3*)

In modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot and in those that limit warming to 2°C (>67%), assuming immediate actions, global GHG emissions are projected to peak in the early 2020s followed by rapid and deep GHG emissions reductions (*high confidence*) [142]. In pathways that limit warming to 1.5°C (>50%) with no or limited overshoot, net global GHG emissions are projected to fall by 43 [34 to 60]%[143] below 2019 levels by 2030, 60 [49 to 77]% by 2035, 69 [58 to 90]% by 2040 and 84 [73 to 98]% by 2050 (*high confidence*) (Section 2.3.1, Table 2.2, Figure 2.5, Table 3.1)[144]. Global modelled pathways that limit warming to 2°C (>67%) have reductions in GHG emissions below 2019 levels of 21 [1 to 42]% by 2030, 35 [22 to 55] % by 2035, 46 [34 to 63] % by 2040 and 64 [53 to 77]% by 2050[145] (*high confidence*). Global GHG emissions associated with NDCs announced prior to COP26 would make it *likely* that warming would exceed 1.5°C (*high confidence*) and limiting warming to 2°C (>67%) would then imply a rapid acceleration of emission reductions during 2030–2050, around 70% faster than in pathways where immediate action is taken to limit warming to 2°C (>67%) (*medium confidence*) (Section 2.3.1) Continued investments in unabated high-emitting infrastructure[146] and limited development and deployment of low-emitting alternatives prior to 2030 would act as barriers to this acceleration and increase feasibility risks (*high confidence*). {*WGIII SPM B.6.3, WGIII 3.5.2, WGIII SPM B.6, WGIII SPM B.6., WGIII SPM C.1, WGIII SPM C1.1, WGIII Table SPM.2*} (*Cross-Section Box.2*)

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141 In the near term (2021–2040), the 1.5°C global warming level is very *likely* to be exceeded under the very high GHG emissions scenario (SSP5-8.5), *likely* to be exceeded under the intermediate and high GHG emissions scenarios (SSP2-4.5, SSP3-7.0), *more likely than not* to be exceeded under the low GHG emissions scenario (SSP1-2.6) and *more likely than not* to be reached under the very low GHG emissions scenario (SSP1-1.9). The best estimates [and *very likely* ranges] of global warming for the different scenarios in the near term are: 1.5 [1.2 to 1.7]°C (SSP1-1.9); 1.5 [1.2 to 1.8]°C (SSP1-2.6); 1.5 [1.2 to 1.8]°C (SSP2-4.5); 1.5 [1.2 to 1.8]°C (SSP3-7.0); and 1.6[1.3 to 1.9]°C (SSP5-8.5). {*WGI SPM B.1.3, WGI Table SPM.1*} (*Cross-Section Box.2*)

142 Values in parentheses indicate the likelihood of limiting warming to the level specified (see Cross-Section Box.2).

143 Median and very *likely* range [5th to 95th percentile]. {*WGIII SPM footnote 30*}

144 These numbers for CO_2 are 48 [36 to 69]% in 2030, 65 [50 to 96] % in 2035, 80 [61 to109] % in 2040 and 99 [79 to 119]% in 2050.

145 These numbers for CO_2 are 22 [1 to 44]% in 2030, 37 [21 to 59] % in 2035, 51 [36 to 70] % in 2040 and 73 [55 to 90]% in 2050.

146 In this context, 'unabated fossil fuels' refers to fossil fuels produced and used without interventions that substantially reduce the amount of GHG emitted throughout the life cycle; for example, capturing 90% or more CO_2 from power plants, or 50 to 80% of fugitive methane emissions from energy supply. {*WGIII SPM footnote 54*}

All global modelled pathways that limit warming to 2°C (>67%) or lower by 2100 involve reductions in both net CO_2 emissions and non-CO_2 emissions (see Figure 3.6) (*high confidence*). For example, in pathways that limit warming to 1.5°C (>50%) with no or limited overshoot, global CH_4 (methane) emissions are reduced by 34 [21 to 57]% below 2019 levels by 2030 and by 44 [31 to 63]% in 2040 (*high confidence*). Global CH_4 emissions are reduced by 24 [9 to 53]% below 2019 levels by 2030 and by 37 [20 to 60]% in 2040 in modelled pathways that limit warming to 2°C with action starting in 2020 (>67%) (*high confidence*). {*WGIII SPM C1.2*, *WGIII Table SPM.2*, *WGIII 3.3; SR1.5 SPM C.1*, *SR1.5 SPM C.1.2*} (*Cross-Section Box.2*)

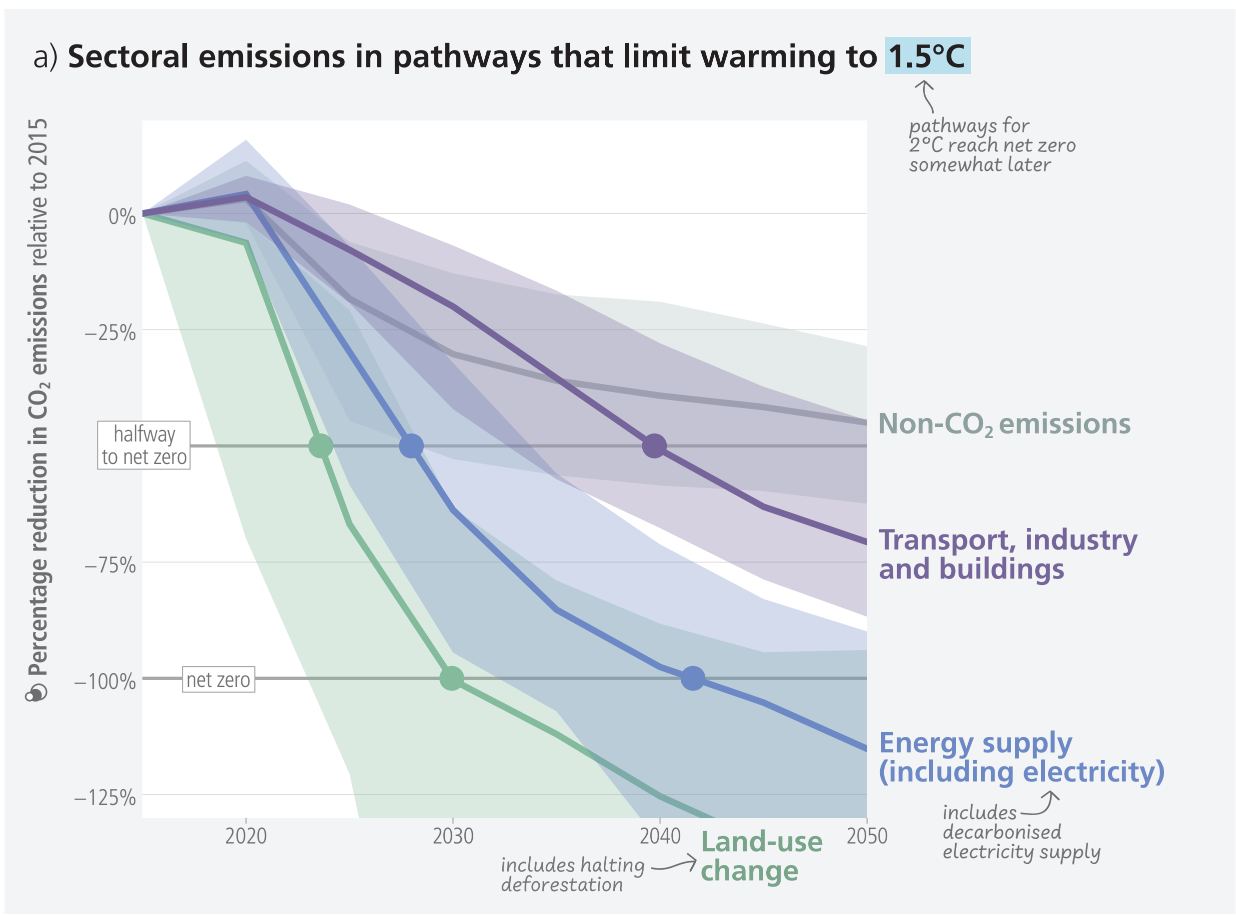
All global modelled pathways that limit warming to 2°C (>67%) or lower by 2100 involve GHG emission reductions in all sectors (*high confidence*). The contributions of different sectors vary across modelled mitigation pathways. In most global modelled mitigation pathways, emissions from land-use, land-use change and forestry, via reforestation and reduced deforestation, and from the energy supply sector reach net zero CO_2 emissions earlier than the buildings, industry and transport sectors (Figure 4.1). Strategies can rely on combinations of different options (Figure 4.1, Section 4.5), but doing less in one sector needs to be compensated by further reductions in other sectors if warming is to be limited. (*high confidence*) {*WGIII SPM C.3*, *WGIII SPM C.3.1*, *WGIII SPM 3.2*, *WGIII SPM C.3.3*} (*Cross-Section Box.2*)

Without rapid, deep and sustained mitigation and accelerated adaptation actions, losses and damages will continue to increase, including projected adverse impacts in Africa, LDCs, SIDS, Central and South America[147], Asia and the Arctic, and will disproportionately affect the most vulnerable populations (*high confidence*). {*WGII SPM C.3.5*, *WGII SPM B.2.4*, *WGII 12.2*, *WGII 10. Box 10.6*, *WGII TS D.7.5*, *WGII Cross-Chapter Box 6 ES*, *WGII Global to Regional Atlas Annex A1.15*, *WGII Global to Regional Atlas Annex A1.27; SR1.5 SPM B.5.3*, *SR 1.5 SPM B.5.7; SRCCL A.5.6*} (*Figure 3.2; Figure 3.3*)

[147] The southern part of Mexico is included in the climatic subregion South Central America (SCA) for WGI. Mexico is assessed as part of North America for WGII. The climate change literature for the SCA region occasionally includes Mexico, and in those cases WGII assessment makes reference to Latin America. Mexico is considered part of Latin America and the Caribbean for WGIII. {*WGII 12.1.1, WGIII AII.1.1*}

The transition towards net zero CO_2 will have different pace across different sectors

CO_2 emissions from the electricity/fossil fuel industries sector and land-use change generally reach net zero earlier than other sectors



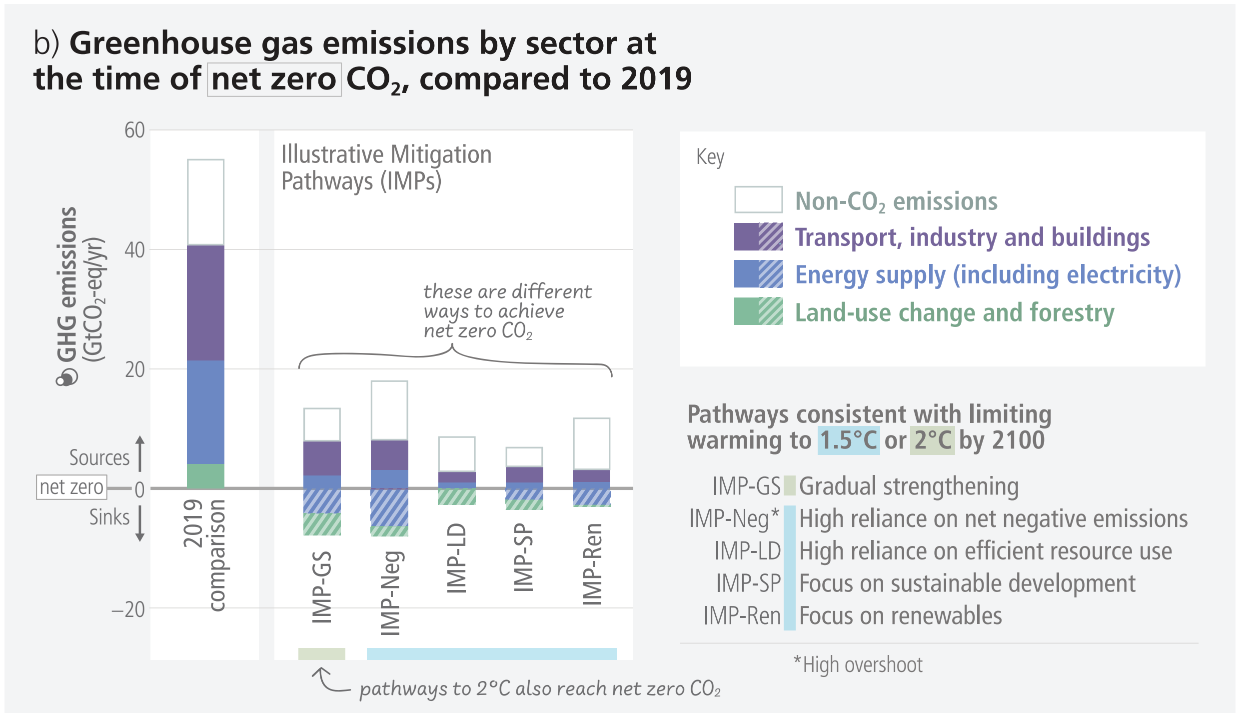


Figure 4.1: Sectoral emissions in pathways that limit warming to 1.5°C. Panel (a) shows sectoral CO_2 and non-CO_2 emissions in global modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot. The horizontal lines illustrate halving 2015 emissions (base year of the pathways) (dashed) and reaching net zero emissions (solid line). The range shows the 5–95th percentile of the emissions across the pathways. The timing strongly differs by sector, with the CO_2 emissions from the electricity/fossil fuel industries sector and land-use change generally reaching net zero earlier. Non-CO_2 emissions from agriculture are also substantially reduced compared to pathways without climate policy but do not typically reach zero. **Panel (b)** Although all pathways include strongly reduced emissions, there are different pathways as indicated by the illustrative mitigation pathways used in IPCC WGIII. The pathways emphasise routes consistent with limiting warming to 1.5°C with a high reliance on net negative emissions (IMP-Neg), high resource efficiency (IMP-LD), a focus on sustainable development (IMP-SP) or renewables (IMP-Ren) and consistent with 2°C based on a less rapid introduction of mitigation measures followed by a subsequent gradual strengthening (IMP-GS). Positive (solid filled bars) and negative emissions (hatched bars) for different illustrative mitigation pathways are compared to GHG emissions from the year 2019. The category "energy supply (including electricity)" includes bioenergy with carbon capture and storage and direct air carbon capture and storage. {*WGIII Box TS.5*, *WGIII 3.3*, *WGIII 3.4*, *WGIII 6.6*, *WGIII 10.3*, *WGIII 11.3*} (*Cross-Section Box.2*)

4.2 Benefits of Strengthening Near-Term Action

Accelerated implementation of adaptation will improve well-being by reducing losses and damages, especially for vulnerable populations. Deep, rapid, and sustained mitigation actions would reduce future adaptation costs and losses and damages, enhance sustainable development co-benefits, avoid locking-in emission sources, and reduce stranded assets and irreversible climate changes. These near-term actions involve higher up-front investments and disruptive changes, which can be moderated by a range of enabling conditions and removal or reduction of barriers to feasibility. (*high confidence*)

Accelerated implementation of adaptation responses will bring benefits to human well-being (*high confidence*) (Section 4.3). As adaptation options often have long implementation times, long-term planning and accelerated implementation, particularly in this decade, is important to close adaptation gaps, recognising that constraints remain for some regions. The benefits to vulnerable populations would be high (see Section 4.4). *(high confidence)* {*WGI SPM B.1*, *WGI SPM B.1.3*, *WGI SPM B.2.2*, *WGI SPM B.3; WGII SPM C.1.1*, *WGII SPM C.1.2*, *WGII SPM C.2*, *WGII SPM C.3.1*, *WGII Figure SPM.4b; SROCC SPM C.3.4*, *SROCC Figure 3.4*, *SROCC Figure SPM.5*}

Near-term actions that limit global warming to close to 1.5°C would substantially reduce projected losses and damages related to climate change in human systems and ecosystems, compared to higher warming levels, but cannot eliminate them all (*very high confidence*). The magnitude and rate of climate change and associated risks depend strongly on near-term mitigation and adaptation actions, and projected adverse impacts and related losses and damages escalate with every increment of global warming (*very high confidence*). Delayed mitigation action will further increase global warming which will decrease the effectiveness of many adaptation options, including Ecosystem-based Adaptation and many water-related options, as well as increasing mitigation feasibility risks, such as for options based on ecosystems (*high confidence*). Comprehensive, effective, and innovative responses integrating adaptation and mitigation can harness synergies and reduce trade-offs between adaptation and mitigation, as well as in meeting requirements for financing (*very high confidence*) (see Section 4.5, 4.6, 4.8 and 4.9). {*WGII SPM B.3*, *WGII SPM B.4*, *WGII SPM B.6.2*, *WGII SPM C.2*, *WGII SPM C.3*, *WGII SPM D.1*, *WGII SPM D.4.3*, *WGII SPM D.5*, *WG II TS D.1.4*, *WG II TS.D.5*, *WGII TS D.7.5; WGIII SPM B.6.3*, *WGIII SPM B.6.4*, *WGIII SPM C.9*, *WGIII SPM D.2*, *WGIII SPM E.13; SR1.5 SPM C.2.7*, *SR1.5 D.1.3*, *SR1.5 D.5.2*}

Mitigation actions will have other sustainable development co-benefits (*high confidence*). Mitigation will improve air quality and human health in the near term notably because many air pollutants are co-emitted by GHG emitting sectors and because methane emissions leads to surface ozone formation (*high confidence*). The benefits from air quality improvement include prevention of air pollution-related premature deaths, chronic diseases and damages to ecosystems and crops. The economic benefits for human health from air quality improvement arising from mitigation action can be of the same order of magnitude as mitigation costs, and potentially even larger (*medium confidence*). As methane has a short lifetime but is a potent GHG, strong, rapid and sustained reductions in methane emissions can limit near-term warming and improve air quality by reducing global surface ozone (*high confidence*). {*WGI SPM D.1.7*, *WGI SPM D.2.2*, *WGI 6.7*, *WGI TS Box TS.7*, *WGI 6 Box 6.2*, *WGI Figure 6.3*, *WGI Figure 6.16*, *WGI Figure 6.17; WGII TS.D.8.3*, *WGII Cross-Chapter Box HEALTH*, *WGII 5 ES*, *WGII 7 ES; WGII 7.3.1.2; WGIII Figure SPM.8*, *WGIII SPM C.2.3*, *WGIII SPM C.4.2*, *WGIII TS.4.2*}

Challenges from delayed adaptation and mitigation actions include the risk of cost escalation, lock-in of infrastructure, stranded assets, and reduced feasibility and effectiveness of adaptation and mitigation options (*high confidence*). The continued installation of unabated fossil fuel[148] infrastructure will 'lock-in' GHG emissions (*high confidence*). Limiting global warming to 2°C or below will leave a substantial amount of fossil fuels unburned and could strand considerable fossil fuel infrastructure (*high confidence*), with globally discounted value projected to be around USD 1 to 4 trillion from 2015 to 2050 (*medium confidence*). Early actions would limit the size of these stranded assets, whereas delayed actions with continued investments in unabated high-emitting infrastructure and limited development and deployment of low-emitting alternatives prior to 2030 would raise future stranded assets to the higher end of the range – thereby acting as barriers and increasing political economy feasibility risks that may jeopardise efforts to limit global warming. (*high confidence*). {*WGIII SPM B.6.3*, *WGIII SPM C.4*, *WGIII Box TS.8*}

[148] In this context, 'unabated fossil fuels' refers to fossil fuels produced and used without interventions that substantially reduce the amount of GHG emitted throughout the life cycle; for example, capturing 90% or more CO_2 from power plants, or 50 to 80% of fugitive methane emissions from energy supply. {*WGIII SPM footnote 54*}

Scaling-up near-term climate actions (Section 4.1) will mobilise a mix of low-cost and high-cost options. High-cost options, as in energy and infrastructure, are needed to avoid future lock-ins, foster innovation and initiate transformational changes (Figure 4.4). Climate resilient development pathways in support of sustainable development for all are shaped by equity, and social and climate justice (*very high confidence*). Embedding effective and equitable adaptation and mitigation in development planning can reduce vulnerability, conserve and restore ecosystems, and enable climate resilient development. This is especially challenging in localities with persistent development gaps and limited resources. (*high confidence*) {*WGII SPM C.5, WGII SPM D1; WGIII TS.5.2, WGIII 8.3.1, WGIII 8.3.4, WGIII 8.4.1, WGIII 8.6*}

Scaling-up climate action may generate disruptive changes in economic structure with distributional consequences and need to reconcile divergent interests, values and worldviews, within and between countries. Deeper fiscal, financial, institutional and regulatory reforms can offset such adverse effects and unlock mitigation potentials. Societal choices and actions implemented in this decade will determine the extent to which medium and long-term development pathways will deliver higher or lower climate resilient development outcomes. (*high confidence*) {*WGII SPM D.2, WGII SPM D.5, WGII Box TS.8; WGIII SPM D.3, WGIII SPM E.2, WGIII SPM E.3, WGIII SPM E.4, WGIII TS.2, WGIII TS.4.1, WGIII TS.6.4, WGIII 15.2, WGIII 15.6*}

Enabling conditions would need to be strengthened in the near-term and barriers reduced or removed to realise opportunities for deep and rapid adaptation and mitigation actions and climate resilient development (*high confidence*) (Figure 4.2). These enabling conditions are differentiated by national, regional and local circumstances and geographies, according to capabilities, and include: equity and inclusion in climate action (see Section 4.4), rapid and far-reaching transitions in sectors and system (see Section 4.5), measures to achieve synergies and reduce trade-offs with sustainable development goals (see Section 4.6), governance and policy improvements (see Section 4.7), access to finance, improved international cooperation and technology improvements (see Section 4.8), and integration of near-term actions across sectors, systems and regions (see Section 4.9). {*WGII SPM D.2; WGIII SPM E.1, WGIII SPM E.2*}

Barriers to feasibility would need to be reduced or removed to deploy mitigation and adaptation options at scale. Many limits to feasibility and effectiveness of responses can be overcome by addressing a range of barriers, including economic, technological, institutional, social, environmental and geophysical barriers. The feasibility and effectiveness of options increase with integrated, multi-sectoral solutions that differentiate responses based on climate risk, cut across systems and address social inequities. Strengthened near-term actions in modelled cost-effective pathways that limit global warming to 2°C or lower, reduce the overall risk to the feasibility of the system transitions, compared to modelled pathways with delayed or uncoordinated action. (*high confidence*) {*WGII SPM C.2, WGII SPM C.3, WGII SPM C.5; WGIII SPM E.1, WGIII SPM E.1.3*}

Integrating ambitious climate actions with macroeconomic policies under global uncertainty would provide benefits (*high confidence*). This encompasses three main directions: (a) economy-wide mainstreaming packages supporting options to improved sustainable low-emission economic recovery, development and job creation programs (Sections 4.4, 4.5, 4.6, 4.8, 4.9) (b) safety nets and social protection in the transition (Section 4.4, 4.7); and (c) broadened access to finance, technology and capacity-building and coordinated support to low-emission infrastructure ('leap-frog' potential), especially in developing regions, and under debt stress (*high confidence*). (Section 4.8) {*WGII SPM C.2, WGII SPM C.4.1, WGII SPM D.1.3, WGII SPM D.2, WGII SPM D.3.2, WGII SPM E.2.2, WGII SPM E.4, WGII SPM TS.2, WGII SPM TS.5.2, WGII TS.6.4, WGII TS.15, WGII TS Box TS.3; WGIII SPM B.4.2, WGIII SPM C.5.4, WGIII SPM C.6.2, WGIII SPM C.12.2, WGIII SPM D.3.4, WGIII SPM E.4.2, WGIII SPM E.4.5, WGIII SPM E.5.2, WGIII SPM E.5.3, WGIII TS.1, WGIII Box TS.15, WGIII 15.2, WGIII Cross-Chapter Box 1 on COVID in Chapter 1*}

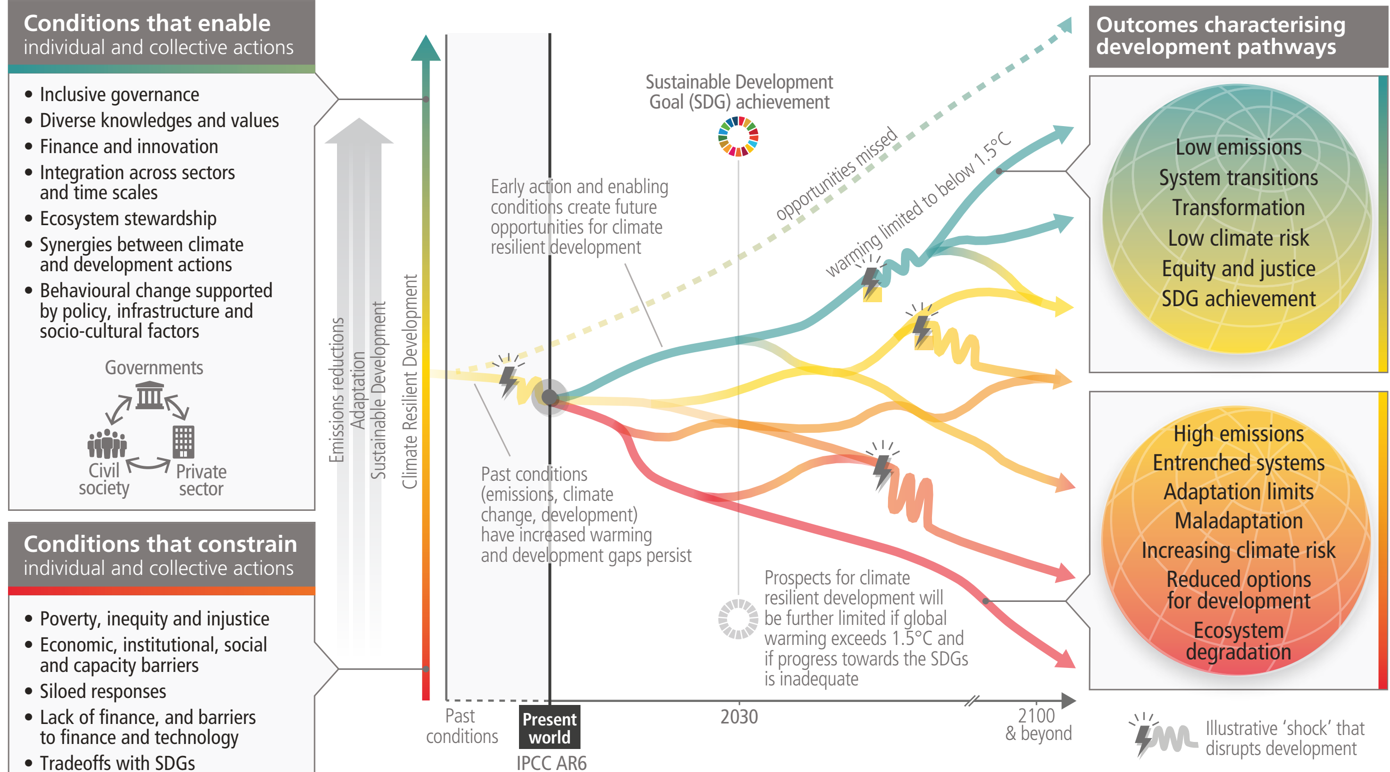


Figure 4.2: The illustrative development pathways (red to green) and associated outcomes (right panel) show that there is a rapidly narrowing window of opportunity to secure a liveable and sustainable future for all. Climate resilient development is the process of implementing greenhouse gas mitigation and adaptation measures to support sustainable development. Diverging pathways illustrate that interacting choices and actions made by diverse government, private sector and civil society actors can advance climate resilient development, shift pathways towards sustainability, and enable lower emissions and adaptation. Diverse knowledges and values include cultural values, Indigenous Knowledge, local knowledge, and scientific knowledge. Climatic and non-climatic events, such as droughts, floods or pandemics, pose more severe shocks to pathways with lower climate resilient development (red to yellow) than to pathways with higher climate resilient development (green). There are limits to adaptation and adaptive capacity for some human and natural systems at global warming of 1.5°C, and with every increment of warming, losses and damages will increase. The development pathways taken by countries at all stages of economic development impact GHG emissions and hence shape mitigation challenges and opportunities, which vary across countries and regions. Pathways and opportunities for action are shaped by previous actions (or inactions and opportunities missed, dashed pathway), and enabling and constraining conditions (left panel), and take place in the context of climate risks, adaptation limits and development gaps. The longer emissions reductions are delayed, the fewer effective adaptation options. {*WGI SPM B.1; WGII SPM B.1 to B.5, WGII SPM C.2 to 5, WGII SPM D.1 to 5, WGII Figure SPM.3, WGII Figure SPM.4, WGII Figure SPM.5, WGII TS.D.5, WGII 3.1, WGII 3.2, WGII 3.4, WGII 4.2, WGII Figure 4.4, WGII 4.5, WGII 4.6, WGII 4.9; WGIII SPM A, WGIII SPM B1, WGIII SPM B.3, WGIII SPM B.6, WGIII SPM C.4, WGIII SPM D1 to 3, WGIII SPM E.1, WGIII SPM E.2, WGIII SPM E.4, WGIII SPM E.5, WGIII Figure TS.1, WGIII Figure TS.7, WGIII Box TS.3, WGIII Box TS.8, Cross-Working Group Box 1 in Chapter 3, WGIII Cross-Chapter Box 5 in Chapter 4; SR1.5 SPM D.1 to 6; SRCCL SPM D.3*}

4.3 Near-Term Risks

Many changes in the climate system, including extreme events, will become larger in the near term with increasing global warming (*high confidence*). Multiple climatic and non-climatic risks will interact, resulting in increased compounding and cascading impacts becoming more difficult to manage (*high confidence*). Losses and damages will increase with increasing global warming (*very high confidence*), while strongly concentrated among the poorest vulnerable populations (*high confidence*). Continuing with current unsustainable development patterns would increase exposure and vulnerability of ecosystems and people to climate hazards (*high confidence*).

Global warming will continue to increase in the near term (2021–2040) mainly due to increased cumulative CO_2 emissions in nearly all considered scenarios and pathways. In the near term, every region in the world is projected to face further increases in climate hazards (*medium* to *high confidence*, depending on region and hazard), increasing multiple risks to ecosystems and humans (*very high confidence*). In the near term, natural variability[149] will modulate human-caused changes, either attenuating or amplifying projected changes, especially at regional scales, with little effect on centennial global warming. Those modulations are important to consider in adaptation planning. Global surface temperature in any single year can vary above or below the long-term human-induced trend, due to natural variability. By 2030, global surface temperature in any individual year could exceed 1.5°C relative to 1850–1900 with a probability between 40% and 60%, across the five scenarios assessed in WGI (*medium confidence*). The occurrence of individual years with global surface temperature change above a certain level does not imply that this global warming level has been reached. If a large explosive volcanic eruption were to occur in the near term[150] , it would temporarily and partially mask human-caused climate change by reducing global surface temperature and precipitation, especially over land, for one to three years (*medium confidence*). {*WGI SPM B.1.3, WGI SPM B.1.4, WGI SPM C.1, WGI SPM C.2, WGI Cross-Section Box TS.1, WGI Cross-Chapter Box 4.1; WGII SPM B.3, WGII SPM B.3.1; WGIII Box SPM.1 Figure 1*}

The level of risk for humans and ecosystems will depend on near-term trends in vulnerability, exposure, level of socio-economic development and adaptation (*high confidence*). In the near term, many climate-associated risks to natural and human systems depend more strongly on changes in these systems' vulnerability and exposure than on differences in climate hazards between emissions scenarios (*high confidence*). Future exposure to climatic hazards is increasing globally due to socio-economic development trends including growing inequality, and when urbanisation or migration increase exposure (*high confidence*). Urbanisation increases hot extremes (*very high confidence*) and precipitation runoff intensity (*high confidence*). Increasing urbanisation in low-lying and coastal zones will be a major driver of increasing exposure to extreme riverflow events and sea level rise hazards, increasing risks (*high confidence*) (Figure 4.3). Vulnerability will also rise rapidly in low-lying Small Island Developing States and atolls in the context of sea level rise (*high confidence*) (see Figure 3.4 and Figure 4.3). Human vulnerability will concentrate in informal settlements and rapidly growing smaller settlements; and vulnerability in rural areas will be heightened by reduced habitability and high reliance on climate-sensitive livelihoods (*high confidence*). Human and ecosystem vulnerability are interdependent (*high confidence*). Vulnerability to climate change for ecosystems will be strongly influenced by past, present, and future patterns of human development, including from unsustainable consumption and production, increasing demographic pressures, and persistent unsustainable use and management of land, ocean, and water (*high confidence*). Several near-term risks can be moderated with adaptation (*high confidence*). {*WGI SPM C.2.6; WGII SPM B.2, WGII SPM B.2.3, WGII SPM B.2.5, WGII SPM B.3, WGII SPM B.3.2, WGII TS.C.5.2*} (*Section 4.5 and 3.2*)

Principal hazards and associated risks expected in the near term (at 1.5°C global warming) are:

- Increased intensity and frequency of hot extremes and dangerous heat-humidity conditions, with increased human mortality, morbidity, and labour productivity loss (*high confidence*). {*WGI SPM B.2.2, WGI TS Figure TS.6; WGII SPM B.1.4, WGII SPM B.4.4, WGII Figure SPM.2*}

- Increasing frequency of marine heatwaves will increase risks of biodiversity loss in the oceans, including from mass mortality events (*high confidence*). {*WGI SPM B.2.3; WGII SPM B.1.2, WGII Figure SPM.2; SROCC SPM B.5.1*}

- Near-term risks for biodiversity loss are moderate to high in forest ecosystems (*medium confidence*) and kelp and seagrass ecosystems (*high* to *very high confidence*) and are high to very high in Arctic sea-ice and terrestrial ecosystems (*high confidence*) and warm-water coral reefs (*very high confidence*). {*WGII SPM B.3.1*}

- More intense and frequent extreme rainfall and associated flooding in many regions including coastal and other low-lying cities (*medium* to *high confidence*), and increased proportion of and peak wind speeds of intense tropical cyclones (*high confidence*). {*WGI SPM B.2.4, WGI SPM C.2.2, WGI SPM C.2.6, WGI 11.7*}

- High risks from dryland water scarcity, wildfire damage, and permafrost degradation (*medium confidence*). {*SRCCL SPM A.5.3.*}

- Continued sea level rise and increased frequency and magnitude of extreme sea level events encroaching on coastal human settlements and damaging coastal infrastructure *(high confidence)*, committing low-lying coastal ecosystems to submergence and loss (*medium confidence*), expanding land salinization (*very high confidence*), with cascading to risks to livelihoods, health, well-being, cultural values, food and water security (*high confidence*). {*WGI SPM C.2.5, WGI SPM C.2.6; WGII SPM B.3.1, WGII SPM B.5.2; SRCCL SPM A.5.6; SROCC SPM B.3.4, SROCC SPM 3.6, SROCC SPM B.9.1*} (*Figure 3.4, 4.3*)

- Climate change will significantly increase ill health and premature deaths from the near to long term (*high confidence*). Further warming will increase climate-sensitive food-borne, water-borne, and vector-borne disease risks (*high confidence*), and mental health challenges including anxiety and stress (*very high confidence*). {*WGII SPM B.4.4*}

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[149] See Annex I: Glossary. The main internal variability phenomena include El Niño–Southern Oscillation, Pacific Decadal Variability and Atlantic Multi-decadal Variability through their regional influence. The internal variability of global surface temperature in any single year is estimated to be about ±0.25°C (5 to 95% range, *high confidence).* {*WGI SPM footnote 29, WGI SPM footnote 37*}

[150] Based on 2500-year reconstructions, eruptions with a radiative forcing more negative than –1 Wm^{-2}, related to the radiative effect of volcanic stratospheric aerosols in the literature assessed in this report, occur on average twice per century. {*WGI SPM footnote 38*}

- Cryosphere-related changes in floods, landslides, and water availability have the potential to lead to severe consequences for people, infrastructure and the economy in most mountain regions (*high confidence*). {*WGII TS C.4.2*}

- The projected increase in frequency and intensity of heavy precipitation (*high confidence*) will increase rain-generated local flooding (*medium confidence*). {*WGI Figure SPM.6, WGI SPM B.2.2; WGII TS C.4.5*}

Multiple climate change risks will increasingly compound and cascade in the near term (*high confidence*). Many regions are projected to experience an increase in the probability of compound events with higher global warming (*high confidence*) including concurrent heatwaves and drought. Risks to health and food production will be made more severe from the interaction of sudden food production losses from heat and drought, exacerbated by heat-induced labour productivity losses (*high confidence*) (Figure 4.3). These interacting impacts will increase food prices, reduce household incomes, and lead to health risks of malnutrition and climate-related mortality with no or low levels of adaptation, especially in tropical regions (*high confidence*). Concurrent and cascading risks from climate change to food systems, human settlements, infrastructure and health will make these risks more severe and more difficult to manage, including when interacting with non-climatic risk drivers such as competition for land between urban expansion and food production, and pandemics (*high confidence*). Loss of ecosystems and their services has cascading and long-term impacts on people globally, especially for Indigenous Peoples and local communities who are directly dependent on ecosystems, to meet basic needs (*high confidence*). Increasing transboundary risks are projected across the food, energy and water sectors as impacts from weather and climate extremes propagate through supply-chains, markets, and natural resource flows (*high confidence*) and may interact with impacts from other crises such as pandemics. Risks also arise from some responses intended to reduce the risks of climate change, including risks from maladaptation and adverse side effects of some emissions reduction and carbon dioxide removal measures, such as afforestation of naturally unforested land or poorly implemented bioenergy compounding climate-related risks to biodiversity, food and water security, and livelihoods (*high confidence*) (see Section 3.4.1 and 4.5). {*WGI SPM.2.7; WGII SPM B.2.1, WGII SPM B.5, WGII SPM B.5.1, WGII SPM B.5.2, WGII SPM B.5.3, WGII SPM B.5.4, WGII Cross-Chapter Box COVID in Chapter 7; WGIII SPM C.11.2; SRCCL SPM A.5, SRCCL SPM A.6.5*} (*Figure 4.3*)

With every increment of global warming losses and damages will increase (*very high confidence*), become increasingly difficult to avoid and be strongly concentrated among the poorest vulnerable populations (*high confidence*). Adaptation does not prevent all losses and damages, even with effective adaptation and before reaching soft and hard limits. Losses and damages will be unequally distributed across systems, regions and sectors and are not comprehensively addressed by current financial, governance and institutional arrangements, particularly in vulnerable developing countries. (*high confidence*). {*WGII SPM B.4, WGII SPM C.3, WGII SPM C.3.5*}

Every region faces more severe and/or frequent compound and cascading climate risks

a) Increase in the population exposed to sea level rise from 2020 to 2040

Exposure to a coastal flooding event that currently occurs on average once every 100 years

North America
0.34 million
+0.24 million (71%)

absolute increase (and percent increase)

Europe
0.67 million
+0.38 million (57%)

Asia
63.81 million
+16.36 million (26%)

Central and South America
0.69 million
+0.24 million (35%)

Africa
2.40 million
+2.29 million (95%)

Small Islands
0.18 million
+0.10 million (57%)

Australasia
0.02 million
+0.01 million (52%)

Population exposed in 2020
Additional population exposed in 2040 → SSP2-4.5
Increase due to sea level rise only
Increase due to sea level rise and population change
0.1 million
1 million

b) Increased frequency of extreme sea level events by 2040

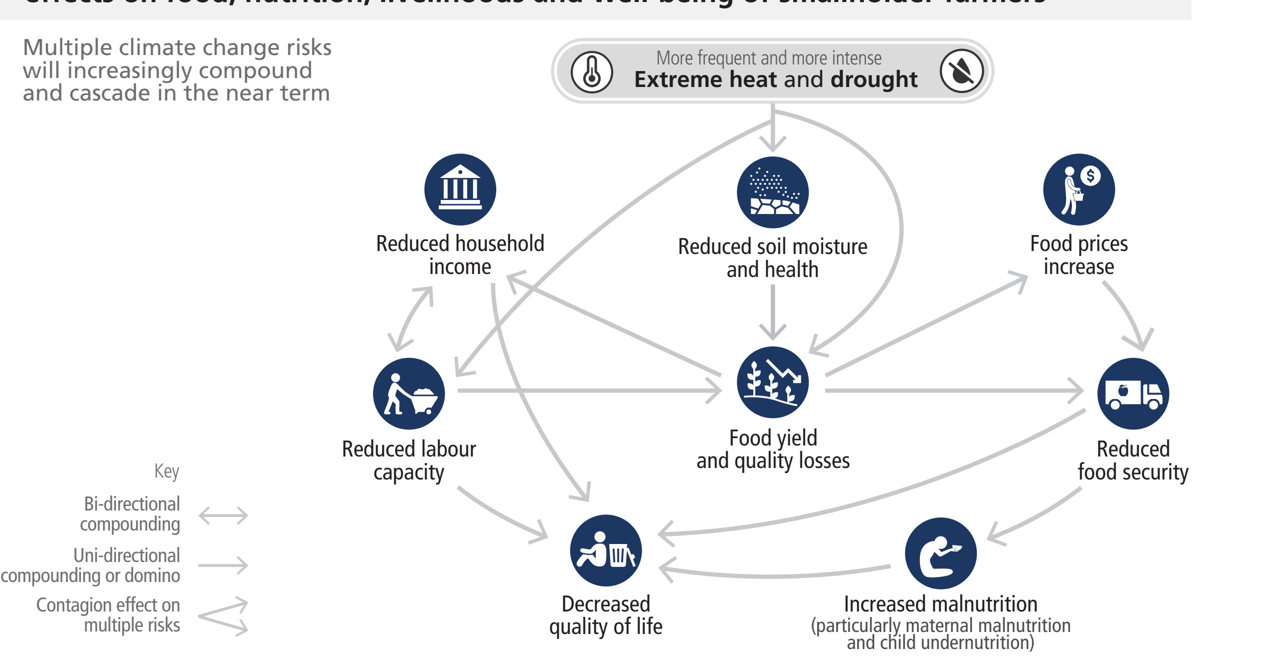
Frequency of events that currently occur on average once every 100 years

The absence of a circle indicates an inability to perform an assessment due to a lack of data.

Projected change to 1-in-100 year events under the intermediate SSP2-4.5 scenario
Annual event
Decadal event
Twice-a-century event
No change

c) Example of complex risk, where impacts from climate extreme events have cascading effects on food, nutrition, livelihoods and well-being of smallholder farmers

Multiple climate change risks will increasingly compound and cascade in the near term



Section 4

Figure 4.3: Every region faces more severe or frequent compound and/or cascading climate risks in the near term. Changes in risk result from changes in the degree of the hazard, the population exposed, and the degree of vulnerability of people, assets, or ecosystems. **Panel (a)** Coastal flooding events affect many of the highly populated regions of the world where large percentages of the population are exposed. The panel shows near-term projected increase of population exposed to 100-year flooding events depicted as the increase from the year 2020 to 2040 (due to sea level rise and population change), based on the intermediate GHG emissions scenario (SSP2-4.5) and current adaptation measures. Out-migration from coastal areas due to future sea level rise is not considered in the scenario. **Panel (b)** projected median probability in the year 2040 for extreme water levels resulting from a combination of mean sea level rise, tides and storm surges, which have a historical 1% average annual probability. A peak-over-threshold (99.7%) method was applied to the historical tide gauge observations available in the Global Extreme Sea Level Analysis version 2 database, which is the same information as WGI Figure 9.32, except here the panel uses relative sea level projections under SSP2-4.5 for the year 2040 instead of 2050 The absence of a circle indicates an inability to perform an assessment due to a lack of data, but does not indicate absence of increasing frequencies. **Panel (c)** Climate hazards can initiate risk cascades that affect multiple sectors and propagate across regions following complex natural and societal connections. This example of a compound heat wave and a drought event striking an agricultural region shows how multiple risks are interconnected and lead to cascading biophysical, economic, and societal impacts even in distant regions, with vulnerable groups such as smallholder farmers, children and pregnant women particularly impacted. {*WGI Figure 9.32; WGII SPM B4.3*, *WGII SPM B1.3*, *WGII SPM B.5.1*, *WGII TS Figure TS.9*, *WGII TS Figure TS.10 (c)*, *WGII Fig 5.2*, *WGII TS.B.2.3*, *WGII TS.B.2.3*, *WGII TS.B.3.3*, *WGII 9.11.1.2*}

4.4 Equity and Inclusion in Climate Change Action

Actions that prioritise equity, climate justice, social justice and inclusion lead to more sustainable outcomes, co-benefits, reduce trade-offs, support transformative change and advance climate resilient development. Adaptation responses are immediately needed to reduce rising climate risks, especially for the most vulnerable. Equity, inclusion and just transitions are key to progress on adaptation and deeper societal ambitions for accelerated mitigation. (*high confidence*)

Adaptation and mitigation actions, across scales, sectors and regions, that prioritise equity, climate justice, rights-based approaches, social justice and inclusivity, lead to more sustainable outcomes, reduce trade-offs, support transformative change and advance climate resilient development (*high confidence*). Redistributive policies across sectors and regions that shield the poor and vulnerable, social safety nets, equity, inclusion and just transitions, at all scales can enable deeper societal ambitions and resolve trade-offs with sustainable development goals.(SDGs), particularly education, hunger, poverty, gender and energy access (*high confidence*). Mitigation efforts embedded within the wider development context can increase the pace, depth and breadth of emission reductions (*medium confidence*). Equity, inclusion and just transitions at all scales enable deeper societal ambitions for accelerated mitigation, and climate action more broadly (*high confidence*). The complexity in risk of rising food prices, reduced household incomes, and health and climate-related malnutrition (particularly maternal malnutrition and child undernutrition) and mortality increases with little or low levels of adaptation (*high confidence*). {*WGII SPM B.5.1*, *WGII SPM C.2.9*, *WGII SPM D.2.1*, *WGII TS Box TS.4; WGIII SPM D.3*, *WGIII SPM D.3.3*, *WGIII SPM WGIII SPM E.3*, *SR1.5 SPM D.4.5*} (*Figure 4.3c*)

Regions and people with considerable development constraints have high vulnerability to climatic hazards. Adaptation outcomes for the most vulnerable within and across countries and regions are enhanced through approaches focusing on equity, inclusivity, and rights-based approaches, including 3.3 to 3.6 billion people living in contexts that are highly vulnerable to climate change (*high confidence*). Vulnerability is higher in locations with poverty, governance challenges and limited access to basic services and resources, violent conflict and high levels of climate-sensitive livelihoods (e.g., smallholder farmers, pastoralists, fishing communities) (*high confidence*). Several risks can be moderated with adaptation (*high confidence*). The largest adaptation gaps exist among lower income population groups (*high confidence*) and adaptation progress is unevenly distributed with observed adaptation gaps (*high confidence*). Present development challenges causing high vulnerability are influenced by historical and ongoing patterns of inequity such as colonialism, especially for many Indigenous Peoples and local communities (*high confidence*). Vulnerability is exacerbated by inequity and marginalisation linked to gender, ethnicity, low income or combinations thereof, especially for many Indigenous Peoples and local communities (*high confidence*). {*WGII SPM B.2*, *WGII SPM B.2.4*, *WGII SPM B.3.2*, *WGII SPM B.3.3*, *WGII SPM C.1*, *WGII SPM C.1.2*, *WGII SPM C.2.9*}

Meaningful participation and inclusive planning, informed by cultural values, Indigenous Knowledge, local knowledge, and scientific knowledge can help address adaptation gaps and avoid maladaptation (*high confidence*). Such actions with flexible pathways may encourage low-regret and timely actions (*very high confidence*). Integrating climate adaptation into social protection programmes, including cash transfers and public works programmes, would increase resilience to climate change, especially when supported by basic services and infrastructure *(high confidence).* {*WGII SPM C.2.3*, *WGII SPM C.4.3*, *WGII SPM C.4.4*, *WGII SPM C.2.9*, *WGII WPM D.3*}

Equity, inclusion, just transitions, broad and meaningful participation of all relevant actors in decision making at all scales enable deeper societal ambitions for accelerated mitigation, and climate action more broadly, and build social trust, support transformative changes and an equitable sharing of benefits and burdens (*high confidence*). Equity remains a central element in the UN climate regime, notwithstanding shifts in differentiation between states over time and challenges in assessing fair shares. Ambitious mitigation pathways imply large and sometimes disruptive changes in economic structure, with significant distributional consequences, within and between countries, including shifting of income and employment during the transition from high to low emissions activities (*high confidence*). While some jobs may be lost, low-emissions development can also open up opportunities to enhance skills and create jobs (*high confidence*). Broadening equitable access to finance, technologies and governance that facilitate mitigation, and consideration of climate justice can help equitable sharing of benefits

and burdens, especially for vulnerable countries and communities. {*WGIII SPM D.3*, *WGIII SPM D.3.2*, *WGIII SPM D.3.3*, *WGIII SPM D.3.4*, *WGIII TS Box TS.4*}

Development priorities among countries also reflect different starting points and contexts, and enabling conditions for shifting development pathways towards increased sustainability will therefore differ, giving rise to different needs (*high confidence*). Implementing just transition principles through collective and participatory decision-making processes is an effective way of integrating equity principles into policies at all scales depending on national circumstances, while in several countries just transition commissions, task forces and national policies have been established (*medium confidence*). {*WGIII SPM D.3.1*, *WGIII SPM D.3.3*}

Many economic and regulatory instruments have been effective in reducing emissions and practical experience has informed instrument design to improve them while addressing distributional goals and social acceptance (*high confidence*). The design of behavioural interventions, including the way that choices are presented to consumers work synergistically with price signals, making the combination more effective (*medium confidence*). Individuals with high socio-economic status contribute disproportionately to emissions, and have the highest potential for emissions reductions, e.g., as citizens, investors, consumers, role models, and professionals (*high confidence*). There are options on design of instruments such as taxes, subsidies, prices, and consumption-based approaches, complemented by regulatory instruments to reduce high-emissions consumption while improving equity and societal well-being (*high confidence*). Behaviour and lifestyle changes to help end-users adopt low-GHG-intensive options can be supported by policies, infrastructure and technology with multiple co-benefits for societal well-being (*high confidence*). Broadening equitable access to domestic and international finance, technologies and capacity can also act as a catalyst for accelerating mitigation and shifting development pathways in low-income contexts (*high confidence*). Eradicating extreme poverty, energy poverty, and providing decent living standards to all in these regions in the context of achieving sustainable development objectives, in the near term, can be achieved without significant global emissions growth (*high confidence*). Technology development, transfer, capacity building and financing can support developing countries/ regions leapfrogging or transitioning to low-emissions transport systems thereby providing multiple co-benefits (*high confidence*). Climate resilient development is advanced when actors work in equitable, just and enabling ways to reconcile divergent interests, values and worldviews, toward equitable and just outcomes (*high confidence*). {*WGII D.2.1*, *WGIII SPM B.3.3*, *WGIII SPM.C.8.5*, *WGIII SPM C.10.2*, *WGIII SPM C.10.4*, *WGIII SPM D.3.4*, *WGIII SPM E.4.2*, *WGIII TS.5.1*, *WGIII 5.4*, *WGIII 5.8*, *WGIII 15.2*}

4.5 Near-Term Mitigation and Adaptation Actions

Rapid and far-reaching transitions across all sectors and systems are necessary to achieve deep and sustained emissions reductions and secure a liveable and sustainable future for all. These system transitions involve a significant upscaling of a wide portfolio of mitigation and adaptation options. Feasible, effective and low-cost options for mitigation and adaptation are already available, with differences across systems and regions. (*high confidence*)

Rapid and far-reaching transitions across all sectors and systems are necessary to achieve deep emissions reductions and secure a liveable and sustainable future for all (*high confidence*). System transitions[151] consistent with pathways that limit warming to 1.5°C (>50%) with no or limited overshoot are more rapid and pronounced in the near-term than in those that limit warming to 2°C (>67%) (*high confidence*). Such a systemic change is unprecedented in terms of scale, but not necessarily in terms of speed (*medium confidence*). The system transitions make possible the transformative adaptation required for high levels of human health and well-being, economic and social resilience, ecosystem health, and planetary health. {*WGII SPM A*, *WGII Figure SPM.1; WGIII SPM C.3; SR1.5 SPM C.2*, *SR1.5 SPM C.2.1*, *SR1.5 SPM C.2*, *SR1.5 SPM C.5*}

Feasible, effective and low-cost options for mitigation and adaptation are already available (*high confidence*) (Figure 4.4). Mitigation options costing USD 100 tCO_2-eq^{-1} or less could reduce global GHG emissions by at least half the 2019 level by 2030 (options costing less than USD 20 tCO_2-eq^{-1} are estimated to make up more than half of this potential) (*high confidence*) (Figure 4.4). The availability, feasibility[152] and potential of mitigation or effectiveness of adaptation options in the near term differ across systems and regions (*very high confidence*). {*WGII SPM C.2; WGIII SPM C.12*, *WGIII SPM E.1.1; SR1.5 SPM B.6*}

Demand-side measures and new ways of end-use service provision can reduce global GHG emissions in end-use sectors by 40 to 70% by 2050 compared to baseline scenarios, while some regions and socioeconomic groups require additional energy and resources. Demand-side mitigation encompasses changes in infrastructure use, end-use technology adoption, and socio-cultural and behavioural change. (*high confidence*) (Figure 4.4). {*WGIII SPM C.10*}

[151] System transitions involve a wide portfolio of mitigation and adaptation options that enable deep emissions reductions and transformative adaptation in all sectors. This report has a particular focus on the following system transitions: energy; industry; cities, settlements and infrastructure; land, ocean, food and water; health and nutrition; and society, livelihood and economies. {*WGII SPM A, WGII Figure SPM.1, WGII Figure SPM.4; SR1.5 SPM C.2*}

[152] See Annex I: Glossary.

There are multiple opportunities for scaling up climate action

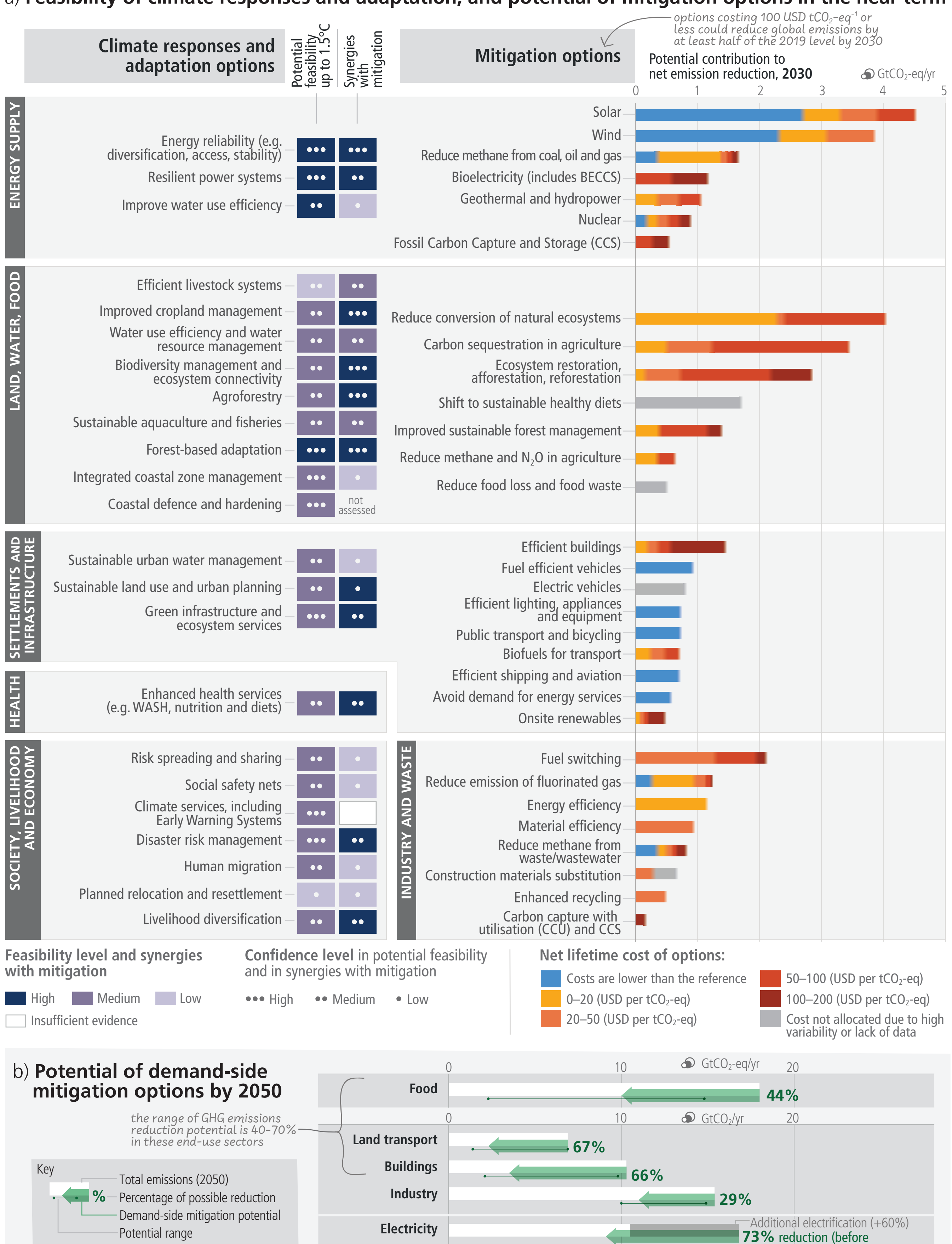


Figure 4.4: Multiple Opportunities for scaling up climate action. Panel (a) presents selected mitigation and adaptation options across different systems. The left hand side of panel (a) shows climate responses and adaptation options assessed for their multidimensional feasibility at global scale, in the near term and up to 1.5°C global warming. As literature above 1.5°C is limited, feasibility at higher levels of warming may change, which is currently not possible to assess robustly. The term response is used here in addition to adaptation because some responses, such as migration, relocation and resettlement may or may not be considered to be adaptation. Migration, when voluntary, safe and orderly, allows reduction of risks to climatic and non-climatic stressors. Forest based adaptation includes sustainable forest management, forest conservation and restoration, reforestation and afforestation. WASH refers to water, sanitation and hygiene. Six feasibility dimensions (economic, technological, institutional, social, environmental and geophysical) were used to calculate the potential feasibility of climate responses and adaptation options, along with their synergies with mitigation. For potential feasibility and feasibility dimensions, the figure shows high, medium, or low feasibility. Synergies with mitigation are identified as high, medium, and low. The right-hand side of panel (a) provides an overview of selected mitigation options and their estimated costs and potentials in 2030. Relative potentials and costs will vary by place, context and time and in the longer term compared to 2030. Costs are net lifetime discounted monetary costs of avoided greenhouse gas emissions calculated relative to a reference technology. The potential (horizontal axis) is the quantity of net GHG emission reduction that can be achieved by a given mitigation option relative to a specified emission baseline. Net GHG emission reductions are the sum of reduced emissions and/or enhanced sinks. The baseline used consists of current policy (around 2019) reference scenarios from the AR6 scenarios database (25–75 percentile values). The mitigation potentials are assessed independently for each option and are not necessarily additive. Health system mitigation options are included mostly in settlement and infrastructure (e.g., efficient healthcare buildings) and cannot be identified separately. Fuel switching in industry refers to switching to electricity, hydrogen, bioenergy and natural gas. The length of the solid bars represents the mitigation potential of an option. Potentials are broken down into cost categories, indicated by different colours (see legend). Only discounted lifetime monetary costs are considered. Where a gradual colour transition is shown, the breakdown of the potential into cost categories is not well known or depends heavily on factors such as geographical location, resource availability, and regional circumstances, and the colours indicate the range of estimates. The uncertainty in the total potential is typically 25–50%. When interpreting this figure, the following should be taken into account: (1) The mitigation potential is uncertain, as it will depend on the reference technology (and emissions) being displaced, the rate of new technology adoption, and several other factors; (2) Different options have different feasibilities beyond the cost aspects, which are not reflected in the figure; and (3) Costs for accommodating the integration of variable renewable energy sources in electricity systems are expected to be modest until 2030, and are not included. **Panel (b)** displays the indicative potential of demand-side mitigation options for 2050. Potentials are estimated based on approximately 500 bottom-up studies representing all global regions. The baseline (white bar) is provided by the sectoral mean GHG emissions in 2050 of the two scenarios (IEA-STEPS and IP_ModAct) consistent with policies announced by national governments until 2020. The green arrow represents the demand-side emissions reductions potentials. The range in potential is shown by a line connecting dots displaying the highest and the lowest potentials reported in the literature. Food shows demand-side potential of socio-cultural factors and infrastructure use, and changes in land-use patterns enabled by change in food demand. Demand-side measures and new ways of end-use service provision can reduce global GHG emissions in end-use sectors (buildings, land transport, food) by 40–70% by 2050 compared to baseline scenarios, while some regions and socioeconomic groups require additional energy and resources. The last row shows how demand-side mitigation options in other sectors can influence overall electricity demand. The dark grey bar shows the projected increase in electricity demand above the 2050 baseline due to increasing electrification in the other sectors. Based on a bottom-up assessment, this projected increase in electricity demand can be avoided through demand-side mitigation options in the domains of infrastructure use and socio-cultural factors that influence electricity usage in industry, land transport, and buildings (green arrow). {*WGII Figure SPM.4, WGII Cross-Chapter Box FEASIB in Chapter 18; WGIII SPM C.10, WGIII 12.2.1, WGIII 12.2.2, WGIII Figure SPM.6, WGIII Figure SPM.7*}

4.5.1. Energy Systems

Rapid and deep reductions in GHG emissions require major energy system transitions (*high confidence*). Adaptation options can help reduce climate-related risks to the energy system (*very high confidence*). Net zero CO_2 energy systems entail: a substantial reduction in overall fossil fuel use, minimal use of unabated fossil fuels[153], and use of Carbon Capture and Storage in the remaining fossil fuel systems; electricity systems that emit no net CO_2; widespread electrification; alternative energy carriers in applications less amenable to electrification; energy conservation and efficiency; and greater integration across the energy system *(high confidence).* Large contributions to emissions reductions can come from options costing less than USD 20 $tCO_2\text{-eq}^{-1}$, including solar and wind energy, energy efficiency improvements, and CH_4 (methane) emissions reductions (from coal mining, oil and gas, and waste) (*medium confidence*).[154] Many of these response options are technically viable and are supported by the public (*high confidence*). Maintaining emission-intensive systems may, in some regions and sectors, be more expensive than transitioning to low emission systems (*high confidence*). {*WGII SPM C.2.10; WGIII SPM C.4.1, WGIII SPM C.4.2, WGIII SPM C.12.1, WGIII SPM E.1.1, WGIII TS.5.1*}

Climate change and related extreme events will affect future energy systems, including hydropower production, bioenergy yields, thermal power plant efficiencies, and demands for heating and cooling (*high confidence*). The most feasible energy system adaptation options support infrastructure resilience, reliable power systems and efficient water use for existing and new energy generation systems (*very high confidence*). Adaptations for hydropower and thermo-electric power generation are effective in most regions up to 1.5°C to 2°C, with decreasing effectiveness at higher levels of warming (*medium confidence*). Energy generation diversification (e.g., wind, solar, small-scale hydroelectric) and demand side management (e.g., storage and energy efficiency improvements) can increase energy reliability and reduce vulnerabilities to climate change, especially in rural populations (*high confidence*). Climate responsive energy markets, updated design standards on energy assets according to current and projected climate change, smart-grid technologies, robust transmission systems and improved capacity to respond to supply deficits have high feasibility in the medium- to long-term, with mitigation co-benefits (*very high confidence*). {*WGII SPM B.5.3, WGII SPM C.2.10; WGIII TS.5.1*}

4.5.2. Industry

There are several options to reduce industrial emissions that differ by type of industry; many industries are disrupted by climate change, especially from extreme events (*high confidence*). Reducing industry emissions will entail coordinated action throughout value chains to promote all mitigation options, including demand management, energy and materials efficiency, circular material flows, as well as abatement technologies and

153 In this context, 'unabated fossil fuels' refers to fossil fuels produced and used without interventions that substantially reduce the amount of GHG emitted throughout the life cycle; for example, capturing 90% or more CO_2 from power plants, or 50–80% of fugitive methane emissions from energy supply. {*WGIII SPM footnote 54*}

154 The mitigation potentials and mitigation costs of individual technologies in a specific context or region may differ greatly from the provided estimates (*medium confidence*). {*WGIII SPM C.12.1*}

transformational changes in production processes (*high confidence*). Light industry and manufacturing can be largely decarbonized through available abatement technologies (e.g., material efficiency, circularity), electrification (e.g., electrothermal heating, heat pumps), and switching to low- and zero-GHG emitting fuels (e.g., hydrogen, ammonia, and bio-based and other synthetic fuels) (*high confidence*), while deep reduction of cement process emissions will rely on cementitious material substitution and the availability of Carbon Capture and Storage (CCS) until new chemistries are mastered (*high confidence*). Reducing emissions from the production and use of chemicals would need to rely on a life cycle approach, including increased plastics recycling, fuel and feedstock switching, and carbon sourced through biogenic sources, and, depending on availability, Carbon Capture and Utilisation (CCU), direct air CO_2 capture, as well as CCS (*high confidence*). Action to reduce industry sector emissions may change the location of GHG-intensive industries and the organisation of value chains, with distributional effects on employment and economic structure (*medium confidence*). {*WGII TS.B.9.1*, *WGII 16.5.2; WGIII SPM C.5*, *WGIII SPM C.5.2*, *WGIII SPM C.5.3*, *WGIII TS.5.5*}

Many industrial and service sectors are negatively affected by climate change through supply and operational disruptions, especially from extreme events (*high confidence*), and will require adaptation efforts. Water intensive industries (e.g., mining) can undertake measures to reduce water stress, such as water recycling and reuse, using brackish or saline sources, working to improve water use efficiency. However, residual risks will remain, especially at higher levels of warming (*medium confidence*). {*WGII TS.B.9.1*, *WGII 16.5.2*, *WGII 4.6.3*} (*Section 3.2*)

4.5.3. Cities, Settlements and Infrastructure

Urban systems are critical for achieving deep emissions reductions and advancing climate resilient development, particularly when this involves integrated planning that incorporates physical, natural and social infrastructure (*high confidence*). Deep emissions reductions and integrated adaptation actions are advanced by: integrated, inclusive land use planning and decision-making; compact urban form by co-locating jobs and housing; reducing or changing urban energy and material consumption; electrification in combination with low emissions sources; improved water and waste management infrastructure; and enhancing carbon uptake and storage in the urban environment (e.g. bio-based building materials, permeable surfaces and urban green and blue infrastructure). Cities can achieve net zero emissions if emissions are reduced within and outside of their administrative boundaries through supply chains, creating beneficial cascading effects across other sectors. (*high confidence*) {*WGII SPM C.5.6*, *WGII SPM D.1.3*, *WGII SPM D.3; WGIII SPM C.6*, *WGIII SPM C.6.2*, *WGIII TS 5.4*, *SR1.5 SPM C.2.4*}

Considering climate change impacts and risks (e.g., through climate services) in the design and planning of urban and rural settlements and infrastructure is critical for resilience and enhancing human well-being. Effective mitigation can be advanced at each of the design, construction, retrofit, use and disposal stages for buildings. Mitigation interventions for buildings include: at the construction phase, low-emission construction materials, highly efficient building envelope and the integration of renewable energy solutions; at the use phase, highly efficient appliances/equipment, the optimisation of the use of buildings and their supply with low-emission energy sources; and at the disposal phase, recycling and re-using construction materials. Sufficiency[155] measures can limit the demand for energy and materials over the lifecycle of buildings and appliances. (*high confidence*) {*WGII SPM C.2.5; WGIII SPM C.7.2*}

Transport-related GHG emissions can be reduced by demand-side options and low-GHG emissions technologies. Changes in urban form, reallocation of street space for cycling and walking, digitalisation (e.g., teleworking) and programs that encourage changes in consumer behaviour (e.g. transport, pricing) can reduce demand for transport services and support the shift to more energy efficient transport modes (*high confidence*). Electric vehicles powered by low-emissions electricity offer the largest decarbonisation potential for land-based transport, on a life cycle basis (*high confidence*). Costs of electrified vehicles are decreasing and their adoption is accelerating, but they require continued investments in supporting infrastructure to increase scale of deployment (*high confidence*). The environmental footprint of battery production and growing concerns about critical minerals can be addressed by material and supply diversification strategies, energy and material efficiency improvements, and circular material flows (*medium confidence*). Advances in battery technologies could facilitate the electrification of heavy-duty trucks and compliment conventional electric rail systems (*medium confidence*). Sustainable biofuels can offer additional mitigation benefits in land-based transport in the short and medium term (*medium confidence*). Sustainable biofuels, low-emissions hydrogen, and derivatives (including synthetic fuels) can support mitigation of CO_2 emissions from shipping, aviation, and heavy-duty land transport but require production process improvements and cost reductions (*medium confidence*). Key infrastructure systems including sanitation, water, health, transport, communications and energy will be increasingly vulnerable if design standards do not account for changing climate conditions (*high confidence*). {*WGII SPM B.2.5; WGIII SPM C.6.2*, *WGIII SPM C.8*, *WGIII SPM C.8.1*, *WGIII SPM C.8.2*, *WGIII SPM C.10.2*, *WGIII SPM C.10.3*, *WGIII SPM C.10.4*}

Green/natural and blue infrastructure such as urban forestry, green roofs, ponds and lakes, and river restoration can mitigate climate change through carbon uptake and storage, avoided emissions, and reduced energy use while reducing risk from extreme events such as heatwaves, heavy precipitation and droughts, and advancing co-benefits for health, well-being and livelihoods (*medium confidence*). Urban greening can provide local cooling (*very high confidence*). Combining green/natural and grey/physical infrastructure adaptation responses has potential to reduce adaptation costs and contribute to flood control, sanitation, water resources management, landslide prevention and coastal protection (*medium confidence*). Globally, more financing is directed at grey/physical infrastructure than green/natural infrastructure and social infrastructure (*medium confidence*), and there is limited evidence of investment in informal settlements (*medium* to *high confidence*). The greatest gains in well-being in urban areas can be achieved by prioritising finance to reduce climate risk for low-income

[155] A set of measures and daily practices that avoid demand for energy, materials, land and water while delivering human well-being for all within planetary boundaries. {*WGIII Annex I*}

and marginalised communities including people living in informal settlements (*high confidence*). {*WGII SPM C.2.5, WGII SPM C.2.6, WGII SPM C.2.7, WGII SPM D.3.2, WGII TS.E.1.4, WGII Cross-Chapter Box FEAS; WGIII SPM C.6, WGIII SPM C.6.2, WGIII SPM D.1.3, WGIII SPM D.2.1*}

Responses to ongoing sea level rise and land subsidence in low-lying coastal cities and settlements and small islands include protection, accommodation, advance and planned relocation. These responses are more effective if combined and/or sequenced, planned well ahead, aligned with sociocultural values and development priorities, and underpinned by inclusive community engagement processes. (*high confidence*) {*WGII SPM C.2.8*}

4.5.4. Land, Ocean, Food, and Water

There is substantial mitigation and adaptation potential from options in agriculture, forestry and other land use, and in the oceans, that could be upscaled in the near term across most regions (*high confidence*) (Figure 4.5). Conservation, improved management, and restoration of forests and other ecosystems offer the largest share of economic mitigation potential, with reduced deforestation in tropical regions having the highest total mitigation potential. Ecosystem restoration, reforestation, and afforestation can lead to trade-offs due to competing demands on land. Minimizing trade-offs requires integrated approaches to meet multiple objectives including food security. Demand-side measures (shifting to sustainable healthy diets and reducing food loss/waste) and sustainable agricultural intensification can reduce ecosystem conversion and CH_4 and N_2O emissions, and free up land for reforestation and ecosystem restoration. Sustainably sourced agriculture and forest products, including long-lived wood products, can be used instead of more GHG-intensive products in other sectors. Effective adaptation options include cultivar improvements, agroforestry, community-based adaptation, farm and landscape diversification, and urban agriculture. These AFOLU response options require integration of biophysical, socioeconomic and other enabling factors. The effectiveness of ecosystem-based adaptation and most water-related adaptation options declines with increasing warming (see 3.2). (*high confidence*) {*WGII SPM C.2.1, WGII SPM C.2.2, WGII SPM C.2.5; WGIII SPM C.9.1; SRCCL SPM B.1.1, SRCCL SPM B.5.4, SRCCL SPM D.1; SROCC SPM C*}

Some options, such as conservation of high-carbon ecosystems (e.g., peatlands, wetlands, rangelands, mangroves and forests), have immediate impacts while others, such as restoration of high-carbon ecosystems, reclamation of degraded soils or afforestation, take decades to deliver measurable results (*high confidence*). Many sustainable land management technologies and practices are financially profitable in three to ten years (*medium confidence*). {*SRCCL SPM B.1.2, SRCCL SPM D.2.2*}

Maintaining the resilience of biodiversity and ecosystem services at a global scale depends on effective and equitable conservation of approximately 30–50% of Earth's land, freshwater and ocean areas, including currently near-natural ecosystems (*high confidence*). The services and options provided by terrestrial, freshwater, coastal and ocean ecosystems can be supported by protection, restoration, precautionary ecosystem-based management of renewable resource use, and the reduction of pollution and other stressors (*high confidence*). {*WGII SPM C.2.4, WGII SPM D.4; SROCC SPM C.2*}

Large-scale land conversion for bioenergy, biochar, or afforestation can increase risks to biodiversity, water and food security. In contrast, restoring natural forests and drained peatlands, and improving sustainability of managed forests enhances the resilience of carbon stocks and sinks and reduces ecosystem vulnerability to climate change. Cooperation, and inclusive decision making, with local communities and Indigenous Peoples, as well as recognition of inherent rights of Indigenous Peoples, is integral to successful adaptation across forests and other ecosystems. (*high confidence*) {*WGII SPM B.5.4, WGII SPM C.2.3, WGII SPM C.2.4; WGIII SPM D.2.3; SRCCL B.7.3, SRCCL SPM C.4.3, SRCCL TS.7*}

Natural rivers, wetlands and upstream forests reduce flood risk in most circumstances (*high confidence*). Enhancing natural water retention such as by restoring wetlands and rivers, land use planning such as no build zones or upstream forest management, can further reduce flood risk (*medium confidence*). For inland flooding, combinations of non-structural measures like early warning systems and structural measures like levees have reduced loss of lives (*medium confidence*), but hard defences against flooding or sea level rise can also be maladaptive (*high confidence*). {*WGII SPM C.2.1, WGII SPM C.4.1, WGII SPM C.4.2, WGII SPM C.2.5*}

Protection and restoration of coastal 'blue carbon' ecosystems (e.g., mangroves, tidal marshes and seagrass meadows) could reduce emissions and/or increase carbon uptake and storage (*medium confidence*). Coastal wetlands protect against coastal erosion and flooding (*very high confidence*). Strengthening precautionary approaches, such as rebuilding overexploited or depleted fisheries, and responsiveness of existing fisheries management strategies reduces negative climate change impacts on fisheries, with benefits for regional economies and livelihoods (*medium confidence*). Ecosystem-based management in fisheries and aquaculture supports food security, biodiversity, human health and well-being (*high confidence*). {*WGII SPM C.2.2, WGII SPM C.2; SROCC SPM C2.3, SROCC SPM C.2.4*}

4.5.5. Health and Nutrition

Human health will benefit from integrated mitigation and adaptation options that mainstream health into food, infrastructure, social protection, and water policies (*very high confidence*). Balanced and sustainable healthy diets[156] and reduced food loss and waste present important opportunities for adaptation and mitigation while generating significant co-benefits in terms of biodiversity and human health (*high confidence*). Public health policies to improve nutrition, such as increasing the diversity of food sources in public procurement, health insurance, financial incentives, and awareness-raising campaigns, can potentially influence food demand, reduce food waste, reduce healthcare costs, contribute to lower GHG emissions and enhance adaptive capacity (*high confidence*).

[156] Balanced diets refer to diets that feature plant-based foods, such as those based on coarse grains, legumes, fruits and vegetables, nuts and seeds, and animal-sourced food produced in resilient, sustainable and low-GHG emission systems, as described in SRCCL.

Improved access to clean energy sources and technologies, and shifts to active mobility (e.g., walking and cycling) and public transport can deliver socioeconomic, air quality and health benefits, especially for women and children (*high confidence*). {*WGII SPM C.2.2, WGII SPM C.2.11, WGII Cross-Chapter Box HEALTH; WGIII SPM C.2.2, WGIII SPM C.4.2, WGIII SPM C.9.1, WGIII SPM C.10.4, WGIII SPM D.1.3, WGIII Figure SPM.6, WGIII Figure SPM.8; SRCCL SPM B.6.2, SRCCL SPM B.6.3, SRCCL B.4.6, SRCCL SPM C.2.4*}

Effective adaptation options exist to help protect human health and well-being (*high confidence*). Health Action Plans that include early warning and response systems are effective for extreme heat (*high confidence*). Effective options for water-borne and food-borne diseases include improving access to potable water, reducing exposure of water and sanitation systems to flooding and extreme weather events, and improved early warning systems (*very high confidence*). For vector-borne diseases, effective adaptation options include surveillance, early warning systems, and vaccine development (*very high confidence*). Effective adaptation options for reducing mental health risks under climate change include improving surveillance and access to mental health care, and monitoring of psychosocial impacts from extreme weather events (*high confidence*). A key pathway to climate resilience in the health sector is universal access to healthcare (*high confidence*). {*WGII SPM C.2.11, WGII 7.4.6*}

4.5.6 Society, Livelihoods, and Economies

Enhancing knowledge on risks and available adaptation options promotes societal responses, and behaviour and lifestyle changes supported by policies, infrastructure and technology can help reduce global GHG emissions (*high confidence*). Climate literacy and information provided through climate services and community approaches, including those that are informed by Indigenous Knowledge and local knowledge, can accelerate behavioural changes and planning (*high confidence*). Educational and information programmes, using the arts, participatory modelling and citizen science can facilitate awareness, heighten risk perception, and influence behaviours (*high confidence*). The way choices are presented can enable adoption of low GHG intensive socio-cultural options, such as shifts to balanced, sustainable healthy diets, reduced food waste, and active mobility (*high confidence*). Judicious labelling, framing, and communication of social norms can increase the effect of mandates, subsidies, or taxes (*medium confidence*). {*WGII SPM C.5.3, WGII TS.D.10.1; WGIII SPM C.10, WGIII SPM C.10.2, WGIII SPM C.10.3, WGIII SPM E.2.2, WGIII Figure SPM.6, WGIII TS.6.1, 5.4; SR1.5 SPM D.5.6; SROCC SPM C.4*}

A range of adaptation options, such as disaster risk management, early warning systems, climate services and risk spreading and sharing approaches, have broad applicability across sectors and provide greater risk reduction benefits when combined (*high confidence*). Climate services that are demand-driven and inclusive of different users and providers can improve agricultural practices, inform better water use and efficiency, and enable resilient infrastructure planning (*high confidence*). Policy mixes that include weather and health insurance, social protection and adaptive safety nets, contingent finance and reserve funds, and universal access to early warning systems combined with effective contingency plans, can reduce vulnerability and exposure of human systems (*high confidence*). Integrating climate adaptation into social protection programs, including cash transfers and public works programs, is highly feasible and increases resilience to climate change, especially when supported by basic services and infrastructure (*high confidence*). Social safety nets can build adaptive capacities, reduce socioeconomic vulnerability, and reduce risk linked to hazards (*robust evidence, medium agreement*). {*WGII SPM C.2.9, WGII SPM C.2.13, WGII Cross-Chapter Box FEASIB in Chapter 18; SRCCL SPM C.1.4, SRCCL SPM D.1.2*}

Reducing future risks of involuntary migration and displacement due to climate change is possible through cooperative, international efforts to enhance institutional adaptive capacity and sustainable development (*high confidence*). Increasing adaptive capacity minimises risk associated with involuntary migration and immobility and improves the degree of choice under which migration decisions are made, while policy interventions can remove barriers and expand the alternatives for safe, orderly and regular migration that allows vulnerable people to adapt to climate change (*high confidence*). {*WGII SPM C.2.12, WGII TS.D.8.6, WGII Cross-Chapter Box MIGRATE in Chapter 7*}

Accelerating commitment and follow-through by the private sector is promoted for instance by building business cases for adaptation, accountability and transparency mechanisms, and monitoring and evaluation of adaptation progress (*medium confidence*). Integrated pathways for managing climate risks will be most suitable when so-called 'low-regret' anticipatory options are established jointly across sectors in a timely manner and are feasible and effective in their local context, and when path dependencies and maladaptations across sectors are avoided (*high confidence*). Sustained adaptation actions are strengthened by mainstreaming adaptation into institutional budget and policy planning cycles, statutory planning, monitoring and evaluation frameworks and into recovery efforts from disaster events (*high confidence*). Instruments that incorporate adaptation such as policy and legal frameworks, behavioural incentives, and economic instruments that address market failures, such as climate risk disclosure, inclusive and deliberative processes strengthen adaptation actions by public and private actors (*medium confidence*). {*WGII SPM C.5.1, WGII SPM C.5.2, WGII TS.D.10.4*}

4.6 Co-Benefits of Adaptation and Mitigation for Sustainable Development Goals

Mitigation and adaptation actions have more synergies than trade-offs with Sustainable Development Goals (SDGs). Synergies and trade-offs depend on context and scale of implementation. Potential trade-offs can be compensated or avoided with additional policies, investments and financial partnerships. (*high confidence*)

Many mitigation and adaptation actions have multiple synergies with Sustainable Development Goals (SDGs), but some actions can also have trade-offs. Potential synergies with SDGs exceed potential trade-offs. Synergies and trade-offs are context specific and depend on: means and scale of implementation, intra- and inter-sectoral interactions, cooperation between countries and regions, the sequencing, timing and stringency of actions, governance, and policy design. Eradicating extreme poverty, energy poverty, and providing decent living standards to all, consistent with near-term sustainable development objectives, can be achieved without significant global emissions growth. (*high confidence*) {*WGII SPM C.2.3, WGII Figure SPM.4b; WGIII SPM B.3.3, WGIII SPM C.9.2, WGIII SPM D.1.2, WGIII SPM D.1.4, WGIII Figure SPM.8*} (*Figure 4.5*)

Several mitigation and adaptation options can harness near-term synergies and reduce trade-offs to advance sustainable development in energy, urban and land systems (Figure 4.5) (*high confidence*). Clean energy supply systems have multiple co-benefits, including improvements in air quality and health. Heat Health Action Plans that include early warning and response systems, approaches that mainstream health into food, livelihoods, social protection, water and sanitation benefit health and well-being. There are potential synergies between multiple Sustainable Development Goals and sustainable land use and urban planning with more green spaces, reduced air pollution, and demand-side mitigation including shifts to balanced, sustainable healthy diets. Electrification combined with low-GHG energy, and shifts to public transport can enhance health, employment, and can contribute to energy security and deliver equity. Conservation, protection and restoration of terrestrial, freshwater, coastal and ocean ecosystems, together with targeted management to adapt to unavoidable impacts of climate change can generate multiple additional benefits, such as agricultural productivity, food security, and biodiversity conservation. (*high confidence*) {*WGII SPM C.1.1, WGII C.2.4, WGII SPM D.1, WGII Figure SPM.4, WGII Cross-Chapter Box HEALTH in Chapter 17, WGII Cross-Chapter Box FEASIB in Chapter 18; WGIII SPM C.4.2, WGIII SPM D.1.3, WGIII SPM D.2, WGIII Figure SPM.8; SRCCL SPM B.4.6*}

When implementing mitigation and adaptation together, and taking trade-offs into account, multiple co-benefits and synergies for human well-being as well as ecosystem and planetary health can be realised (*high confidence*). There is a strong link between sustainable development, vulnerability and climate risks. Social safety nets that support climate change adaptation have strong co-benefits with development goals such as education, poverty alleviation, gender inclusion and food security. Land restoration contributes to mitigation and adaptation with synergies via enhanced ecosystem services and with economically positive returns and co-benefits for poverty reduction and improved livelihoods. Trade-offs can be evaluated and minimised by giving emphasis to capacity building, finance, technology transfer, investments; governance, development, context specific gender-based and other social equity considerations with meaningful participation of Indigenous Peoples, local communities and vulnerable populations. (*high confidence*). {*WGII SPM C.2.9, WGII SPM C.5.6, WGII SPM D.5.2, WGII Cross-Chapter Box on Gender in Chapter 18; WGIII SPM C.9.2, WGIII SPM D.1.2, WGIII SPM D.1.4, WGIII SPM D.2; SRCCL SPM D.2.2, SRCCL TS.4*}

Context relevant design and implementation requires considering people's needs, biodiversity, and other sustainable development dimensions (*very high confidence*). Countries at all stages of economic development seek to improve the well-being of people, and their development priorities reflect different starting points and contexts. Different contexts include but are not limited to social, economic, environmental, cultural, or political circumstances, resource endowment, capabilities, international environment, and prior development. n regions with high dependency on fossil fuels for, among other things, revenue and employment generation, mitigating risks for sustainable development requires policies that promote economic and energy sector diversification and considerations of just transitions principles, processes and practices (*high confidence*). For individuals and households in low-lying coastal areas, in Small Islands, and smallholder farmers transitioning from incremental to transformational adaptation can help overcome soft adaptation limits (*high confidence*). Effective governance is needed to limit trade-offs of some mitigation options such as large scale afforestation and bioenergy options due to risks from their deployment for food systems, biodiversity, other ecosystem functions and services, and livelihoods (*high confidence*). Effective governance requires adequate institutional capacity at all levels (*high confidence*). {*WGII SPM B.5.4, WGII SPM C.3.1, WGII SPM C.3.4; WGIII SPM D.1.3, WGIII SPM E.4.2; SR1.5 SPM C.3.4, SR1.5 SPM C.3.5, SR1.5 SPM Figure SPM.4, SR1.5 SPM D.4.3, SR1.5 SPM D.4.4*}

Near-term adaptation and mitigation actions have more synergies than trade-offs with Sustainable Development Goals (SDGs)

Synergies and trade-offs depend on context and scale

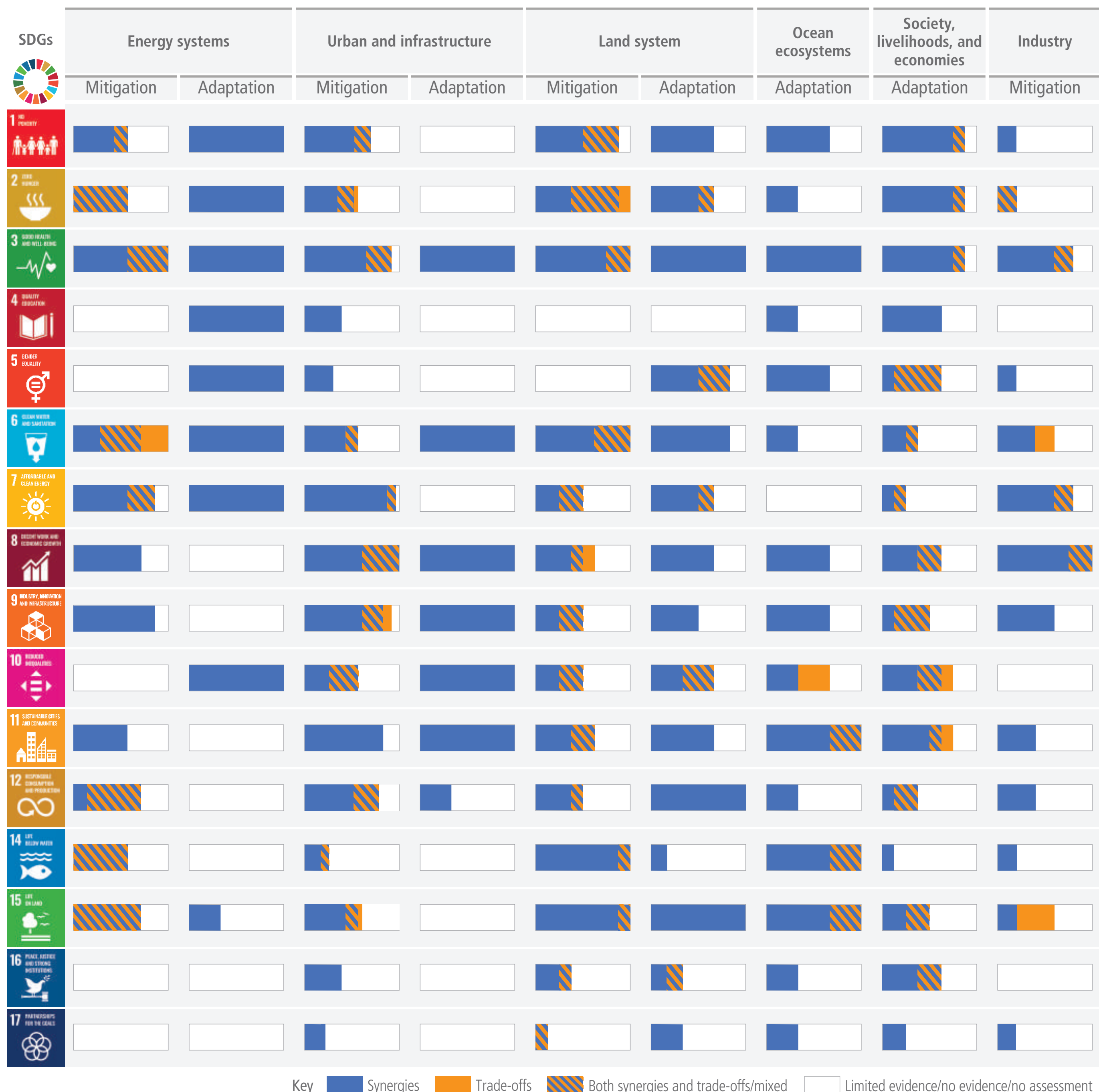


Figure 4.5: Potential synergies and trade-offs between the portfolio of climate change mitigation and adaptation options and the Sustainable Development Goals (SDGs). This figure presents a high-level summary of potential synergies and trade-offs assessed in WGII Figure SPM.4b and WGIII Figure SPM.8, based on the qualitative and quantitative assessment of each individual mitigation or option. The SDGs serve as an analytical framework for the assessment of different sustainable development dimensions, which extend beyond the time frame of 2030 SDG targets. Synergies and trade-offs across all individual options within a sector/system are aggregated into sector/system potentials for the whole mitigation or adaptation portfolio. The length of each bar represents the total number of mitigation or adaptation options under each system/sector. The number of adaptation and mitigation options vary across system/sector, and have been normalised to 100% so that bars are comparable across mitigation, adaptation, system/sector, and SDGs. Positive links shown in WGII Figure SPM.4b and WGIII Figure SPM.8 are counted and aggregated to generate the percentage share of synergies, represented here by the blue proportion within the bars. Negative links shown in WGII Figure SPM.4b and WGIII Figure SPM.8 are counted and aggregated to generate the percentage share of trade-offs and is represented by orange proportion within the bars. 'Both synergies and trade-offs' shown in WGII Figure SPM.4b WGIII Figure SPM.8 are counted and aggregated to generate the percentage share of 'both synergies and trade-off', represented by the striped proportion within the bars. The 'white' proportion within the bar indicates limited evidence/ no evidence/ not assessed. Energy systems comprise all mitigation options listed in WGIII Figure SPM.8 and WGII Figure SPM.4b for adaptation. Urban and infrastructure comprises all mitigation options listed

in WGIII Figure SPM.8 under Urban systems, under Buildings and under Transport and adaptation options listed in WGII Figure SPM.4b under Urban and infrastructure systems. Land system comprises mitigation options listed in WGIII Figure SPM.8 under AFOLU and adaptation options listed in WGII Figure SPM.4b under Land and ocean systems: forest-based adaptation, agroforestry, biodiversity management and ecosystem connectivity, improved cropland management, efficient livestock management, water use efficiency and water resource management. Ocean ecosystems comprises adaptation options listed in WGII Figure SPM.4b under Land and ocean systems: coastal defence and hardening, integrated coastal zone management and sustainable aquaculture and fisheries. Society, livelihood and economies comprises adaptation options listed in WGII Figure SPM.4b under Cross-sectoral; Industry comprises all those mitigation options listed in WGIII Figure SPM.8 under Industry. SDG 13 (Climate Action) is not listed because mitigation/ adaptation is being considered in terms of interaction with SDGs and not vice versa (SPM SR1.5 Figure SPM.4 caption). The bars denote the strength of the connection and do not consider the strength of the impact on the SDGs. The synergies and trade-offs differ depending on the context and the scale of implementation. Scale of implementation particularly matters when there is competition for scarce resources. For the sake of uniformity, we are not reporting the confidence levels because there is knowledge gap in adaptation option wise relation with SDGs and their confidence level which is evident from WGII fig SPM.4b. {*WGII Figure SPM.4b; WGIII Figure SPM.8*}

4.7 Governance and Policy for Near-Term Climate Change Action

Effective climate action requires political commitment, well-aligned multi-level governance and institutional frameworks, laws, policies and strategies. It needs clear goals, adequate finance and financing tools, coordination across multiple policy domains, and inclusive governance processes. Many mitigation and adaptation policy instruments have been deployed successfully, and could support deep emissions reductions and climate resilience if scaled up and applied widely, depending on national circumstances. Adaptation and mitigation action benefits from drawing on diverse knowledge. (*high confidence*)

Effective climate governance enables mitigation and adaptation by providing overall direction based on national circumstances, setting targets and priorities, mainstreaming climate action across policy domains and levels, based on national circumstances and in the context of international cooperation. Effective governance enhances monitoring and evaluation and regulatory certainty, prioritising inclusive, transparent and equitable decision-making, and improves access to finance and technology (*high confidence*). These functions can be promoted by climate-relevant laws and plans, which are growing in number across sectors and regions, advancing mitigation outcomes and adaptation benefits (*high confidence*). Climate laws have been growing in number and have helped deliver mitigation and adaptation outcomes (*medium confidence*). {*WGII SPM C.5, WGII SPM C.5.1, WGII SPM C5.4, WGII SPM C.5.6; WGIII SPM B.5.2, WGIII SPM E.3.1*}

Effective municipal, national and sub-national climate institutions, such as expert and co-ordinating bodies, enable co-produced, multi-scale decision-processes, build consensus for action among diverse interests, and inform strategy settings (*high confidence*). This requires adequate institutional capacity at all levels (*high confidence*). Vulnerabilities and climate risks are often reduced through carefully designed and implemented laws, policies, participatory processes, and interventions that address context specific inequities such as based on gender, ethnicity, disability, age, location and income (*high confidence*). Policy support is influenced by Indigenous Peoples, businesses, and actors in civil society, including, youth, labour, media, and local communities, and effectiveness is enhanced by partnerships between many different groups in society (*high confidence*). Climate-related litigation is growing, with a large number of cases in some developed countries and with a much smaller number in some developing countries, and in some cases has influenced the outcome and ambition of climate governance (*medium confidence*). {*WGII SPM C2.6, WGII SPM C.5.2, WGII SPM C.5.5, WGII SPM C.5.6, WGII SPM D.3.1; WGIII SPM E3.2, WGIII SPM E.3.3*}

Effective climate governance is enabled by inclusive decision processes, allocation of appropriate resources, and institutional review, monitoring and evaluation (*high confidence*). Multi-level, hybrid and cross-sector governance facilitates appropriate consideration for co-benefits and trade-offs, particularly in land sectors where decision processes range from farm level to national scale (*high confidence*). Consideration of climate justice can help to facilitate shifting development pathways towards sustainability. {*WGII SPM C.5.5, WGII SPM C.5.6, WGII SPM D.1.1, WGII SPM D.2, WGII SPM D.3.2; SRCCL SPM C.3, SRCCL TS.1*}

Drawing on diverse knowledge and partnerships, including with women, youth, Indigenous Peoples, local communities, and ethnic minorities can facilitate climate resilient development and has allowed locally appropriate and socially acceptable solutions (*high confidence*). {*WGII SPM D.2, D.2.1*}

Many regulatory and economic instruments have already been deployed successfully. These instruments could support deep emissions reductions if scaled up and applied more widely. Practical experience has informed instrument design and helped to improve predictability, environmental effectiveness, economic efficiency, and equity. (*high confidence*) {*WGII SPM E.4; WGIII SPM E.4.2*}

Scaling up and enhancing the use of regulatory instruments, consistent with national circumstances, can improve mitigation outcomes in sectoral applications (*high confidence*), and regulatory instruments that include flexibility mechanisms can reduce costs of cutting emissions (*medium confidence*). {*WGII SPM C.5.4; WGIII SPM E.4.1*}

Where implemented, carbon pricing instruments have incentivized low-cost emissions reduction measures, but have been less effective, on their own and at prevailing prices during the assessment period, to promote higher-cost measures necessary for further reductions (*medium confidence*). Revenue from carbon taxes or emissions trading can be used for equity and distributional goals, for example to support low-income households, among other

approaches (*high confidence*). There is no consistent evidence that current emission trading systems have led to significant emissions leakage (*medium confidence*). {*WGIII SPM E4.2, WGIII SPM E.4.6*}

Removing fossil fuel subsidies would reduce emissions, improve public revenue and macroeconomic performance, and yield other environmental and sustainable development benefits such as improved public revenue, macroeconomic and sustainability performance; subsidy removal can have adverse distributional impacts especially on the most economically vulnerable groups which, in some cases, can be mitigated by measures such as re-distributing revenue saved, and depend on national circumstances (*high confidence*). Fossil fuel subsidy removal is projected by various studies to reduce global CO_2 emissions by 1–4%, and GHG emissions by up to 10% by 2030, varying across regions (*medium confidence*). {*WGIII SPM E.4.2*}

National policies to support technology development, and participation in international markets for emission reduction, can bring positive spillover effects for other countries (*medium confidence*), although reduced demand for fossil fuels as a result of climate policy could result in costs to exporting countries (*high confidence*). Economy-wide packages can meet short-term economic goals while reducing emissions and shifting development pathways towards sustainability (*medium confidence*). Examples are public spending commitments; pricing reforms; and investment in education and training, R&D and infrastructure (*high confidence*). Effective policy packages would be comprehensive in coverage, harnessed to a clear vision for change, balanced across objectives, aligned with specific technology and system needs, consistent in terms of design and tailored to national circumstances (*high confidence*). {*WGIII SPM E4.4, WGIII SPM 4.5, WGIII SPM 4.6*}

4.8 Strengthening the Response: Finance, International Cooperation and Technology

Finance, international cooperation and technology are critical enablers for accelerated climate action. If climate goals are to be achieved, both adaptation and mitigation financing would have to increase many-fold. There is sufficient global capital to close the global investment gaps but there are barriers to redirect capital to climate action. Barriers include institutional, regulatory and market access barriers, which can be reduced to address the needs and opportunities, economic vulnerability and indebtedness in many developing countries. Enhancing international cooperation is possible through multiple channels. Enhancing technology innovation systems is key to accelerate the widespread adoption of technologies and practices. (*high confidence*)

4.8.1. Finance for Mitigation and Adaptation Actions

Improved availability and access to finance[157] will enable accelerated climate action (*very high confidence*). Addressing needs and gaps and broadening equitable access to domestic and international finance, when combined with other supportive actions, can act as a catalyst for accelerating mitigation and shifting development pathways (*high confidence*). Climate resilient development is enabled by increased international cooperation including improved access to financial resources, particularly for vulnerable regions, sectors and groups, and inclusive governance and coordinated policies (*high confidence*). Accelerated international financial cooperation is a critical enabler of low-GHG and just transitions, and can address inequities in access to finance and the costs of, and vulnerability to, the impacts of climate change (*high confidence*). {*WGII SPM C.1.2, WGII SPM C.3.2, WGII SPM C.5, WGII SPM C.5.4, WGII SPM D.2, WGII SPM D.3.2, WGII SPM D.5, WGII SPM D.5.2; WGIII SPM B.4.2,WGIII SPM B.5, WGIII SPM B.5.4, WGIII SPM C.4.2, WGIII SPM C.7.3, WGIII SPM C.8.5, WGIII SPM D.1.2, WGIII SPM D.2.4, WGIII SPM D.3.4, WGIII SPM E.2.3, WGIII SPM E.3.1, WGIII SPM E.5, WGIII SPM E.5.1, WGIII SPM E.5.2, WGIII SPM E.5.3, WGIII SPM E.5.4, WGIII SPM E.6.2*}

Both adaptation and mitigation finance need to increase many-fold, to address rising climate risks and to accelerate investments in emissions reduction (*high confidence*). Increased finance would address soft limits to adaptation and rising climate risks while also averting some related losses and damages, particularly in vulnerable developing countries (*high confidence*). Enhanced mobilisation of and access to finance, together with building capacity, are essential for implementation of adaptation actions and to reduce adaptation gaps given rising risks and costs, especially for the most vulnerable groups, regions and sectors (*high confidence*). Public finance is an important enabler of adaptation and mitigation, and can also leverage private finance (*high confidence*). Adaptation funding predominately comes from public sources, and public mechanisms and finance can leverage private sector finance by addressing real and perceived regulatory, cost and market barriers, for instance via public-private partnerships (*high confidence*). Financial and technological resources enable effective and ongoing implementation of adaptation, especially when supported by institutions with a strong understanding of adaptation needs and capacity (*high confidence*). Average annual modelled mitigation investment requirements for 2020 to 2030 in scenarios that limit warming to 2°C or 1.5°C are a factor of three to six greater than current levels, and total mitigation investments (public, private, domestic and international) would need to increase across all sectors and regions (*medium confidence*). Even if extensive global mitigation efforts are implemented, there will be a large need for financial, technical, and human resources for adaptation (*high confidence*). {*WGII SPM C.1.2, WGII SPM C2.11, WGII SPM C.3, WGII SPM C.3.2, WGII SPM C3.5, WGII SPM C.5, WGII SPM C.5.4, WGII SPM D.1, WGII SPM D.1.1, WGII SPM D.1.2, WGII SPM C.5.4; WGIII SPM D.2.4, WGIII SPM E.5, WGIII SPM E.5.1, WGIII 15.2*} *(Section 2.3.2, 2.3.3, 4.4, Figure 4.6)*

[157] Finance can originate from diverse sources, singly or in combination: public or private, local, national or international, bilateral or multilateral, and alternative sources (e.g., philanthropic, carbon offsets). It can be in the form of grants, technical assistance, loans (concessional and non-concessional), bonds, equity, risk insurance and financial guarantees (of various types).

There is sufficient global capital and liquidity to close global investment gaps, given the size of the global financial system, but there are barriers to redirect capital to climate action both within and outside the global financial sector and in the context of economic vulnerabilities and indebtedness facing many developing countries (*high confidence*). For shifts in private finance, options include better assessment of climate-related risks and investment opportunities within the financial system, reducing sectoral and regional mismatches between available capital and investment needs, improving the risk-return profiles of climate investments, and developing institutional capacities and local capital markets. Macroeconomic barriers include, amongst others, indebtedness and economic vulnerability of developing regions. (*high confidence*) {*WGII SPM C.5.4; WGIII SPM E.4.2, WGIII SPM E.5, WGIII SPM E.5.2, WGIII SPM E.5.3*}

Scaling up financial flows requires clear signalling from governments and the international community (*high confidence*). Tracked financial flows fall short of the levels needed for adaptation and to achieve mitigation goals across all sectors and regions (*high confidence*). These gaps create many opportunities and the challenge of closing gaps is largest in developing countries (*high confidence*). This includes a stronger alignment of public finance, lowering real and perceived regulatory, cost and market barriers, and higher levels of public finance to lower the risks associated with low-emission investments. Up-front risks deter economically sound low carbon projects, and developing local capital markets are an option. Investors, financial intermediaries, central banks and financial regulators can shift the systemic underpricing of climate-related risks. A robust labelling of bonds and transparency is needed to attract savers. (*high confidence*) {*WGII SPM C.5.4; WGIII SPM B.5.4, WGIII SPM E.4, WGIII SPM E.5.4, WGIII 15.2, WGIII 15.6.1, WGIII 15.6.2, WGIII 15.6.7*}

The largest climate finance gaps and opportunities are in developing countries (*high confidence*). Accelerated support from developed countries and multilateral institutions is a critical enabler to enhance mitigation and adaptation action and can address inequities in finance, including its costs, terms and conditions, and economic vulnerability to climate change. Scaled-up public grants for mitigation and adaptation funding for vulnerable regions, e.g., in Sub-Saharan Africa, would be cost-effective and have high social returns in terms of access to basic energy. Options for scaling up mitigation and adaptation in developing regions include: increased levels of public finance and publicly mobilised private finance flows from developed to developing countries in the context of the USD 100 billion-a-year goal of the Paris Agreement; increase the use of public guarantees to reduce risks and leverage private flows at lower cost; local capital markets development; and building greater trust in international cooperation processes. A coordinated effort to make the post-pandemic recovery sustainable over the long term through increased flows of financing over this decade can accelerate climate action, including in developing regions facing high debt costs, debt distress and macroeconomic uncertainty. (*high confidence*) {*WGII SPM C.5.2, WGII SPM C.5.4, WGII SPM C.6.5, WGII SPM D.2, WGII TS.D.10.2; WGIII SPM E.5, WGIII SPM E.5.3, WGIII TS.6.4, WGIII Box TS.1, WGIII 15.2, WGIII 15.6*}

4.8.2. International Cooperation and Coordination

International cooperation is a critical enabler for achieving ambitious climate change mitigation goals and climate resilient development (*high confidence*). Climate resilient development is enabled by increased international cooperation including mobilising and enhancing access to finance, particularly for developing countries, vulnerable regions, sectors and groups and aligning finance flows for climate action to be consistent with ambition levels and funding needs (*high confidence*). While agreed processes and goals, such as those in the UNFCCC, Kyoto Protocol and Paris Agreement, are helping (Section 2.2.1), international financial, technology and capacity building support to developing countries will enable greater implementation and more ambitious actions (*medium confidence*). By integrating equity and climate justice, national and international policies can help to facilitate shifting development pathways towards sustainability, especially by mobilising and enhancing access to finance for vulnerable regions, sectors and communities (*high confidence*). International cooperation and coordination, including combined policy packages, may be particularly important for sustainability transitions in emissions-intensive and highly traded basic materials industries that are exposed to international competition (*high confidence*). The large majority of emission modelling studies assume significant international cooperation to secure financial flows and address inequality and poverty issues in pathways limiting global warming. There are large variations in the modelled effects of mitigation on GDP across regions, depending notably on economic structure, regional emissions reductions, policy design and level of international cooperation (*high confidence*). Delayed global cooperation increases policy costs across regions (*high confidence*). {*WGII SPM D.2, WGII SPM D.3.1, WGII SPM D.5.2; WGIII SPM D.3.4, WGIII SPM C5.4, WGIII SPM C.12.2, WGIII SPM E.6, WGIII SPM E.6.1, WGIII E.5.4, WGIII TS.4.2, WGIII TS.6.2; SR1.5 SPM D.6.3, SR1.5 SPM D.7, SR1.5 SPM D.7.3*}

The transboundary nature of many climate change risks (e.g., for supply chains, markets and natural resource flows in food, fisheries, energy and water, and potential for conflict) increases the need for climate-informed transboundary management, cooperation, responses and solutions through multi-national or regional governance processes (*high confidence*). Multilateral governance efforts can help reconcile contested interests, world views and values about how to address climate change. International environment and sectoral agreements, and initiatives in some cases, may help to stimulate low GHG investment and reduce emissions (such as ozone depletion, transboundary air pollution and atmospheric emissions of mercury). Improvements to national and international governance structures would further enable the decarbonisation of shipping and aviation through deployment of low-emissions fuels, for example through stricter efficiency and carbon intensity standards. Transnational partnerships can also stimulate policy development, low-emissions technology diffusion, emission reductions and adaptation, by linking sub-national and other actors, including cities, regions, non-governmental organisations and private sector entities, and by enhancing interactions between state and non-state actors, though uncertainties remain over their costs, feasibility, and effectiveness. International environmental and sectoral agreements, institutions, and initiatives are helping, and in some cases may help, to stimulate low GHG emissions investment and reduce emissions. (*medium confidence*) {*WGII SPM B.5.3, WGII SPM C.5.6, WGII TS.E.5.4, WGII TS.E.5.5; WGIII SPM C.8.4, WGIII SPM E.6.3, WGIII SPM E.6.4, WGIII SPM E.6.4, WGIII TS.5.3*}

Higher mitigation investment flows required for all sectors and regions to limit global warming

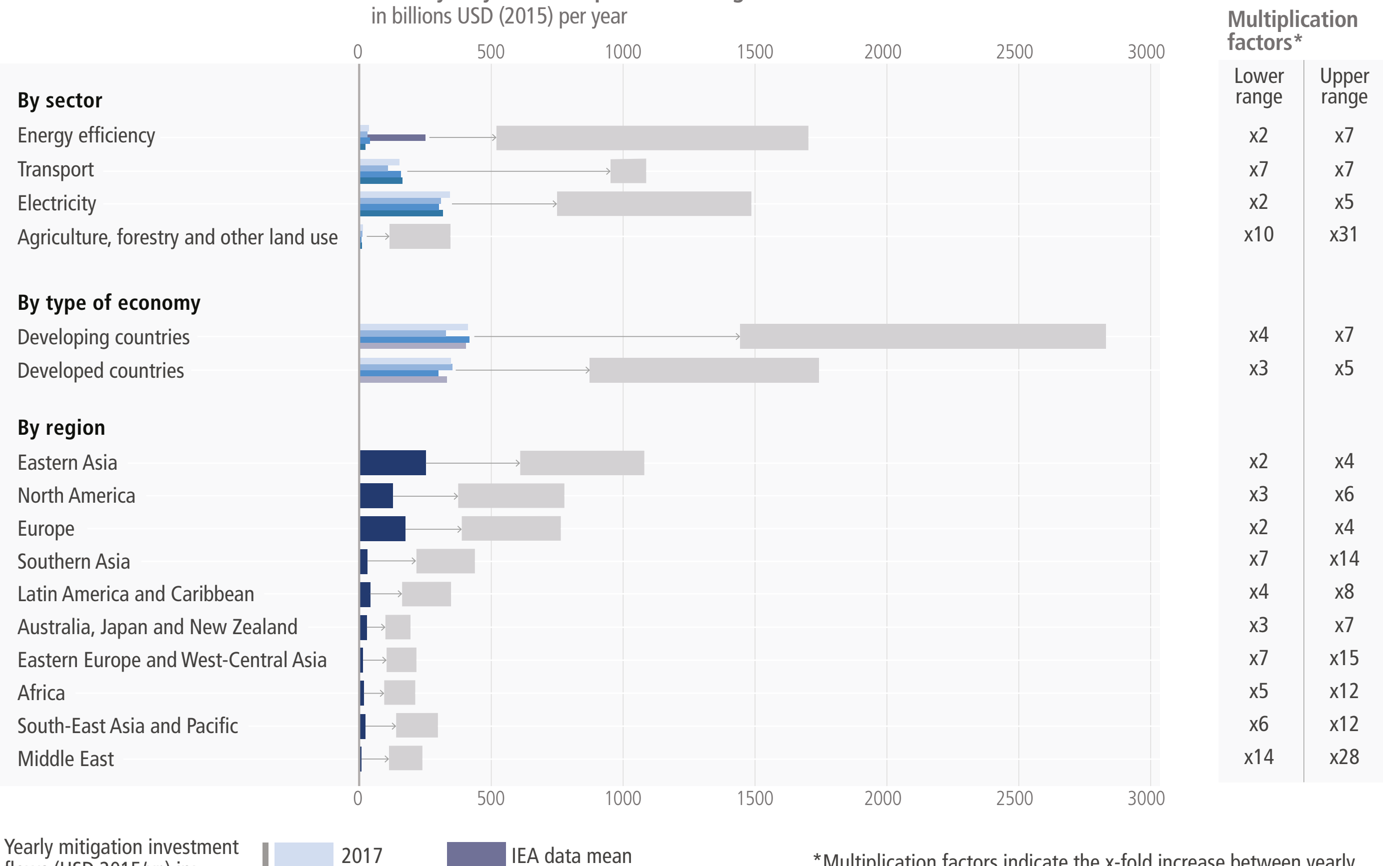


Figure 4.6: Breakdown of average mitigation investment flows and investment needs until 2030 (USD billion). Mitigation investment flows and investment needs by sector (energy efficiency, transport, electricity, and agriculture, forestry and other land use), by type of economy, and by region (see WGIII Annex II Part I Section 1 for the classification schemes for countries and areas). The blue bars display data on mitigation investment flows for four years: 2017, 2018, 2019 and 2020 by sector and by type of economy. For the regional breakdown, the annual average mitigation investment flows for 2017–2019 are shown. The grey bars show the minimum and maximum level of global annual mitigation investment needs in the assessed scenarios. This has been averaged until 2030. The multiplication factors show the ratio of global average early mitigation investment needs (averaged until 2030) and current yearly mitigation flows (averaged for 2017/18–2020). The lower multiplication factor refers to the lower end of the range of investment needs. The upper multiplication factor refers to the upper range of investment needs. Given the multiple sources and lack of harmonised methodologies, the data can be considered only if indicative of the size and pattern of investment needs. {*WGIII Figure TS.25, WGIII 15.3, WGIII 15.4, WGIII 15.5, WGIII Table 15.2, WGIII Table 15.3, WGIII Table 15.4*}

4.8.3. Technology Innovation, Adoption, Diffusion and Transfer

Enhancing technology innovation systems can provide opportunities to lower emissions growth and create social and environmental co-benefits. Policy packages tailored to national contexts and technological characteristics have been effective in supporting low-emission innovation and technology diffusion. Support for successful low-carbon technological innovation includes public policies such as training and R&D, complemented by regulatory and market-based instruments that create incentives and market opportunities such as appliance performance standards and building codes. (*high confidence*) {*WGIII SPM B.4, WGIII SPM B.4.4, WGIII SPM E.4.3, WGIII SPM E4.4*}

International cooperation on innovation systems and technology development and transfer, accompanied by capacity building, knowledge sharing, and technical and financial support can accelerate the global diffusion of mitigation technologies, practices and policies and align these with other development objectives (*high confidence*). Choice architecture can help end-users adopt technology and low-GHG-intensive options (*high confidence*). Adoption of low-emission technologies lags in most developing countries, particularly least developed ones, due in part to weaker enabling conditions, including limited finance, technology development and transfer, and capacity building (*medium confidence*). {*WGIII SPM B.4.2, WGIII SPM E.6.2, WGIII SPM C.10.4, WGIII 16.5*}

International cooperation on innovation works best when tailored to and beneficial for local value chains, when partners collaborate on an equal footing, and when capacity building is an integral part of the effort (*medium confidence*). {*WGIII SPM E.4.4, WGIII SPM E.6.2*}

Technological innovation can have trade-offs that include externalities such as new and greater environmental impacts and social inequalities; rebound effects leading to lower net emission reductions or even emission increases; and overdependence on foreign knowledge and providers (*high confidence*). Appropriately designed policies and governance have helped address distributional impacts and rebound effects (*high confidence*). For example, digital technologies can promote large increases in energy efficiency through coordination and an economic shift to services (*high confidence*). However, societal digitalization can induce greater consumption of goods and energy and increased electronic waste as well as negatively impacting labour markets and worsening inequalities between and within countries (*medium confidence*). Digitalisation requires appropriate governance and policies in order to enhance mitigation potential (*high confidence*). Effective policy packages can help to realise synergies, avoid trade-offs and/or reduce rebound effects: these might include a mix of efficiency targets, performance standards, information provision, carbon pricing, finance and technical assistance (*high confidence*). {*WGIII SPM B.4.2, WGIII SPM B.4.3, WGIII SPM E.4.4, WGIII TS 6.5, WGIII Cross-Chapter Box 11 on Digitalization in Chapter 16*}

Technology transfer to expand use of digital technologies for land use monitoring, sustainable land management, and improved agricultural productivity supports reduced emissions from deforestation and land use change while also improving GHG accounting and standardisation (*medium confidence*). {*SRCCL SPM C.2.1, SRCCL SPM D.1.2, SRCCL SPM D.1.4, SRCCL 7.4.4, SRCCL 7.4.6*}

4.9 Integration of Near-Term Actions Across Sectors and Systems

The feasibility, effectiveness and benefits of mitigation and adaptation actions are increased when multi-sectoral solutions are undertaken that cut across systems. When such options are combined with broader sustainable development objectives, they can yield greater benefits for human well-being, social equity and justice, and ecosystem and planetary health. (*high confidence*)

Climate resilient development strategies that treat climate, ecosystems and biodiversity, and human society as parts of an integrated system are the most effective (*high confidence*). Human and ecosystem vulnerability are interdependent (*high confidence*). Climate resilient development is enabled when decision-making processes and actions are integrated across sectors (*very high confidence*). Synergies with and progress towards the Sustainable Development Goals enhance prospects for climate resilient development. Choices and actions that treat humans and ecosystems as an integrated system build on diverse knowledge about climate risk, equitable, just and inclusive approaches, and ecosystem stewardship. {*WGII SPM B.2, WGII Figure SPM.5, WGII SPM D.2, WGII SPM D2.1, WGII SPM 2.2, WGII SPM D4, WGII SPM D4.1, WGII SPM D4.2, WGII SPM D5.2, WGII Figure SPM.5*}

Approaches that align goals and actions across sectors provide opportunities for multiple and large-scale benefits and avoided damages in the near term. Such measures can also achieve greater benefits through cascading effects across sectors (*medium confidence*). For example, the feasibility of using land for both agriculture and centralised solar production can increase when such options are combined (*high confidence*). Similarly, integrated transport and energy infrastructure planning and operations can together reduce the environmental, social, and economic impacts of decarbonising the transport and energy sectors (*high confidence*). The implementation of packages of multiple city-scale mitigation strategies can have cascading effects across sectors and reduce GHG emissions both within and outside a city's administrative boundaries (*very high confidence*). Integrated design approaches to the construction and retrofit of buildings provide increasing examples of zero energy or zero carbon buildings in several regions. To minimise maladaptation, multi-sectoral, multi-actor and inclusive planning with flexible pathways encourages low-regret and timely actions that keep options open, ensure benefits in multiple sectors and systems and suggest the available solution space for adapting to long-term climate change (*very high confidence*). Trade-offs in terms of employment, water use, land-use competition and biodiversity, as well as access to, and the affordability of, energy, food, and water can be avoided by well-implemented land-based mitigation options, especially those that do not threaten existing sustainable land uses and land rights, with frameworks for integrated policy implementation (*high confidence*). {*WGII SPM C.2, WGII SPM C.4.4; WGIII SPM C.6.3, WGIII SPM C.6, WGIII SPM C.7.2, WGIII SPM C.8.5, WGIII SPM D.1.2, WGIII SPM D.1.5, WGIII SPM E.1.2*}

Mitigation and adaptation when implemented together, and combined with broader sustainable development objectives, would yield multiple benefits for human well-being as well as ecosystem and planetary health (*high confidence*). The range of such positive interactions is significant in the landscape of near-term climate policies across regions, sectors and systems. For example, AFOLU mitigation actions in land-use change and forestry, when sustainably implemented, can provide large-scale GHG emission reductions and removals that simultaneously benefit biodiversity, food security, wood supply and other ecosystem services but cannot fully compensate for delayed mitigation action in other sectors. Adaptation measures in land, ocean and ecosystems similarly can have widespread benefits for food security, nutrition, health and well-being, ecosystems and biodiversity. Equally, urban systems are critical, interconnected sites for climate resilient development; urban policies that implement multiple interventions can yield adaptation or mitigation gains with equity and human well-being. Integrated policy packages can improve the ability to integrate considerations of equity, gender equality and justice. Coordinated cross-sectoral policies and planning can maximise synergies and avoid or reduce trade-offs between mitigation

and adaptation. Effective action in all of the above areas will require near-term political commitment and follow-through, social cooperation, finance, and more integrated cross-sectoral policies and support and actions. (*high confidence*). {*WGII SPM C.1, WG II SPM C.2, WGII SPM C.2, WGII SPM C.5, WGII SPM D.2, WGII SPM D.3.2, WGII SPM D.3.3, WGII Figure SPM.4; WGIII SPM C.6.3, WGIII SPM C.8.2, WGIII SPM C.9, WGIII SPM C.9.1, WGIII SPM C.9.2, WGIII SPM D.2, WGIII SPM D.2.4, WGIII SPM D.3.2, WGIII SPM E.1, WGIII SPM E.2.4, WGIII Figure SPM.8, WGIII TS.7, WGIII TS Figure TS.29: SRCCL ES 7.4.8, SRCCL SPM B.6*} (*3.4, 4.4*)

Annexes

Annex I
Glossary

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This concise Synthesis Report (SYR) Glossary defines selected key terms used in this report, drawn from the glossaries of the three Working Group contributions to the AR6. A more comprehensive, harmonised set of definitions for terms used in this SYR and the three AR6 Working Group reports is available from the IPCC Online Glossary: https://apps.ipcc.ch/glossary/

Readers are requested to refer to this comprehensive online glossary for definitions of terms of a more technical nature, and for scientific references relevant to individual terms. Italicized words indicate that the term is defined in this or/and the online glossary. Subterms appear in italics beneath main terms.

2030 Agenda for Sustainable Development
A UN resolution in September 2015 aadopting a plan of action for people, planet and prosperity in a new global development framework anchored in 17 *Sustainable Development Goals.*

Abrupt climate change
A large-scale *abrupt change* in the *climate system* that takes place over a few decades or less, persists (or is anticipated to persist) for at least a few decades and causes substantial *impacts* in *human and/or natural systems.* **See also:** *Abrupt change, Tipping point.*

Adaptation
In *human systems*, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In *natural systems*, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects. **See also:** *Adaptation options, Adaptive capacity, Maladaptive actions (Maladaptation).*

Adaptation gap
The difference between actually implemented *adaptation* and a societally set goal, determined largely by preferences related to tolerated climate change impacts and reflecting resource limitations and competing priorities.

Adaptation limits
The point at which an actor's objectives (or system needs) cannot be secured from intolerable *risks* through adaptive actions.

- Hard *adaptation* limit - No adaptive actions are possible to avoid intolerable risks.
- Soft *adaptation* limit - Options may exist but are currently not available to avoid intolerable risks through adaptive action.

Transformational adaptation
Adaptation that changes the fundamental attributes of a social-ecological system in anticipation of *climate change* and its *impacts*.

Aerosol
A suspension of airborne solid or liquid particles, with typical particle size in the range of a few nanometres to several tens of micrometres and atmospheric lifetimes of up to several days in the *troposphere* and up to years in the *stratosphere*. The term aerosol, which includes both the particles and the suspending gas, is often used in this report in its plural form to mean 'aerosol particles'. Aerosols may be of either natural or anthropogenic origin in the troposphere; stratospheric aerosols mostly stem from volcanic eruptions. Aerosols can cause an *effective radiative forcing* directly through scattering and absorbing radiation *(aerosol–radiation interaction)*, and indirectly by acting as *cloud condensation nuclei* or ice nucleating particles that affect the properties of clouds *(aerosol–cloud interaction)*, and upon deposition on snow- or ice-covered surfaces. Atmospheric aerosols may be either emitted as primary particulate matter or formed within the *atmosphere* from gaseous *precursors* (secondary production). Aerosols may be composed of sea salt, organic carbon, *black carbon* (BC), mineral species (mainly desert dust), sulphate, nitrate and ammonium or their mixtures. **See also:** *Particulate matter (PM), Aerosol–radiation interaction, Short-lived climate forcers (SLCFs).*

Afforestation
Conversion to forest of land that historically has not contained forests. **See also:** *Anthropogenic removals, Carbon dioxide removal (CDR), Deforestation, Reducing Emissions from Deforestation and Forest Degradation (REDD+), Reforestation.*

[Note: For a discussion of the term forest and related terms such as *afforestation*, *reforestation* and *deforestation*, see the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and their 2019 Refinement, and information provided by the United Nations Framework Convention on Climate Change]

Agricultural drought
See: *Drought.*

Agriculture, Forestry and Other Land Use (AFOLU)
In the context of national *greenhouse gas (GHG)* inventories under the *United Nations Convention on Climate Change (UNFCCC)*, AFOLU is the sum of the GHG inventory sectors Agriculture and *Land Use, Land-Use Change and Forestry (LULUCF)*; see the 2006 IPCC Guidelines for National GHG Inventories for details. Given the difference in estimating the *'anthropogenic' carbon dioxide (CO_2)* removals between countries and the global modelling community, the land-related net GHG emissions from global models included in this report are not necessarily directly comparable with LULUCF estimates in national GHG Inventories. **See also:** *Land use, land-use change and forestry (LULUCF), Land-use change (LUC).*

Agroforestry
Collective name for *land-use* systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same *land-management* units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence. In agroforestry systems there are both ecological and economical interactions between the different components. Agroforestry can also be defined as a dynamic, ecologically based, natural resource management system that, through the integration of trees on farms

and in the agricultural landscape, diversifies and sustains production for increased social, economic and environmental benefits for land users at all levels.

Anthropogenic
Resulting from or produced by human activities.

Behavioural change
In this report, behavioural change refers to alteration of human decisions and actions in ways that mitigate *climate change* and/or reduce negative consequences of climate change impacts.

Biodiversity
Biodiversity or biological diversity means the variability among living organisms from all sources including, among other things, terrestrial, marine and other aquatic *ecosystems*, and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. **See also:** *Ecosystem*, *Ecosystem services*.

Bioenergy
Energy derived from any form of biomass or its metabolic by-products. **See also:** *Biofuel*.

Bioenergy with carbon dioxide capture and storage (BECCS)
Carbon dioxide capture and storage (CCS) technology applied to a *bioenergy* facility. Note that, depending on the total emissions of the BECCS supply chain, *carbon dioxide (CO_2)* can be removed from the atmosphere. **See also:** *Anthropogenic removals*, *Carbon dioxide capture and storage (CCS)*, *Carbon dioxide removal (CDR)*.

Blue carbon
Biologically-driven carbon fluxes and storage in marine systems that are amenable to management. Coastal blue carbon focuses on rooted vegetation in the coastal zone, such as tidal marshes, mangroves and seagrasses. These *ecosystems* have high carbon burial rates on a per unit area basis and accumulate carbon in their soils and sediments. They provide many non-climatic benefits and can contribute to *ecosystem-based adaptation*. If degraded or lost, coastal blue carbon ecosystems are likely to release most of their carbon back to the *atmosphere*. There is current debate regarding the application of the blue carbon concept to other coastal and non-coastal processes and ecosystems, including the open *ocean*. **See also:** *Ecosystem services*, *Sequestration*.

Blue infrastructure
See: *Infrastructure*.

Carbon budget
Refers to two concepts in the literature:
(1) an assessment of carbon cycle *sources* and *sinks* on a global level, through the synthesis of evidence for *fossil fuel* and cement emissions, emissions and removals associated with *land use* and *land-use change*, ocean and natural land sources and sinks of *carbon dioxide (CO_2)*, and the resulting change in atmospheric CO_2 concentration. This is referred to as the Global Carbon Budget; (2) the maximum amount of cumulative net global *anthropogenic* CO_2 emissions that would result in limiting *global warming* to a given level with a given probability, taking into account the effect of other *anthropogenic* climate *forcers*. This is referred to as the Total Carbon Budget when expressed starting from the *pre-industrial* period, and as the Remaining Carbon Budget when expressed from a recent specified date.

[Note 1: Net anthropogenic CO_2 emissions are *anthropogenic* CO_2 emissions minus *anthropogenic* CO_2 removals. **See also:** *Carbon Dioxide Removal (CDR)*.
Note 2: The maximum amount of cumulative net global *anthropogenic* CO_2 emissions is reached at the time that annual net *anthropogenic* CO_2 emissions reach zero.
Note 3: The degree to which *anthropogenic* climate forcers other than CO_2 affect the total carbon budget and remaining carbon budget depends on human choices about the extent to which these forcers are mitigated and their resulting climate effects.
Note 4: The notions of a total carbon budget and remaining carbon budget are also being applied in parts of the scientific literature and by some entities at regional, national, or sub-national level. The distribution of global budgets across individual different entities and emitters depends strongly on considerations of *equity* and other value judgements.]

Carbon dioxide capture and storage (CCS)
A process in which a relatively pure stream of *carbon dioxide (CO_2)* from industrial and energy-related sources is separated (captured), conditioned, compressed and transported to a storage location for long-term isolation from the *atmosphere*. Sometimes referred to as Carbon Capture and Storage. **See also:** *Anthropogenic removals*, *Bioenergy with carbon dioxide capture and storage (BECCS)*, *Carbon dioxide capture and utilisation (CCU)*, *Carbon dioxide removal (CDR)*, *Sequestration*.

Carbon dioxide removal (CDR)
Anthropogenic activities removing *carbon dioxide (CO_2)* from the atmosphere and durably storing it in geological, terrestrial, or *ocean* reservoirs, or in products. It includes existing and potential *anthropogenic* enhancement of biological or geochemical CO_2 *sinks* and direct air carbon dioxide capture and storage (DACCS) but excludes natural CO_2 *uptake* not directly caused by human activities. **See also:** *Afforestation, Anthropogenic removals*, *Biochar, Bioenergy with carbon dioxide capture and storage (BECCS)*, *Carbon dioxide capture and storage (CCS)*, *Enhanced weathering*, *Ocean alkalinization/Ocean alkalinity enhancement*, *Reforestation*, *Soil carbon sequestration (SCS)*.

Cascading impacts
Cascading impacts from *extreme weather/climate events occur* when an extreme *hazard* generates a sequence of secondary events in natural and *human systems* that result in physical, natural, social or economic disruption, whereby the resulting impact is significantly larger than the initial impact. Cascading impacts are complex and multi-dimensional, and are associated more with the magnitude of *vulnerability* than with that of the *hazard*.

Climate
In a narrow sense, climate is usually defined as the average weather -or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities- over a period of time ranging from months to thousands or millions of years. The classical period for averaging these variables is 30 years, as defined by the World

Meteorological Organization (WMO). The relevant quantities are most often surface variables such as temperature, precipitation and wind. Climate in a wider sense is the state, including a statistical description, of the *climate system*.

Climate change

A change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use. **See also:** *Climate variability*, *Detection and attribution*, *Global warming, Natural (climate) variability*, *Ocean acidification (OA)*.

[Note that the United Nations Framework Convention on Climate Change (UNFCCC), in its Article 1, defines climate change as: 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to *natural climate variability* observed over comparable time periods'. The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition and climate variability attributable to natural causes.]

Climate extreme (extreme weather or climate event)

The occurrence of a value of a weather or *climate* variable above (or below) a threshold value near the upper (or lower) ends of the range of observed values of the variable. By definition, the characteristics of what is called extreme weather may vary from place to place in an absolute sense. When a pattern of *extreme weather* persists for some time, such as a season, it may be classified as an extreme climate event, especially if it yields an average or total that is itself extreme (e.g., high temperature, *drought*, or heavy rainfall over a season). For simplicity, both extreme weather events and extreme climate events are referred to collectively as 'climate extremes'.

Climate finance

There is no agreed definition of climate finance. The term 'climate finance' is applied to the financial resources devoted to addressing *climate change* by all public and private actors from global to local scales, including international financial flows to *developing countries* to assist them in addressing climate change. Climate finance aims to reduce net greenhouse gas emissions and/or to enhance *adaptation* and increase *resilience* to the impacts of current and projected climate change. Finance can come from private and public sources, channelled by various intermediaries, and is delivered by a range of instruments, including grants, concessional and non-concessional debt, and internal budget reallocations.

Climate governance

The structures, processes, and actions through which private and public actors seek to mitigate and adapt to *climate change*.

Climate justice

See: *Justice*.

Climate literacy

Climate literacy encompasses being aware of climate change, its *anthropogenic* causes, and implications.

Climate resilient development (CRD)

Climate-resilient development refers to the process of implementing *greenhouse gas mitigation* and *adaptation* measures to support *sustainable development* for all.

Climate sensitivity

The change in the surface temperature in response to a change in the atmospheric *carbon dioxide* (CO_2) concentration or other radiative forcing. **See also:** *Climate feedback parameter*.

Equilibrium climate sensitivity (ECS)

The equilibrium (steady state) change in the surface temperature following a doubling of the atmospheric *carbon dioxide* (CO_2) concentration from *pre-industrial* conditions.

Climate services

Climate services involve the provision of climate information in such a way as to assist decision-making. The service includes appropriate engagement from users and providers, is based on scientifically credible information and expertise, has an effective access mechanism, and responds to user needs.

Climate system

The global system consisting of five major components: the *atmosphere*, the *hydrosphere*, the *cryosphere*, the *lithosphere* and the *biosphere*, and the interactions between them. The climate system changes in time under the influence of its own internal dynamics and because of *external forcings* such as volcanic eruptions, solar variations, orbital forcing, and *anthropogenic* forcings such as the changing composition of the *atmosphere* and *land-use change*.

Climatic impact-driver (CID)

Physical *climate system* conditions (e.g., means, events, extremes) that affect an element of society or *ecosystems*. Depending on system tolerance, CIDs and their changes can be detrimental, beneficial, neutral or a mixture of each across interacting system elements and *regions*. **See also:** *Hazard*, *Impacts*, *Risk*.

CO_2-equivalent emission (CO_2-eq)

The amount of *carbon dioxide* (CO_2) emission that would have an equivalent effect on a specified key measure of *climate change*, over a specified time horizon, as an emitted amount of another *greenhouse gas (GHG)* or a mixture of other GHGs. For a mix of GHGs it is obtained by summing the CO_2-equivalent emissions of each gas. There are various ways and time horizons to compute such equivalent emissions (*see greenhouse gas emission metric*). CO_2-equivalent emissions are commonly used to compare emissions of different GHGs but should not be taken to imply that these emissions have an equivalent effect across all key measures of *climate change*.

[Note: Under the Paris Rulebook [Decision 18/CMA.1, annex, paragraph 37], parties have agreed to use GWP100 values from the IPCC AR5 or GWP100 values from a subsequent IPCC Assessment Report to report

aggregate emissions and removals of GHGs. In addition, parties may use other metrics to report supplemental information on aggregate emissions and removals of GHGs.]

Compound weather/climate events
The terms 'compound events', 'compound extremes' and 'compound extreme events' are used interchangeably in the literature and this report, and refer to the combination of multiple *drivers* and/or *hazards* that contribute to societal and/or environmental *risk*.

Deforestation
Conversion of forest to non-forest. **See also:** *Afforestation*, *Reforestation*, *Reducing Emissions from Deforestation and Forest Degradation (REDD+)*.

[Note: For a discussion of the term forest and related terms such as *afforestation*, *reforestation* and *deforestation*, see the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and their 2019 Refinement, and information provided by the United Nations Framework Convention on Climate Change]

Demand-side measures
Policies and programmes for influencing the *demand* for goods and/ or services. In the energy sector, demand-side *mitigation* measures aim at reducing the amount of *greenhouse gas* emissions emitted per unit of energy service used.

Developed / developing countries (Industrialised / developed / developing countries)
There is a diversity of approaches for categorizing countries on the basis of their level of development, and for defining terms such as industrialised, developed, or developing. Several categorisations are used in this report. (1) In the United Nations (UN) system, there is no established convention for the designation of developed and developing countries or areas. (2) The UN Statistics Division specifies developed and developing regions based on common practice. In addition, specific countries are designated as least developed countries, landlocked developing countries, *Small Island Developing States (SIDS)*, and *transition* economies. Many countries appear in more than one of these categories. (3) The World Bank uses *income* as the main criterion for classifying countries as low, lower middle, upper middle, and high income. (4) The UN Development Programme (UNDP) aggregates indicators for life expectancy, educational attainment, and *income* into a single composite Human Development Index (HDI) to classify countries as low, medium, high, or very high human development.

Development pathways
See: *Pathways*.

Disaster risk management (DRM)
Processes for designing, implementing and evaluating strategies, policies and measures to improve the understanding of current and future *disaster risk*, foster *disaster risk* reduction and transfer, and promote continuous improvement in disaster preparedness, prevention and protection, response and recovery practices, with the explicit purpose of increasing *human security*, *well-being*, quality of life and *sustainable development (SD)*.

Displacement (of humans)
The involuntary movement, individually or collectively, of persons from their country or community, notably for reasons of armed conflict, civil unrest, or natural or human-made disasters.

Drought
An exceptional period of water shortage for existing *ecosystems* and the human population (due to low rainfall, high temperature and/or wind). **See also:** *Plant evaporative stress*.

Agricultural and ecological drought
Depending on the affected *biome*: a period with abnormal *soil moisture* deficit, which results from combined shortage of precipitation and excess *evapotranspiration*, and during the growing season impinges on crop production or ecosystem function in general.

Early warning systems (EWS)
The set of technical and institutional capacities to forecast, predict, and communicate timely and meaningful warning information to enable individuals, communities, managed *ecosystems*, and organisations threatened by a *hazard* to prepare to act promptly and appropriately to reduce the possibility of harm or loss. Depending upon context, EWS may draw upon scientific and/or *Indigenous knowledge*, and other knowledge types. EWS are also considered for ecological applications, e.g., conservation, where the organisation itself is not threatened by *hazard* but the *ecosystem* under conservation is (e.g., *coral bleaching* alerts), in agriculture (e.g., warnings of heavy rainfall, *drought*, ground frost, and hailstorms) and in fisheries (e.g., warnings of storm, *storm surge*, and tsunamis).

Ecological drought
See: *Drought*.

Ecosystem
An ecosystem is a functional unit consisting of living organisms, their nonliving environment and the interactions within and between them. The components included in a given ecosystem and its spatial boundaries depend on the purpose for which the ecosystem is defined: in some cases, they are relatively sharp, while in others they are diffuse. Ecosystem boundaries can change over time. Ecosystems are nested within other ecosystems and their scale can range from very small to the entire *biosphere*. In the current era, most ecosystems either contain people as key organisms, or are influenced by the effects of human activities in their environment. **See also:** *Ecosystem health*, *Ecosystem services*.

Ecosystem-based adaptation (EbA)
The use of *ecosystem* management activities to increase the *resilience* and reduce the *vulnerability* of people and *ecosystems* to *climate change*. **See also:** *Adaptation*, *Nature-based solution (NbS)*.

Ecosystem services
Ecological processes or functions having monetary or non-monetary value to individuals or society at large. These are frequently classified as (1) supporting services such as productivity or *biodiversity* maintenance, (2) provisioning services such as food or fibre, (3) regulating services such as climate regulation or *carbon sequestration*, and (4) cultural

services such as tourism or spiritual and aesthetic appreciation. **See also:** *Ecosystem*, *Ecosystem health*, *Nature's contributions to people (NCP)*.

Emission scenario
See: *Scenario*.

Emission pathways
See: *Pathways*.

Enabling conditions (for adaptation and mitigation options)
Conditions that enhance the *feasibility* of *adaptation* and *mitigation* options. *Enabling conditions* include finance, technological innovation, strengthening policy instruments, *institutional capacity*, *multi-level governance*, and *changes in human behaviour* and lifestyles.

Equality
A principle that ascribes equal worth to all human beings, including equal opportunities, rights and obligations, irrespective of origins. **See also:** *Equity*, *Fairness*.

Inequality
Uneven opportunities and social positions, and processes of discrimination within a group or society, based on gender, class, ethnicity, age, and (dis)ability, often produced by uneven development. Income inequality refers to gaps between highest and lowest income earners within a country and between countries.

Equilibrium climate sensitivity (ECS)
See: *Climate sensitivity*.

Equity
The principle of being fair and impartial, and a basis for understanding how the *impacts* and responses to climate change, including costs and benefits, are distributed in and by society in more or less equal ways. Often aligned with ideas of *equality*, fairness and *justice* and applied with respect to equity in the responsibility for, and distribution of, climate *impacts* and policies across society, generations, and gender, and in the sense of who participates and controls the processes of decision-making.

Exposure
The presence of people; livelihoods; species or ecosystems; environmental functions, services, and resources; *infrastructure*; or economic, social, or cultural assets in places and settings that could be adversely affected. **See also:** *Hazard, Exposure*, *Vulnerability*, *Impacts*, *Risk*.

Feasibility
In this report, feasibility refers to the potential for a *mitigation* or *adaptation option* to be implemented. Factors influencing feasibility are context-dependent, temporally dynamic, and may vary between different groups and actors. Feasibility depends on geophysical, environmental-ecological, technological, economic, socio-cultural and institutional factors that enable or constrain the implementation of an option. The feasibility of options may change when different options are combined and increase when *enabling conditions* are strengthened. **See also:** *Enabling conditions (for adaptation and mitigation options)*.

Fire weather
Weather conditions conducive to triggering and sustaining wildfires, usually based on a set of indicators and combinations of indicators including temperature, *soil moisture*, humidity, and wind. Fire weather does not include the presence or absence of fuel load.

Food loss and waste
The decrease in quantity or quality of food. Food waste is part of food loss and refers to discarding or alternative (non-food) use of food that is safe and nutritious for human consumption along the entire food supply chain, from primary production to end household consumer level. Food waste is recognized as a distinct part of food loss because the drivers that generate it and the solutions to it are different from those of food losses.

Food security
A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. The four pillars of food security are availability, access, utilization and stability. The nutritional dimension is integral to the concept of food security.

Global warming
Global warming refers to the increase in global surface temperature relative to a baseline *reference period*, averaging over a period sufficient to remove interannual variations (e.g., 20 or 30 years). A common choice for the baseline is 1850–1900 (the earliest period of reliable observations with sufficient geographic coverage), with more modern baselines used depending upon the application. **See also:** *Climate change*, *Climate variability*, *Natural (climate) variability*.

Global warming potential (GWP)
An index measuring the *radiative forcing* following an emission of a unit mass of a given substance, accumulated over a chosen time horizon, relative to that of the reference substance, carbon dioxide (CO_2). The GWP thus represents the combined effect of the differing times these substances remain in the *atmosphere* and their effectiveness in causing radiative forcing. **See also:** *Lifetime*, *Greenhouse gas emission metric*.

Green infrastructure
See: *Infrastructure*.

Greenhouse gases (GHGs)
Gaseous constituents of the *atmosphere*, both natural and *anthropogenic*, that absorb and emit radiation at specific wavelengths within the spectrum of radiation emitted by the Earth's surface, by the atmosphere itself, and by clouds. This property causes the *greenhouse effect*. Water vapour (H_2O), carbon dioxide (CO_2), *nitrous oxide* (N_2O), *methane* (CH_4) and *ozone* (O_3) are the primary *GHGs* in the Earth's atmosphere. Human-made GHGs include *sulphur hexafluoride* (SF6), *hydrofluorocarbons* (HFCs), *chlorofluorocarbons* (CFCs) and perfluorocarbons (PFCs); several of these are also O3-depleting (and are regulated under the *Montreal Protocol*). **See also:** *Well-mixed greenhouse gas*.

Grey infrastructure
See: *Infrastructure*.

Hazard
The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury or other *health* impacts, as well as damage and loss to property, *infrastructure*, *livelihoods*, service provision, *ecosystems* and environmental resources. **See also:** *Exposure*, *Vulnerability*, *Impacts*, *Risk*.

Impacts
The consequences of realised *risks* on natural and *human systems*, where *risks* result from the interactions of climate-related *hazards* (including *extreme weather/climate events*), *exposure*, and *vulnerability*. *Impacts* generally refer to effects on lives, *livelihoods*, *health* and *well-being*, *ecosystems* and species, economic, social and cultural assets, services (including *ecosystem services*), and *infrastructure*. *Impacts* may be referred to as consequences or outcomes and can be adverse or beneficial. **See also:** *Adaptation*, *Hazard, Exposure*, *Vulnerability*, *Risk*.

Inequality
See: *Equality*.

Indigenous knowledge (IK)
The understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings. For many *Indigenous Peoples*, IK informs decision-making about fundamental aspects of life, from day-to-day activities to longer term actions. This knowledge is integral to cultural complexes, which also encompass language, systems of classification, resource use practices, social interactions, values, ritual and spirituality. These distinctive ways of knowing are important facets of the world's cultural diversity. **See also:** *Local knowledge (LK)*.

Indigenous Peoples
Indigenous Peoples and nations are those that, having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing on those territories, or parts of them. They form at present principally non-dominant sectors of society and are often determined to preserve, develop, and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions, and common law system.

Informal settlement
A term given to *settlements* or residential areas that by at least one criterion fall outside official rules and regulations. Most informal settlements have poor housing (with widespread use of temporary materials) and are developed on land that is occupied illegally with high levels of overcrowding. In most such settlements, provision for safe water, sanitation, drainage, paved roads, and basic services is inadequate or lacking. The term 'slum' is often used for informal settlements, although it is misleading as many informal settlements develop into good quality residential areas, especially where governments support such development.

Infrastructure
The designed and built set of physical systems and corresponding institutional arrangements that mediate between people, their communities, and the broader environment to provide services that support economic growth, *health*, quality of life, and safety.

Blue infrastructure
Blue infrastructure includes bodies of water, watercourses, ponds, lakes and storm drainage, that provide ecological and hydrological functions including *evaporation*, transpiration, *drainage*, infiltration, and temporary storage of *runoff* and discharge.

Green infrastructure
The strategically planned interconnected set of natural and constructed ecological systems, green spaces and other landscape features that can provide functions and services including air and water purification, temperature management, floodwater management and coastal defence often with *co-benefits* for people and *biodiversity*. Green infrastructure includes planted and remnant native vegetation, soils, *wetlands*, parks and green open spaces, as well as building and street level design interventions that incorporate vegetation.

Grey infrastructure
Engineered physical components and networks of pipes, wires, tracks and roads that underpin energy, transport, communications (including digital), built form, water and sanitation, and solid-waste management systems.

Irreversibility
A perturbed state of a *dynamical system* is defined as irreversible on a given time scale if the recovery from this state due to natural processes takes substantially longer than the time scale of interest. **See also:** *Tipping point*.

Just transition
See: *Transition*.

Justice
Justice is concerned with ensuring that people get what is due to them, setting out the moral or legal principles of *fairness* and *equity* in the way people are treated, often based on the ethics and values of society.

Climate justice
Justice that links development and *human rights* to achieve a human-centred approach to addressing *climate change*, safeguarding the rights of the most vulnerable people and sharing the burdens and benefits of climate change and its *impacts* equitably and fairly.

Social justice
Just or fair relations within society that seek to address the distribution of wealth, access to resources, opportunity, and support according to principles of *justice* and *fairness*.

Key risk
See: *Risk*.

Land use, land-use change and forestry (LULUCF)
In the context of national *greenhouse gas* (GHG) inventories under the United Nations Framework Convention on Climate Change, LULUCF is a GHG inventory sector that covers *anthropogenic emissions* and *removals* of GHG in managed lands, excluding non-CO_2 agricultural emissions. Following the 2006 IPCC Guidelines for National GHG Inventories and

their 2019 Refinement, '*anthropogenic*' land-related GHG fluxes are defined as all those occurring on '*managed land*', i.e., 'where human interventions and practices have been applied to perform production, ecological or social functions'. Since managed land may include *carbon dioxide* (CO_2) removals not considered as '*anthropogenic*' in some of the scientific literature assessed in this report (e.g., removals associated with CO_2 fertilisation and N deposition), the land-related net *GHG emission* estimates from global models included in this report are not necessarily directly comparable with LULUCF estimates in National GHG Inventories *(IPCC 2006, 2019)*.

Least Developed Countries (LDCs)
A list of countries designated by the Economic and Social Council of the United Nations (ECOSOC) as meeting three criteria: (1) a low *income* criterion below a certain threshold of gross national income per capita of between USD 750 and USD 900, (2) a human resource weakness based on indicators of *health*, education, adult literacy, and (3) an economic vulnerability weakness based on indicators on instability of agricultural production, instability of export of goods and services, economic importance of non-traditional activities, merchandise export concentration, and the handicap of economic smallness. Countries in this category are eligible for a number of programmes focused on assisting countries most in need. These privileges include certain benefits under the articles of the United Nations Framework Convention on Climate Change (UNFCCC).

Livelihood
The resources used and the activities undertaken in order for people to live. *Livelihoods* are usually determined by the entitlements and assets to which people have access. Such assets can be categorised as human, social, natural, physical or financial.

Local knowledge (LK)
The understandings and skills developed by individuals and populations, specific to the places where they live. Local knowledge informs decision-making about fundamental aspects of life, from day-to-day activities to longer term actions. This knowledge is a key element of the social and cultural systems which influence observations of and responses to *climate change*; it also informs *governance* decisions. **See also:** *Indigenous knowledge (IK).*

Lock-in
A situation in which the future development of a system, including *infrastructure*, technologies, investments, institutions, and behavioural norms, is determined or constrained ('locked in') by historic developments. **See also:** *Path dependence.*

Loss and Damage, and losses and damages
Research has taken *Loss and Damage* (capitalised letters) to refer to political debate under the United Nations Framework Convention on Climate Change (UNFCCC) following the establishment of the Warsaw Mechanism on Loss and Damage in 2013, which is to 'address loss and damage associated with impacts of *climate change*, including *extreme events* and slow onset events, in *developing countries* that are particularly vulnerable to the adverse effects of climate change.' Lowercase letters (*losses and damages*) have been taken to refer broadly to harm from (observed) *impacts* and (projected) risks and can be economic or non-economic.

Low-likelihood, high-impact outcomes
Outcomes/events whose probability of occurrence is low or not well known (as in the context of *deep uncertainty*) but whose potential *impacts* on society and *ecosystems* could be high. To better inform *risk assessment* and decision-making, such low-*likelihood* outcomes are considered if they are associated with very large consequences and may therefore constitute material risks, even though those consequences do not necessarily represent the most likely outcome. **See also:** *Impacts.*

Maladaptive actions (Maladaptation)
Actions that may lead to increased risk of adverse climate-related outcomes, including via increased *greenhouse gas (GHG) emissions*, increased or shifted *vulnerability* to *climate change*, more inequitable outcomes, or diminished welfare, now or in the future. Most often, maladaptation is an unintended consequence.

Migration (of humans)
Movement of a person or a group of persons, either across an international border, or within a State. It is a population movement, encompassing any kind of movement of people, whatever its length, composition and causes; it includes migration of refugees, displaced persons, economic migrants, and persons moving for other purposes, including family reunification.

Mitigation (of climate change)
A human intervention to reduce emissions or enhance the *sinks of greenhouse gases.*

Mitigation potential
The quantity of net *greenhouse gas* emission reductions that can be achieved by a given *mitigation option* relative to specified emission baselines. **See also:** *Sequestration potential.*

[Note: Net greenhouse gas emission reductions is the sum of reduced emissions and/or enhanced *sinks*]

Natural (climate) variability
Natural variability refers to climatic fluctuations that occur without any human influence, that is *internal variability* combined with the response to external natural factors such as volcanic eruptions, changes in *solar activity* and, on longer time-scales, orbital effects and plate tectonics. **See also:** *Orbital forcing.*

Net zero CO_2 emissions
Condition in which *anthropogenic carbon dioxide (CO_2)* emissions are balanced by *anthropogenic CO_2 removals* over a specified period. **See also:** *Carbon neutrality*, *Land use*, *land-use change and forestry (LULUCF)*, *Net zero greenhouse gas emissions.*

[Note: *Carbon neutrality* and net zero CO_2 emissions are overlapping concepts. The concepts can be applied at global or sub-global scales (e.g., regional, national and sub-national). At a global scale, the terms carbon neutrality and net zero CO_2 emissions are equivalent. At sub-global scales, net zero CO_2 emissions is generally applied to emissions and removals under direct control or territorial responsibility of the reporting entity, while carbon neutrality generally includes emissions and removals within and beyond the direct control

or territorial responsibility of the reporting entity. Accounting rules specified by GHG programmes or schemes can have a significant influence on the quantification of relevant CO_2 emissions and removals.]

Net zero GHG emissions

Condition in which metric-weighted *anthropogenic greenhouse gas (GHG) emissions* are balanced by metric-weighted *anthropogenic GHG removals* over a specified period. The quantification of net zero GHG emissions depends on the *GHG emission metric* chosen to compare emissions and removals of different gases, as well as the time horizon chosen for that metric. **See also:** *Greenhouse gas neutrality*, *Land use, land-use change and forestry (LULUCF)*, *Net zero CO_2 emissions*.

[Note 1: *Greenhouse gas neutrality* and net zero GHG emissions are overlapping concepts. The concept of net zero GHG emissions can be applied at global or sub-global scales (e.g., regional, national and sub-national). At a global scale, the terms GHG neutrality and net zero GHG emissions are equivalent. At sub-global scales, net zero GHG emissions is generally applied to emissions and removals under direct control or territorial responsibility of the reporting entity, while GHG neutrality generally includes anthropogenic emissions and anthropogenic removals within and beyond the direct control or territorial responsibility of the reporting entity. Accounting rules specified by GHG programmes or schemes can have a significant influence on the quantification of relevant emissions and removals.

Note 2: Under the Paris Rulebook (Decision 18/CMA.1, annex, paragraph 37), parties have agreed to use GWP100 values from the IPCC AR5 or GWP100 values from a subsequent IPCC Assessment Report to report aggregate emissions and removals of GHGs. In addition, parties may use other metrics to report supplemental information on aggregate emissions and removals of GHGs.]

New Urban Agenda

The *New Urban Agenda* was adopted at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in Quito, Ecuador, on 20 October 2016. It was endorsed by the United Nations General Assembly at its sixty-eighth plenary meeting of the seventy-first session on 23 December 2016.

Overshoot pathways

See: *Pathways*.

Pathways

The temporal evolution of *natural* and/or *human systems* towards a future state. Pathway concepts range from sets of quantitative and qualitative *scenarios* or *narratives* of potential futures to solution-oriented decision-making processes to achieve desirable societal goals. Pathway approaches typically focus on biophysical, techno-economic and/or socio-behavioural trajectories and involve various dynamics, goals and actors across different scales. **See also:** *Scenario*, *Storyline*.

Development pathways

Development pathways evolve as the result of the countless decisions being made and actions being taken at all levels of societal structure, as well due to the emergent dynamics within and between institutions, cultural norms, technological systems and other drivers of *behavioural change*. **See also:** *Shifting development pathways (SDPs)*, *Shifting development pathways to sustainability (SDPS)*.

Emission pathways

Modelled *trajectories* of global *anthropogenic emissions* over the 21st century are termed emission pathways.

Overshoot pathways

Pathways that first exceed a specified concentration, forcing or *global warming* level, and then return to or below that level again before the end of a specified period of time (e.g., before 2100). Sometimes the magnitude and *likelihood* of the *overshoot* are also characterised. The overshoot duration can vary from one *pathway* to the next, but in most overshoot pathways in the literature and referred to as overshoot pathways in the AR6, the overshoot occurs over a period of at least one decade and up to several decades. **See also:** *Temperature overshoot*.

Shared socio-economic pathways (SSPs)

Shared socio-economic pathways (SSPs) have been developed to complement the *Representative Concentration Pathways (RCPs)*. By design, the RCP emission and concentration *pathways* were stripped of their association with a certain socio-economic development. Different levels of emissions and *climate change* along the dimension of the RCPs can hence be explored against the backdrop of different socio-economic development pathways (SSPs) on the other dimension in a matrix. This integrative SSP-RCP framework is now widely used in the climate impact and policy analysis literature (see, e.g., http://iconics-ssp.org), where *climate projections* obtained under the RCP *scenarios* are analysed against the backdrop of various SSPs. As several emission updates were due, a new set of *emission scenarios* was developed in conjunction with the SSPs. Hence, the abbreviation SSP is now used for two things: On the one hand SSP1, SSP2, …, SSP5 is used to denote the five socio-economic *scenario* families. On the other hand, the abbreviations SSP1-1.9, SSP1-2.6, …, SSP5-8.5 are used to denote the newly developed *emission scenarios* that are the result of an SSP implementation within an *integrated assessment model*. Those SSP *scenarios* are bare of climate policy assumption, but in combination with so-called shared policy assumptions (SPAs), various approximate *radiative forcing* levels of 1.9, 2.6, …, or 8.5 W m–2 are reached by the end of the century, respectively. denote trajectories that address social, environmental and economic dimensions of *sustainable development*, *adaptation* and *mitigation*, and *transformation*, in a generic sense or from a particular methodological perspective such as *integrated assessment models* and *scenario* simulations.

Planetary health

A concept based on the understanding that human health and human civilisation depend on *ecosystem* health and the wise stewardship of *ecosystems*.

Reasons for concern (RFCs)

Elements of a classification framework, first developed in the IPCC Third Assessment Report, which aims to facilitate judgements about what level of *climate change* may be dangerous (in the language of Article 2 of the UNFCCC; UNFCCC, 1992) by aggregating *risks* from various sectors, considering *hazards*, *exposures*, *vulnerabilities*, capacities to adapt, and the resulting *impacts*.

Reforestation
Conversion to forest of land that has previously contained forests but that has been converted to some other use. **See also:** *Afforestation*, *Anthropogenic removals*, *Carbon dioxide removal (CDR)*, *Deforestation*, *Reducing Emissions from Deforestation and Forest Degradation (REDD+)*.

[Note: For a discussion of the term forest and related terms such as *afforestation*, *reforestation* and *deforestation*, see the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and their 2019 Refinement, and information provided by the United Nations Framework Convention on Climate Change]

Residual risk
The risk related to *climate change impacts* that remains following *adaptation* and *mitigation* efforts. *Adaptation* actions can redistribute *risk* and *impacts*, with increased *risk* and *impacts* in some areas or populations, and decreased *risk* and *impacts* in others. **See also:** *Loss and Damage*, *losses and damages*.

Resilience
The capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure. Resilience is a positive attribute when it maintains capacity for *adaptation*, learning and/or *transformation*. **See also:** *Hazard*, *Risk*, *Vulnerability*.

Restoration
In the environmental context, *restoration* involves human interventions to assist the recovery of an *ecosystem* that has been previously degraded, damaged or destroyed.

Risk
The potential for adverse consequences for human or ecological systems, recognising the diversity of values and objectives associated with such systems. In the context of *climate change*, *risks* can arise from potential *impacts* of *climate change* as well as human responses to *climate change*. Relevant adverse consequences include those on lives, *livelihoods*, *health* and *well-being*, economic, social and cultural assets and investments, *infrastructure*, services (including *ecosystem services*), *ecosystems* and species.
In the context of *climate change impacts*, *risks* result from dynamic interactions between climate-related *hazards* with the *exposure* and *vulnerability* of the affected human or ecological system to the *hazards*. *Hazards*, *exposure* and *vulnerability* may each be subject to *uncertainty* in terms of magnitude and *likelihood* of occurrence, and each may change over time and space due to socio-economic changes and human decision-making.
In the context of climate *change responses*, *risks* result from the potential for such responses not achieving the intended objective(s), or from potential *trade-offs* with, or negative side-effects on, other societal objectives, such as the *Sustainable Development Goals (SDGs)*. *Risks* can arise for example from *uncertainty* in the implementation, effectiveness or outcomes of *climate policy*, climate-related investments, technology development or adoption, and system *transitions*.
See also: *Hazard*, *Exposure*, *Vulnerability*, *Impacts*, *Risk management*, *Adaptation*, *Mitigation*.

Key risk
Key risks have potentially severe adverse consequences for humans and social-ecological systems resulting from the interaction of climate related *hazards* with *vulnerabilities* of societies and systems exposed.

Scenario
A plausible description of how the future may develop based on a coherent and internally consistent set of assumptions about key driving forces (e.g., rate of technological change, prices) and relationships. Note that scenarios are neither *predictions* nor *forecasts* but are used to provide a view of the implications of developments and actions. **See also:** *Scenario*, *Scenario storyline*.

Emission scenario
A plausible representation of the future development of emissions of substances that are radiatively active (e.g., *greenhouse gases* (GHGs) or *aerosols*) based on a coherent and internally consistent set of assumptions about driving forces (such as demographic and socio-economic development, technological change, energy and *land use*) and their key relationships. Concentration scenarios, derived from *emission scenarios*, are often used as input to a *climate model* to compute climate *projections*.

Sendai Framework for Disaster Risk Reduction
The *Sendai Framework for Disaster Risk Reduction 2015-2030* outlines seven clear targets and four priorities for action to prevent new, and to reduce existing *disaster risks*. The voluntary, non-binding agreement recognises that the State has the primary role to reduce disaster risk, but that responsibility should be shared with other stakeholders including local government, the private sector and other stakeholders, with the aim for the substantial reduction of disaster risk and losses in lives, *livelihoods* and *health* and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.

Settlements
Places of concentrated human habitation. *Settlements* can range from isolated rural villages to *urban* regions with significant global influence. They can include formally planned and informal or illegal habitation and related *infrastructure*. **See also:** *Cities*, *Urban*, *Urbanisation*.

Shared socio-economic pathways (SSPs)
See: *Pathways*

Shifting development pathways (SDPs)
In this report, shifting development pathways describes *transitions* aimed at redirecting existing developmental trends. Societies may put in place *enabling conditions* to influence their future *development pathways*, when they endeavour to achieve certain outcomes. Some outcomes may be common, while others may be context-specific, given different starting points. **See also:** *Development pathways*, *Shifting development pathways to sustainability*.

Sink
Any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the *atmosphere*. **See also:** *Pool - Carbon and nitrogen*, *Reservoir*, *Sequestration*, *Sequestration potential*, *Source*, *Uptake*.

Small Island Developing States (SIDS)
Small Island Developing States (SIDS), as recognised by the United Nations OHRLLS (UN Office of the High Representative for the *Least Developed Countries*, Landlocked Developing Countries and Small Island Developing States), are a distinct group of developing countries facing specific social, economic and environmental vulnerabilities. They were recognised as a special case both for their environment and development at the Rio Earth Summit in Brazil in 1992. Fifty-eight countries and territories are presently classified as SIDS by the UN OHRLLS, with 38 being UN member states and 20 being Non-UN Members or Associate Members of the Regional Commissions.

Social justice
See: *Justice.*

Social protection
In the context of development aid and climate policy, social protection usually describes public and private initiatives that provide *income* or consumption transfers to the poor, protect the vulnerable against *livelihood risks*, and enhance the social status and rights of the marginalized, with the overall objective of reducing the economic and social *vulnerability* of poor, vulnerable, and marginalized groups. In other contexts, social protection may be used synonymously with social policy and can be described as all public and private initiatives that provide access to services, such as *health*, education, or housing, or income and consumption transfers to people. Social protection policies protect the poor and *vulnerable* against livelihood *risks* and enhance the social status and rights of the marginalized, as well as prevent *vulnerable* people from falling into poverty.

Solar radiation modification (SRM)
Refers to a range of radiation modification measures not related to *greenhouse gas (GHG) mitigation* that seek to limit *global warming*. Most methods involve reducing the amount of incoming *solar radiation* reaching the surface, but others also act on the longwave radiation budget by reducing optical thickness and cloud lifetime.

Source
Any process or activity which releases a *greenhouse gas*, an *aerosol* or a precursor of a greenhouse gas into the *atmosphere.* **See also:** *Pool - carbon and nitrogen*, *Reservoir*, *Sequestration*, *Sequestration potential*, *Sink*, *Uptake.*

Stranded assets
Assets exposed to devaluations or conversion to 'liabilities' because of unanticipated changes in their initially expected revenues due to innovations and/or evolutions of the business context, including changes in public regulations at the domestic and international levels.

Sustainable development (SD)
Development that meets the needs of the present without compromising the ability of future generations to meet their own needs and balances social, economic and environmental concerns. **See also:** *Development pathways*, *Sustainable Development Goals (SDGs).*

Sustainable Development Goals (SDGs)
The 17 Global Goals for development for all countries established by the United Nations through a participatory process and elaborated in the *2030 Agenda for Sustainable Development*, including ending poverty and hunger; ensuring health and *well-being*, education, gender equality, clean water and energy, and decent work; building and ensuring resilient and sustainable *infrastructure*, cities and consumption; reducing *inequalities*; protecting land and water *ecosystems*; promoting peace, *justice* and partnerships; and taking urgent action on *climate change.* **See also:** *Development pathways*, *Sustainable development (SD).*

Sustainable land management
The stewardship and use of *land* resources, including soils, water, animals and plants, to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions.

Temperature overshoot
Exceedance of a specified *global warming* level, followed by a decline to or below that level during a specified period of time (e.g., before 2100). Sometimes the magnitude and likelihood of the overshoot is also characterized. The overshoot duration can vary from one *pathway* to the next but in most *overshoot pathways* in the literature and referred to as overshoot pathways in the AR6, the overshoot occurs over a period of at least one and up to several decades. **See also:** *Overshoot Pathways.*

Tipping point
A critical threshold beyond which a system reorganises, often abruptly and/or irreversibly. **See also:** *Abrupt climate change*, *Irreversibility*, *Tipping element.*

Transformation
A change in the fundamental attributes of *natural* and *human systems.*

Transformational adaptation
See: *Adaptation.*

Transition
The process of changing from one state or condition to another in a given period of time. Transition can be in individuals, firms, *cities*, *regions* and nations, and can be based on incremental or *transformative* change.

Just transitions
A set of principles, processes and practices that aim to ensure that no people, workers, places, sectors, countries or regions are left behind in the *transition* from a high-carbon to a low-carbon economy. It stresses the need for targeted and proactive measures from governments, agencies, and authorities to ensure that any negative social, environmental or economic impacts of economy-wide transitions are minimized, whilst benefits are maximized for those disproportionately affected. Key principles of just transitions include: respect and dignity for vulnerable groups; *fairness* in energy access and use, social dialogue and democratic consultation with relevant stakeholders; the creation of decent jobs; *social protection*; and rights at work. Just transitions could include fairness in energy, *land use* and climate planning and decision-making processes;

economic diversification based on low-carbon investments; realistic training/retraining programs that lead to decent work; gender specific policies that promote equitable outcomes; the fostering of international cooperation and coordinated multilateral actions; and the eradication of poverty. Lastly, just transitions may embody the redressing of past harms and perceived injustices.

Urban

The categorisation of areas as "urban" by government statistical departments is generally based either on population size, population density, economic base, provision of services, or some combination of the above. Urban systems are networks and nodes of intensive interaction and exchange including capital, culture, and material objects. Urban areas exist on a continuum with rural areas and tend to exhibit higher levels of complexity, higher populations and population density, intensity of capital investment, and a preponderance of secondary (processing) and tertiary (service) sector industries. The extent and intensity of these features varies significantly within and between urban areas. Urban places and systems are open, with much movement and exchange between more rural areas as well as other urban regions. Urban areas can be globally interconnected, facilitating rapid flows between them, of capital investment, of ideas and culture, human *migration*, and disease. **See also:** *Cities*, *City region*, *Peri-urban areas*, *Urban Systems*, *Urbanisation.*

Urbanisation

Urbanisation is a multi-dimensional process that involves at least three simultaneous changes: 1) *land use change*: transformation of formerly rural *settlements* or natural land into *urban settlements*; 2) demographic change: a shift in the spatial distribution of a population from rural to *urban* areas; and 3) *infrastructure* change: an increase in provision of *infrastructure* services including electricity, sanitation, etc. *Urbanisation* often includes changes in lifestyle, culture, and behaviour, and thus alters the demographic, economic, and social structure of both urban and rural areas. **See also:** *Settlement*, *Urban*, *Urban Systems.*

Vector-borne disease

Illnesses caused by parasites, viruses and bacteria that are transmitted by various vectors (e.g. mosquitoes, sandflies, triatomine bugs, blackflies, ticks, tsetse flies, mites, snails and lice).

Vulnerability

The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt. **See also:** *Hazard*, *Exposure*, *Impacts*, *Risk.*

Water security

The capacity of a population to safeguard sustainable access to adequate quantities of acceptable-quality water for sustaining *livelihoods*, human *well-being* and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters and for preserving *ecosystems* in a climate of peace and political stability.

Well-being

A state of existence that fulfills various human needs, including material living conditions and quality of life, as well as the ability to pursue one's goals, to thrive and to feel satisfied with one's life. Ecosystem well-being refers to the ability of *ecosystems* to maintain their diversity and quality.

Annex II
Acronyms, Chemical Symbols and Scientific Units

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AFOLU Agriculture, Forestry and Other Land Use *

AR5 Fifth Assessment Report

AR6 Sixth Assessment Report

BECCS Bioenergy with Carbon Dioxide Capture and Storage *

CCS Carbon Capture and Storage *

CCU Carbon Capture and Utilization

CDR Carbon Dioxide Removal *

CH_4 Methane

CID Climatic impact-driver *

CMIP5 Coupled Model Intercomparison Project Phase 5

CMIP6 Coupled Model Intercomparison Project Phase 6

CO_2 Carbon Dioxide

CO_2-eq Carbon Dioxide Equivalent *

CRD Climate Resilient Development *

CO_2-FFI CO_2 from Fossil Fuel combustion and Industrial processes

CO_2-LULUCF CO_2 from Land Use, Land-Use Change and Forestry

CSB Cross-Section Box

DACCS Direct Air Carbon Capture and Storage

DRM Disaster Risk Management *

EbA Ecosystem-based Adaptation *

ECS Equilibrium climate sensitivity *

ES Executive Summary

EV Electric Vehicle

EWS Early Warning System *

FaIR Finite Amplitude Impulse Response simple climate model

FAO Food and Agriculture Organization of the United Nations

FFI Fossil-Fuel combustion and Industrial processes

F-gases Fluorinated gases

GDP Gross Domestic Product

GHG Greenhouse Gas *

Gt Gigatonnes

GW Gigawatt

GWL Global Warming Level

GWP100 Global Warming Potential over a 100 year time horizon *

HFCs Hydrofluorocarbons

IEA International Energy Agency

IEA-STEPS International Energy Agency Stated Policies Scenario

IMP Illustrative Mitigation Pathway

IMP-LD Illustrative Mitigation Pathway - Low Demand

IMP-NEG Illustrative Mitigation Pathway - NEGative emissions deployment

IMP-SP Illustrative Mitigation Pathway - Shifting development Pathways

IMP-REN Illustrative Mitigation Pathway - Heavy reliance on RENewables

IP-ModAct Illustrative Pathway Moderate Action

IPCC Intergovernmental Panel on Climate Change

kWh Kilowatt hour

LCOE Levelized Cost of Energy

LDC Least Developed Countries *

Li-on Lithium-ion

LK Local Knowledge *

LULUCF Land Use, Land-Use Change and Forestry *

MAGICC Model for the Assessment of Greenhouse Gas Induced Climate Change

MWh Megawatt hour

N_2O Nitrous oxide

NDC Nationally Determined Contribution

NF_3 Nitrogen trifluoride

O_3 Ozone

PFCs Perfluorocarbons

ppb parts per billion

PPP Purchasing Power Parity

ppm parts per million

PV Photovoltaic

R&D Research and Development

RCB Remaining Carbon Budget

RCPs Representative Concentration Pathways (e.g. RCP2.6, pathway for which radiative forcing by 2100 is limited to 2.6 Wm^{-2})

RFCs Reasons for Concern *

SDG Sustainable Development Goal *

SDPs Shifting Development Pathways *

SF_6 Sulphur Hexafluoride

SIDS Small Island Developing States *

SLCF Short-Lived Climate Forcer

SPM Summary For Policymakers

SR1.5 Special Report on Global Warming of 1.5°C

SRCCL Special Report on Climate Change and Land

SRM Solar Radiation Modification *

SROCC Special Report on the Ocean and Cryosphere in a Changing Climate

SSP Shared Socioeconomic Pathway *

SYR Synthesis Report

tCO_2-eq Tonne of carbon dioxide equivalent

tCO_2-FFI Tonne of carbon dioxide from Fossil Fuel combustion and Industrial processes

TS Technical Summary

UNFCCC United Framework Convention on Climate Change

USD United States Dollar

WG Working Group

WGI IPCC Working Group I

WGII IPCC Working Group II

WGIII IPCC Working Group III

WHO World Health Organization

WIM Warsaw International Mechanism on Loss and Damage under UNFCCC *

Wm^{-2} Watts per square meter

* For a full definition see also Annex I: Glossary

Definitions of additional terms are available in the IPCC Online Glossary: https://apps.ipcc.ch/glossary/

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Annex V
List of Publications of the Intergovernmental Panel on Climate Change

Assessment Reports

Sixth Assessment Report

Climate Change 2021: The Physical Science Basis
Contribution of Working Group I to the Sixth Assessment Report

Climate Change 2022: Impacts, Adaptation, and Vulnerability
Contribution of Working Group II to the Sixth Assessment Report

Climate Change 2022: Mitigation of Climate Change
Contribution of Working Group III to the Sixth Assessment Report

Climate Change 2023: Synthesis Report
A Report of the Intergovernmental Panel on Climate Change

Fifth Assessment Report

Climate Change 2013: The Physical Science Basis
Contribution of Working Group I to the Fifth Assessment Report

Climate Change 2014: Impacts, Adaptation, and Vulnerability
Contribution of Working Group II to the Fifth Assessment Report

Climate Change 2014: Mitigation of Climate Change
Contribution of Working Group III to the Fifth Assessment Report

Climate Change 2014: Synthesis Report
A Report of the Intergovernmental Panel on Climate Change

Fourth Assessment Report

Climate Change 2007: The Physical Science Basis
Contribution of Working Group I to the Fourth Assessment Report

Climate Change 2007: Impacts, Adaptation and Vulnerability
Contribution of Working Group II to the Fourth Assessment Report

Climate Change 2007: Mitigation of Climate Change
Contribution of Working Group III to the Fourth Assessment Report

Climate Change 2007: Synthesis Report
A Report of the Intergovernmental Panel on Climate Change

Third Assessment Report

Climate Change 2001: The Scientific Basis
Contribution of Working Group I to the Third Assessment Report

Climate Change 2001: Impacts, Adaptation, and Vulnerability
Contribution of Working Group II to the Third Assessment Report

Climate Change 2001: Mitigation
Contribution of Working Group III to the Third Assessment Report

Climate Change 2001: Synthesis Report
Contribution of Working Groups I, II and III to the Third Assessment Report

Second Assessment Report

Climate Change 1995: Science of Climate Change
Contribution of Working Group I to the Second Assessment Report

Climate Change 1995: Scientific-Technical Analyses of Impacts, Adaptations and Mitigation of Climate Change
Contribution of Working Group II to the Second Assessment Report

Climate Change 1995: Economic and Social Dimensions of Climate Change
Contribution of Working Group III to the Second Assessment Report

Climate Change 1995: Synthesis of Scientific-Technical Information Relevant to Interpreting Article 2 of the UN Framework Convention on Climate Change
A Report of the Intergovernmental Panel on Climate Change

Supplementary Reports to the First Assessment Report

Climate Change 1992: The Supplementary Report to the IPCC Scientific Assessment
Supplementary report of the IPCC Scientific Assessment Working Group I

Climate Change 1992: The Supplementary Report to the IPCC Impacts Assessment
Supplementary report of the IPCC Impacts Assessment Working Group II

Climate Change: The IPCC 1990 and 1992 Assessments
IPCC First Assessment Report Overview and Policymaker Summaries and 1992 IPCC Supplement

First Assessment Report

Climate Change: The Scientific Assessment
Report of the IPCC Scientific Assessment Working Group I, 1990

Climate Change: The IPCC Impacts Assessment
Report of the IPCC Impacts Assessment Working Group II, 1990

Climate Change: The IPCC Response Strategies
Report of the IPCC Response Strategies Working Group III, 1990

Special Reports

The Ocean and Cryosphere in a Changing Climate 2019

Climate Change and Land
An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems 2019

Global Warming of 1.5 °C
An IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. 2018

Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation 2012

Renewable Energy Sources and Climate Change Mitigation 2011

Carbon Dioxide Capture and Storage 2005

Safeguarding the Ozone Layer and the Global Climate System: Issues Related to Hydrofluorocarbons and Perfluorocarbons (IPCC/TEAP joint report) 2005

Land Use, Land-Use Change, and Forestry 2000

Emissions Scenarios 2000

Methodological and Technological Issues in Technology Transfer 2000

Aviation and the Global Atmosphere 1999

The Regional Impacts of Climate Change: An Assessment of Vulnerability 1997

Climate Change 1994: Radiative Forcing of Climate Change and an Evaluation of the IPCC IS92 Emission Scenarios 1994

Methodology Reports and Technical Guidelines

2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories 2019

2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol (KP Supplement) 2014

2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (Wetlands Supplement) 2014

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The Intergovernmental Panel on Climate Change (IPCC) is the leading international body for the assessment of climate change. It was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) to provide an authoritative international assessment of the scientific aspects of climate change, based on the most recent scientific, technical, and socio-economic information published worldwide. The IPCC's periodic assessments of the causes, impacts and possible response strategies to climate change are the most comprehensive and up-to-date reports available on the subject, and form the standard reference for all concerned with climate change in academia, government and industry worldwide. This Synthesis Report is the fourth element of the IPCC Sixth Assessment Report, Climate Change 2021/2023. More than 800 international experts assessed climate change in this Sixth Assessment Report. The three Working Group contributions are available from the Cambridge University Press:

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INTERNATIONAL COURT OF JUSTICE

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CASE CONCERNING APPLICATION OF THE CONVENTION ON THE PREVENTION AND PUNISHMENT OF THE CRIME OF GENOCIDE

(BOSNIA AND HERZEGOVINA *v.* SERBIA AND MONTENEGRO)

JUDGMENT OF 26 FEBRUARY 2007

2007

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(BOSNIE-HERZÉGOVINE c. SERBIE-ET-MONTÉNÉGRO)

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(BOSNIE-HERZÉGOVINE c. SERBIE-ET-MONTÉNÉGRO)

26 FÉVRIER 2007

ARRÊT

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LIST OF ACRONYMS

Abbreviation	*Full name*	*Comments*
ARBiH	Army of the Republic of Bosnia and Herzegovina	
FRY	Federal Republic of Yugoslavia	Name of Serbia and Montenegro between 27 April 1992 (adoption of the Constitution) and 3 February 2003
ICTR	International Criminal Tribunal for Rwanda	
ICTY	International Criminal Tribunal for the former Yugoslavia	
ILC	International Law Commission	
JNA	Yugoslav People's Army	Army of the SFRY (ceased to exist on 27 April 1992, with the creation of the VJ)
MUP	Ministarstvo Unutrašnjih Pollova	Ministry of the Interior
NATO	North Atlantic Treaty Organization	
SFRY	Socialist Federal Republic of Yugoslavia	
TO	Teritorijalna Odbrana	Territorial Defence Forces
UNHCR	United Nations High Commissioner for Refugees	
UNPROFOR	United Nations Protection Force	
VJ	Yugoslav Army	Army of the FRY, under the Constitution of 27 April 1992 (succeeded to the JNA)
VRS	Army of the Republika Srpska	

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CASE CONCERNING APPLICATION OF THE CONVENTION ON THE PREVENTION AND PUNISHMENT OF THE CRIME OF GENOCIDE

(BOSNIA AND HERZEGOVINA *v.* SERBIA AND MONTENEGRO)

JUDGMENT

Present: *President* HIGGINS; *Vice-President* AL-KHASAWNEH; *Judges* RANJEVA, SHI, KOROMA, OWADA, SIMMA, TOMKA, ABRAHAM, KEITH, SEPÚLVEDA-AMOR, BENNOUNA, SKOTNIKOV; *Judges* ad hoc MAHIOU, KREĆA; *Registrar* COUVREUR.

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between

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as Co-Agents;

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Mr. Ian Brownlie, C.B.E., Q.C., F.B.A., Member of the International Law Commission, member of the English Bar, Distinguished Fellow of All Souls College, Oxford,
Mr. Xavier de Roux, Maîtrise de droit, avocat à la cour, Paris,
Ms Nataša Fauveau-Ivanović, avocat à la cour, Paris, member of the Council of the International Criminal Bar,
Mr. Andreas Zimmerman, LL.M. (Harvard), Professor of Law at the University of Kiel, Director of the Walther-Schücking Institute,

Mr. Vladimir Djerić, LL.M. (Michigan), Attorney at Law, Mikijelj, Janković & Bogdanović, Belgrade, President of the International Law Association of Serbia and Montenegro,
Mr. Igor Olujić, Attorney at Law, Belgrade,

as Counsel and Advocates;

Ms Sanja Djajić, S.J.D, Associate Professor at the Novi Sad University School of Law,
Ms Ivana Mroz, LL.M. (Minneapolis),
Mr. Svetislav Rabrenović, Expert-associate at the Office of the Prosecutor for War Crimes of the Republic of Serbia,
Mr. Aleksandar Djurdjić, LL.M., First Secretary at the Ministry of Foreign Affairs of Serbia and Montenegro,
Mr. Miloš Jastrebić, Second Secretary at the Ministry of Foreign Affairs of Serbia and Montenegro,
Mr. Christian J. Tams, LL.M., Ph.D. (Cambridge), Walther-Schücking Institute, University of Kiel,
Ms Dina Dobrkovic, LL.B.,

as Assistants,

THE COURT,

composed as above,

after deliberation,

delivers the following Judgment:

1. On 20 March 1993, the Government of the Republic of Bosnia and Herzegovina (with effect from 14 December 1995 "Bosnia and Herzegovina") filed in the Registry of the Court an Application instituting proceedings against the Federal Republic of Yugoslavia (with effect from 4 February 2003, "Serbia and Montenegro" and with effect from 3 June 2006, the Republic of Serbia — see paragraphs 67 and 79 below) in respect of a dispute concerning alleged violations of the Convention on the Prevention and Punishment of the Crime of Genocide, adopted by the General Assembly of the United Nations on 9 December 1948 (hereinafter "the Genocide Convention" or "the Convention"), as well as various matters which Bosnia and Herzegovina claimed were connected therewith. The Application invoked Article IX of the Genocide Convention as the basis of the jurisdiction of the Court.

2. Pursuant to Article 40, paragraph 2, of the Statute of the Court, the Application was immediately communicated to the Government of the Federal Republic of Yugoslavia (hereinafter "the FRY") by the Registrar; and in accordance with paragraph 3 of that Article, all States entitled to appear before the Court were notified of the Application.

3. In conformity with Article 43 of the Rules of Court, the Registrar addressed the notification provided for in Article 63, paragraph 1, of the Statute to all the States appearing on the list of the parties to the Genocide Convention held by the Secretary-General of the United Nations as depositary. The Registrar also sent to the Secretary-General the notification provided for in Article 34, paragraph 3, of the Statute.

4. On 20 March 1993, immediately after the filing of its Application, Bosnia

and Herzegovina submitted a request for the indication of provisional measures pursuant to Article 73 of the Rules of Court. On 31 March 1993, Bosnia and Herzegovina filed in the Registry, and invoked as an additional basis of jurisdiction, the text of a letter dated 8 June 1992, addressed jointly by the President of the then Republic of Montenegro and the President of the then Republic of Serbia to the President of the Arbitration Commission of the International Conference for Peace in Yugoslavia. On 1 April 1993, the FRY submitted written observations on Bosnia and Herzegovina's request for provisional measures, in which it, in turn, recommended that the Court indicate provisional measures to be applied to Bosnia and Herzegovina. By an Order dated 8 April 1993, the Court, after hearing the Parties, indicated certain provisional measures with a view to the protection of rights under the Genocide Convention.

5. By an Order dated 16 April 1993, the President of the Court fixed 15 October 1993 as the time-limit for the filing of the Memorial of Bosnia and Herzegovina and 15 April 1994 as the time-limit for the filing of the Counter-Memorial of the FRY.

6. Since the Court included upon the Bench no judge of the nationality of the Parties, each of them exercised its right under Article 31, paragraph 3, of the Statute to choose a judge *ad hoc* to sit in the case: Bosnia and Herzegovina chose Mr. Elihu Lauterpacht and the FRY chose Mr. Milenko Kreća.

7. On 27 July 1993, Bosnia and Herzegovina submitted a new request for the indication of provisional measures. By letters of 6 August and 10 August 1993, the Agent of Bosnia and Herzegovina indicated that his Government wished to invoke additional bases of jurisdiction in the case: the Treaty between the Allied and Associated Powers and the Kingdom of the Serbs, Croats and Slovenes on the Protection of Minorities, signed at Saint-Germain-en-Laye on 10 September 1919, and customary and conventional international laws of war and international humanitarian law. By a letter of 13 August 1993, the Agent of Bosnia and Herzegovina confirmed his Government's intention also to rely on the above-mentioned letter from the Presidents of Montenegro and Serbia dated 8 June 1992 as an additional basis of jurisdiction (see paragraph 4).

8. On 10 August 1993, the FRY also submitted a request for the indication of provisional measures and on 10 August and 23 August 1993, it filed written observations on Bosnia and Herzegovina's new request. By an Order dated 13 September 1993, the Court, after hearing the Parties, reaffirmed the measures indicated in its Order of 8 April 1993 and stated that those measures should be immediately and effectively implemented.

9. By an Order dated 7 October 1993, the Vice-President of the Court, at the request of Bosnia and Herzegovina, extended the time-limit for the filing of the Memorial to 15 April 1994 and accordingly extended the time-limit for the filing of the Counter-Memorial to 15 April 1995. Bosnia and Herzegovina filed its Memorial within the time-limit thus extended. By a letter dated 9 May 1994, the Agent of the FRY submitted that the Memorial filed by Bosnia and Herzegovina failed to meet the requirements of Article 43 of the Statute and Articles 50 and 51 of the Rules of Court. By letter of 30 June 1994, the Registrar, acting on the instructions of the Court, requested Bosnia and Herzegovina, pursuant to Article 50, paragraph 2, of the Rules of Court, to file as annexes to its Memorial the extracts of the documents to which it referred therein. Bosnia and

Herzegovina accordingly filed Additional Annexes to its Memorial on 4 January 1995.

10. By an Order dated 21 March 1995, the President of the Court, at the request of the FRY, extended the time-limit for the filing of the Counter-Memorial to 30 June 1995. Within the time-limit thus extended, the FRY, referring to Article 79, paragraph 1, of the Rules of Court of 14 April 1978, raised preliminary objections concerning the Court's jurisdiction to entertain the case and to the admissibility of the Application. Accordingly, by an Order of 14 July 1995, the President of the Court noted that, by virtue of Article 79, paragraph 3, of the 1978 Rules of Court, the proceedings on the merits were suspended, and fixed 14 November 1995 as the time-limit within which Bosnia and Herzegovina might present a written statement of its observations and submissions on the preliminary objections raised by the FRY. Bosnia and Herzegovina filed such a statement within the time-limit thus fixed.

11. By a letter dated 2 February 1996, the Agent of the FRY submitted to the Court the text of the General Framework Agreement for Peace in Bosnia and Herzegovina and the annexes thereto, initialled in Dayton, Ohio, on 21 November 1995, and signed in Paris on 14 December 1995 (hereinafter the "Dayton Agreement").

12. Public hearings were held on preliminary objections between 29 April and 3 May 1996. By a Judgment of 11 July 1996, the Court dismissed the preliminary objections and found that it had jurisdiction to adjudicate on the dispute on the basis of Article IX of the Genocide Convention and that the Application was admissible.

13. By an Order dated 23 July 1996, the President fixed 23 July 1997 as the time-limit for the filing of the Counter-Memorial of the FRY. The Counter-Memorial, which was filed on 22 July 1997, contained counter-claims. By a letter dated 28 July 1997, Bosnia and Herzegovina, invoking Article 80 of the 1978 Rules of Court, challenged the admissibility of the counter-claims. On 22 September 1997, at a meeting held between the President of the Court and the Agents of the Parties, the Agents accepted that their respective Governments submit written observations on the question of the admissibility of the counter-claims. Bosnia and Herzegovina and the FRY submitted their observations to the Court on 10 October 1997 and 24 October 1997, respectively. By an Order dated 17 December 1997, the Court found that the counter-claims submitted by the FRY were admissible as such and formed part of the current proceedings since they fulfilled the conditions set out in Article 80, paragraphs 1 and 2, of the 1978 Rules of Court. The Court further directed Bosnia and Herzegovina to submit a Reply and the FRY to submit a Rejoinder relating to the claims of both Parties and fixed 23 January 1998 and 23 July 1998 as the respective time-limits for the filing of those pleadings. The Court also reserved the right of Bosnia and Herzegovina to present its views on the counter-claims of the FRY in an additional pleading.

14. By an Order dated 22 January 1998, the President, at the request of Bosnia and Herzegovina, extended the time-limit for the filing of the Reply of Bosnia and Herzegovina to 23 April 1998 and accordingly extended the time-limit for the filing of the Rejoinder of the FRY to 22 January 1999.

15. On 15 April 1998, the Co-Agent of the FRY filed "Additional Annexes

to the Counter-Memorial of the Federal Republic of Yugoslavia". By a letter dated 14 May 1998, the Deputy Agent of Bosnia and Herzegovina, referring to Articles 50 and 52 of the Rules of Court, objected to the admissibility of these documents in view of their late filing. On 22 September 1998, the Parties were informed that the Court had decided that the documents in question "[were] admissible as Annexes to the Counter-Memorial to the extent that they were established, in the original language, on or before the date fixed by the Order of 23 July 1996 for the filing of the Counter-Memorial" and that "[a]ny such document established after that date [would] have to be submitted as an Annex to the Rejoinder, if Yugoslavia so wishe[d]".

16. On 23 April 1998, within the time-limit thus extended, Bosnia and Herzegovina filed its Reply. By a letter dated 27 November 1998, the FRY requested the Court to extend the time-limit for the filing of its Rejoinder to 22 April 1999. By a letter dated 9 December 1998, Bosnia and Herzegovina objected to any extension of the time-limit fixed for the filing of the Rejoinder. By an Order of 11 December 1998, the Court, having regard to the fact that Bosnia and Herzegovina had been granted an extension of the time-limit for the filing of its Reply, extended the time-limit for the filing of the Rejoinder of the FRY to 22 February 1999. The FRY filed its Rejoinder within the time-limit thus extended.

17. On 19 April 1999, the President of the Court held a meeting with the representatives of the Parties in order to ascertain their views with regard to questions of procedure. Bosnia and Herzegovina indicated that it did not intend to file an additional pleading concerning the counter-claims made by the FRY and considered the case ready for oral proceedings. The Parties also expressed their views about the organization of the oral proceedings.

18. By a letter dated 9 June 1999, the then Chairman of the Presidency of Bosnia and Herzegovina, Mr. Zivko Radisić, informed the Court of the appointment of a Co-Agent, Mr. Svetozar Miletić. By a letter dated 10 June 1999, the thus appointed Co-Agent informed the Court that Bosnia and Herzegovina wished to discontinue the case. By a letter of 14 June 1999, the Agent of Bosnia and Herzegovina asserted that the Presidency of Bosnia and Herzegovina had taken no action to appoint a Co-Agent or to terminate the proceedings before the Court. By a letter of 15 June 1999, the Agent of the FRY stated that his Government accepted the discontinuance of the proceedings. By a letter of 21 June 1999, the Agent of Bosnia and Herzegovina reiterated that the Presidency had not made any decision to discontinue the proceedings and transmitted to the Court letters from two members of the Presidency, including the new Chairman of the Presidency, confirming that no such decision had been made.

19. By letters dated 30 June 1999 and 2 September 1999, the President of the Court requested the Chairman of the Presidency to clarify the position of Bosnia and Herzegovina regarding the pendency of the case. By a letter dated 3 September 1999, the Agent of the FRY submitted certain observations on this matter, concluding that there was an agreement between the Parties to discontinue the case. By a letter dated 15 September 1999, the Chairman of the Presidency of Bosnia and Herzegovina informed the Court that at its 58th session held on 8 September 1999, the Presidency had concluded that: (i) the Presidency "did not make a decision to discontinue legal proceedings before the International Court of Justice"; (ii) the Presidency "did not make a decision to name a Co-Agent in this case"; (iii) the Presidency would "inform [the Court] timely about any further decisions concerning this case".

20. By a letter of 20 September 1999, the President of the Court informed

the Parties that the Court intended to schedule hearings in the case beginning in the latter part of February 2000 and requested the Chairman of the Presidency of Bosnia and Herzegovina to confirm that Bosnia and Herzegovina's position was that the case should so proceed. By a letter of 4 October 1999, the Agent of Bosnia and Herzegovina confirmed that the position of his Government was that the case should proceed and he requested the Court to set a date for the beginning of the oral proceedings as soon as possible. By a letter dated 10 October 1999, the member of the Presidency of Bosnia and Herzegovina from the Republika Srpska informed the Court that the letter of 15 September 1999 from the Chairman of the Presidency was "without legal effects" *inter alia* because the National Assembly of the Republika Srpska, acting pursuant to the Constitution of Bosnia and Herzegovina, had declared the decision of 15 September "destructive of a vital interest" of the Republika Srpska. On 22 October 1999, the President informed the Parties that, having regard to the correspondence received on this matter, the Court had decided not to hold hearings in the case in February 2000.

21. By a letter dated 23 March 2000 transmitting to the Court a letter dated 20 March 2000 from the Chairman of the Presidency, the Agent of Bosnia and Herzegovina reaffirmed that the appointment of a Co-Agent by the former Chairman of the Presidency of Bosnia and Herzegovina on 9 June 1999 lacked any legal basis and that the communications of the Co-Agent did not reflect the position of Bosnia and Herzegovina. Further, the Agent asserted that, contrary to the claims of the member of the Presidency of Bosnia and Herzegovina from the Republic of Srpska, the letter of 15 September 1999 was not subject to the veto mechanism contained in the Constitution of Bosnia and Herzegovina. The Agent requested the Court to set a date for oral proceedings at its earliest convenience.

22. By a letter dated 13 April 2000, the Agent of the FRY transmitted to the Court a document entitled "Application for the Interpretation of the Decision of the Court on the Pendency of the case concerning Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina *v.* Yugoslavia)", requesting an interpretation of the decision of the Court to which the President of the Court had referred in his letter dated 22 October 1999. By a letter dated 18 April 2000, the Registrar informed the Agent of the FRY that, according to Article 60 of the Statute, a request for interpretation could relate only to a judgment of the Court and therefore the document transmitted to the Court on 13 April 2000 could not constitute a request for interpretation and had not been entered on the Court's General List. The Registrar further explained that the sole decision to which reference was made in the letter of 22 October 1999 was that no hearings would be held in February 2000. The Registrar requested the Agent to transmit as soon as possible any comments he might have on the letter dated 23 March 2000 from the Agent of Bosnia and Herzegovina and the letter from the Chairman of the Presidency enclosed therewith. By a letter dated 25 April 2000, the Agent of the FRY submitted such comments to the Court and requested that the Court record and implement the agreement for the discontinuance of the case evidenced by the exchange of the letter of the Co-Agent of the Applicant dated 10 June 1999 and the letter of the Agent of the FRY dated 15 June 1999. By a letter dated 8 May 2000, the Agent of Bosnia and Herzegovina submitted certain observations regarding the letter dated 25 April 2000 from the Agent of the FRY and reiterated the wish of his Government to continue with the proceedings in the case. By letters dated 8 June, 26 June and 4 October 2000 from the

FRY and letters dated 9 June and 21 September 2000 from Bosnia and Herzegovina, the Agents of the Parties restated their positions.

23. By a letter dated 29 September 2000, Mr. Svetozar Miletić, who had purportedly been appointed Co-Agent on 9 June 1999 by the then Chairman of the Presidency of Bosnia and Herzegovina, reiterated his position that the case had been discontinued. By a letter dated 6 October 2000, the Agent of Bosnia and Herzegovina stated that this letter and the recent communication from the Agent of the FRY had not altered the commitment of the Government of Bosnia and Herzegovina to continue the proceedings.

24. By letters dated 16 October 2000 from the President of the Court and from the Registrar, the Parties were informed that, at its meeting of 10 October 2000, the Court, having examined all the correspondence received on this question, had found that Bosnia and Herzegovina had not demonstrated its will to withdraw the Application in an unequivocal manner. The Court had thus concluded that there had been no discontinuance of the case by Bosnia and Herzegovina. Consequently, in accordance with Article 54 of the Rules, the Court, after having consulted the Parties, would, at an appropriate time, fix a date for the opening of the oral proceedings.

25. By a letter dated 18 January 2001, the Minister for Foreign Affairs of the FRY requested the Court to grant a stay of the proceedings or alternatively to postpone the opening of the oral proceedings for a period of 12 months due, *inter alia*, to the change of Government of the FRY and the resulting fundamental change in the policies and international position of that State. By a letter dated 25 January 2001, the Agent of Bosnia and Herzegovina communicated the views of his Government on the request made by the FRY and reserved his Government's final judgment on the matter, indicating that, in the intervening period, Bosnia and Herzegovina's position continued to be that there should be an expedited resolution of the case.

26. By a letter dated 20 April 2001, the Agent of the FRY informed the Court that his Government wished to withdraw the counter-claims submitted by the FRY in its Counter-Memorial. The Agent also informed the Court that his Government was of the opinion that the Court did not have jurisdiction *ratione personae* over the FRY and further that the FRY intended to submit an application for revision of the Judgment of 11 July 1996. On 24 April 2001, the FRY filed in the Registry of the Court an Application instituting proceedings whereby, referring to Article 61 of the Statute, it requested the Court to revise the Judgment delivered on Preliminary Objections on 11 July 1996 (*Application for Revision of the Judgment of 11 July 1996 in the Case concerning* Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina *v.* Yugoslavia), Preliminary Objections *(Yugoslavia* v. *Bosnia and Herzegovina)*, hereinafter referred to as "the *Application for Revision* case"). In the present case the Agent of the FRY submitted, under cover of a letter dated 4 May 2001, a document entitled "Initiative to the Court to Reconsider *ex officio* Jurisdiction over Yugoslavia", accompanied by one volume of annexes (hereinafter "the Initiative"). The Agent informed the Court that the Initiative was based on facts and arguments which were essentially identical to those submitted in the FRY's Application for revision of the Judgment of 11 July 1996 since his Government believed that these were both appropriate procedural avenues. In the Initiative, the FRY requested the Court to adjudge and declare that it had no jurisdiction *ratione personae* over the FRY, contending that it had not been a party to the Statute of the Court until its admission to the United Nations on 1 November 2000, that it had not been

and still was not a party to the Genocide Convention; it added moreover that its notification of accession to that Convention dated 8 March 2001 contained a reservation to Article IX thereof. The FRY asked the Court to suspend the proceedings on the merits until a decision was rendered on the Initiative.

27. By a letter dated 12 July 2001 and received in the Registry on 15 August 2001, Bosnia and Herzegovina informed the Court that it had no objection to the withdrawal of the counter-claims by the FRY and stated that it intended to submit observations regarding the Initiative. By an Order dated 10 September 2001, the President of the Court placed on record the withdrawal by the FRY of the counter-claims submitted in its Counter-Memorial.

28. By a letter dated 3 December 2001, Bosnia and Herzegovina provided the Court with its views regarding the Initiative and transmitted a memorandum on "differences between the Application for Revision of 23 April 2001 and the 'Initiative' of 4 May 2001" as well as a copy of the written observations and annexes filed by Bosnia and Herzegovina on 3 December 2001 in the *Application for Revision* case. In that letter, Bosnia and Herzegovina submitted that "there [was] no basis in fact nor in law to honour this so-called 'Initiative'" and requested the Court *inter alia* to "respond in the negative to the request embodied in the 'Initiative'".

29. By a letter dated 22 February 2002 to the President of the Court, Judge *ad hoc* Lauterpacht resigned from the case.

30. Under cover of a letter of 18 April 2002, the Registrar, referring to Article 34, paragraph 3, of the Statute, transmitted copies of the written proceedings to the Secretary-General of the United Nations.

31. In its Judgment of 3 February 2003 in the *Application for Revision* case, the Court found that the FRY's Application for revision, under Article 61 of the Statute of the Court, of the Judgment of 11 July 1996 on preliminary objections was inadmissible.

32. By a letter dated 5 February 2003, the FRY informed the Court that, following the adoption and promulgation of the Constitutional Charter of Serbia and Montenegro by the Assembly of the FRY on 4 February 2003, the name of the State had been changed from the "Federal Republic of Yugoslavia" to "Serbia and Montenegro". The title of the case was duly changed and the name "Serbia and Montenegro" was used thereafter for all official purposes of the Court.

33. By a letter of 17 February 2003, Bosnia and Herzegovina reaffirmed its position with respect to the Initiative, as stated in the letter of 3 December 2001, and expressed its desire to proceed with the case. By a letter dated 8 April 2003, Serbia and Montenegro submitted that, due to major new developments since the filing of the last written pleading, additional written pleadings were necessary in order to make the oral proceedings more effective and less time-consuming. On 24 April 2003, the President of the Court held a meeting with the Agents of the Parties to discuss questions of procedure. Serbia and Montenegro stated that it maintained its request for the Court to rule on its Initiative while Bosnia and Herzegovina considered that there was no need for additional written pleadings. The possible dates and duration of the oral proceedings were also discussed.

34. By a letter dated 25 April 2003, Bosnia and Herzegovina chose Mr. Ahmed Mahiou to sit as judge *ad hoc* in the case.

35. By a letter of 12 June 2003, the Registrar informed Serbia and Montenegro that the Court could not accede to its request that the proceedings be suspended until a decision was rendered on the jurisdictional issues raised in the Initiative; however, should it wish to do so, Serbia and Montenegro would be free to present further argument on jurisdictional questions during the oral proceedings on the merits. In further letters of the same date, the Parties were informed that the Court, having considered Serbia and Montenegro's request, had decided not to authorize the filing of further written pleadings in the case.

36. In an exchange of letters in October and November 2003, the Agents of the Parties made submissions as to the scheduling of the oral proceedings.

37. Following a further exchange of letters between the Parties in March and April 2004, the President held a meeting with the Agents of the Parties on 25 June 2004, at which the Parties presented their views on, *inter alia*, the scheduling of the hearings and the calling of witnesses and experts.

38. By letters dated 26 October 2004, the Parties were informed that, after examining the list of cases before it ready for hearing and considering all the relevant circumstances, the Court had decided to fix Monday 27 February 2006 for the opening of the oral proceedings in the case.

39. On 14 March 2005, the President met with the Agents of the Parties in order to ascertain their views with regard to the organization of the oral proceedings. At this meeting, both Parties indicated that they intended to call witnesses and experts.

40. By letters dated 19 March 2005, the Registrar, referring to Articles 57 and 58 of the Rules of Court, requested the Parties to provide, by 9 September 2005, details of the witnesses, experts and witness-experts whom they intended to call and indications of the specific point or points to which the evidence of the witness, expert or witness-expert would be directed. By a letter of 8 September 2005, the Agent of Serbia and Montenegro transmitted to the Court a list of eight witnesses and two witness-experts whom his Government wished to call during the oral proceedings. By a further letter of the same date, the Agent of Serbia and Montenegro communicated a list of five witnesses whose attendance his Government requested the Court to arrange pursuant to Article 62, paragraph 2, of the Rules of Court. By a letter dated 9 September 2005, Bosnia and Herzegovina transmitted to the Court a list of three experts whom it wished to call at the hearings.

41. By a letter dated 5 October 2005, the Deputy Agent of Bosnia and Herzegovina informed the Registry of Bosnia and Herzegovina's views with regard to the time that it considered necessary for the hearing of the experts it wished to call and made certain submissions, *inter alia*, with respect to the request made by Serbia and Montenegro pursuant to Article 62, paragraph 2, of the Rules of Court. By letters of 4 and 11 October 2005, the Agent and the Co-Agent of Serbia and Montenegro, respectively, informed the Registry of the views of their Government with respect to the time necessary for the hearing of the witnesses and witness-experts whom it wished to call.

42. By letters of 15 November 2005, the Registrar informed the Parties, *inter alia*, that the Court had decided that it would hear the three experts and ten witnesses and witness-experts that Bosnia and Herzegovina and Serbia and Montenegro respectively wished to call and, moreover, that it had decided not to arrange for the attendance, pursuant to Article 62, paragraph 2, of the Rules

of Court, of the five witnesses proposed by Serbia and Montenegro. However, the Court reserved the right to exercise subsequently, if necessary, its powers under that provision to call persons of its choosing on its own initiative. The Registrar also requested the Parties to provide certain information related to the hearing of the witnesses, experts and witness-experts including, *inter alia*, the language in which each witness, expert or witness-expert would speak and, in respect of those speaking in a language other than English or French, the arrangements which the Party intended to make, pursuant to Article 70, paragraph 2, of the Rules of Court, for interpretation into one of the official languages of the Court. Finally the Registrar transmitted to the Parties the calendar for the oral proceedings as adopted by the Court.

43. By a letter dated 12 December 2005, the Agent of Serbia and Montenegro informed the Court, *inter alia*, that eight of the ten witnesses and witness-experts it wished to call would speak in Serbian and outlined the arrangements that Serbia and Montenegro would make for interpretation from Serbian to one of the official languages of the Court. By a letter dated 15 December 2005, the Deputy Agent of Bosnia and Herzegovina informed the Court, *inter alia,* that the three experts called by Bosnia and Herzegovina would speak in one of the official languages of the Court.

44. By a letter dated 28 December 2005, the Deputy Agent of Bosnia and Herzegovina, on behalf of the Government, requested that the Court call upon Serbia and Montenegro, under Article 49 of the Statute and Article 62, paragraph 1, of the Rules of Court, to produce a certain number of documents. By a letter dated 16 January 2006, the Agent of Serbia and Montenegro informed the Court of his Government's views on this request. By a letter dated 19 January 2006, the Registrar, acting on the instructions of the Court, asked Bosnia and Herzegovina to provide certain further information relating to its request under Article 49 of the Statute and Article 62, paragraph 2, of the Rules of Court. By letters dated 19 and 24 January 2006, the Deputy Agent of Bosnia and Herzegovina submitted additional information and informed the Court that Bosnia and Herzegovina had decided, for the time being, to restrict its request to the redacted sections of certain documents. By a letter dated 31 January 2006, the Co-Agent of Serbia and Montenegro communicated his Government's views regarding this modified request. By letters dated 2 February 2006, the Registrar informed the Parties that the Court had decided, at this stage of the proceedings, not to call upon Serbia and Montenegro to produce the documents in question. However, the Court reserved the right to exercise subsequently, if necessary, its powers under Article 49 of the Statute and Article 62, paragraph 1, of the Rules of Court, to request, *proprio motu*, the production by Serbia and Montenegro of the documents in question.

45. By a letter dated 16 January 2006, the Deputy Agent of Bosnia and Herzegovina transmitted to the Registry copies of new documents that Bosnia and Herzegovina wished to produce pursuant to Article 56 of the Rules of Court. Under cover of the same letter and of a letter dated 23 January 2006, the Deputy Agent of Bosnia and Herzegovina also transmitted to the Registry copies of video material, extracts of which Bosnia and Herzegovina intended to present at the oral proceedings. By a letter dated 31 January 2006, the Co-Agent of Serbia and Montenegro informed the Court that his Government did not object to the production of the new documents by Bosnia and Herzegovina. Nor did it object to the video material being shown at the oral proceedings. By

letters of 2 February 2006, the Registrar informed the Parties that, in view of the fact that no objections had been raised by Serbia and Montenegro, the Court had decided to authorize the production of the new documents by Bosnia and Herzegovina pursuant to Article 56 of the Rules of Court and that it had further decided that Bosnia and Herzegovina could show extracts of the video material at the hearings.

46. Under cover of a letter dated 18 January 2006 and received on 20 January 2006, the Agent of Serbia and Montenegro provided the Registry with copies of new documents which his Government wished to produce pursuant to Article 56 of the Rules of Court. By a letter of 1 February 2006, the Deputy Agent of Bosnia and Herzegovina informed the Court that Bosnia and Herzegovina did not object to the production of the said documents by Serbia and Montenegro. By a letter dated 2 February 2006, the Registrar informed the Parties that, in view of the fact that no objection had been raised by Bosnia and Herzegovina, the Court had decided to authorize the production of the new documents by Serbia and Montenegro. By a letter dated 9 February 2006, the Co-Agent of Serbia and Montenegro transmitted to the Court certain missing elements of the new documents submitted on 20 January 2006 and made a number of observations concerning the new documents produced by Bosnia and Herzegovina. By a letter dated 20 February 2006, the Deputy Agent of Bosnia and Herzegovina informed the Court that Bosnia and Herzegovina did not intend to make any observations regarding the new documents produced by Serbia and Montenegro.

47. Under cover of a letter dated 31 January 2006, the Co-Agent of Serbia and Montenegro transmitted to the Court a list of public documents that his Government would refer to in its first round of oral argument. By a further letter dated 14 February 2006, the Co-Agent of Serbia and Montenegro transmitted to the Court copies of folders containing the public documents referred to in the list submitted on 31 January 2006 and informed the Court that Serbia and Montenegro had decided not to submit the video materials included in that list. By a letter dated 20 February 2006, the Deputy Agent of Bosnia and Herzegovina informed the Court that Bosnia and Herzegovina had no observations to make regarding the list of public documents submitted by Serbia and Montenegro on 31 January 2006. He also stated that Bosnia and Herzegovina would refer to similar sources during its pleadings and was planning to provide the Court and the Respondent, at the end of the first round of its oral argument, with a CD-ROM containing materials it had quoted (see below, paragraph 54).

48. By a letter dated 26 January 2006, the Registrar informed the Parties of certain decisions taken by the Court with regard to the hearing of the witnesses, experts and witness-experts called by the Parties including, *inter alia*, that, exceptionally, the verbatim records of the sittings at which the witnesses, experts and witness-experts were heard would not be made available to the public or posted on the website of the Court until the end of the oral proceedings.

49. By a letter dated 13 February 2006, the Agent of Serbia and Montenegro informed the Court that his Government had decided not to call two of the witnesses and witness-experts included in the list transmitted to the Court on 8 September 2005 and that the order in which the remaining witnesses and witness-expert would be heard had been modified. By a letter dated 21 February 2006, the Agent of Serbia and Montenegro requested the Court's per-

mission for the examination of three of the witnesses called by his Government to be conducted in Serbian (namely, Mr. Dušan Mihajlović, Mr. Vladimir Milićević, Mr. Dragoljub Mićunović). By a letter dated 22 February 2006, the Registrar informed the Agent of Serbia and Montenegro that there was no objection to such a procedure being followed, pursuant to the provisions of Article 39, paragraph 3, of the Statute and Article 70 of the Rules of Court.

50. Pursuant to Article 53, paragraph 2, of the Rules, the Court, after ascertaining the views of the Parties, decided that copies of the pleadings and documents annexed would be made available to the public at the opening of the oral proceedings.

51. Public sittings were held from 27 February to 9 May 2006, at which the Court heard the oral arguments and replies of:

For Bosnia and Herzegovina: Mr. Sakib Softić,
Mr. Phon van den Biesen,
Mr. Alain Pellet,
Mr. Thomas M. Franck,
Ms Brigitte Stern,
Mr. Luigi Condorelli,
Ms Magda Karagiannakis,
Ms Joanna Korner,
Ms Laura Dauban,
Mr. Antoine Ollivier,
Mr. Morten Torkildsen.

For Serbia and Montenegro: H.E. Mr. Radoslav Stojanović,
Mr. Saša Obradović,
Mr. Vladimir Cvetković,
Mr. Tibor Varady,
Mr. Ian Brownlie,
Mr. Xavier de Roux,
Ms Nataša Fauveau-Ivanović,
Mr. Andreas Zimmerman,
Mr. Vladimir Djerić,
Mr. Igor Olujić.

52. On 1 March 2006, the Registrar, on the instructions of the Court, requested Bosnia and Herzegovina to specify the precise origin of each of the extracts of video material and of the graphics, charts and photographs shown or to be shown at the oral proceedings. On 2 March 2006 Bosnia and Herzegovina provided the Court with certain information regarding the extracts of video material shown at the sitting on 1 March 2006 and those to be shown at the sittings on 2 March 2006 including the source of such video material. Under cover of a letter dated 5 March 2006, the Agent of Bosnia and Herzegovina transmitted to the Court a list detailing the origin of the extracts of video material, graphics, charts and photographs shown or to be shown by it during its first round of oral argument, as well as transcripts, in English and in French, of the above-mentioned extracts of video material.

53. By a letter dated 5 March 2006, the Agent of Bosnia and Herzegovina informed the Court that it wished to withdraw one of the experts it had intended to call. In that letter, the Agent of Bosnia and Herzegovina also asked the Court to request each of the Parties to provide a one-page outline per wit-

ness, expert or witness-expert detailing the topics which would be covered in his evidence or statement. By letters dated 7 March 2006, the Parties were informed that the Court requested them to provide, at least three days before the hearing of each witness, expert or witness-expert, a one-page summary of the latter's evidence or statement.

54. On 7 March 2006, Bosnia and Herzegovina provided the Court and the Respondent with a CD-ROM containing "ICTY Public Exhibits and other Documents cited by Bosnia and Herzegovina during its Oral Pleadings (07/03/2006)". By a letter dated 10 March 2006, Serbia and Montenegro informed the Court that it objected to the production of the CD-ROM on the grounds that the submission at such a late stage of so many documents "raise[d] serious concerns related to the respect for the Rules of Court and the principles of fairness and equality of the parties". It also pointed out that the documents included on the CD-ROM "appear[ed] questionable from the point of [view of] Article 56, paragraph 4, of the Rules [of Court]". By a letter dated 13 March 2006, the Agent of Bosnia and Herzegovina informed the Court of his Government's views regarding the above-mentioned objections raised by Serbia and Montenegro. In that letter, the Agent submitted, *inter alia*, that all the documents on the CD-ROM had been referred to by Bosnia and Herzegovina in its oral argument and were documents which were in the public domain and were readily available within the terms of Article 56, paragraph 4, of the Rules of Court. The Agent added that Bosnia and Herzegovina was prepared to withdraw the CD-ROM if the Court found it advisable. By a letter of 14 March 2006, the Registrar informed Bosnia and Herzegovina that, given that Article 56, paragraph 4, of the Rules of Court did not require or authorize the submission to the Court of the full text of a document to which reference was made during the oral proceedings pursuant to that provision and since it was difficult for the other Party and the Court to come to terms, at the late stage of the proceedings, with such an immense mass of documents, which in any case were in the public domain and could thus be consulted if necessary, the Court had decided that it was in the interests of the good administration of justice that the CD-ROM be withdrawn. By a letter dated 16 March 2006, the Agent of Bosnia and Herzegovina withdrew the CD-ROM which it had submitted on 7 March 2006.

55. On 17 March 2006, Bosnia and Herzegovina submitted a map for use during the statement to be made by one of its experts on the morning of 20 March 2006. On 20 March 2006, Bosnia and Herzegovina produced a folder of further documents to be used in the examination of that expert. Serbia and Montenegro objected strongly to the production of the documents at such a late stage since its counsel would not have time to prepare for cross-examination. On 20 March 2006, the Court decided that the map submitted on 17 March 2006 could not be used during the statement of the expert. Moreover, having consulted both Parties, the Court decided to cancel the morning sitting and instead hear the expert during an afternoon sitting in order to allow Serbia and Montenegro to be ready for cross-examination.

56. On 20 March 2006, Serbia and Montenegro informed the Court that one of the witnesses it had intended to call finally would not be giving evidence.

57. The following experts were called by Bosnia and Herzegovina and made their statements at public sittings on 17 and 20 March 2006: Mr. András J. Riedlmayer and General Sir Richard Dannatt. The experts were examined by

counsel for Bosnia and Herzegovina and cross-examined by counsel for Serbia and Montenegro. The experts were subsequently re-examined by counsel for Bosnia and Herzegovina. Questions were put to Mr. Riedlmayer by Judges Kreća, Tomka, Simma and the Vice-President and replies were given orally. Questions were put to General Dannatt by the President, Judge Koroma and Judge Tomka and replies were given orally.

58. The following witnesses and witness-expert were called by Serbia and Montenegro and gave evidence at public sittings on 23, 24, 27 and 28 March 2006: Mr. Vladimir Lukić; Mr. Vitomir Popović; General Sir Michael Rose; Mr. Jean-Paul Sardon (witness-expert); Mr. Dušan Mihajlović; Mr. Vladimir Milićević; Mr. Dragoljub Mićunović. The witnesses and witness-expert were examined by counsel for Serbia and Montenegro and cross-examined by counsel for Bosnia and Herzegovina. General Rose, Mr. Mihajlović and Mr. Milićević were subsequently re-examined by counsel for Serbia and Montenegro. Questions were put to Mr. Lukić by Judges Ranjeva, Simma, Tomka and Bennouna and replies were given orally. Questions were put to General Rose by the Vice-President and Judges Owada and Simma and replies were given orally.

59. With the exception of General Rose and Mr. Jean-Paul Sardon, the above-mentioned witnesses called by Serbia and Montenegro gave their evidence in Serbian and, in accordance with Article 39, paragraph 3, of the Statute and Article 70, paragraph 2, of the Rules of Court, Serbia and Montenegro made the necessary arrangements for interpretation into one of the official languages of the Court and the Registry verified this interpretation. Mr. Stojanović conducted his examination of Mr. Dragoljub Mićunović in Serbian in accordance with the exchange of correspondence between Serbia and Montenegro and the Court on 21 and 22 February 2006 (see paragraph 49 above).

60. In the course of the hearings, questions were put by Members of the Court, to which replies were given orally and in writing, pursuant to Article 61, paragraph 4, of the Rules of Court.

61. By a letter of 8 May 2006, the Agent of Bosnia and Herzegovina requested the Court to allow the Deputy Agent to take the floor briefly on 9 May 2006, in order to correct an assertion about one of the counsel of and one of the experts called by Bosnia and Herzegovina which had been made by Serbia and Montenegro in its oral argument. By a letter dated 9 May 2006, the Agent of Serbia and Montenegro communicated the views of his Government on that matter. On 9 May 2006, the Court decided, in the particular circumstances of the case, to authorize the Deputy Agent of Bosnia and Herzegovina to make a very brief statement regarding the assertion made about its counsel.

62. By a letter dated 3 May 2006, the Agent of Bosnia and Herzegovina informed the Court that there had been a number of errors in references included in its oral argument presented on 2 March 2006 and provided the Court with the corrected references. By a letter dated 8 May 2006, the Agent of Serbia and Montenegro, "in light of the belated corrections by the Applicant, and for the sake of the equality between the parties", requested the Court to accept a paragraph of its draft oral argument of 2 May 2006 which responded to one of the corrections made by Bosnia and Herzegovina but had been left out of the final version of its oral argument "in order to fit the schedule of [Serbia and Montenegro's] presentations". By a letter dated 7 June 2006, the Parties were informed that the Court had taken due note of both the explana-

tion given by the Agent of Bosnia and Herzegovina and the observations made in response by the Agent of Serbia and Montenegro.

63. In January 2007, Judge Parra-Aranguren, who had attended the oral proceedings in the case, and had participated in part of the deliberation, but had for medical reasons been prevented from participating in the later stages thereof, informed the President of the Court, pursuant to Article 24, paragraph 1, of the Statute, that he considered that he should not take part in the decision of the case. The President took the view that the Court should respect and accept Judge Parra-Aranguren's position, and so informed the Court.

*

64. In its Application, the following requests were made by Bosnia and Herzegovina:

"Accordingly, while reserving the right to revise, supplement or amend this Application, and subject to the presentation to the Court of the relevant evidence and legal arguments, Bosnia and Herzegovina requests the Court to adjudge and declare as follows:

(a) that Yugoslavia (Serbia and Montenegro) has breached, and is continuing to breach, its legal obligations toward the People and State of Bosnia and Herzegovina under Articles I, II *(a)*, II *(b)*, II *(c)*, II *(d)*, III *(a)*, III *(b)*, III *(c)*, III *(d)*, III *(e)*, IV and V of the Genocide Convention;

(b) that Yugoslavia (Serbia and Montenegro) has violated and is continuing to violate its legal obligations toward the People and State of Bosnia and Herzegovina under the four Geneva Conventions of 1949, their Additional Protocol I of 1977, the customary international laws of war including the Hague Regulations on Land Warfare of 1907, and other fundamental principles of international humanitarian law;

(c) that Yugoslavia (Serbia and Montenegro) has violated and continues to violate Articles 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26 and 28 of the Universal Declaration of Human Rights with respect to the citizens of Bosnia and Herzegovina;

(d) that Yugoslavia (Serbia and Montenegro), in breach of its obligations under general and customary international law, has killed, murdered, wounded, raped, robbed, tortured, kidnapped, illegally detained, and exterminated the citizens of Bosnia and Herzegovina, and is continuing to do so;

(e) that in its treatment of the citizens of Bosnia and Herzegovina, Yugoslavia (Serbia and Montenegro) has violated, and is continuing to violate, its solemn obligations under Articles 1 (3), 55 and 56 of the United Nations Charter;

(f) that Yugoslavia (Serbia and Montenegro) has used and is continuing to use force and the threat of force against Bosnia and Herzegovina in violation of Articles 2 (1), 2 (2), 2 (3), 2 (4) and 33 (1), of the United Nations Charter;

(g) that Yugoslavia (Serbia and Montenegro), in breach of its obligations under general and customary international law, has used and is using force and the threat of force against Bosnia and Herzegovina;

(h) that Yugoslavia (Serbia and Montenegro), in breach of its obligations under general and customary international law, has violated and is violating the sovereignty of Bosnia and Herzegovina by:

— armed attacks against Bosnia and Herzegovina by air and land;

— aerial trespass into Bosnian airspace;
— efforts by direct and indirect means to coerce and intimidate the Government of Bosnia and Herzegovina;

(i) that Yugoslavia (Serbia and Montenegro), in breach of its obligations under general and customary international law, has intervened and is intervening in the internal affairs of Bosnia and Herzegovina;

(j) that Yugoslavia (Serbia and Montenegro), in recruiting, training, arming, equipping, financing, supplying and otherwise encouraging, supporting, aiding, and directing military and paramilitary actions in and against Bosnia and Herzegovina by means of its agents and surrogates, has violated and is violating its express charter and treaty obligations to Bosnia and Herzegovina and, in particular, its charter and treaty obligations under Article 2 (4), of the United Nations Charter, as well as its obligations under general and customary international law;

(k) that under the circumstances set forth above, Bosnia and Herzegovina has the sovereign right to defend Itself and its People under United Nations Charter Article 51 and customary international law, including by means of immediately obtaining military weapons, equipment, supplies and troops from other States;

(l) that under the circumstances set forth above, Bosnia and Herzegovina has the sovereign right under United Nations Charter Article 51 and customary international law to request the immediate assistance of any State to come to its defence, including by military means (weapons, equipment, supplies, troops, etc.);

(m) that Security Council resolution 713 (1991), imposing a weapons embargo upon the former Yugoslavia, must be construed in a manner that shall not impair the inherent right of individual or collective self-defence of Bosnia and Herzegovina under the terms of United Nations Charter Article 51 and the rules of customary international law;

(n) that all subsequent Security Council resolutions that refer to or reaffirm resolution 713 (1991) must be construed in a manner that shall not impair the inherent right of individual or collective self-defence of Bosnia and Herzegovina under the terms of United Nations Charter Article 51 and the rules of customary international law;

(o) that Security Council resolution 713 (1991) and all subsequent Security Council resolutions referring thereto or reaffirming thereof must not be construed to impose an arms embargo upon Bosnia and Herzegovina, as required by Articles 24 (1) and 51 of the United

Nations Charter and in accordance with the customary doctrine of *ultra vires*;

(p) that pursuant to the right of collective self-defence recognized by United Nations Charter Article 51, all other States parties to the Charter have the right to come to the immediate defence of Bosnia and Herzegovina — at its request — including by means of immediately providing It with weapons, military equipment and supplies, and armed forces (soldiers, sailors, air-people, etc.);

(q) that Yugoslavia (Serbia and Montenegro) and its agents and surrogates are under an obligation to cease and desist immediately from its breaches of the foregoing legal obligations, and is under a particular duty to cease and desist immediately:

— from its systematic practice of so-called 'ethnic cleansing' of the citizens and sovereign territory of Bosnia and Herzegovina;
— from the murder, summary execution, torture, rape, kidnapping, mayhem, wounding, physical and mental abuse, and detention of the citizens of Bosnia and Herzegovina;

— from the wanton devastation of villages, towns, districts, cities, and religious institutions in Bosnia and Herzegovina;

— from the bombardment of civilian population centres in Bosnia and Herzegovina, and especially its capital, Sarajevo;
— from continuing the siege of any civilian population centres in Bosnia and Herzegovina, and especially its capital, Sarajevo;
— from the starvation of the civilian population in Bosnia and Herzegovina;
— from the interruption of, interference with, or harassment of humanitarian relief supplies to the citizens of Bosnia and Herzegovina by the international community;
— from all use of force — whether direct or indirect, overt or covert — against Bosnia and Herzegovina, and from all threats of force against Bosnia and Herzegovina;
— from all violations of the sovereignty, territorial integrity or political independence of Bosnia and Herzegovina, including all intervention, direct or indirect, in the internal affairs of Bosnia and Herzegovina;
— from all support of any kind — including the provision of training, arms, ammunition, finances, supplies, assistance, direction or any other form of support — to any nation, group, organization, movement or individual engaged or planning to engage in military or paramilitary actions in or against Bosnia and Herzegovina;

(r) that Yugoslavia (Serbia and Montenegro) has an obligation to pay Bosnia and Herzegovina, in its own right and as *parens patriae* for its citizens, reparations for damages to persons and property as well as to the Bosnian economy and environment caused by the foregoing violations of international law in a sum to be determined by the Court. Bosnia and Herzegovina reserves the right to introduce to the Court a precise evaluation of the damages caused by Yugoslavia (Serbia and Montenegro)."

65. In the written proceedings, the following submissions were presented by the Parties:

On behalf of the Government of Bosnia and Herzegovina,

in the Memorial:

"On the basis of the evidence and legal arguments presented in this Memorial, the Republic of Bosnia and Herzegovina,

Requests the International Court of Justice to adjudge and declare,

1. That the Federal Republic of Yugoslavia (Serbia and Montenegro), directly, or through the use of its surrogates, has violated and is violating the Convention on the Prevention and Punishment of the Crime of Genocide, by destroying in part, and attempting to destroy in whole, national, ethnical or religious groups within the, but not limited to the, territory of the Republic of Bosnia and Herzegovina, including in particular the Muslim population, by

— killing members of the group;
— causing deliberate bodily or mental harm to members of the group; deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part;
— imposing measures intended to prevent births within the group;

2. That the Federal Republic of Yugoslavia (Serbia and Montenegro) has violated and is violating the Convention on the Prevention and Punishment of the Crime of Genocide by conspiring to commit genocide, by complicity in genocide, by attempting to commit genocide and by incitement to commit genocide;

3. That the Federal Republic of Yugoslavia (Serbia and Montenegro) has violated and is violating the Convention on the Prevention and Punishment of the Crime of Genocide by aiding and abetting individuals and groups engaged in acts of genocide;

4. That the Federal Republic of Yugoslavia (Serbia and Montenegro) has violated and is violating the Convention on the Prevention and Punishment of the Crime of Genocide by virtue of having failed to prevent and to punish acts of genocide;

5. That the Federal Republic of Yugoslavia (Serbia and Montenegro) must immediately cease the above conduct and take immediate and effective steps to ensure full compliance with its obligations under the Convention on the Prevention and Punishment of the Crime of Genocide;

6. That the Federal Republic of Yugoslavia (Serbia and Montenegro) must wipe out the consequences of its international wrongful acts and must restore the situation existing before the violations of the Convention on the Prevention and Punishment of the Crime of Genocide were committed;

7. That, as a result of the international responsibility incurred for the above violations of the Convention on the Prevention and Punishment of the Crime of Genocide, the Federal Republic of Yugoslavia (Serbia and Montenegro) is required to pay, and the Republic of Bosnia and Herzegovina is entitled to receive, in its own right and as *parens patriae* for its citizens, full compensation for the damages and losses caused, in the

amount to be determined by the Court in a subsequent phase of the proceedings in this case.

The Republic of Bosnia and Herzegovina reserves its right to supplement or amend its submissions in the light of further pleadings.

The Republic of Bosnia and Herzegovina also respectfully draws the attention of the Court to the fact that it has not reiterated, at this point, several of the requests it made in its Application, on the formal assumption that the Federal Republic of Yugoslavia (Serbia and Montenegro) has accepted the jurisdiction of this Court under the terms of the Convention on the Prevention and Punishment of the Crime of Genocide. If the Respondent were to reconsider its acceptance of the jurisdiction of the Court under the terms of that Convention — which it is, in any event, not entitled to do — the Government of Bosnia and Herzegovina reserves its right to invoke also all or some of the other existing titles of jurisdiction and to revive all or some of its previous submissions and requests."

On behalf of the Government of Serbia and Montenegro,
in the Counter-Memorial[1]:

"The Federal Republic of Yugoslavia requests the International Court of Justice to adjudge and declare:

1. In view of the fact that no obligations established by the 1948 Convention on the Prevention and Punishment of the Crime of Genocide have been violated with regard to Muslims and Croats,

— since the acts alleged by the Applicant have not been committed at all, or not to the extent and in the way alleged by the Applicant, or

— if some have been committed, there was absolutely no intention of committing genocide, and/or
— they have not been directed specifically against the members of one ethnic or religious group, i.e. they have not been committed against individuals just because they belong to some ethnic or religious group, consequently, they cannot be qualified as acts of genocide or other acts prohibited by the 1948 Convention on the Prevention and Punishment of the Crime of Genocide; and/or

2. In view of the fact that the acts alleged by the Applicant in its submissions cannot be attributed to the Federal Republic of Yugoslavia,

— since they have not been committed by the organs of the Federal Republic of Yugoslavia,
— since they have not been committed on the territory of the Federal Republic of Yugoslavia,
— since they have not been committed by the order or under control of the organs of the Federal Republic of Yugoslavia,
— since there is no other grounds based on the rules of international law to consider them as acts of the Federal Republic of Yugoslavia,

[1] Submissions 3 to 6 relate to counter-claims which were subsequently withdrawn (see paragraphs 26 and 27 above).

therefore the Court rejects all claims of the Applicant; and

3. Bosnia and Herzegovina is responsible for the acts of genocide committed against the Serbs in Bosnia and Herzegovina and for other violations of the obligations established by the 1948 Convention on the Prevention and Punishment of the Crime of Genocide,

— because it has incited acts of genocide by the 'Islamic Declaration', and in particular by the position contained in it that 'there can be no peace or coexistence between "Islamic faith" and "non-Islamic" social and political institutions',
— because it has incited acts of genocide by the *Novi Vox*, paper of the Muslim youth, and in particular by the verses of a 'Patriotic Song' which read as follows:

'Dear mother, I'm going to plant willows,
We'll hang Serbs from them.
Dear mother, I'm going to sharpen knives,
We'll soon fill pits again';

— because it has incited acts of genocide by the paper *Zmaj od Bosne*, and in particular by the sentence in an article published in it that 'Each Muslim must name a Serb and take oath to kill him';

— because public calls for the execution of Serbs were broadcast on radio 'Hajat' and thereby acts of genocide were incited;

— because the armed forces of Bosnia and Herzegovina, as well as other organs of Bosnia and Herzegovina have committed acts of genocide and other acts prohibited by the 1948 Convention on the Prevention and Punishment of the Crime of Genocide, against the Serbs in Bosnia and Herzegovina, which have been stated in Chapter Seven of the Counter-Memorial;
— because Bosnia and Herzegovina has not prevented the acts of genocide and other acts prohibited by the 1948 Convention on the Prevention and Punishment of the Crime of Genocide, against the Serbs on its territory, which have been stated in Chapter Seven of the Counter-Memorial;

4. Bosnia and Herzegovina has the obligation to punish the persons held responsible for the acts of genocide and other acts prohibited by the 1948 Convention on the Prevention and Punishment of the Crime of Genocide;

5. Bosnia and Herzegovina is bound to take necessary measures so that the said acts would not be repeated in the future;

6. Bosnia and Herzegovina is bound to eliminate all consequences of the violation of the obligations established by the 1948 Convention on the Prevention and Punishment of the Crime of Genocide and provide adequate compensation."

On behalf of the Government of Bosnia and Herzegovina,

in the Reply:

"Therefore the Applicant persists in its claims as presented to this Court on 14 April 1994, and recapitulates its Submissions in their entirety.

Bosnia and Herzegovina requests the International Court of Justice to adjudge and declare,

1. That the Federal Republic of Yugoslavia, directly, or through the use of its surrogates, has violated and is violating the Convention on the Prevention and Punishment of the Crime of Genocide, by destroying in part, and attempting to destroy in whole, national, ethnical or religious groups within the, but not limited to the, territory of Bosnia and Herzegovina, including in particular the Muslim population, by

— killing members of the group;
— causing deliberate bodily or mental harm to members of the group;
— deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part;
— imposing measures intended to prevent births within the group;

2. That the Federal Republic of Yugoslavia has violated and is violating the Convention on the Prevention and Punishment of the Crime of Genocide by conspiring to commit genocide, by complicity in genocide, by attempting to commit genocide and by incitement to commit genocide;

3. That the Federal Republic of Yugoslavia has violated and is violating the Convention on the Prevention and Punishment of the Crime of Genocide by aiding and abetting individuals and groups engaged in acts of genocide;

4. That the Federal Republic of Yugoslavia has violated and is violating the Convention on the Prevention and Punishment of the Crime of Genocide by virtue of having failed to prevent and to punish acts of genocide;

5. That the Federal Republic of Yugoslavia must immediately cease the above conduct and take immediate and effective steps to ensure full compliance with its obligations under the Convention on the Prevention and Punishment of the Crime of Genocide;

6. That the Federal Republic of Yugoslavia must wipe out the consequences of its international wrongful acts and must restore the situation existing before the violations of the Convention on the Prevention and Punishment of the Crime of Genocide were committed;

7. That, as a result of the international responsibility incurred for the above violations of the Convention on the Prevention and Punishment of the Crime of Genocide, the Federal Republic of Yugoslavia is required to pay, and Bosnia and Herzegovina is entitled to receive, in its own right and as *parens patriae* for its citizens, full compensation for the damages and losses caused, in the amount to be determined by the Court in a subsequent phase of the proceedings in this case.

Bosnia and Herzegovina reserves its right to supplement or amend its submissions in the light of further pleadings;

8. On the very same grounds the conclusions and submissions of the Federal Republic of Yugoslavia with regard to the submissions of Bosnia and Herzegovina need to be rejected;

9. With regard to the Respondent's counter-claims the Applicant comes to the following conclusion. There is no basis in fact and no basis in law

for the proposition that genocidal acts have been committed against Serbs in Bosnia and Herzegovina. There is no basis in fact and no basis in law for the proposition that any such acts, if proven, would have been committed under the responsibility of Bosnia and Herzegovina or that such acts, if proven, would be attributable to Bosnia and Herzegovina. Also, there is no basis in fact and no basis in law for the proposition that Bosnia and Herzegovina has violated any of its obligations under the Convention on the Prevention and Punishment of the Crime of Genocide. On the contrary, Bosnia and Herzegovina has continuously done everything within its possibilities to adhere to its obligations under the Convention, and will continue to do so;

10. For these reasons, Bosnia and Herzegovina requests the International Court of Justice to reject the counter-claims submitted by the Respondent in its Counter-Memorial of 23 July 1997."

On behalf of the Government of Serbia and Montenegro,

in the Rejoinder[2] :

"The Federal Republic of Yugoslavia requests the International Court of Justice to adjudge and declare:

1. In view of the fact that no obligations established by the 1948 Convention on the Prevention and Punishment of the Crime of Genocide have been violated with regard to Muslims and Croats,

— since the acts alleged by the Applicant have not been committed at all, or not to the extent and in the way alleged by the Applicant, or

— if some have been committed, there was absolutely no intention of committing genocide, and/or
— they have not been directed specifically against the members of one ethnic or religious group, i.e. they have not been committed against individuals just because they belong to some ethnic or religious group,

consequently they cannot be qualified as acts of genocide or other acts prohibited by the 1948 Convention on the Prevention and Punishment of the Crime of Genocide, and/or

2. In view of the fact that the acts alleged by the Applicant in its submissions cannot be attributed to the Federal Republic of Yugoslavia,

— since they have not been committed by the organs of the Federal Republic of Yugoslavia,
— since they have not been committed on the territory of the Federal Republic of Yugoslavia,
— since they have not been committed by the order or under control of the organs of the Federal Republic of Yugoslavia,
— since there are no other grounds based on the rules of international law to consider them as acts of the Federal Republic of Yugoslavia,

[2] Submissions 3 to 6 relate to counter-claims which were subsequently withdrawn (see paragraphs 26 and 27 above).

therefore the Court rejects all the claims of the Applicant, and

3. Bosnia and Herzegovina is responsible for the acts of genocide committed against Serbs in Bosnia and Herzegovina and for other violations of the obligations established by the 1948 Convention on the Prevention and Punishment of the Crime of Genocide,

— because it has incited acts of genocide by the 'Islamic Declaration', and in particular by the position contained in it that *'there can be no peace or coexistence between "Islamic faith" and "non-Islamic" social and political institutions'*,
— because it has incited acts of genocide by the *Novi Vox*, paper of the Muslim youth, and in particular by the verses of a 'Patriotic Song' which read as follows:

'Dear mother, I'm going to plant willows,
We'll hang Serbs from them.
Dear mother, I'm going to sharpen knives,
We'll soon fill pits again';

— because it has incited acts of genocide by the paper *Zmaj od Bosne*, and in particular by the sentence in an article published in it that 'Each Muslim' must name a Serb and take oath to kill him;

— because public calls for the execution of Serbs were broadcast on radio 'Hajat' and thereby acts of genocide were incited;

— because the armed forces of Bosnia and Herzegovina, as well as other organs of Bosnia and Herzegovina have committed acts of genocide and other acts prohibited by the 1948 Convention on the Prevention and Punishment of the Crime of Genocide (enumerated in Article III), against Serbs in Bosnia and Herzegovina, which have been stated in Chapter Seven of the Counter-Memorial;
— because Bosnia and Herzegovina has not prevented the acts of genocide and other acts prohibited by the 1948 Convention on the Prevention and Punishment of the Crime of Genocide (enumerated in Article III), against Serbs on its territory, which have been stated in Chapter Seven of the Counter-Memorial;

4. Bosnia and Herzegovina has the obligation to punish the persons held responsible for the acts of genocide and other acts prohibited by the 1948 Convention on the Prevention and Punishment of the Crime of Genocide;

5. Bosnia and Herzegovina is bound to take necessary measures so that the said acts would not be repeated in the future;

6. Bosnia and Herzegovina is bound to eliminate all the consequences of violation of the obligations established by the 1948 Convention on the Prevention and Punishment of the Crime of Genocide and to provide adequate compensation."

66. At the oral proceedings, the following final submissions were presented by the Parties:

On behalf of the Government of Bosnia and Herzegovina,
at the hearing of 24 April 2006:

"Bosnia and Herzegovina requests the International Court of Justice to adjudge and declare:

1. That Serbia and Montenegro, through its organs or entities under its control, has violated its obligations under the Convention on the Prevention and Punishment of the Crime of Genocide by intentionally destroying in part the non-Serb national, ethnical or religious group within, but not limited to, the territory of Bosnia and Herzegovina, including in particular the Muslim population, by

— killing members of the group;
— causing serious bodily or mental harm to members of the group;
— deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part;
— imposing measures intended to prevent births within the group;
— forcibly transferring children of the group to another group;

2. Subsidiarily:

(i) that Serbia and Montenegro has violated its obligations under the Convention on the Prevention and Punishment of the Crime of Genocide by complicity in genocide as defined in paragraph 1, above; and/or

(ii) that Serbia and Montenegro has violated its obligations under the Convention on the Prevention and Punishment of the Crime of Genocide by aiding and abetting individuals, groups and entities engaged in acts of genocide, as defined in paragraph 1 above;

3. That Serbia and Montenegro has violated its obligations under the Convention on the Prevention and Punishment of the Crime of Genocide by conspiring to commit genocide and by inciting to commit genocide, as defined in paragraph 1 above;

4. That Serbia and Montenegro has violated its obligations under the Convention on the Prevention and Punishment of the Crime of Genocide for having failed to prevent genocide;

5. That Serbia and Montenegro has violated and is violating its obligations under the Convention on the Prevention and Punishment of the Crime of Genocide for having failed and for failing to punish acts of genocide or any other act prohibited by the Convention on the Prevention and Punishment of the Crime of Genocide, and for having failed and for failing to transfer individuals accused of genocide or any other act prohibited by the Convention to the International Criminal Tribunal for the former Yugoslavia and to fully co-operate with this Tribunal;

6. That the violations of international law set out in submissions 1 to 5 constitute wrongful acts attributable to Serbia and Montenegro which entail its international responsibility, and, accordingly,

(a) that Serbia and Montenegro shall immediately take effective steps to ensure full compliance with its obligation to punish acts of genocide under the Convention on the Prevention and Punishment of the Crime of Genocide or any other act prohibited by the Convention and to transfer individuals accused of genocide or any other act pro-

hibited by the Convention to the International Criminal Tribunal for the former Yugoslavia and to fully co-operate with this Tribunal;

(b) that Serbia and Montenegro must redress the consequences of its international wrongful acts and, as a result of the international responsibility incurred for the above violations of the Convention on the Prevention and Punishment of the Crime of Genocide, must pay, and Bosnia and Herzegovina is entitled to receive, in its own right and as *parens patriae* for its citizens, full compensation for the damages and losses caused. That, in particular, the compensation shall cover any financially assessable damage which corresponds to:

(i) damage caused to natural persons by the acts enumerated in Article III of the Convention, including non-material damage suffered by the victims or the surviving heirs or successors and their dependants;

(ii) material damage caused to properties of natural or legal persons, public or private, by the acts enumerated in Article III of the Convention;

(iii) material damage suffered by Bosnia and Herzegovina in respect of expenditures reasonably incurred to remedy or mitigate damage flowing from the acts enumerated in Article III of the Convention;

(c) that the nature, form and amount of the compensation shall be determined by the Court, failing agreement thereon between the Parties one year after the Judgment of the Court, and that the Court shall reserve the subsequent procedure for that purpose;

(d) that Serbia and Montenegro shall provide specific guarantees and assurances that it will not repeat the wrongful acts complained of, the form of which guarantees and assurances is to be determined by the Court;

7. That in failing to comply with the Orders for indication of provisional measures rendered by the Court on 8 April 1993 and 13 September 1993 Serbia and Montenegro has been in breach of its international obligations and is under an obligation to Bosnia and Herzegovina to provide for the latter violation symbolic compensation, the amount of which is to be determined by the Court."

On behalf of the Government of Serbia and Montenegro,

at the hearing of 9 May 2006:

"Serbia and Montenegro asks the Court to adjudge and declare:

— that this Court has no jurisdiction because the Respondent had no access to the Court at the relevant moment; or, in the alternative;

— that this Court has no jurisdiction over the Respondent because the Respondent never remained or became bound by Article IX of the Convention on the Prevention and Punishment of the Crime of Genocide, and because there is no other ground on which jurisdiction over the Respondent could be based.

In case the Court determines that jurisdiction exists Serbia and Montenegro asks the Court to adjudge and declare:

— That the requests in paragraphs 1 to 6 of the Submissions of Bosnia

and Herzegovina relating to alleged violations of the obligations under the Convention on the Prevention and Punishment of the Crime of Genocide be rejected as lacking a basis either in law or in fact.

— In any event, that the acts and/or omissions for which the respondent State is alleged to be responsible are not attributable to the respondent State. Such attribution would necessarily involve breaches of the law applicable in these proceedings.
— Without prejudice to the foregoing, that the relief available to the applicant State in these proceedings, in accordance with the appropriate interpretation of the Convention on the Prevention and Punishment of the Crime of Genocide, is limited to the rendering of a declaratory judgment.
— Further, without prejudice to the foregoing, that any question of legal responsibility for alleged breaches of the Orders for the indication of provisional measures, rendered by the Court on 8 April 1993 and 13 September 1993, does not fall within the competence of the Court to provide appropriate remedies to an applicant State in the context of contentious proceedings, and, accordingly, the request in paragraph 7 of the Submissions of Bosnia and Herzegovina should be rejected."

* * *

II. Identification of the Respondent Party

67. The Court has first to consider a question concerning the identification of the Respondent Party before it in these proceedings. After the close of the oral proceedings, by a letter dated 3 June 2006, the President of the Republic of Serbia informed the Secretary-General of the United Nations that, following the Declaration of Independence adopted by the National Assembly of Montenegro on 3 June 2006, "the membership of the state union Serbia and Montenegro in the United Nations, including all organs and organisations of the United Nations system, [would be] continued by the Republic of Serbia on the basis of Article 60 of the Constitutional Charter of Serbia and Montenegro". He further stated that "in the United Nations the name 'Republic of Serbia' [was] to be henceforth used instead of the name 'Serbia and Montenegro' " and added that the Republic of Serbia "remain[ed] responsible in full for all the rights and obligations of the state union of Serbia and Montenegro under the UN Charter".

68. By a letter of 16 June 2006, the Minister for Foreign Affairs of the Republic of Serbia informed the Secretary-General, *inter alia*, that "[t]he Republic of Serbia continue[d] to exercise its rights and honour its commitments deriving from international treaties concluded by Serbia and Montenegro" and requested that "the Republic of Serbia be considered a party to all international agreements in force, instead of Serbia and Montenegro". By a letter addressed to the Secretary-General dated 30 June

2006, the Minister for Foreign Affairs confirmed the intention of the Republic of Serbia to continue to exercise its rights and honour its commitments deriving from international treaties concluded by Serbia and Montenegro. He specified that "all treaty actions undertaken by Serbia and Montenegro w[ould] continue in force with respect to the Republic of Serbia with effect from 3 June 2006", and that, "all declarations, reservations and notifications made by Serbia and Montenegro w[ould] be maintained by the Republic of Serbia until the Secretary-General, as depositary, [were] duly notified otherwise".

69. On 28 June 2006, by its resolution 60/264, the General Assembly admitted the Republic of Montenegro (hereinafter "Montenegro") as a new Member of the United Nations.

70. By letters dated 19 July 2006, the Registrar requested the Agent of Bosnia and Herzegovina, the Agent of Serbia and Montenegro and the Foreign Minister of Montenegro to communicate to the Court the views of their Governments on the consequences to be attached to the abovementioned developments in the context of the case. By a letter dated 26 July 2006, the Agent of Serbia and Montenegro explained that, in his Government's opinion, "there [was] continuity between Serbia and Montenegro and the Republic of Serbia (on the grounds of Article 60 of the Constitutional Charter of Serbia and Montenegro)". He noted that the entity which had been Serbia and Montenegro "ha[d] been replaced by two distinct States, one of them [was] Serbia, the other [was] Montenegro". In those circumstances, the view of his Government was that "the Applicant ha[d] first to take a position, and to decide whether it wishe[d] to maintain its original claim encompassing both Serbia and Montenegro, or whether it [chose] to do otherwise".

71. By a letter to the Registrar dated 16 October 2006, the Agent of Bosnia and Herzegovina referred to the letter of 26 July 2006 from the Agent of Serbia and Montenegro, and observed that Serbia's definition of itself as the continuator of the former Serbia and Montenegro had been accepted both by Montenegro and the international community. He continued however as follows:

> "this acceptance cannot have, and does not have, any effect on the applicable rules of state responsibility. Obviously, these cannot be altered bilaterally or retroactively. At the time when genocide was committed and at the time of the initiation of this case, Serbia and Montenegro constituted a single state. Therefore, Bosnia and Herzegovina is of the opinion that both Serbia and Montenegro, jointly and severally, are responsible for the unlawful conduct that constitute the cause of action in this case."

72. By a letter dated 29 November 2006, the Chief State Prosecutor of Montenegro, after indicating her capacity to act as legal representative of the Republic of Montenegro, referred to the letter from the Agent of

Bosnia and Herzegovina dated 16 October 2006, quoted in the previous paragraph, expressing the view that "both Serbia and Montenegro, jointly and severally, are responsible for the unlawful conduct that constitute[s] the cause of action in this case". The Chief State Prosecutor stated that the allegation concerned the liability in international law of the sovereign State of Montenegro, and that Montenegro regarded it as an attempt to have it become a participant in this way, without its consent, "i.e. to become a respondent in this procedure". The Chief State Prosecutor drew attention to the fact that, following the referendum held in Montenegro on 21 May 2006, the National Assembly of Montenegro had adopted a decision pronouncing the independence of the Republic of Montenegro. In the view of the Chief State Prosecutor, the Republic of Montenegro had become "an independent state with full international legal personality within its existing administrative borders", and she continued:

> "The issue of international-law succession of [the] State union of Serbia and Montenegro is regulated in Article 60 of [the] Constitutional Charter, and according to [that] Article the legal successor of [the] State union of Serbia and Montenegro is the Republic of Serbia, which, as a sovereign state, [has] become [the] follower of all international obligations and successor in international organizations."

The Chief State Prosecutor concluded that in the dispute before the Court, "the Republic of Montenegro may not have [the] capacity of respondent, [for the] above mentioned reasons".

73. By a letter dated 11 December 2006, the Agent of Serbia referred to the letters from the Applicant and from Montenegro described in paragraphs 71 and 72 above, and observed that there was "an obvious contradiction between the position of the Applicant on the one hand and the position of Montenegro on the other regarding the question whether these proceedings may or may not yield a decision which would result in the international responsibility of Montenegro" for the unlawful conduct invoked by the Applicant. The Agent stated that "Serbia is of the opinion that this issue needs to be resolved by the Court".

74. The Court observes that the facts and events on which the final submissions of Bosnia and Herzegovina are based occurred at a period of time when Serbia and Montenegro constituted a single State.

75. The Court notes that Serbia has accepted "continuity between Serbia and Montenegro and the Republic of Serbia" (paragraph 70 above), and has assumed responsibility for "its commitments deriving from international treaties concluded by Serbia and Montenegro" (paragraph 68 above), thus including commitments under the Genocide Convention. Montenegro, on the other hand, does not claim to be the continuator of Serbia and Montenegro.

76. The Court recalls a fundamental principle that no State may be subject to its jurisdiction without its consent; as the Court observed in the case of *Certain Phosphate Lands in Nauru (Nauru* v. *Australia)*, the Court's "jurisdiction depends on the consent of States and, consequently, the Court may not compel a State to appear before it . . ." (*Preliminary Objections, Judgment, I.C.J. Reports 1992*, p. 260, para. 53). In its Judgment of 11 July 1996 (see paragraph 12 above), the significance of which will be explained below, the Court found that such consent existed, for the purposes of the present case, on the part of the FRY, which subsequently assumed the name of Serbia and Montenegro, without however any change in its legal personality. The events related in paragraphs 67 to 69 above clearly show that the Republic of Montenegro does not continue the legal personality of Serbia and Montenegro; it cannot therefore have acquired, on that basis, the status of Respondent in the present case. It is also clear from the letter of 29 November 2006 quoted in paragraph 72 above that it does not give its consent to the jurisdiction of the Court over it for the purposes of the present dispute. Furthermore, the Applicant did not in its letter of 16 October 2006 assert that Montenegro is still a party to the present case; it merely emphasized its views as to the joint and several liability of Serbia and of Montenegro.

77. The Court thus notes that the Republic of Serbia remains a respondent in the case, and at the date of the present Judgment is indeed the only Respondent. Accordingly, any findings that the Court may make in the operative part of the present Judgment are to be addressed to Serbia.

78. That being said, it has to be borne in mind that any responsibility for past events determined in the present Judgment involved at the relevant time the State of Serbia and Montenegro.

79. The Court observes that the Republic of Montenegro is a party to the Genocide Convention. Parties to that Convention have undertaken the obligations flowing from it, in particular the obligation to co-operate in order to punish the perpetrators of genocide.

* * *

III. THE COURT'S JURISDICTION

(1) Introduction: The Jurisdictional Objection of Serbia and Montenegro

80. Notwithstanding the fact that in this case the stage of oral proceedings on the merits has been reached, and the fact that in 1996 the Court gave a judgment on preliminary objections to its jurisdiction (*Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina* v. *Yugoslavia), Preliminary Objections, Judgment, I.C.J. Reports 1996 (II),* p. 595, hereinafter "the 1996 Judgment"), an important issue of a jurisdictional character has

since been raised by the Initiative, and the Court has been asked to rule upon it (see paragraphs 26-28 above). The basis of jurisdiction asserted by the Applicant, and found applicable by the Court by the 1996 Judgment, is Article IX of the Genocide Convention. The Socialist Federal Republic of Yugoslavia (hereinafter "the SFRY") became a party to that Convention on 29 August 1950. In substance, the central question now raised by the Respondent is whether at the time of the filing of the Application instituting the present proceedings the Respondent was or was not the continuator of the SFRY. The Respondent now contends that it was not a continuator State, and that therefore not only was it not a party to the Genocide Convention when the present proceedings were instituted, but it was not then a party to the Statute of the Court by virtue of membership in the United Nations; and that, not being such a party, it did not have access to the Court, with the consequence that the Court had no jurisdiction *ratione personae* over it.

81. This contention was first raised, in the context of the present case, by the "Initiative to the Court to Reconsider *ex officio* Jurisdiction over Yugoslavia" filed by the Respondent on 4 May 2001 (paragraph 26 above). The circumstances underlying that Initiative will be examined in more detail below (paragraphs 88-99). Briefly stated, the situation was that the Respondent, after claiming that since the break-up of the SFRY in 1992 it was the continuator of that State, and as such maintained the membership of the SFRY in the United Nations, had on 27 October 2000 applied, "in light of the implementation of the Security Council resolution 777 (1992)", to be admitted to the Organization as a new Member, thereby in effect relinquishing its previous claim. The Respondent contended that it had in 2000 become apparent that it had not been a Member of the United Nations in the period 1992-2000, and was thus not a party to the Statute at the date of the filing of the Application in this case; and that it was not a party to the Genocide Convention on that date. The Respondent concluded that "the Court has no jurisdiction over [the Respondent] *ratione personae*". It requested the Court "to suspend proceedings regarding the merits of the Case until a decision on this Initiative is rendered".

82. By a letter of 12 June 2003, the Registrar, acting on the instructions of the Court, informed the Respondent that the Court could not accede to the request made in that document, that the proceedings be suspended until a decision was rendered on the jurisdictional issues raised therein. The Respondent was informed, nevertheless, that the Court "w[ould] not give judgment on the merits in the present case unless it [was] satisfied that it ha[d] jurisdiction" and that, "[s]hould Serbia and Montenegro wish to present further argument to the Court on jurisdictional questions during the oral proceedings on the merits, it w[ould] be free to do so". The Respondent accordingly raised, as an "issue of procedure", the question whether the Respondent had access to the Court at the date of the Application, and each of the parties has now addressed

argument to the Court on that question. It has however at the same time been argued by the Applicant that the Court may not deal with the question, or that the Respondent is debarred from raising it at this stage of the proceedings. These contentions will be examined below.

83. Subsequently, on 15 December 2004, the Court delivered judgment in eight cases brought by Serbia and Montenegro against Member States of NATO (cases concerning the *Legality of Use of Force*). The Applications instituting proceedings in those cases had been filed on 29 April 1999, that is to say prior to the admission of Serbia and Montenegro (then known as the Federal Republic of Yugoslavia) to the United Nations on 1 November 2000. In each of these cases, the Court held that it had no jurisdiction to entertain the claims made in the Application (see, for example, *Legality of Use of Force (Serbia and Montenegro* v. *Belgium), Preliminary Objections, Judgment, I.C.J. Reports 2004*, p. 328, para. 129), on the grounds that "Serbia and Montenegro did not, at the time of the institution of the present proceedings, have access to the Court under either paragraph 1 or paragraph 2 of Article 35 of the Statute" (*ibid.*, p. 327, para. 127). It held, "in light of the legal consequences of the new development since 1 November 2000", that "Serbia and Montenegro was not a Member of the United Nations, and in that capacity a State party to the Statute of the International Court of Justice, at the time of filing its Application . . ." (*ibid.*, p. 311, para. 79). No finding was made in those judgments on the question whether or not the Respondent was a party to the Genocide Convention at the relevant time.

84. Both Parties recognize that each of these Judgments has the force of *res judicata* in the specific case for the parties thereto; but they also recognize that these Judgments, not having been rendered in the present case, and involving as parties States not parties to the present case, do not constitute *res judicata* for the purposes of the present proceedings. In view however of the findings in the cases concerning the *Legality of Use of Force* as to the status of the FRY vis-à-vis the United Nations and the Court in 1999, the Respondent has invoked those decisions as supportive of its contentions in the present case.

85. The grounds upon which, according to Bosnia and Herzegovina, the Court should, at this late stage of the proceedings, decline to examine the questions raised by the Respondent as to the status of Serbia and Montenegro in relation to Article 35 of the Statute, and its status as a party to the Genocide Convention, are because the conduct of the Respondent in relation to the case has been such as to create a sort of *forum prorogatum,* or an estoppel, or to debar it, as a matter of good faith, from asserting at this stage of the proceedings that it had no access to the Court at the date the proceedings were instituted; and because the questions raised by the Respondent had already been resolved by the 1996 Judgment, with the authority of *res judicata*.

86. As a result of the Initiative of the Respondent (paragraph 81 above), and its subsequent argument on what it has referred to as an "issue of procedure", the Court has before it what is essentially an objection by the Respondent to its jurisdiction, which is preliminary in the sense that, if it is upheld, the Court will not proceed to determine the merits. The Applicant objects in turn to the Court examining further the Respondent's jurisdictional objection. These matters evidently require to be examined as preliminary points, and it was for this reason that the Court instructed the Registrar to write to the Parties the letter of 12 June 2003, referred to in paragraph 82 above. The letter was intended to convey that the Court would listen to any argument raised by the Initiative which might be put to it, but not as an indication of what its ruling might be on any such arguments.

87. In order to make clear the background to these issues, the Court will first briefly review the history of the relationship between the Respondent and the United Nations during the period from the break-up of the SFRY in 1992 to the admission of Serbia and Montenegro (then called the Federal Republic of Yugoslavia) to the United Nations on 1 November 2000. The previous decisions of the Court in this case, and in the *Application for Revision* case, have been briefly recalled above (paragraphs 4, 8, 12 and 31). They will be referred to more fully below (paragraphs 105-113) for the purpose of (in particular) an examination of the contentions of Bosnia and Herzegovina on the question of *res judicata*.

* *

(2) History of the Status of the FRY with Regard to the United Nations

88. In the early 1990s the SFRY, a founding Member State of the United Nations, made up of Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, Serbia and Slovenia, began to disintegrate. On 25 June 1991 Croatia and Slovenia both declared independence, followed by Macedonia on 17 September 1991 and Bosnia and Herzegovina on 6 March 1992. On 22 May 1992, Bosnia and Herzegovina, Croatia and Slovenia were admitted as Members to the United Nations; as was the former Yugoslav Republic of Macedonia on 8 April 1993.

89. On 27 April 1992 the "participants of the joint session of the SFRY Assembly, the National Assembly of the Republic of Serbia and the Assembly of the Republic of Montenegro" had adopted a declaration, stating in pertinent parts:

". . . . .

1. The Federal Republic of Yugoslavia, continuing the state, international legal and political personality of the Socialist Federal Republic of Yugoslavia, shall strictly abide by all the commitments that the SFR of Yugoslavia assumed internationally,

. . . .

Remaining bound by all obligations to international organizations and institutions whose member it is . . ." (United Nations doc. A/46/915, Ann. II).

90. An official Note dated 27 April 1992 from the Permanent Mission of Yugoslavia to the United Nations, addressed to the Secretary-General of the United Nations, stated *inter alia* that:

"The Assembly of the Socialist Federal Republic of Yugoslavia, at its session held on 27 April 1992, promulgated the Constitution of the Federal Republic of Yugoslavia. Under the Constitution, on the basis of the continuing personality of Yugoslavia and the legitimate decisions by Serbia and Montenegro to continue to live together in Yugoslavia, the Socialist Federal Republic of Yugoslavia is transformed into the Federal Republic of Yugoslavia, consisting of the Republic of Serbia and the Republic of Montenegro.

Strictly respecting the continuity of the international personality of Yugoslavia, the Federal Republic of Yugoslavia shall continue to fulfil all the rights conferred to, and obligations assumed by, the Socialist Federal Republic of Yugoslavia in international relations, including its membership in all international organizations and participation in international treaties ratified or acceded to by Yugoslavia." (United Nations doc. A/46/915, Ann. I.)

91. On 30 May 1992, the Security Council adopted resolution 757 (1992), in which, *inter alia*, it noted that "the claim by the Federal Republic of Yugoslavia (Serbia and Montenegro) to continue automatically the membership of the former Socialist Federal Republic of Yugoslavia in the United Nations has not been generally accepted".

92. On 19 September 1992, the Security Council adopted resolution 777 (1992) which read as follows:

"*The Security Council,*

Reaffirming its resolution 713 (1991) of 25 September 1991 and all subsequent relevant resolutions,

> *Considering* that the state formerly known as the Socialist Federal Republic of Yugoslavia has ceased to exist,
>
> *Recalling* in particular resolution 757 (1992) which notes that 'the claim by the Federal Republic of Yugoslavia (Serbia and Montenegro) to continue automatically the membership of the former Socialist Federal Republic of Yugoslavia in the United Nations has not been generally accepted',
>
> 1. *Considers* that the Federal Republic of Yugoslavia (Serbia and Montenegro) cannot continue automatically the membership of the former Socialist Federal Republic of Yugoslavia in the United Nations; and therefore *recommends* to the General Assembly that it decide that the Federal Republic of Yugoslavia (Serbia and Montenegro) should apply for membership in the United Nations and that it shall not participate in the work of the General Assembly;
>
> 2. *Decides* to consider the matter again before the end of the main part of the forty-seventh session of the General Assembly."

The resolution was adopted by 12 votes in favour, none against, and 3 abstentions.

93. On 22 September 1992 the General Assembly adopted resolution 47/1, according to which:

> "*The General Assembly,*
>
> *Having received* the recommendation of the Security Council of 19 September 1992 that the Federal Republic of Yugoslavia (Serbia and Montenegro) should apply for membership in the United Nations and that it shall not participate in the work of the General Assembly,
>
> 1. *Considers* that the Federal Republic of Yugoslavia (Serbia and Montenegro) cannot continue automatically the membership of the former Socialist Federal Republic of Yugoslavia in the United Nations; and therefore *decides* that the Federal Republic of Yugoslavia (Serbia and Montenegro) should apply for membership in the United Nations and that it shall not participate in the work of the General Assembly;
>
> 2. *Takes note* of the intention of the Security Council to consider the matter again before the end of the main part of the forty-seventh session of the General Assembly."

The resolution was adopted by 127 votes to 6, with 26 abstentions.

94. On 25 September 1992, the Permanent Representatives of Bosnia and Herzegovina and Croatia addressed a letter to the Secretary-General, in which, with reference to Security Council resolution 777 (1992) and

General Assembly resolution 47/1, they stated their understanding as follows: "At this moment, there is no doubt that the Socialist Federal Republic of Yugoslavia is not a member of the United Nations any more. At the same time, the Federal Republic of Yugoslavia is clearly not yet a member." They concluded that "[t]he flag flying in front of the United Nations and the name-plaque bearing the name 'Yugoslavia' do not represent anything or anybody any more" and "kindly request[ed] that [the Secretary-General] provide a legal explanatory statement concerning the questions raised" (United Nations doc. A/47/474).

95. In response, on 29 September 1992, the Under-Secretary-General and Legal Counsel of the United Nations addressed a letter to the Permanent Representatives of Bosnia and Herzegovina and Croatia, in which he stated that the "considered view of the United Nations Secretariat regarding the practical consequences of the adoption by the General Assembly of resolution 47/1" was as follows:

> "While the General Assembly has stated unequivocally that the Federal Republic of Yugoslavia (Serbia and Montenegro) cannot automatically continue the membership of the former Socialist Federal Republic of Yugoslavia in the United Nations and that the Federal Republic of Yugoslavia (Serbia and Montenegro) should apply for membership in the United Nations, the only practical consequence that the resolution draws is that the Federal Republic of Yugoslavia (Serbia and Montenegro) shall not *participate* in the work of the General Assembly. It is clear, therefore, that representatives of the Federal Republic of Yugoslavia (Serbia and Montenegro) can no longer *participate* in the work of the General Assembly, its subsidiary organs, nor conferences and meetings convened by it.
>
> On the other hand, the resolution neither terminates nor suspends Yugoslavia's *membership* in the Organization. Consequently, the seat and nameplate remain as before, but in Assembly bodies representatives of the Federal Republic of Yugoslavia (Serbia and Montenegro) cannot sit behind the sign 'Yugoslavia'. Yugoslav missions at United Nations Headquarters and offices may continue to function and may receive and circulate documents. At Headquarters, the Secretariat will continue to fly the flag of the old Yugoslavia as it is the last flag of Yugoslavia used by the Secretariat. The resolution does not take away the right of Yugoslavia to participate in the work of organs other than Assembly bodies. The admission to the United Nations of a new Yugoslavia under Article 4 of the Charter will terminate the situation created by resolution 47/1." (United Nations doc. A/47/485; emphasis in the original.)

96. On 29 April 1993, the General Assembly, upon the recommendation contained in Security Council resolution 821 (1993) (couched in terms similar to those of Security Council resolution 777 (1992)), adopted resolution 47/229 in which it decided that "the Federal Republic of Yugoslavia (Serbia and Montenegro) shall not participate in the work of the Economic and Social Council".

97. In its Judgments in the cases concerning the *Legality of Use of Force* (paragraph 83 above), the Court commented on this sequence of events by observing that "all these events testify to the rather confused and complex state of affairs that obtained within the United Nations surrounding the issue of the legal status of the Federal Republic of Yugoslavia in the Organization during this period" (*Preliminary Objections, Judgment, I.C.J. Reports 2004*, p. 308, para. 73), and earlier the Court, in another context, had referred to the "*sui generis* position which the FRY found itself in" during the period between 1992 to 2000 (*loc. cit.*, citing *I.C.J. Reports 2003*, p. 31, para. 71).

98. This situation, however, came to an end with a new development in 2000. On 24 September 2000, Mr. Koštunica was elected President of the FRY. In that capacity, on 27 October 2000 he sent a letter to the Secretary-General requesting admission of the FRY to membership in the United Nations, in the following terms:

> "In the wake of fundamental democratic changes that took place in the Federal Republic of Yugoslavia, in the capacity of President, I have the honour to request the admission of the Federal Republic of Yugoslavia to the United Nations *in light of the implementation of the Security Council resolution 777 (1992)*." (United Nations doc. A/55/528-S/2000/1043; emphasis added.)

99. Acting upon this application by the FRY for membership in the United Nations, the Security Council on 31 October 2000 "*recommend[ed]* to the General Assembly that the Federal Republic of Yugoslavia be admitted to membership in the United Nations" (United Nations doc. S/RES/1326). On 1 November 2000, the General Assembly, by resolution 55/12, "*[h]aving received* the recommendation of the Security Council of 31 October 2000" and "*[h]aving considered* the application for membership of the Federal Republic of Yugoslavia", decided to "admit the Federal Republic of Yugoslavia to membership in the United Nations".

* *

(3) The Response of Bosnia and Herzegovina

100. The Court will now consider the Applicant's response to the jurisdictional objection raised by the Respondent, that is to say the conten-

tion of Bosnia and Herzegovina that the Court should not examine the question, raised by the Respondent in its Initiative (paragraph 81 above), of the status of the Respondent at the date of the filing of the Application instituting proceedings. It is first submitted by Bosnia and Herzegovina that the Respondent was under a duty to raise the issue of whether the FRY (Serbia and Montenegro) was a Member of the United Nations at the time of the proceedings on the preliminary objections, in 1996, and that since it did not do so, the principle of *res judicata*, attaching to the Court's 1996 Judgment on those objections, prevents it from reopening the issue. Secondly, the Applicant argues that the Court itself, having decided in 1996 that it had jurisdiction in the case, would be in breach of the principle of *res judicata* if it were now to decide otherwise, and that the Court cannot call in question the authority of its decisions as *res judicata*.

101. The first contention, as to the alleged consequences of the fact that Serbia did not raise the question of access to the Court under Article 35 at the preliminary objection stage, can be dealt with succinctly. Bosnia and Herzegovina has argued that to uphold the Respondent's objection "would mean that a respondent, after having asserted one or more preliminary objections, could still raise others, to the detriment of the effective administration of justice, the smooth conduct of proceedings, and, in the present case, the doctrine of *res judicata*". It should however be noted that if a party to proceedings before the Court chooses not to raise an issue of jurisdiction by way of the preliminary objection procedure under Article 79 of the Rules, that party is not necessarily thereby debarred from raising such issue during the proceedings on the merits of the case. As the Court stated in the case of *Avena and Other Mexican Nationals (Mexico* v. *United States of America)*,

> "There are of course circumstances in which the party failing to put forward an objection to jurisdiction might be held to have acquiesced in jurisdiction (*Appeal Relating to the Jurisdiction of the ICAO Council, Judgment, I.C.J. Reports 1972*, p. 52, para. 13). However, apart from such circumstances, a party failing to avail itself of the Article 79 procedure may forfeit the right to bring about a suspension of the proceedings on the merits, but can still argue the objection along with the merits." (*Judgment, I.C.J. Reports 2004*, p. 29, para. 24).

This first contention of Bosnia and Herzegovina must thus be understood as a claim that the Respondent, by its conduct in relation to the case, including the failure to raise the issue of the application of Article 35 of the Statute, by way of preliminary objection or otherwise, at an earlier stage of the proceedings, should be held to have acquiesced in jurisdiction. This contention is thus parallel to the argument mentioned above (paragraph 85), also advanced by Bosnia and Herzegovina, that the Respondent is debarred from asking the Court to examine that issue for

reasons of good faith, including estoppel and the principle *allegans contraria nemo audietur.*

102. The Court does not however find it necessary to consider here whether the conduct of the Respondent could be held to constitute an acquiescence in the jurisdiction of the Court. Such acquiescence, if established, might be relevant to questions of consensual jurisdiction, and in particular jurisdiction *ratione materiae* under Article IX of the Genocide Convention, but not to the question whether a State has the capacity under the Statute to be a party to proceedings before the Court.

The latter question may be regarded as an issue prior to that of jurisdiction *ratione personae*, or as one constitutive element within the concept of jurisdiction *ratione personae*. Either way, unlike the majority of questions of jurisdiction, it is not a matter of the consent of the parties. As the Court observed in the cases concerning the *Legality of Use of Force*,

> "a distinction has to be made between a question of jurisdiction that relates to the consent of a party and the question of the right of a party to appear before the Court under the requirements of the Statute, which is not a matter of consent. The question is whether *as a matter of law* Serbia and Montenegro was entitled to seise the Court as a party to the Statute at the time when it instituted proceedings in these cases. Since that question is independent of the views or wishes of the Parties, even if they were now to have arrived at a shared view on the point, the Court would not have to accept that view as necessarily the correct one. The function of the Court to enquire into the matter and reach its own conclusion is thus mandatory upon the Court irrespective of the consent of the parties and is in no way incompatible with the principle that the jurisdiction of the Court depends on consent." (*Legality of Use of Force (Serbia and Montenegro* v. *Belgium), Preliminary Objections, Judgment, I.C.J. Reports 2004*, p. 295, para. 36; emphasis in the original.)

103. It follows that, whether or not the Respondent should be held to have acquiesced in the jurisdiction of the Court in this case, such acquiescence would in no way debar the Court from examining and ruling upon the question stated above. The same reasoning applies to the argument that the Respondent is estopped from raising the matter at this stage, or debarred from doing so by considerations of good faith. All such considerations can, at the end of the day, only amount to attributing to the Respondent an implied acceptance, or deemed consent, in relation to the jurisdiction of the Court; but, as explained above, *ad hoc* consent of a party is distinct from the question of its capacity to be a party to proceedings before the Court.

104. However Bosnia and Herzegovina's second contention is that,

objectively and apart from any effect of the conduct of the Respondent, the question of the application of Article 35 of the Statute in this case has already been resolved as a matter of *res judicata,* and that if the Court were to go back on its 1996 decision on jurisdiction, it would disregard fundamental rules of law. In order to assess the validity of this contention, the Court will first review its previous decisions in the present case in which its jurisdiction, or specifically the question whether Serbia and Montenegro could properly appear before the Court, has been in issue.

* *

(4) Relevant Past Decisions of the Court

105. On 8 April 1993, the Court made an Order in this case indicating certain provisional measures. In that Order the Court briefly examined the circumstances of the break-up of the SFRY, and the claim of the Respondent (then known as "Yugoslavia (Serbia and Montenegro)") to continuity with that State, and consequent entitlement to continued membership in the United Nations. It noted that "the solution adopted" within the United Nations was "not free from legal difficulties", but concluded that "the question whether or not Yugoslavia is a Member of the United Nations and as such a party to the Statute of the Court is one which the Court does not need to determine definitively at the present stage of the proceedings" (*Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina* v. *Yugoslavia (Serbia and Montenegro)), Provisional Measures, Order of 8 April 1993, I.C.J. Reports 1993,* p. 14 para. 18). This conclusion was based in part on a provisional view taken by the Court as to the effect of the proviso to Article 35, paragraph 2, of the Statute (*ibid.*, para. 19). The Order contained the reservation, normally included in orders on requests for provisional measures, that "the decision given in the present proceedings in no way prejudges the question of the jurisdiction of the Court to deal with the merits of the case . . . and leaves unaffected the right of the Governments of Bosnia-Herzegovina and Yugoslavia to submit arguments in respect of [that question]" (*ibid.*, p. 23, para. 51). It is therefore evident that no question of *res judicata* arises in connection with the Order of 8 April 1993. A further Order on provisional measures was made on 13 September 1993, but contained nothing material to the question now being considered.

106. In 1995 the Respondent raised seven preliminary objections (one of which was later withdrawn), three of which invited the Court to find that it had no jurisdiction in the case. None of these objections were however founded on a contention that the FRY was not a party to the Statute at the relevant time; that was not a contention specifically advanced in the proceedings on the preliminary objections. At the time of those

proceedings, the FRY was persisting in the claim, that it was continuing the membership of the former SFRY in the United Nations; and while that claim was opposed by a number of States, the position taken by the various organs gave rise to a "confused and complex state of affairs . . . within the United Nations" (*Legality of Use of Force (Serbia and Montenegro* v. *Belgium), Preliminary Objections, Judgment, I.C.J. Reports 2004,* p. 308, para. 73). Neither party raised the matter before the Court: Bosnia and Herzegovina as Applicant, while denying that the FRY was a Member of the United Nations as a continuator of the SFRY, was asserting before this Court that the FRY was nevertheless a party to the Statute, either under Article 35, paragraph 2, thereof, or on the basis of the declaration of 27 April 1992 (see paragraphs 89 to 90 above); and for the FRY to raise the issue would have involved undermining or abandoning its claim to be the continuator of the SFRY as the basis for continuing membership of the United Nations.

107. By the 1996 Judgment, the Court rejected the preliminary objections of the Respondent, and found that, "on the basis of Article IX of the Convention on the Prevention and Punishment of the Crime of Genocide, it has jurisdiction to adjudicate upon the dispute" (*Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina* v. *Yugoslavia), Preliminary Objections, Judgment, I.C.J. Reports 1996 (II)*, p. 623, para. 47 (2) *(a)*). It also found that the Application was admissible, and stated that "the Court may now proceed to consider the merits of the case . . ." (*ibid.*, p. 622, para. 46).

108. However, on 24 April 2001 Serbia and Montenegro (then known as the Federal Republic of Yugoslavia) filed an Application instituting proceedings seeking revision, under Article 61 of the Statute, of the 1996 Judgment on jurisdiction in this case. That Article requires that there exist "some fact of such a nature as to be a decisive factor, which fact was, when the judgment was given, unknown to the Court . . .". The FRY claimed in its Application that:

> "The admission of the FRY to the United Nations as a new Member on 1 November 2000 is certainly a new fact . . .
>
> . . . .
>
> The admission of the FRY to the United Nations as a new Member clears ambiguities and sheds a different light on the issue of the membership of the FRY in the United Nations, in the Statute and in the Genocide Convention." (*Application for Revision, I.C.J. Reports 2003,* p. 12, para. 18.)

Essentially the contention of the FRY was that its admission to membership in 2000 necessarily implied that it was not a Member of the United Nations and thus not a party to the Statute in 1993, when the proceed-

ings in the present case were instituted, so that the Court would have had no jurisdiction in the case.

109. The history of the relationship between the FRY and the United Nations, from the break-up of the SFRY in 1991-1992 up to the admission of the FRY as a new Member in 2000, has been briefly recalled in paragraphs 88 to 99 above. That history has been examined in detail on more than one occasion, both in the context of the Application for revision referred to in paragraph 108 and in the Court's Judgments in 2004 in the cases concerning the *Legality of Use of Force*. In its Judgment of 3 February 2003 on the Application for revision, the Court carefully studied that relationship; it also recalled the terms of its 1996 Judgment finding in favour of jurisdiction. The Court noted that

> "the FRY claims that the facts which existed at the time of the 1996 Judgment and upon the discovery of which its request for revision of that Judgment is based 'are that the FRY was *not* a party to the Statute, and that it did *not* remain bound by the Genocide Convention continuing the personality of the former Yugoslavia'. It argues that these 'facts' were 'revealed' by its admission to the United Nations on 1 November 2000 and by [a letter from the United Nations Legal Counsel] of 8 December 2000.
>
> . . . .
>
> In the final version of its argument, the FRY claims that its admission to the United Nations and the Legal Counsel's letter of 8 December 2000 simply 'revealed' two facts which had existed in 1996 but had been unknown at the time: that it was not then a party to the Statute of the Court and that it was not bound by the Genocide Convention." (*I.C.J. Reports 2003*, p. 30, paras. 66 and 69.)

110. The Court did not consider that the admission of the FRY to membership was itself a "new fact", since it occurred after the date of the Judgment of which the revision was sought (*ibid.*, para. 68). As to the argument that facts on which an application for revision could be based were "revealed" by the events of 2000, the Court ruled as follows:

> "In advancing this argument, the FRY does not rely on facts that existed in 1996. In reality, it bases its Application for revision on the legal consequences which it seeks to draw from facts subsequent to the Judgment which it is asking to have revised. Those consequences, even supposing them to be established, cannot be regarded as facts within the meaning of Article 61. The FRY's argument cannot accordingly be upheld." (*Ibid.*, pp. 30-31, para. 69.)

111. The Court therefore found the Application for revision inadmissible. However, as the Court has observed in the cases concerning *Legal-*

ity of Use of Force, it did not, in its Judgment on the Application for revision,

> "regard the alleged 'decisive facts' specified by Serbia and Montenegro as 'facts that existed in 1996' for the purpose of Article 61. The Court therefore did not have to rule on the question whether 'the legal consequences' could indeed legitimately be deduced from the later facts; in other words, it did not have to say whether it was correct that Serbia and Montenegro had not been a party to the Statute or to the Genocide Convention in 1996." (*Legality of Use of Force (Serbia and Montenegro* v. *Belgium), Preliminary Objections, Judgment, I.C.J. Reports 2004*, p. 313, para. 87.)

112. In a subsequent paragraph of the 2003 Judgment on the Application for revision of the 1996 Judgment, the Court had stated:

> "It follows from the foregoing that it has not been established that the request of the FRY is based upon the discovery of 'some fact' which was 'when the judgment was given, unknown to the Court and also to the party claiming revision'. The Court therefore concludes that one of the conditions for the admissibility of an application for revision prescribed by paragraph 1 of Article 61 of the Statute has not been satisfied." (*I.C.J. Reports 2003*, p. 31, para. 72.)

In its 2004 decisions in the *Legality of Use of Force* cases the Court further commented on this finding:

> "The Court thus made its position clear that there could have been no retroactive modification of the situation in 2000, which would amount to a new fact, and that therefore the conditions of Article 61 were not satisfied. This, however, did not entail any finding by the Court, in the revision proceedings, as to what that situation actually was." (*Preliminary Objections, Judgment, I.C.J. Reports 2004*, p. 314, para. 89.)

113. For the purposes of the present case, it is thus clear that the Judgment of 2003 on the Application by the FRY for revision, while binding between the parties, and final and without appeal, did not contain any finding on the question whether or not that State had actually been a Member of the United Nations in 1993. The question of the status of the FRY in 1993 formed no part of the issues upon which the Court pronounced judgment when dismissing that Application.

* *

(5) The Principle of Res Judicata

114. The Court will now consider the principle of *res judicata*, and its application to the 1996 Judgment in this case. The Applicant asserts that the 1996 Judgment, whereby the Court found that it had jurisdiction

under the Genocide Convention, "enjoys the authority of *res judicata* and is not susceptible of appeal" and that "any ruling whereby the Court reversed the 1996 Judgment . . . would be incompatible both with the *res judicata* principle and with Articles 59, 60 and 61 of the Statute". The Applicant submits that, like its judgments on the merits, "the Court's decisions on jurisdiction are *res judicata*". It further observes that, pursuant to Article 60 of the Statute, the Court's 1996 Judgment is "final and without appeal" subject only to the possibility of a request for interpretation and revision; and the FRY's request for revision was rejected by the Court in its Judgment of 3 February 2003. The Respondent contends that jurisdiction once upheld may be challenged by new objections; and considers that this does not contravene the principle of *res judicata* or the wording of Article 79 of the Rules of Court. It emphasizes "the right and duty of the Court to act *proprio motu*" to examine its jurisdiction, mentioned in the case of the *Appeal Relating to the Jurisdiction of the ICAO Council (India* v. *Pakistan)* (see paragraph 118 below), and contends that the Court cannot "forfeit" that right by not having itself raised the issue in the preliminary objections phase.

115. There is no dispute between the Parties as to the existence of the principle of *res judicata* even if they interpret it differently as regards judgments deciding questions of jurisdiction. The fundamental character of that principle appears from the terms of the Statute of the Court and the Charter of the United Nations. The underlying character and purposes of the principle are reflected in the judicial practice of the Court. That principle signifies that the decisions of the Court are not only binding on the parties, but are final, in the sense that they cannot be reopened by the parties as regards the issues that have been determined, save by procedures, of an exceptional nature, specially laid down for that purpose. Article 59 of the Statute, notwithstanding its negative wording, has at its core the positive statement that the parties are bound by the decision of the Court in respect of the particular case. Article 60 of the Statute provides that the judgment is final and without appeal; Article 61 places close limits of time and substance on the ability of the parties to seek the revision of the judgment. The Court stressed those limits in 2003 when it found inadmissible the Application made by Serbia and Montenegro for revision of the 1996 Judgment in the *Application for Revision* case (*I.C.J. Reports 2003*, p. 12, para. 17).

116. Two purposes, one general, the other specific, underlie the principle of *res judicata*, internationally as nationally. First, the stability of legal relations requires that litigation come to an end. The Court's function, according to Article 38 of its Statute, is to "decide", that is, to bring to an end, "such disputes as are submitted to it". Secondly, it is in the interest of each party that an issue which has already been adjudicated in favour of that party be not argued again. Article 60 of the Statute articu-

lates this finality of judgments. Depriving a litigant of the benefit of a judgment it has already obtained must in general be seen as a breach of the principles governing the legal settlement of disputes.

117. It has however been suggested by the Respondent that a distinction may be drawn between the application of the principle of *res judicata* to judgments given on the merits of a case, and judgments determining the Court's jurisdiction, in response to preliminary objections; specifically, the Respondent contends that "decisions on preliminary objections do not and cannot have the same consequences as decisions on the merits". The Court will however observe that the decision on questions of jurisdiction, pursuant to Article 36, paragraph 6, of the Statute, is given by a judgment, and Article 60 of the Statute provides that "[t]he judgment is final and without appeal", without distinguishing between judgments on jurisdiction and admissibility, and judgments on the merits. In its Judgment of 25 March 1999 on the request for interpretation of the Judgment of 11 June 1998 in the case of the *Land and Maritime Boundary between Cameroon and Nigeria*, the Court expressly recognized that the 1998 Judgment, given on a number of preliminary objections to jurisdiction and admissibility, constituted *res judicata*, so that the Court could not consider a submission inconsistent with that judgment (*Judgment, I.C.J. Reports 1999 (I)*, p. 39, para. 16). Similarly, in its Judgment of 3 February 2003 in the *Application for Revision* case, the Court, when it began by examining whether the conditions for the opening of the revision procedure, laid down by Article 61 of the Statute, were satisfied, undoubtedly recognized that an application could be made for revision of a judgment on preliminary objections; this could in turn only derive from a recognition that such a judgment is "final and without appeal". Furthermore, the contention put forward by the Respondent would signify that the principle of *res judicata* would not prevent a judgment dismissing a preliminary objection from remaining open to further challenge indefinitely, while a judgment upholding such an objection, and putting an end to the case, would in the nature of things be final and determinative as regards that specific case.

118. The Court recalls that, as it has stated in the case of the *Appeal Relating to the Jurisdiction of the ICAO Council (India* v. *Pakistan)*, it "must however always be satisfied that it has jurisdiction, and must if necessary go into that matter *proprio motu*" (*Judgment, I.C.J. Reports 1972*, p. 52, para. 13). That decision in its context (in a case in which there was no question of reopening a previous decision of the Court) does not support the Respondent's contention. It does not signify that jurisdictional decisions remain reviewable indefinitely, nor that the Court may, *proprio motu* or otherwise, reopen matters already decided with the force of *res judicata*. The Respondent has argued that there is a principle that "an international court may consider or reconsider the issue of juris-

diction at any stage of the proceedings". It has referred in this connection both to the dictum just cited from the *Appeal Relating to the Jurisdiction of the ICAO Council (India* v. *Pakistan)*, and to the *Corfu Channel (United Kingdom* v. *Albania)* case. It is correct that the Court, having in the first phase of that case rejected Albania's preliminary objection to jurisdiction, and having decided that proceedings on the merits were to continue (*Preliminary Objection, Judgment, I.C.J. Reports 1947-1948*, p. 15), did at the merits stage consider and rule on a challenge to its jurisdiction, in particular whether it had jurisdiction to assess compensation (*I.C.J. Reports 1949*, pp. 23-26; 171). But no reconsideration at all by the Court of its earlier Judgment was entailed in this because, following that earlier Judgment, the Parties had concluded a special agreement submitting to the Court, *inter alia*, the question of compensation. The later challenge to jurisdiction concerned only the scope of the jurisdiction conferred by that subsequent agreement.

119. The Respondent also invokes certain international conventions and the rules of other international tribunals. It is true that the European Court of Human Rights may reject, at any stage of the proceedings, an application which it considers inadmissible; and the International Criminal Court may, in exceptional circumstances, permit the admissibility of a case or the jurisdiction of the Court to be challenged after the commencement of the trial. However, these specific authorizations in the instruments governing certain other tribunals reflect their particular admissibility procedures, which are not identical with the procedures of the Court in the field of jurisdiction. They thus do not support the view that there exists a general principle which would apply to the Court, whose Statute not merely contains no such provision, but declares, in Article 60, the *res judicata* principle without exception. The Respondent has also cited certain jurisprudence of the European Court of Human Rights, and an arbitral decision of the German-Polish Mixed Arbitral Tribunal (*von Tiedemann* case); but, in the view of the Court, these too, being based on their particular facts, and the nature of the jurisdictions involved, do not indicate the existence of a principle of sufficient generality and weight to override the clear provisions of the Court's Statute, and the principle of *res judicata*.

120. This does not however mean that, should a party to a case believe that elements have come to light subsequent to the decision of the Court which tend to show that the Court's conclusions may have been based on incorrect or insufficient facts, the decision must remain final, even if it is in apparent contradiction to reality. The Statute provides for only one procedure in such an event: the procedure under Article 61, which offers the possibility for the revision of judgments, subject to the restrictions stated in that Article. In the interests of the stability of legal relations, those restrictions must be rigorously applied. As noted above (para-

graph 110) the FRY's Application for revision of the 1996 Judgment in this case was dismissed, as not meeting the conditions of Article 61. Subject only to this possibility of revision, the applicable principle is *res judicata pro veritate habetur*, that is to say that the findings of a judgment are, for the purposes of the case and between the parties, to be taken as correct, and may not be reopened on the basis of claims that doubt has been thrown on them by subsequent events.

* *

(6) Application of the Principle of Res Judicata *to the 1996 Judgment*

121. In the light of these considerations, the Court reverts to the effect and significance of the 1996 Judgment. That Judgment was essentially addressed, so far as questions of jurisdiction were concerned, to the question of the Court's jurisdiction under the Genocide Convention. It resolved in particular certain questions that had been raised as to the status of Bosnia and Herzegovina in relation to the Convention; as regards the FRY, the Judgment stated simply as follows:

> "the former Socialist Federal Republic of Yugoslavia . . . signed the Genocide Convention on 11 December 1948 and deposited its instrument of ratification, without reservation, on 29 August 1950. At the time of the proclamation of the Federal Republic of Yugoslavia, on 27 April 1992, a formal declaration was adopted on its behalf to the effect that:
>
> > 'The Federal Republic of Yugoslavia, continuing the State, international legal and political personality of the Socialist Federal Republic of Yugoslavia, shall strictly abide by all the commitments that the Socialist Federal Republic of Yugoslavia assumed internationally.'
>
> This intention thus expressed by Yugoslavia to remain bound by the international treaties to which the former Yugoslavia was party was confirmed in an official Note of 27 April 1992 from the Permanent Mission of Yugoslavia to the United Nations, addressed to the Secretary-General. The Court observes, furthermore, that it has not been contested that Yugoslavia was party to the Genocide Convention. Thus, Yugoslavia was bound by the provisions of the Convention on the date of the filing of the Application in the present case, namely, on 20 March 1993." (*Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina* v. *Yugoslavia) Preliminary Objections, Judgment, I.C.J. Reports 1996 (II)*, p. 610, para. 17.)

122. Nothing was stated in the 1996 Judgment about the status of the FRY in relation to the United Nations, or the question whether it could participate in proceedings before the Court; for the reasons already mentioned above (paragraph 106), both Parties had chosen to refrain from asking for a decision on these matters. The Court however considers it necessary to emphasize that the question whether a State may properly come before the Court, on the basis of the provisions of the Statute, whether it be classified as a matter of capacity to be a party to the proceedings or as an aspect of jurisdiction *ratione personae*, is a matter which precedes that of jurisdiction *ratione materiae*, that is, whether that State has consented to the settlement by the Court of the specific dispute brought before it. The question is in fact one which the Court is bound to raise and examine, if necessary, ex officio, and if appropriate after notification to the parties. Thus if the Court considers that, in a particular case, the conditions concerning the capacity of the parties to appear before it are not satisfied, while the conditions of its jurisdiction *ratione materiae* are, it should, even if the question has not been raised by the parties, find that the former conditions are not met, and conclude that, for that reason, it could not have jurisdiction to decide the merits.

123. The operative part of a judgment of the Court possesses the force of *res judicata*. The operative part of the 1996 Judgment stated, in paragraph 47 (2) *(a)*, that the Court found "that, on the basis of Article IX of the Convention on the Prevention and Punishment of the Crime of Genocide, it has jurisdiction to decide upon the dispute". That jurisdiction is thus established with the full weight of the Court's judicial authority. For a party to assert today that, at the date the 1996 Judgment was given, the Court had no power to give it, because one of the parties can now be seen to have been unable to come before the Court is, for the reason given in the preceding paragraph, to call in question the force as *res judicata* of the operative clause of the Judgment. At first sight, therefore, the Court need not examine the Respondent's objection to jurisdiction based on its contention as to its lack of status in 1993.

124. The Respondent has however advanced a number of arguments tending to show that the 1996 Judgment is not conclusive on the matter, and the Court will now examine these. The passage just quoted from the 1996 Judgment is of course not the sole provision of the operative clause of that Judgment: as, the Applicant has noted, the Court first dismissed *seriatim* the specific preliminary objections raised (and not withdrawn) by the Respondent; it then made the finding quoted in paragraph 123 above; and finally it dismissed certain additional bases of jurisdiction invoked by the Applicant. The Respondent suggests that, for the purposes of applying the principle of *res judicata* to a judgment of this kind on preliminary objections, the operative clause *(dispositif)* to be taken into account and given the force of *res judicata* is the decision rejecting specified preliminary objections, rather than "the broad ascertainment

upholding jurisdiction". The Respondent has drawn attention to the provisions of Article 79, paragraph 7, of the 1978 Rules of Court, which provides that the judgment on preliminary objections shall, in respect of each objection "either uphold the objection, reject it, or declare that the objection does not possess, in the circumstances of the case, an exclusively preliminary character". The Respondent suggests therefore that only the clauses of a judgment on preliminary objections that are directed to these ends have the force of *res judicata*, which is, it contends, consistent with the view that new objections may be raised subsequently.

125. The Court does not however consider that it was the purpose of Article 79 of the Rules of Court to limit the extent of the force of *res judicata* attaching to a judgment on preliminary objections, nor that, in the case of such judgment, such force is necessarily limited to the clauses of the *dispositif* specifically rejecting particular objections. There are many examples in the Court's jurisprudence of decisions on preliminary objections which contain a general finding that the Court has jurisdiction, or that the application is admissible, as the case may be; and it would be going too far to suppose that all of these are necessarily superfluous conclusions. In the view of the Court, if any question arises as to the scope of *res judicata* attaching to a judgment, it must be determined in each case having regard to the context in which the judgment was given (cf. *Application for Revision and Interpretation of the Judgment of 24 February 1982 in the Case concerning the* Continental Shelf (Tunisia/Libyan Arab Jamahiriya) *(Tunisia* v. *Libyan Arab Jamahiriya), Judgment, I.C.J. Reports 1985*, pp. 218-219, para. 48).

126. For this purpose, in respect of a particular judgment it may be necessary to distinguish between, first, the issues which have been decided with the force of *res judicata*, or which are necessarily entailed in the decision of those issues; secondly any peripheral or subsidiary matters, or *obiter dicta*; and finally matters which have not been ruled upon at all. Thus an application for interpretation of a judgment under Article 60 of the Statute may well require the Court to settle "[a] difference of opinion [between the parties] as to whether a particular point has or has not been decided with binding force" (*Interpretation of Judgments Nos. 7 and 8 (Factory at Chorzów), Judgment No. 11, 1927, P.C.I.J. Series A, No. 13*, pp. 11-12). If a matter has not in fact been determined, expressly or by necessary implication, then no force of *res judicata* attaches to it; and a general finding may have to be read in context in order to ascertain whether a particular matter is or is not contained in it.

127. In particular, the fact that a judgment may, in addition to rejecting specific preliminary objections, contain a finding that "the Court has jurisdiction" in the case does not necessarily prevent subsequent examination of any jurisdictional issues later arising that have not been resolved, with the force of *res judicata*, by such judgment. The Parties have each referred in this connection to the successive decisions in the *Corfu Chan-*

nel case, which the Court has already considered above (paragraph 118). Mention may also be made of the judgments on the merits in the two cases concerning *Fisheries Jurisdiction (United Kingdom* v. *Iceland) (Federal Republic of Germany* v. *Iceland)* (*I.C.J. Reports 1974*, p. 20, para. 42; pp. 203-204, para. 74), which dealt with minor issues of jurisdiction despite an express finding of jurisdiction in previous judgments (*I.C.J. Reports 1973*, p. 22, para. 46; p. 66, para. 46). Even where the Court has, in a preliminary judgment, specifically reserved certain matters of jurisdiction for later decision, the judgment may nevertheless contain a finding that "the Court has jurisdiction" in the case, this being understood as being subject to the matters reserved (see *Military and Paramilitary Activities in and against Nicaragua (Nicaragua* v. *United States of America), Jurisdiction and Admissibility, Judgment, I.C.J. Reports 1984*, p. 442, para. 113 (1) *(c)*, and pp. 425-426, para. 76; cf. also, in connection with an objection to admissibility, *Questions of Interpretation and Application of the 1971 Montreal Convention arising from the Aerial Incident at Lockerbie (Libyan Arab Jamahiriya* v. *United Kingdom) (Libyan Arab Jamahiriya* v. *United States of America), I.C.J. Reports 1998*, p. 29, para. 51, and pp. 30-31, paras. 53 (2) *(b)* and 53 (3); p. 134, para. 50, and p. 156, paras. 53 (2) *(b)* and 53 (3)).

128. On the other hand, the fact that the Court has in these past cases dealt with jurisdictional issues after having delivered a judgment on jurisdiction does not support the contention that such a judgment can be reopened at any time, so as to permit reconsideration of issues already settled with the force of *res judicata*. The essential difference between the cases mentioned in the previous paragraph and the present case is this: the jurisdictional issues examined at a late stage in those cases were such that the decision on them would not contradict the finding of jurisdiction made in the earlier judgment. In the *Fisheries Jurisdiction* cases, the issues raised related to the extent of the jurisdiction already established in principle with the force of *res judicata*; in the *Military and Paramilitary Activities* case, the Court had clearly indicated in the 1984 Judgment that its finding in favour of jurisdiction did not extend to a definitive ruling on the interpretation of the United States reservation to its optional clause declaration. By contrast, the contentions of the Respondent in the present case would, if upheld, effectively reverse the 1996 Judgment; that indeed is their purpose.

129. The Respondent has contended that the issue whether the FRY had access to the Court under Article 35 of the Statute has in fact never been decided in the present case, so that no barrier of *res judicata* would prevent the Court from examining that issue at the present stage of the

proceedings. It has drawn attention to the fact that when commenting on the 1996 Judgment, in its 2004 Judgments in the cases concerning the *Legality of Use of Force*, the Court observed that "[t]he question of the status of the Federal Republic of Yugoslavia in relation to Article 35 of the Statute was not raised and the Court saw no reason to examine it" (see, for example, *Legality of Use of Force (Serbia and Montenegro* v. *Belgium), I.C.J. Reports 2004*, p. 311, para. 82), and that "in its pronouncements in incidental proceedings" in the present case, the Court "did not commit itself to a definitive position on the issue of the legal status of the Federal Republic of Yugoslavia in relation to the Charter and the Statute" (*ibid.*, pp. 308-309, para. 74).

130. That does not however signify that in 1996 the Court was unaware of the fact that the solution adopted in the United Nations to the question of continuation of the membership of the SFRY "[was] not free from legal difficulties", as the Court had noted in its Order of 8 April 1993 indicating provisional measures in the case (*I.C.J. Reports 1993*, p. 14, para. 18; above, paragraph 105). The FRY was, at the time of the proceedings on its preliminary objections culminating in the 1996 Judgment, maintaining that it was the continuator State of the SFRY. As the Court indicated in its Judgments in the cases concerning the *Legality of Use of Force*,

> "No specific assertion was made in the Application [of 1993, in the present case] that the Court was open to Serbia and Montenegro under Article 35, paragraph 1, of the Statute of the Court, but it was later made clear that the Applicant claimed to be a Member of the United Nations and thus a party to the Statute of the Court, by virtue of Article 93, paragraph 1, of the Charter, at the time of filing of the Application . . . [T]his position was expressly stated in the Memorial filed by Serbia and Montenegro on 4 January 2000 . . ." (*Legality of Use of Force (Serbia and Montenegro* v. *Belgium), Preliminary Objections, Judgment, I.C.J. Reports 2004,* p. 299, para. 47.)

The question whether the FRY was a continuator or a successor State of the SFRY was mentioned in the Memorial of Bosnia and Herzegovina. The view of Bosnia and Herzegovina was that, while the FRY was not a Member of the United Nations, as a successor State of the SFRY which had expressly declared that it would abide by the international commitments of the SFRY, it was nevertheless a party to the Statute. It is also essential, when examining the text of the 1996 Judgment, to take note of the context in which it was delivered, in particular as regards the contemporary state of relations between the Respondent and the United Nations, as recounted in paragraphs 88 to 99 above.

131. The "legal difficulties" referred to were finally dissipated when in 2000 the FRY abandoned its former insistence that it was the continuator of the SFRY, and applied for membership in the United Nations (paragraph 98 above). As the Court observed in its 2004 Judgments in the cases concerning the *Legality of Use of Force*,

> "the significance of this new development in 2000 is that it has clarified the thus far amorphous legal situation concerning the status of the Federal Republic of Yugoslavia vis-à-vis the United Nations. It is in that sense that the situation that the Court now faces in relation to Serbia and Montenegro is manifestly different from that which it faced in 1999. If, at that time, the Court had had to determine definitively the status of the Applicant vis-à-vis the United Nations, its task of giving such a determination would have been complicated by the legal situation, which was shrouded in uncertainties relating to that status. However, from the vantage point from which the Court now looks at the legal situation, and in light of the legal consequences of the new development since 1 November 2000, the Court is led to the conclusion that Serbia and Montenegro was not a Member of the United Nations, and in that capacity a State party to the Statute of the International Court of Justice, at the time of filing its Application to institute the present proceedings before the Court on 29 April 1999." (*Legality of Use of Force (Serbia and Montenegro* v. *Belgium), Preliminary Objections, Judgment, I.C.J. Reports 2004*, pp. 310-311, para. 79.)

As the Court here recognized, in 1999 — and even more so in 1996 — it was by no means so clear as the Court found it to be in 2004 that the Respondent was not a Member of the United Nations at the relevant time. The inconsistencies of approach expressed by the various United Nations organs are apparent from the passages quoted in paragraphs 91 to 96 above.

132. As already noted, the legal complications of the position of the Respondent in relation to the United Nations were not specifically mentioned in the 1996 Judgment. The Court stated, as mentioned in paragraph 121 above, that "Yugoslavia was bound by the provisions of the [Genocide] Convention on the date of the filing of the Application in the present case" (*Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina* v. *Yugoslavia), Preliminary Objections, Judgment, I.C.J. Reports 1996 (II)*, p. 610, para. 17), and found that "on the basis of Article IX of the Convention on the Prevention and Punishment of the Crime of Genocide, it has jurisdiction to adjudicate upon the dispute" (*ibid.*, p. 623, para. 47 (2) *(a)*). Since, as observed above, the question of a State's capacity to be a party to proceedings is a matter which precedes that of jurisdiction *ratione materiae*, and one which the Court must, if necessary, raise ex officio (see

paragraph 122 above), this finding must as a matter of construction be understood, by necessary implication, to mean that the Court at that time perceived the Respondent as being in a position to participate in cases before the Court. On that basis, it proceeded to make a finding on jurisdiction which would have the force of *res judicata*. The Court does not need, for the purpose of the present proceedings, to go behind that finding and consider on what basis the Court was able to satisfy itself on the point. Whether the Parties classify the matter as one of "access to the Court" or of "jurisdiction *ratione personae*", the fact remains that the Court could not have proceeded to determine the merits unless the Respondent had had the capacity under the Statute to be a party to proceedings before the Court.

133. In the view of the Court, the express finding in the 1996 Judgment that the Court had jurisdiction in the case *ratione materiae*, on the basis of Article IX of the Genocide Convention, seen in its context, is a finding which is only consistent, in law and logic, with the proposition that, in relation to both Parties, it had jurisdiction *ratione personae* in its comprehensive sense, that is to say, that the status of each of them was such as to comply with the provisions of the Statute concerning the capacity of States to be parties before the Court. As regards Bosnia and Herzegovina, there was no question but that it was a party to the Statute at the date of filing its Application instituting proceedings; and in relation to the Convention, the Court found that it "could . . . become a party to the Convention" from the time of its admission to the United Nations (*I.C.J. Reports 1996 (II)*, p. 611, para. 19), and had in fact done so. As regards the FRY, the Court found that it "was bound by the provisions of the Convention", i.e. was a party thereto, "on the date of the filing of the Application" (*ibid.*, p. 610, para. 17); in this respect the Court took note of the declaration made by the FRY on 27 April 1992, set out in paragraph 89 above, whereby the FRY "continuing the State, international legal and political personality" of the SFRY, declared that it would "strictly abide by" the international commitments of the SFRY. The determination by the Court that it had jurisdiction under the Genocide Convention is thus to be interpreted as incorporating a determination that all the conditions relating to the capacity of the Parties to appear before it had been met.

134. It has been suggested by the Respondent that the Court's finding of jurisdiction in the 1996 Judgment was based merely upon an assumption: an assumption of continuity between the SFRY and the FRY. It has drawn attention to passages, already referred to above (paragraph 129), in the Judgments in the *Legality of Use of Force* cases, to the effect that in 1996 the Court saw no reason to examine the question of access, and that, in its pronouncements in incidental proceedings, the Court did not commit itself to a definitive position on the issue of the legal status of the Respondent.

135. That the FRY had the capacity to appear before the Court in

accordance with the Statute was an element in the reasoning of the 1996 Judgment which can — and indeed must — be read into the Judgment as a matter of logical construction. That element is not one which can at any time be reopened and re-examined, for the reasons already stated above. As regards the passages in the 2004 Judgments relied on by the Respondent, it should be borne in mind that the concern of the Court was not then with the scope of *res judicata* of the 1996 Judgment, since in any event such *res judicata* could not extend to the proceedings in the cases that were then before it, between different parties. It was simply appropriate in 2004 for the Court to consider whether there was an expressly stated finding in another case that would throw light on the matters before it. No such express finding having been shown to exist, the Court in 2004 did not, as it has in the present case, have to go on to consider what might be the unstated foundations of a judgment given in another case, between different parties.

136. The Court thus considers that the 1996 Judgment contained a finding, whether it be regarded as one of jurisdiction *ratione personae*, or as one anterior to questions of jurisdiction, which was necessary as a matter of logical construction, and related to the question of the FRY's capacity to appear before the Court under the Statute. The force of *res judicata* attaching to that judgment thus extends to that particular finding.

137. However it has been argued by the Respondent that even were that so,

> "the fundamental nature of access as a precondition for the exercise of the Court's judicial function means that positive findings on access cannot be taken as definitive and final until the final judgment is rendered in proceedings, because otherwise it would be possible that the Court renders its final decision with respect to a party over which it cannot exercise [its] judicial function. In other words, access is so fundamental that, until the final judgment, it overrides the principle of *res judicata*. Thus, even if the 1996 Judgment had made a finding on access, *quod non*, that would not be a bar for the Court to re-examine this issue until the end of the proceedings."

A similar argument advanced by the Respondent is based on the principle that the jurisdiction of the Court derives from a treaty, namely the Statute of the Court; the Respondent questions whether the Statute could have endowed the 1996 Judgment with any effects at all, since the Respondent was, it alleges, not a party to the Statute. Counsel for the Respondent argued that

> "Today it is known that in 1996 when the decision on preliminary objections was rendered, the Respondent was not a party to the Statute. Thus, there was no foothold, Articles 36 (6), 59, and 60 did

not represent a binding treaty provision providing a possible basis for deciding on jurisdiction with *res judicata* effects."

138. It appears to the Court that these contentions are inconsistent with the nature of the principle of *res judicata*. That principle signifies that once the Court has made a determination, whether on a matter of the merits of a dispute brought before it, or on a question of its own jurisdiction, that determination is definitive both for the parties to the case, in respect of the case (Article 59 of the Statute), and for the Court itself in the context of that case. However fundamental the question of the capacity of States to be parties in cases before the Court may be, it remains a question to be determined by the Court, in accordance with Article 36, paragraph 6, of the Statute, and once a finding in favour of jurisdiction has been pronounced with the force of *res judicata*, it is not open to question or re-examination, except by way of revision under Article 61 of the Statute. There is thus, *as a matter of law*, no possibility that the Court might render "its final decision with respect to a party over which it cannot exercise its judicial function", because the question whether a State is or is not a party subject to the jurisdiction of the Court is one which is reserved for the sole and authoritative decision of the Court.

139. Counsel for the Respondent contended further that, in the circumstances of the present case, reliance on the *res judicata* principle "would justify the Court's *ultra vires* exercise of its judicial functions contrary to the mandatory requirements of the Statute". However, the operation of the "mandatory requirements of the Statute" falls to be determined by the Court in each case before it; and once the Court has determined, with the force of *res judicata*, that it has jurisdiction, then for the purposes of that case no question of *ultra vires* action can arise, the Court having sole competence to determine such matters under the Statute. For the Court *res judicata pro veritate habetur*, and the judicial truth within the context of a case is as the Court has determined it, subject only to the provision in the Statute for revision of judgments. This result is required by the nature of the judicial function, and the universally recognized need for stability of legal relations.

* *

(7) Conclusion: Jurisdiction Affirmed

140. The Court accordingly concludes that, in respect of the contention that the Respondent was not, on the date of filing of the Application instituting proceedings, a State having the capacity to come before the Court under the Statute, the principle of *res judicata* precludes any reopening of the decision embodied in the 1996 Judgment. The Respondent

has however also argued that the 1996 Judgment is not *res judicata* as to the further question whether the FRY was, at the time of institution of proceedings, a party to the Genocide Convention, and has sought to show that at that time it was not, and could not have been, such a party. The Court however considers that the reasons given above for holding that the 1996 Judgment settles the question of jurisdiction in this case with the force of *res judicata* are applicable *a fortiori* as regards this contention, since on this point the 1996 Judgment was quite specific, as it was not on the question of capacity to come before the Court. The Court does not therefore find it necessary to examine the argument of the Applicant that the failure of the Respondent to advance at the time the reasons why it now contends that it was not a party to the Genocide Convention might raise considerations of estoppel, or *forum prorogatum* (cf. paragraphs 85 and 101 above). The Court thus concludes that, as stated in the 1996 Judgment, it has jurisdiction, under Article IX of the Genocide Convention, to adjudicate upon the dispute brought before it by the Application filed on 20 March 1993. It follows from the above that the Court does not find it necessary to consider the questions, extensively addressed by the Parties, of the status of the Respondent under the Charter of the United Nations and the Statute of the Court, and its position in relation to the Genocide Convention at the time of the filing of the Application.

*

141. There has been some reference in the Parties' arguments before the Court to the question whether Article 35, paragraphs 1 and 2, of the Statute apply equally to applicants and to respondents. This matter, being one of interpretation of the Statute, would be one for the Court to determine. However, in the light of the conclusion that the Court has reached as to the *res judicata* status of the 1996 decision, it does not find at present the necessity to do so.

* * *

IV. The Applicable Law: The Convention on the Prevention and Punishment of the Crime of Genocide

(1) The Convention in Brief

142. The Contracting Parties to the Convention, adopted on 9 December 1948, offer the following reasons for agreeing to its text:

> "The Contracting Parties,
>
> Having considered the declaration made by the General Assembly of the United Nations in its resolution 96 (I) dated 11 December 1946 that genocide is a crime under international law, contrary

to the spirit and aims of the United Nations and condemned by the civilized world,

Recognizing that at all periods of history genocide has inflicted great losses on humanity, and

Being convinced that, in order to liberate mankind from such an odious scourge, international co-operation is required,

Hereby agree as hereinafter provided . . ."

143. Under Article I "[t]he Contracting Parties confirm that genocide, whether committed in time of peace or in time of war, is a crime under international law which they undertake to prevent and to punish". Article II defines genocide in these terms:

"In the present Convention, genocide means any of the following acts committed with intent to destroy, in whole or in part, a national, ethnical, racial or religious group, as such:

(a) Killing members of the group;
(b) Causing serious bodily or mental harm to members of the group;
(c) Deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part;
(d) Imposing measures intended to prevent births within the group;
(e) Forcibly transferring children of the group to another group."

Article III provides as follows:

"The following acts shall be punishable:

(a) Genocide;
(b) Conspiracy to commit genocide;
(c) Direct and public incitement to commit genocide;
(d) Attempt to commit genocide;
(e) Complicity in genocide."

144. According to Article IV, persons committing any of those acts shall be punished whether they are constitutionally responsible rulers, public officials or private individuals. Article V requires the parties to enact the necessary legislation to give effect to the Convention, and, in particular, to provide effective penalties for persons guilty of genocide or other acts enumerated in Article III. Article VI provides that

"[p]ersons charged with genocide or any of the other acts enumerated in article III shall be tried by a competent tribunal of the State in the territory of which the act was committed, or by such international penal tribunal as may have jurisdiction with respect to those Contracting Parties which shall have accepted its jurisdiction".

Article VII provides for extradition.

145. Under Article VIII

> "Any Contracting Party may call upon the competent organs of the United Nations to take such action under the Charter of the United Nations as they consider appropriate for the prevention and suppression of acts of genocide or any of the other acts enumerated in Article III."

146. Article IX provides for certain disputes to be submitted to the Court:

> "Disputes between the Contracting Parties relating to the interpretation, application or fulfilment of the present Convention, including those relating to the responsibility of a State for genocide or for any of the other acts enumerated in Article III, shall be submitted to the International Court of Justice at the request of any of the parties to the dispute."

The remaining ten Articles are final clauses dealing with such matters as parties to the Convention and its entry into force.

147. The jurisdiction of the Court in this case is based solely on Article IX of the Convention. All the other grounds of jurisdiction invoked by the Applicant were rejected in the 1996 Judgment on jurisdiction (*I.C.J. Reports 1996 (II)*, pp. 617-621, paras. 35-41). It follows that the Court may rule only on the disputes between the Parties to which that provision refers. The Parties disagree on whether the Court finally decided the scope and meaning of that provision in its 1996 Judgment and, if it did not, on the matters over which the Court has jurisdiction under that provision. The Court rules on those two matters in following sections of this Judgment. It has no power to rule on alleged breaches of other obligations under international law, not amounting to genocide, particularly those protecting human rights in armed conflict. That is so even if the alleged breaches are of obligations under peremptory norms, or of obligations which protect essential humanitarian values, and which may be owed *erga omnes*.

148. As it has in other cases, the Court recalls the fundamental distinction between the existence and binding force of obligations arising under international law and the existence of a court or tribunal with jurisdiction to resolve disputes about compliance with those obligations. The fact that there is not such a court or tribunal does not mean that the obligations do not exist. They retain their validity and legal force. States are required to fulfil their obligations under international law, including international humanitarian law, and they remain responsible for acts contrary to international law which are attributable to them (e.g. case concerning *Armed Activities on the Territory of the Congo (New Appli-*

cation: 2002) (Democratic Republic of the Congo v. *Rwanda), Jurisdiction of the Court and Admissibility of the Application, Judgment, I.C.J. Reports 2006*, pp. 52-53, para. 127).

149. The jurisdiction of the Court is founded on Article IX of the Convention, and the disputes subject to that jurisdiction are those "relating to the interpretation, application or fulfilment" of the Convention, but it does not follow that the Convention stands alone. In order to determine whether the Respondent breached its obligation under the Convention, as claimed by the Applicant, and, if a breach was committed, to determine its legal consequences, the Court will have recourse not only to the Convention itself, but also to the rules of general international law on treaty interpretation and on responsibility of States for internationally wrongful acts.

* *

(2) The Court's 1996 Decision about the Scope and Meaning of Article IX

150. According to the Applicant, the Court in 1996 at the preliminary objections stage decided that it had jurisdiction under Article IX of the Convention to adjudicate upon the responsibility of the respondent State, as indicated in that Article, "for genocide or any of the other acts enumerated in article III", and that that reference "does not exclude any form of State responsibility". The issue, it says, is *res judicata*. The Respondent supports a narrower interpretation of the Convention: the Court's jurisdiction is confined to giving a declaratory judgment relating to breaches of the duties to prevent and punish the commission of genocide by individuals.

151. The Respondent accepts that the first, wider, interpretation "was preferred by the majority of the Court in the preliminary objections phase" and quotes the following passage in the Judgment:

> "The Court now comes to the second proposition advanced by Yugoslavia [in support of one of its preliminary objections], regarding the type of State responsibility envisaged in Article IX of the Convention. According to Yugoslavia, that Article would only cover the responsibility flowing from the failure of a State to fulfil its obligations of prevention and punishment as contemplated by Articles V, VI and VII; on the other hand, the responsibility of a State for an act of genocide perpetrated by the State itself would be excluded from the scope of the Convention.
>
> *The Court would observe that the reference to Article IX to 'the responsibility of a State for genocide or for any of the other acts enumerated in Article III', does not exclude any form of State responsibility.*
>
> *Nor is the responsibility of a State for acts of its organs excluded*

> *by Article IV of the Convention, which contemplates the commission of an act of genocide by 'rulers' or 'public officials'.*
>
> In the light of the foregoing, the Court considers that it must reject the fifth preliminary objection of Yugoslavia. It would moreover observe that it is sufficiently apparent from the very terms of that objection that the Parties not only differ with respect to the facts of the case, their imputability and the applicability to them of the provisions of the Genocide Convention, but are moreover in disagreement with respect to the meaning and legal scope of several of those provisions, including Article IX. For the Court, there is accordingly no doubt that there exists a dispute between them relating to 'the interpretation, application or fulfilment of the . . . Convention, including . . . the responsibility of a State for genocide . . .', according to the form of words employed by that latter provision (cf. *Applicability of the Obligation to Arbitrate under Section 21 of the United Nations Headquarters Agreement of 26 June 1947, Advisory Opinion, I.C.J. Reports 1988,* pp. 27-32)." (*Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina* v. *Yugoslavia), Preliminary Objections, Judgment, I.C.J. Reports 1996 (II)*, pp. 616-617, paras. 32-33; emphasis now added to 1996 text.)

The Applicant relies in particular on the sentences in paragraph 32 which have been emphasized in the above quotation. The Respondent submits that

> "this expression of opinion is of marked brevity and is contingent upon the dismissal of the preliminary objection based upon the existence or otherwise of a dispute relating to the interpretation of the Genocide Convention. The interpretation adopted in this provisional mode by the Court is not buttressed by any reference to the substantial preparatory work of the Convention.
>
> In the circumstances, there is no reason of principle or consideration of common sense indicating that the issue of interpretation is no longer open."

While submitting that the Court determined the issue and spoke emphatically on the matter in 1996 the Applicant also says that this present phase of the case

> "will provide an additional opportunity for this Court to rule on [the] important matter, not only for the guidance of the Parties here before you, but for the benefit of future generations that should not have to fear the immunity of States from responsibility for their genocidal acts".

152. The Court has already examined above the question of the authority of *res judicata* attaching to the 1996 Judgment, and indicated that it cannot reopen issues decided with that authority. Whether or not the issue now raised by the Respondent falls in that category, the Court

observes that the final part of paragraph 33 of that Judgment, quoted above, must be taken as indicating that "the meaning and legal scope" of Article IX and of other provisions of the Convention remain in dispute. In particular a dispute "exists" about whether the only obligations of the Contracting Parties for the breach of which they may be held responsible under the Convention are to legislate, and to prosecute or extradite, or whether the obligations extend to the obligation not to commit genocide and the other acts enumerated in Article III. That dispute "exists" and was left by the Court for resolution at the merits stage. In these circumstances, and taking into account the positions of the Parties, the Court will determine at this stage whether the obligations of the Parties under the Convention do so extend. That is to say, the Court will decide "the meaning and legal scope" of several provisions of the Convention, including Article IX with its reference to "the responsibility of a State for genocide or any of the other acts enumerated in Article III".

* *

(3) The Court's 1996 Decision about the Territorial Scope of the Convention

153. A second issue about the *res judicata* effect of the 1996 Judgment concerns the territorial limits, if any, on the obligations of the States parties to prevent and punish genocide. In support of one of its preliminary objections the Respondent argued that it did not exercise jurisdiction over the Applicant's territory at the relevant time. In the final sentence of its reasons for rejecting this argument the Court said this: "[t]he Court notes that the obligation each State thus has to prevent and to punish the crime of genocide is not territorially limited by the Convention" (*I.C.J. Reports 1996 (II)*, p. 616, para. 31).

154. The Applicant suggests that the Court in that sentence ruled that the obligation extends without territorial limit. The Court does not state the obligation in that positive way. The Court does not say that the obligation is "territorially unlimited by the Convention". Further, earlier in the paragraph, it had quoted from Article VI (about the obligation of any State in the territory of which the act was committed to prosecute) as "the only provision relevant to" territorial "problems" related to the application of the Convention. The quoted sentence is therefore to be understood as relating to the undertaking stated in Article I. The Court did not in 1996 rule on the territorial scope of each particular obligation arising under the Convention. Accordingly the Court has still to rule on that matter. It is not *res judicata*.

* *

(4) The Obligations Imposed by the Convention on the Contracting Parties

155. The Applicant, in the words of its Agent, contends that "[t]his case is about State responsibility and seeks to establish the responsibilities of a State which, through its leadership, through its organs, committed the most brutal violations of one of the most sacred instruments of international law". The Applicant has emphasized that in its view, the Genocide Convention "created a universal, treaty-based concept of State responsibility", and that "[i]t is State responsibility for genocide that this legal proceeding is all about". It relies in this respect on Article IX of the Convention, which, it argues, "quite explicitly impose[s] on States a direct responsibility themselves not to commit genocide or to aid in the commission of genocide". As to the obligation of prevention under Article I, a breach of that obligation, according to the Applicant, "is established — it might be said is 'eclipsed' — by the fact that [the Respondent] is *itself* responsible for the genocide committed; . . . a State which commits genocide has not fulfilled its commitment to prevent it" (emphasis in the original). The argument moves on from alleged breaches of Article I to "violations [by the Respondent] of its obligations under Article III . . . to which express reference is made in Article IX, violations which stand at the heart of our case. This fundamental provision establishes the obligations whose violation engages the responsibility of States parties." It follows that, in the contention of the Applicant, the Court has jurisdiction under Article IX over alleged violations by a Contracting Party of those obligations.

156. The Respondent contends to the contrary that

> "the Genocide Convention does not provide for the responsibility of States for acts of genocide as such. The duties prescribed by the Convention relate to 'the prevention and punishment of the crime of genocide' when this crime is committed by individuals: and the provisions of Articles V and VI [about enforcement and prescription] . . . make this abundantly clear."

It argues that the Court therefore does not have jurisdiction *ratione materiae* under Article IX; and continues:

> "[t]hese provisions [Articles I, V, VI and IX] do not extend to the responsibility of a Contracting Party as such for acts of genocide but [only] to responsibility for failure to prevent or to punish acts of genocide committed by individuals within its territory or . . . its control".

The sole remedy in respect of that failure would, in the Respondent's view, be a declaratory judgment.

157. As a subsidiary argument, the Respondent also contended that

> "for a State to be responsible under the Genocide Convention, the facts must first be established. As genocide is a crime, it can only be established in accordance with the rules of criminal law, under which the first requirement to be met is that of individual responsibility. The State can incur responsibility only when the existence of genocide has been established beyond all reasonable doubt. In addition, it must then be shown that the person who committed the genocide can engage the responsibility of the State . . ."

(This contention went on to mention responsibility based on breach of the obligation to prevent and punish, matters considered later in this Judgment.)

158. The Respondent has in addition presented what it refers to as "alternative arguments concerning solely State responsibility for breaches of Articles II and III". Those arguments addressed the necessary conditions, especially of intent, as well as of attribution. When presenting those alternative arguments, counsel for the Respondent repeated the principal submission set out above that "the Convention does not suggest in any way that States themselves can commit genocide".

159. The Court notes that there is no disagreement between the Parties that the reference in Article IX to disputes about "the responsibility of a State" as being among the disputes relating to the interpretation, application or fulfilment of the Convention which come within the Court's jurisdiction, indicates that provisions of the Convention do impose obligations on States in respect of which they may, in the event of breach, incur responsibility. Articles V, VI and VII requiring legislation, in particular providing effective penalties for persons guilty of genocide and the other acts enumerated in Article III, and for the prosecution and extradition of alleged offenders are plainly among them. Because those provisions regulating punishment also have a deterrent and therefore a preventive effect or purpose, they could be regarded as meeting and indeed exhausting the undertaking to prevent the crime of genocide stated in Article I and mentioned in the title. On that basis, in support of the Respondent's principal position, that Article would rank as merely hortatory, introductory or purposive and as preambular to those specific obligations. The remaining specific provision, Article VIII about competent organs of the United Nations taking action, may be seen as completing the system by supporting both prevention and suppression, in this case at the political level rather than as a matter of legal responsibility.

160. The Court observes that what obligations the Convention imposes upon the parties to it depends on the ordinary meaning of the terms of

the Convention read in their context and in the light of its object and purpose. To confirm the meaning resulting from that process or to remove ambiguity or obscurity or a manifestly absurd or unreasonable result, the supplementary means of interpretation to which recourse may be had include the preparatory work of the Convention and the circumstances of its conclusion. Those propositions, reflected in Articles 31 and 32 of the Vienna Convention on the Law of Treaties, are well recognized as part of customary international law: see *Legal Consequences of the Construction of a Wall in Occupied Palestinian Territory, Advisory Opinion, I.C.J. Reports 2004,* p. 174, para. 94; case concerning *Avena and Other Mexican Nationals (Mexico* v. *United States of America), Judgment, I.C.J. Reports 2004,* p. 48, para. 83; *LaGrand (Germany* v. *United States of America), Judgment, I.C.J. Reports 2001,* p. 501, para. 99; and *Sovereignty over Pulau Ligitan and Pulau Sipadan (Indonesia/Malaysia), Judgment, I.C.J. Reports 2002,* p. 645, para. 37, and the other cases referred to in those decisions.

161. To determine what are the obligations of the Contracting Parties under the Genocide Convention, the Court will begin with the terms of its Article I. It contains two propositions. The first is the affirmation that genocide is a crime under international law. That affirmation is to be read in conjunction with the declaration that genocide is a crime under international law, unanimously adopted by the General Assembly two years earlier in its resolution 96 (I), and referred to in the Preamble to the Convention (paragraph 142, above). The affirmation recognizes the existing requirements of customary international law, a matter emphasized by the Court in 1951:

> "The origins of the Convention show that it was the intention of the United Nations to condemn and punish genocide as 'a crime under international law' involving a denial of the right of existence of entire human groups, a denial which shocks the conscience of mankind and results in great losses to humanity, and which is contrary to moral law and to the spirit and aims of the United Nations (Resolution 96 (I) of the General Assembly, December 11th 1946). The first consequence arising from this conception is that the principles underlying the Convention are principles which are recognized by civilized nations as binding on States, even without any conventional obligation. A second consequence is the universal character both of the condemnation of genocide and of the co-operation required 'in order to liberate mankind from such an odious scourge' (Preamble to the Convention) . . .
>
> The objects of such a convention must also be considered. The Convention was manifestly adopted for a purely humanitarian and civilizing purpose. It is indeed difficult to imagine a convention that might have this dual character to a greater degree, since its object on the one hand is to safeguard the very existence of certain human

> groups and on the other to confirm and endorse the most elementary principles of morality." (*Reservations to the Convention on the Prevention and Punishment of the Crime of Genocide, Advisory Opinion, I.C.J. Reports 1951*, p. 23.)

Later in that Opinion, the Court referred to "the moral and humanitarian principles which are its basis" (*ibid.,* p. 24). In earlier phases of the present case the Court has also recalled resolution 96 (I) (*I.C.J. Reports 1993*, p. 23; see also pp. 348 and 440) and has quoted the 1951 statement (*I.C.J. Reports 1996 (II)*, p. 616). The Court reaffirmed the 1951 and 1996 statements in its Judgment of 3 February 2006 in the case concerning *Armed Activities on the Territory of the Congo (New Application 2002) (Democratic Republic of the Congo* v. *Rwanda)*, paragraph 64, when it added that the norm prohibiting genocide was assuredly a peremptory norm of international law *(jus cogens)*.

162. Those characterizations of the prohibition on genocide and the purpose of the Convention are significant for the interpretation of the second proposition stated in Article I — the undertaking by the Contracting Parties to prevent and punish the crime of genocide, and particularly in this context the undertaking to prevent. Several features of that undertaking are significant. The ordinary meaning of the word "undertake" is to give a formal promise, to bind or engage oneself, to give a pledge or promise, to agree, to accept an obligation. It is a word regularly used in treaties setting out the obligations of the Contracting Parties (cf., for example, International Convention on the Elimination of All Forms of Racial Discrimination (7 March 1966), Art. 2, para. 1; International Covenant on Civil and Political Rights (16 December 1966), Art. 2, para. 1, and 3, for example). It is not merely hortatory or purposive. The undertaking is unqualified (a matter considered later in relation to the scope of the obligation of prevention); and it is not to be read merely as an introduction to later express references to legislation, prosecution and extradition. Those features support the conclusion that Article I, in particular its undertaking to prevent, creates obligations distinct from those which appear in the subsequent Articles. That conclusion is also supported by the purely humanitarian and civilizing purpose of the Convention.

163. The conclusion is confirmed by two aspects of the preparatory work of the Convention and the circumstances of its conclusion as referred to in Article 32 of the Vienna Convention. In 1947 the United Nations General Assembly, in requesting the Economic and Social Council to submit a report and a draft convention on genocide to the Third Session of the Assembly, declared "that genocide is an international crime entailing national and international responsibility on the part of individuals and States" (A/RES/180 (II)). That duality of responsibilities

is also to be seen in two other associated resolutions adopted on the same day, both directed to the newly established International Law Commission (hereinafter "the ILC"): the first on the formulation of the Nuremberg principles, concerned with the rights (Principle V) and duties of individuals, and the second on the draft declaration on the rights and duties of States (A/RES/177 and A/RES/178 (II)). The duality of responsibilities is further considered later in this Judgment (paragraphs 173-174).

164. The second feature of the drafting history emphasizes the operative and non-preambular character of Article I. The Preamble to the draft Convention, prepared by the *Ad Hoc* Committee on Genocide for the Third Session of the General Assembly and considered by its Sixth Committee, read in part as follows:

> "The High Contracting Parties
>
> . . . .
>
> Being convinced that the prevention and punishment of genocide requires international co-operation,
>
> *Hereby agree to prevent and punish the crime as hereinafter provided*."

The first Article would have provided "[g]enocide is a crime under international law whether committed in time of peace or in time of war" (report of the *Ad Hoc* Committee on Genocide, 5 April to 10 May 1948, United Nations, *Official Records of the Economic and Social Council, Seventh Session, Supplement No. 6*, doc. E/794, pp. 2, 18).

Belgium was of the view that the undertaking to prevent and punish should be made more effective by being contained in the operative part of the Convention rather than in the Preamble and proposed the following Article I to the Sixth Committee of the General Assembly: "The High Contracting Parties undertake to prevent and punish the crime of genocide." (United Nations doc. A/C.6/217.) The Netherlands then proposed a new text of Article I combining the *Ad Hoc* Committee draft and the Belgian proposal with some changes: "The High Contracting Parties reaffirm that genocide is a crime under international law, which they undertake to prevent and to punish, in accordance with the following articles." (United Nations docs. A/C.6/220; United Nations, *Official Records of the General Assembly, Third Session, Part I, Sixth Committee*, Summary Records of the 68th meeting, p. 45.) The Danish representative thought that Article I should be worded more effectively and proposed the deletion of the final phrase — "in accordance with the following articles" (*ibid.*, p. 47). The Netherlands representative agreed with that suggestion (*ibid.*, pp. 49-50). After the USSR's proposal to delete Article I was rejected by 36 votes to 8 with 5 abstentions and its proposal to transfer its various points to the Preamble was rejected by 40 votes to 8, and the phrase "whether committed in time of peace or of

war" was inserted by 30 votes to 7 with 6 abstentions, the amended text of Article I was adopted by 37 votes to 3 with 2 abstentions (*ibid.*, pp. 51 and 53).

165. For the Court both changes — the movement of the undertaking from the Preamble to the first operative Article and the removal of the linking clause ("in accordance with the following articles") — confirm that Article I does impose distinct obligations over and above those imposed by other Articles of the Convention. In particular, the Contracting Parties have a direct obligation to prevent genocide.

166. The Court next considers whether the Parties are also under an obligation, by virtue of the Convention, not to commit genocide themselves. It must be observed at the outset that such an obligation is not expressly imposed by the actual terms of the Convention. The Applicant has however advanced as its main argument that such an obligation is imposed by Article IX, which confers on the Court jurisdiction over disputes "including those relating to the responsibility of a State for genocide or any of the other acts enumerated in Article III". Since Article IX is essentially a jurisdictional provision, the Court considers that it should first ascertain whether the substantive obligation on States not to commit genocide may flow from the other provisions of the Convention. Under Article I the States parties are bound to prevent such an act, which it describes as "a crime under international law", being committed. The Article does not *expressis verbis* require States to refrain from themselves committing genocide. However, in the view of the Court, taking into account the established purpose of the Convention, the effect of Article I is to prohibit States from themselves committing genocide. Such a prohibition follows, first, from the fact that the Article categorizes genocide as "a crime under international law": by agreeing to such a categorization, the States parties must logically be undertaking not to commit the act so described. Secondly, it follows from the expressly stated obligation to prevent the commission of acts of genocide. That obligation requires the States parties, *inter alia*, to employ the means at their disposal, in circumstances to be described more specifically later in this Judgment, to prevent persons or groups not directly under their authority from committing an act of genocide or any of the other acts mentioned in Article III. It would be paradoxical if States were thus under an obligation to prevent, so far as within their power, commission of genocide by persons over whom they have a certain influence, but were not forbidden to commit such acts through their own organs, or persons over whom they have such firm control that their conduct is attributable to the State concerned under international law. In short, the obligation to prevent genocide necessarily implies the prohibition of the commission of genocide.

167. The Court accordingly concludes that Contracting Parties to the Convention are bound not to commit genocide, through the actions of their organs or persons or groups whose acts are attributable to them. That conclusion must also apply to the other acts enumerated in Article III. Those acts are forbidden along with genocide itself in the list included in Article III. They are referred to equally with genocide in Article IX and without being characterized as "punishable"; and the "purely humanitarian and civilizing purpose" of the Convention may be seen as being promoted by the fact that States are subject to that full set of obligations, supporting their undertaking to prevent genocide. It is true that the concepts used in paragraphs *(b)* to *(e)* of Article III, and particularly that of "complicity", refer to well known categories of criminal law and, as such, appear particularly well adapted to the exercise of penal sanctions against individuals. It would however not be in keeping with the object and purpose of the Convention to deny that the international responsibility of a State — even though quite different in nature from criminal responsibility — can be engaged through one of the acts, other than genocide itself, enumerated in Article III.

168. The conclusion that the Contracting Parties are bound in this way by the Convention not to commit genocide and the other acts enumerated in Article III is confirmed by one unusual feature of the wording of Article IX. But for that unusual feature and the addition of the word "fulfilment" to the provision conferring on the Court jurisdiction over disputes as to the "interpretation and application" of the Convention (an addition which does not appear to be significant in this case), Article IX would be a standard dispute settlement provision.

169. The unusual feature of Article IX is the phrase "including those [disputes] relating to the responsibility of a State for genocide or any of the other acts enumerated in Article III". The word "including" tends to confirm that disputes relating to the responsibility of Contracting Parties for genocide, and the other acts enumerated in Article III to which it refers, are comprised within a broader group of disputes relating to the interpretation, application or fulfilment of the Convention. The responsibility of a party for genocide and the other acts enumerated in Article III arises from its failure to comply with the obligations imposed by the other provisions of the Convention, and in particular, in the present context, with Article III read with Articles I and II. According to the English text of the Convention, the responsibility contemplated is responsibility "for genocide" (in French, "responsabilité . . . en matière de génocide"), not merely responsibility "for failing to prevent or punish genocide". The particular terms of the phrase as a whole confirm that Contracting Parties may be responsible for genocide and the other acts enumerated in Article III of the Convention.

*

170. The Court now considers three arguments, advanced by the Respondent which may be seen as contradicting the proposition that the Convention imposes a duty on the Contracting Parties not to commit genocide and the other acts enumerated in Article III. The first is that, as a matter of general principle, international law does not recognize the criminal responsibility of the State, and the Genocide Convention does not provide a vehicle for the imposition of such criminal responsibility. On the matter of principle the Respondent calls attention to the rejection by the ILC of the concept of international crimes when it prepared the final draft of its Articles on State Responsibility, a decision reflecting the strongly negative reactions of a number of States to any such concept. The Applicant accepts that general international law does not recognize the criminal responsibility of States. It contends, on the specific issue, that the obligation for which the Respondent may be held responsible, in the event of breach, in proceedings under Article IX, is simply an obligation arising under international law, in this case the provisions of the Convention. The Court observes that the obligations in question in this case, arising from the terms of the Convention, and the responsibilities of States that would arise from breach of such obligations, are obligations and responsibilities under international law. They are not of a criminal nature. This argument accordingly cannot be accepted.

171. The second argument of the Respondent is that the nature of the Convention is such as to exclude from its scope State responsibility for genocide and the other enumerated acts. The Convention, it is said, is a standard international criminal law convention focused essentially on the criminal prosecution and punishment of individuals and not on the responsibility of States. The emphasis of the Convention on the obligations and responsibility of individuals excludes any possibility of States being liable and responsible in the event of breach of the obligations reflected in Article III. In particular, it is said, that possibility cannot stand in the face of the references, in Article III to punishment (of individuals), and in Article IV to individuals being punished, and the requirement, in Article V for legislation in particular for effective penalties for persons guilty of genocide, the provision in Article VI for the prosecution of persons charged with genocide, and requirement in Article VII for extradition.

172. The Court is mindful of the fact that the famous sentence in the Nuremberg Judgment that "[c]rimes against international law are committed by men, not by abstract entities . . ." (Judgment of the International Military Tribunal, Trial of the Major War Criminals, 1947, *Official Documents*, Vol. 1, p. 223) might be invoked in support of the proposition that only individuals can breach the obligations set out in Article III. But the Court notes that that Tribunal was answering the argument that "international law is concerned with the actions of sov-

ereign States, and provides no punishment for individuals" (Judgment of the International Military Tribunal, *op. cit.*, p. 222), and that thus States alone were responsible under international law. The Tribunal rejected that argument in the following terms: "[t]hat international law imposes duties and liabilities upon individuals as well as upon States has long been recognized" (*ibid.*, p. 223; the phrase "as well as upon States" is missing in the French text of the Judgment).

173. The Court observes that that duality of responsibility continues to be a constant feature of international law. This feature is reflected in Article 25, paragraph 4, of the Rome Statute for the International Criminal Court, now accepted by 104 States: "No provision in this Statute relating to individual criminal responsibility shall affect the responsibility of States under international law." The Court notes also that the ILC's Articles on the Responsibility of States for Internationally Wrongful Acts (Annex to General Assembly resolution 56/83, 12 December 2001), to be referred to hereinafter as "the ILC Articles on State Responsibility", affirm in Article 58 the other side of the coin: "These articles are without prejudice to any question of the individual responsibility under international law of any person acting on behalf of a State." In its Commentary on this provision, the Commission said:

> "Where crimes against international law are committed by State officials, it will often be the case that the State itself is responsible for the acts in question or for failure to prevent or punish them. In certain cases, in particular aggression, the State will by definition be involved. Even so, the question of individual responsibility is in principle distinct from the question of State responsibility. The State is not exempted from its own responsibility for internationally wrongful conduct by the prosecution and punishment of the State officials who carried it out." (ILC Commentary on the Draft Articles on Responsibility of States for Internationally Wrongful Acts, ILC Report A/56/10, 2001, Commentary on Article 58, para. 3.)

The Commission quoted Article 25, paragraph 4, of the Rome Statute, and concluded as follows:

> "Article 58 . . . [makes] it clear that the Articles do not address the question of the individual responsibility under international law of any person acting on behalf of a State. The term 'individual responsibility' has acquired an accepted meaning in light of the Rome Statute and other instruments; it refers to the responsibility of individual persons, including State officials, under certain rules of international law for conduct such as genocide, war crimes and crimes against humanity."

174. The Court sees nothing in the wording or the structure of the provisions of the Convention relating to individual criminal liability which would displace the meaning of Article I, read with paragraphs *(a)* to *(e)* of Article III, so far as these provisions impose obligations on States distinct from the obligations which the Convention requires them to place on individuals. Furthermore, the fact that Articles V, VI and VII focus on individuals cannot itself establish that the Contracting Parties may not be subject to obligations not to commit genocide and the other acts enumerated in Article III.

175. The third and final argument of the Respondent against the proposition that the Contracting Parties are bound by the Convention not to commit genocide is based on the preparatory work of the Convention and particularly of Article IX. The Court has already used part of that work to confirm the operative significance of the undertaking in Article I (see paragraphs 164 and 165 above), an interpretation already determined from the terms of the Convention, its context and purpose.

176. The Respondent, claiming that the Convention and in particular Article IX is ambiguous, submits that the drafting history of the Convention, in the Sixth Committee of the General Assembly, shows that "there was no question of direct responsibility of the State for acts of genocide". It claims that the responsibility of the State was related to the "key provisions" of Articles IV-VI: the Convention is about the criminal responsibility of individuals supported by the civil responsibility of States to prevent and punish. This argument against any wider responsibility for the Contracting Parties is based on the records of the discussion in the Sixth Committee, and is, it is contended, supported by the rejection of United Kingdom amendments to what became Articles IV and VI. Had the first amendment been adopted, Article IV, concerning the punishment of individuals committing genocide or any of the acts enumerated in Article III, would have been extended by the following additional sentence: "[Acts of genocide] committed by or on behalf of States or governments constitute a breach of the present Convention."(A/C.6/236 and Corr. 1.) That amendment was defeated (United Nations, *Official Records of the General Assembly, Third Session, Part I, Sixth Committee, Summary Records of the 96th Meeting*, p. 355). What became Article VI would have been replaced by a provision conferring jurisdiction on the Court if an act of genocide is or is alleged to be the act of a State or government or its organs. The United Kingdom in response to objections that the proposal was out of order (because it meant going back on a decision already taken) withdrew the amendment in favour of the joint amendment to what became Article IX, submitted by the United Kingdom and Belgium (*ibid., 100th Meeting*, p. 394). In speaking to that joint amendment the United Kingdom delegate acknowledged that the debate had clearly shown the Committee's decision to confine what is now Article VI to the responsibility of individuals (*ibid., 100th Meeting*, p. 430). The United Kingdom/Belgium amendment would have added

the words "including disputes relating to the responsibility of a State for any of the acts enumerated in Articles II and IV [as the Convention was then drafted]". The United Kingdom delegate explained that what was involved was civil responsibility, not criminal responsibility (United Nations, *Official Records of the General Assembly, op. cit., 103rd Meeting*, p. 440). A proposal to delete those words failed and the provision was adopted (*ibid., 104th Meeting*, p. 447), with style changes being made by the Drafting Committee.

177. At a later stage a Belgium/United Kingdom/United States proposal which would have replaced the disputed phrase by including "disputes arising from a charge by a Contracting Party that the crime of genocide or any other of the acts enumerated in article III has been committed within the jurisdiction of another Contracting Party" was ruled by the Chairman of the Sixth Committee as a change of substance and the Committee did not adopt the motion (which required a two-thirds majority) for reconsideration (A/C.6/305). The Chairman gave the following reason for his ruling which was not challenged:

> "it was provided in article IX that those disputes, among others, which concerned the responsibility of a State for genocide or for any of the acts enumerated in article III, should be submitted to the International Court of Justice. According to the joint amendment, on the other hand, the disputes would not be those which concerned the responsibility of the State but those which resulted from an accusation to the effect that the crime had been committed in the territory of one of the contracting parties." (United Nations, *Official Records of the General Assembly, Third Session, Part I, Sixth Committee, Summary Records of the 131st Meeting*, p. 690.)

By that time in the deliberations of the Sixth Committee it was clear that only individuals could be held criminally responsible under the draft Convention for genocide. The Chairman was plainly of the view that the Article IX, as it had been modified, provided for State responsibility for genocide.

178. In the view of the Court, two points may be drawn from the drafting history just reviewed. The first is that much of it was concerned with proposals supporting the criminal responsibility of States; but those proposals were *not* adopted. The second is that the amendment which was adopted — to Article IX — is about jurisdiction in respect of the responsibility of States *simpliciter*. Consequently, the drafting history may be seen as supporting the conclusion reached by the Court in paragraph 167 above.

179. Accordingly, having considered the various arguments, the Court

affirms that the Contracting Parties are bound by the obligation under the Convention not to commit, through their organs or persons or groups whose conduct is attributable to them, genocide and the other acts enumerated in Article III. Thus if an organ of the State, or a person or group whose acts are legally attributable to the State, commits any of the acts proscribed by Article III of the Convention, the international responsibility of that State is incurred.

* *

(5) Question Whether the Court May Make a Finding of Genocide by a State in the Absence of a Prior Conviction of an Individual for Genocide by a Competent Court

180. The Court observes that if a State is to be responsible because it has breached its obligation not to commit genocide, it must be shown that genocide as defined in the Convention has been committed. That will also be the case with conspiracy under Article III, paragraph *(b),* and complicity under Article III, paragraph *(e)*; and, as explained below (paragraph 431) for purposes of the obligation to prevent genocide. The Respondent has raised the question whether it is necessary, as a matter of law, for the Court to be able to uphold a claim of the responsibility of a State for an act of genocide, or any other act enumerated in Article III, that there should have been a finding of genocide by a court or tribunal exercising criminal jurisdiction. According to the Respondent, the condition *sine qua non* for establishing State responsibility is the prior establishment, according to the rules of criminal law, of the individual responsibility of a perpetrator engaging the State's responsibility.

181. The different procedures followed by, and powers available to, this Court and to the courts and tribunals trying persons for criminal offences, do not themselves indicate that there is a legal bar to the Court itself finding that genocide or the other acts enumerated in Article III have been committed. Under its Statute the Court has the capacity to undertake that task, while applying the standard of proof appropriate to charges of exceptional gravity (paragraphs 209-210 below). Turning to the terms of the Convention itself, the Court has already held that it has jurisdiction under Article IX to find a State responsible if genocide or other acts enumerated in Article III are committed by its organs, or persons or groups whose acts are attributable to it.

182. Any other interpretation could entail that there would be no legal recourse available under the Convention in some readily conceivable circumstances: genocide has allegedly been committed within a State by its leaders but they have not been brought to trial because, for instance, they are still very much in control of the powers of the State including the

police, prosecution services and the courts and there is no international penal tribunal able to exercise jurisdiction over the alleged crimes; or the responsible State may have acknowledged the breach. The Court accordingly concludes that State responsibility can arise under the Convention for genocide and complicity, without an individual being convicted of the crime or an associated one.

* *

(6) The Possible Territorial Limits of the Obligations

183. The substantive obligations arising from Articles I and III are not on their face limited by territory. They apply to a State wherever it may be acting or may be able to act in ways appropriate to meeting the obligations in question. The extent of that ability in law and fact is considered, so far as the obligation to prevent the crime of genocide is concerned, in the section of the Judgment concerned with that obligation (cf. paragraph 430 below). The significant relevant condition concerning the obligation not to commit genocide and the other acts enumerated in Article III is provided by the rules on attribution (paragraphs 379 ff. below).

184. The obligation to prosecute imposed by Article VI is by contrast subject to an express territorial limit. The trial of persons charged with genocide is to be in a competent tribunal of the State in the territory of which the act was committed (cf. paragraph 442 below), or by an international penal tribunal with jurisdiction (paragraphs 443 ff. below).

* *

(7) The Applicant's Claims in Respect of Alleged Genocide Committed Outside Its Territory against Non-Nationals

185. In its final submissions the Applicant requests the Court to make rulings about acts of genocide and other unlawful acts allegedly committed against "non-Serbs" outside its own territory (as well as within it) by the Respondent. Insofar as that request might relate to non-Bosnian victims, it could raise questions about the legal interest or standing of the Applicant in respect of such matters and the significance of the *jus cogens* character of the relevant norms, and the *erga omnes* character of the relevant obligations. For the reasons explained in paragraphs 368 and 369 below, the Court will not however need to address those questions of law.

* *

(8) The Question of Intent to Commit Genocide

186. The Court notes that genocide as defined in Article II of the Convention comprises "acts" and an "intent". It is well established that the acts —

"*(a)* Killing members of the group;
(b) Causing serious bodily or mental harm to members of the group;
(c) Deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part;
(d) Imposing measures intended to prevent births within the group; [and]
(e) Forcibly transferring children of the group to another group" —

themselves include mental elements. "Killing" must be intentional, as must "causing serious bodily or mental harm". Mental elements are made explicit in paragraphs *(c)* and *(d)* of Article II by the words "deliberately" and "intended", quite apart from the implications of the words "inflicting" and "imposing"; and forcible transfer too requires deliberate intentional acts. The acts, in the words of the ILC, are by their very nature conscious, intentional or volitional acts (Commentary on Article 17 of the 1996 Draft Code of Crimes against the Peace and Security of Mankind, ILC Report 1996, *Yearbook of the International Law Commission, 1996*, Vol. II, Part Two, p. 44, para. 5).

187. In addition to those mental elements, Article II requires a further mental element. It requires the establishment of the "intent to destroy, in whole or in part, . . . [the protected] group, as such". It is not enough to establish, for instance in terms of paragraph *(a)*, that deliberate unlawful killings of members of the group have occurred. The additional intent must also be established, and is defined very precisely. It is often referred to as a special or specific intent or *dolus specialis*; in the present Judgment it will usually be referred to as the "specific intent *(dolus specialis)*". It is not enough that the members of the group are targeted because they belong to that group, that is because the perpetrator has a discriminatory intent. Something more is required. The acts listed in Article II must be done with intent to destroy the group as such in whole or in part. The words "as such" emphasize that intent to destroy the protected group.

188. The specificity of the intent and its particular requirements are highlighted when genocide is placed in the context of other related criminal acts, notably crimes against humanity and persecution, as the Trial Chamber of the International Criminal Tribunal for the former Yugoslavia (hereinafter "ICTY" or "the Tribunal") did in the *Kupreškić et al.* case:

"the *mens rea* requirement for persecution is higher than for ordinary crimes against humanity, although lower than for genocide. In this context the Trial Chamber wishes to stress that persecution as a crime against humanity is an offence belonging to the same *genus* as genocide. Both persecution and genocide are crimes perpetrated against persons that belong to a particular group and who are targeted because of such belonging. In both categories what matters is the intent to discriminate: to attack persons on account of their ethnic, racial, or religious characteristics (as well as, in the case of persecution, on account of their political affiliation). While in the case of persecution the discriminatory intent can take multifarious inhumane forms and manifest itself in a plurality of actions including murder, in the case of genocide that intent must be accompanied by the intention to destroy, in whole or in part, the group to which the victims of the genocide belong. Thus, it can be said that, from the viewpoint of *mens rea*, genocide is an extreme and most inhuman form of persecution. To put it differently, when persecution escalates to the extreme form of wilful and deliberate acts designed to destroy a group or part of a group, it can be held that such persecution amounts to genocide." (IT-95-16-T, Judgment, 14 January 2000, para. 636.)

189. The specific intent is also to be distinguished from other reasons or motives the perpetrator may have. Great care must be taken in finding in the facts a sufficiently clear manifestation of that intent.

* *

(9) Intent and "Ethnic Cleansing"

190. The term "ethnic cleansing" has frequently been employed to refer to the events in Bosnia and Herzegovina which are the subject of this case; see, for example, Security Council resolution 787 (1992), para. 2; resolution 827 (1993), Preamble; and the Report with that title attached as Annex IV to the Final Report of the United Nations Commission of Experts (S/1994/674/Add.2) (hereinafter "Report of the Commission of Experts"). General Assembly resolution 47/121 referred in its Preamble to "the abhorrent policy of 'ethnic cleansing', which is a form of genocide", as being carried on in Bosnia and Herzegovina. It will be convenient at this point to consider what legal significance the expression may have. It is in practice used, by reference to a specific region or area, to mean "rendering an area ethnically homogeneous by using force or intimidation to remove persons of given groups from the area" (S/35374 (1993), para. 55, Interim Report by the Commission of Experts). It does not appear in the Genocide Convention; indeed, a proposal

during the drafting of the Convention to include in the definition "measures intended to oblige members of a group to abandon their homes in order to escape the threat of subsequent ill-treatment" was not accepted (A/C.6/234). It can only be a form of genocide within the meaning of the Convention, if it corresponds to or falls within one of the categories of acts prohibited by Article II of the Convention. Neither the intent, as a matter of policy, to render an area "ethnically homogeneous", nor the operations that may be carried out to implement such policy, can *as such* be designated as genocide: the intent that characterizes genocide is "to destroy, in whole or in part" a particular group, and deportation or displacement of the members of a group, even if effected by force, is not necessarily equivalent to destruction of that group, nor is such destruction an automatic consequence of the displacement. This is not to say that acts described as "ethnic cleansing" may never constitute genocide, if they are such as to be characterized as, for example, "deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part", contrary to Article II, paragraph *(c)*, of the Convention, provided such action is carried out with the necessary specific intent *(dolus specialis)*, that is to say with a view to the destruction of the group, as distinct from its removal from the region. As the ICTY has observed, while "there are obvious similarities between a genocidal policy and the policy commonly known as 'ethnic cleansing'" (*Krstić*, IT-98-33-T, Trial Chamber Judgment, 2 August 2001, para. 562), yet "[a] clear distinction must be drawn between physical destruction and mere dissolution of a group. The expulsion of a group or part of a group does not in itself suffice for genocide." (*Stakić*, IT-97-24-T, Trial Chamber Judgment, 31 July 2003, para. 519.) In other words, whether a particular operation described as "ethnic cleansing" amounts to genocide depends on the presence or absence of acts listed in Article II of the Genocide Convention, and of the intent to destroy the group as such. In fact, in the context of the Convention, the term "ethnic cleansing" has no legal significance of its own. That said, it is clear that acts of "ethnic cleansing" may occur in parallel to acts prohibited by Article II of the Convention, and may be significant as indicative of the presence of a specific intent *(dolus specialis)* inspiring those acts.

* *

(10) Definition of the Protected Group

191. When examining the facts brought before the Court in support of the accusations of the commission of acts of genocide, it is necessary to have in mind the identity of the group against which genocide may be considered to have been committed. The Court will therefore next consider the application in this case of the requirement of Article II of the Genocide Convention, as an element of genocide, that the proscribed acts be "committed with intent to destroy, in whole or in part, a national, ethnical, racial or religious group, as such". The Parties disagreed on aspects of the definition of the "group". The Applicant in its final submission refers to "the non-Serb national, ethnical or religious group within, but not limited to, the territory of Bosnia and Herzegovina, including in particular the Muslim population" (paragraph 66 above). It thus follows what is termed the negative approach to the definition of the group in question. The Respondent sees two legal problems with that formulation:

> "First, the group targeted is not sufficiently well defined as such, since, according to the Applicant's allegation, that group consists of the non-Serbs, thus an admixture of all the individuals living in Bosnia and Herzegovina except the Serbs, but more particularly the Muslim population, which accounts for only a part of the non-Serb population. Second, the intent to destroy concerned only a part of the non-Serb population, but the Applicant failed to specify which part of the group was targeted."

In addition to those issues of the negative definition of the group and its geographic limits (or their lack), the Parties also discussed the choice between subjective and objective approaches to the definition. The Parties essentially agree that international jurisprudence accepts a combined subjective-objective approach. The issue is not in any event significant on the facts of this case and the Court takes it no further.

192. While the Applicant has employed the negative approach to the definition of a protected group, it places major, for the most part exclusive, emphasis on the Bosnian Muslims as the group being targeted. The Respondent, for instance, makes the point that the Applicant did not mention the Croats in its oral arguments relating to sexual violence, Srebrenica and Sarajevo, and that other groups including "the Jews, Roma and Yugoslavs" were not mentioned. The Applicant does however maintain the negative approach to the definition of the group in its final submissions and the Court accordingly needs to consider it.

193. The Court recalls first that the essence of the intent is to destroy the protected group, in whole or in part, as such. It is a group which must have particular positive characteristics — national, ethnical, racial or religious — and not the lack of them. The intent must also relate to the group "as such". That means that the crime requires an intent to destroy

a collection of people who have a particular group identity. It is a matter of who those people are, not who they are not. The etymology of the word — killing a group — also indicates a positive definition; and Raphael Lemkin has explained that he created the word from the Greek *genos*, meaning race or tribe, and the termination "-cide", from the Latin *caedere*, to kill (*Axis Rule in Occupied Europe* (1944), p. 79). In 1945 the word was used in the Nuremberg indictment which stated that the defendants "conducted deliberate and systematic genocide, viz., the extermination of racial and national groups . . . in order to destroy particular races and classes of people and national, racial or religious groups . . ." (Indictment, Trial of the Major War Criminals before the International Military Tribunal, *Official Documents*, Vol. 1, pp. 43 and 44). As the Court explains below (paragraph 198), when part of the group is targeted, that part must be significant enough for its destruction to have an impact on the group as a whole. Further, each of the acts listed in Article II require that the proscribed action be against members of the "group".

194. The drafting history of the Convention confirms that a positive definition must be used. Genocide as "the denial of the existence of entire human groups" was contrasted with homicide, "the denial of the right to live of individual human beings" by the General Assembly in its 1946 resolution 96 (I) cited in the Preamble to the Convention. The drafters of the Convention also gave close attention to the positive identification of groups with specific distinguishing characteristics in deciding which groups they would include and which (such as political groups) they would exclude. The Court spoke to the same effect in 1951 in declaring as an object of the Convention the safeguarding of "the very existence of certain human groups" (*Reservations to the Convention on the Prevention and Punishment of the Crime of Genocide, Advisory Opinion, I.C.J. Reports 1951*, p. 23). Such an understanding of genocide requires a positive identification of the group. The rejection of proposals to include within the Convention political groups and cultural genocide also demonstrates that the drafters were giving close attention to the positive identification of groups with specific distinguishing well-established, some said immutable, characteristics. A negatively defined group cannot be seen in that way.

195. The Court observes that the ICTY Appeals Chamber in the *Stakić* case (IT-97-24-A, Judgment, 22 March 2006, paras. 20-28) also came to the conclusion that the group must be defined positively, essentially for the same reasons as the Court has given.

196. Accordingly, the Court concludes that it should deal with the matter on the basis that the targeted group must in law be defined posi-

tively, and thus not negatively as the "non-Serb" population. The Applicant has made only very limited reference to the non-Serb populations of Bosnia and Herzegovina other than the Bosnian Muslims, e.g. the Croats. The Court will therefore examine the facts of the case on the basis that genocide may be found to have been committed if an intent to destroy the Bosnian Muslims, as a group, in whole or in part, can be established.

197. The Parties also addressed a specific question relating to the impact of geographic criteria on the group as identified positively. The question concerns in particular the atrocities committed in and around Srebrenica in July 1995, and the question whether in the circumstances of that situation the definition of genocide in Article II was satisfied so far as the intent of destruction of the "group" "in whole or in part" requirement is concerned. This question arises because of a critical finding in the *Krstić* case. In that case the Trial Chamber was "ultimately satisfied that murders and infliction of serious bodily or mental harm were committed with the intent to kill all the Bosnian Muslim men of military age at Srebrenica" (IT-98-33, Judgment, 2 August 2001, para. 546). Those men were systematically targeted whether they were civilians or soldiers *(ibid.)*. The Court addresses the facts of that particular situation later (paragraphs 278-297). For the moment, it considers how as a matter of law the "group" is to be defined, in territorial and other respects.

198. In terms of that question of law, the Court refers to three matters relevant to the determination of "part" of the "group" for the purposes of Article II. In the first place, the intent must be to destroy at least a substantial part of the particular group. That is demanded by the very nature of the crime of genocide: since the object and purpose of the Convention as a whole is to prevent the intentional destruction of groups, the part targeted must be significant enough to have an impact on the group as a whole. That requirement of substantiality is supported by consistent rulings of the ICTY and the International Criminal Tribunal for Rwanda (ICTR) and by the Commentary of the ILC to its Articles in the draft Code of Crimes against the Peace and Security of Mankind (e.g. *Krstić*, IT-98-33-A, Appeals Chamber Judgment, 19 April 2004, paras. 8-11 and the cases of *Kayishema*, *Byilishema*, and *Semanza* there referred to; and *Yearbook of the International Law Commission, 1996*, Vol. II, Part Two, p. 45, para. 8 of the Commentary to Article 17).

199. Second, the Court observes that it is widely accepted that genocide may be found to have been committed where the intent is to destroy the group within a geographically limited area. In the words of the ILC, "it is not necessary to intend to achieve the complete annihilation of a group from every corner of the globe" *(ibid.)*. The area of the perpetrator's activity and control are to be considered. As the ICTY Appeals

Chamber has said, and indeed as the Respondent accepts, the opportunity available to the perpetrators is significant (*Krstić*, IT-98-33-A, Judgment, 19 April 2004, para. 13). This criterion of opportunity must however be weighed against the first and essential factor of substantiality. It may be that the opportunity available to the alleged perpetrator is so limited that the substantiality criterion is not met. The Court observes that the ICTY Trial Chamber has indeed indicated the need for caution, lest this approach might distort the definition of genocide (*Stakić*, IT-97-24-T, Judgment, 31 July 2003, para. 523). The Respondent, while not challenging this criterion, does contend that the limit militates against the existence of the specific intent *(dolus specialis)* at the national or State level as opposed to the local level — a submission which, in the view of the Court, relates to attribution rather than to the "group" requirement.

200. A third suggested criterion is qualitative rather than quantitative. The Appeals Chamber in the *Krstić* case put the matter in these carefully measured terms:

> "The number of individuals targeted should be evaluated not only in absolute terms, but also in relation to the overall size of the entire group. In addition to the numeric size of the targeted portion, its prominence within the group can be a useful consideration. If a specific part of the group is emblematic of the overall group, or is essential to its survival, that may support a finding that the part qualifies as substantial within the meaning of Article 4 [of the Statute which exactly reproduces Article II of the Convention]." (IT-98-33-A, Judgment, 19 April 2004, para. 12; footnote omitted.)

Establishing the "group" requirement will not always depend on the substantiality requirement alone although it is an essential starting point. It follows in the Court's opinion that the qualitative approach cannot stand alone. The Appeals Chamber in *Krstić* also expresses that view.

201. The above list of criteria is not exhaustive, but, as just indicated, the substantiality criterion is critical. They are essentially those stated by the Appeals Chamber in the *Krstić* case, although the Court does give this first criterion priority. Much will depend on the Court's assessment of those and all other relevant factors in any particular case.

* * *

V. Questions of Proof: Burden of Proof, the Standard of Proof, Methods of Proof

202. When turning to the facts of the dispute, the Court must note that many allegations of fact made by the Applicant are disputed by the

Respondent. That is so notwithstanding increasing agreement between the Parties on certain matters through the course of the proceedings. The disputes relate to issues about the facts, for instance the number of rapes committed by Serbs against Bosnian Muslims, and the day-to-day relationships between the authorities in Belgrade and the authorities in Pale, and the inferences to be drawn from, or the evaluations to be made of, facts, for instance about the existence or otherwise of the necessary specific intent *(dolus specialis)* and about the attributability of the acts of the organs of Republika Srpska and various paramilitary groups to the Respondent. The allegations also cover a very wide range of activity affecting many communities and individuals over an extensive area and over a long period. They have already been the subject of many accounts, official and non-official, by many individuals and bodies. The Parties drew on many of those accounts in their pleadings and oral argument.

203. Accordingly, before proceeding to an examination of the alleged facts underlying the claim in this case, the Court first considers, in this section of the Judgment, in turn the burden or onus of proof, the standard of proof, and the methods of proof.

204. On the burden or onus of proof, it is well established in general that the applicant must establish its case and that a party asserting a fact must establish it; as the Court observed in the case of *Military and Paramilitary Activities in and against Nicaragua (Nicaragua* v. *United States of America)*, "it is the litigant seeking to establish a fact who bears the burden of proving it" (*Jurisdiction and Admissibility, Judgment, I.C.J. Reports 1984*, p. 437, para. 101). While the Applicant accepts that approach as a general proposition, it contends that in certain respects the onus should be reversed, especially in respect of the attributability of alleged acts of genocide to the Respondent, given the refusal of the Respondent to produce the full text of certain documents.

205. The particular issue concerns the "redacted" sections of documents of the Supreme Defence Council of the Respondent, i.e. sections in which parts of the text had been blacked out so as to be illegible. The documents had been classified, according to the Co-Agent of the Respondent, by decision of the Council as a military secret, and by a confidential decision of the Council of Ministers of Serbia and Montenegro as a matter of national security interest. The Applicant contends that the Court should draw its own conclusions from the failure of the Respondent to produce complete copies of the documents. It refers to the power of the Court, which it had invoked earlier (paragraph 44 above), to call for documents under Article 49 of the Statute, which provides that "[f]ormal note shall be taken of any refusal". In the second round of oral argument the Applicant's Deputy Agent submitted that

> "Serbia and Montenegro should not be allowed to respond to our quoting the redacted SDC reports if it does not provide at the very same time the Applicant and the Court with copies of entirely

> unredacted versions of *all* the SDC shorthand records and of *all* of the minutes of the same. Otherwise, Serbia and Montenegro would have an overriding advantage over Bosnia and Herzegovina with respect to documents, which are apparently, and not in the last place in the Respondent's eyes, of direct relevance to winning or losing the present case. We explicitly, Madam President, request the Court to instruct the Respondent accordingly." (Emphasis in the original.)

206. On this matter, the Court observes that the Applicant has extensive documentation and other evidence available to it, especially from the readily accessible ICTY records. It has made very ample use of it. In the month before the hearings it submitted what must be taken to have been a careful selection of documents from the very many available from the ICTY. The Applicant called General Sir Richard Dannatt, who, drawing on a number of those documents, gave evidence on the relationship between the authorities in the Federal Republic of Yugoslavia and those in the Republika Srpska and on the matter of control and instruction. Although the Court has not agreed to either of the Applicant's requests to be provided with unedited copies of the documents, it has not failed to note the Applicant's suggestion that the Court may be free to draw its own conclusions.

207. On a final matter relating to the burden of proof, the Applicant contends that the Court should draw inferences, notably about specific intent *(dolus specialis)*, from established facts, i.e., from what the Applicant refers to as a "pattern of acts" that "speaks for itself". The Court considers that matter later in the Judgment (paragraphs 370-376 below).

208. The Parties also differ on the second matter, the standard of proof. The Applicant, emphasizing that the matter is not one of criminal law, says that the standard is the balance of evidence or the balance of probabilities, inasmuch as what is alleged is breach of treaty obligations. According to the Respondent, the proceedings "concern the most serious issues of State responsibility and . . . a charge of such exceptional gravity against a State requires a proper degree of certainty. The proofs should be such as to leave no room for reasonable doubt."

209. The Court has long recognized that claims against a State involving charges of exceptional gravity must be proved by evidence that is fully conclusive (cf. *Corfu Channel (United Kingdom* v. *Albania), Judgment, I.C.J. Reports 1949*, p. 17). The Court requires that it be fully convinced that allegations made in the proceedings, that the crime of genocide or the other acts enumerated in Article III have been committed, have been clearly established. The same standard applies to the proof of attribution for such acts.

210. In respect of the Applicant's claim that the Respondent has breached its undertakings to prevent genocide and to punish and extradite persons charged with genocide, the Court requires proof at a high level of certainty appropriate to the seriousness of the allegation.

211. The Court now turns to the third matter — the method of proof. The Parties submitted a vast array of material, from different sources, to the Court. It included reports, resolutions and findings by various United Nations organs, including the Secretary-General, the General Assembly, the Security Council and its Commission of Experts, and the Commission on Human Rights, the Sub-Commission on the Prevention of Discrimination and Protection of Minorities and the Special Rapporteur on Human Rights in the former Yugoslavia; documents from other intergovernmental organizations such as the Conference for Security and Co-operation in Europe; documents, evidence and decisions from the ICTY; publications from governments; documents from non-governmental organizations; media reports, articles and books. They also called witnesses, experts and witness-experts (paragraphs 57-58 above).

212. The Court must itself make its own determination of the facts which are relevant to the law which the Applicant claims the Respondent has breached. This case does however have an unusual feature. Many of the allegations before this Court have already been the subject of the processes and decisions of the ICTY. The Court considers their significance later in this section of the Judgment.

213. The assessment made by the Court of the weight to be given to a particular item of evidence may lead to the Court rejecting the item as unreliable, or finding it probative, as appears from the practice followed for instance in the case concerning *United States Diplomatic and Consular Staff in Tehran, Judgment, I.C.J. Reports 1980*, pp. 9-10, paras. 11-13; *Military and Paramilitary Activities in and against Nicaragua (Nicaragua* v. *United States of America), Merits, Judgment, I.C.J. Reports 1986*, pp. 39-41, paras. 59-73; and *Armed Activities on the Territory of the Congo (Democratic Republic of the Congo* v. *Uganda), Judgment, I.C.J. Reports 2005*, pp. 200-201, paras. 57-61. In the most recent case the Court said this:

> "The Court will treat with caution evidentiary materials specially prepared for this case and also materials emanating from a single source. It will prefer contemporaneous evidence from persons with direct knowledge. It will give particular attention to reliable evidence acknowledging facts or conduct unfavourable to the State represented by the person making them (*Military and Paramilitary Activi-*

ties in and against Nicaragua (Nicaragua v. *United States of America), Merits, Judgment, I.C.J. Reports 1986*, p. 41, para. 64). The Court will also give weight to evidence that has not, even before this litigation, been challenged by impartial persons for the correctness of what it contains. The Court moreover notes that evidence obtained by examination of persons directly involved, and who were subsequently cross-examined by judges skilled in examination and experienced in assessing large amounts of factual information, some of it of a technical nature, merits special attention. The Court thus will give appropriate consideration to the Report of the Porter Commission, which gathered evidence in this manner. The Court further notes that, since its publication, there has been no challenge to the credibility of this Report, which has been accepted by both Parties." (*Armed Activities on the Territory of the Congo (Democratic Republic of the Congo* v. *Uganda), Judgment, I.C.J. Reports 2005*, p. 35, para. 61. See also paras. 78-79, 114 and 237-242.)

214. The fact-finding process of the ICTY falls within this formulation, as "evidence obtained by examination of persons directly involved", tested by cross-examination, the credibility of which has not been challenged subsequently. The Court has been referred to extensive documentation arising from the Tribunal's processes, including indictments by the Prosecutor, various interlocutory decisions by judges and Trial Chambers, oral and written evidence, decisions of the Trial Chambers on guilt or innocence, sentencing judgments following a plea agreement and decisions of the Appeals Chamber.

215. By the end of the oral proceedings the Parties were in a broad measure of agreement on the significance of the ICTY material. The Applicant throughout has given and gives major weight to that material. At the written stage the Respondent had challenged the reliability of the Tribunal's findings, the adequacy of the legal framework under which it operates, the adequacy of its procedures and its neutrality. At the stage of the oral proceedings, its position had changed in a major way. In its Agent's words, the Respondent now based itself on the jurisprudence of the Tribunal and had "in effect" distanced itself from the opinions about the Tribunal expressed in its Rejoinder. The Agent was however careful to distinguish between different categories of material:

"[W]e do not regard all the material of the Tribunal for the former Yugoslavia as having the same relevance or probative value. We have primarily based ourselves upon the judgments of the Tribunal's Trial and Appeals Chambers, given that only the judgments can be

regarded as establishing the facts about the crimes in a credible way."

And he went on to point out that the Tribunal has not so far, with the exception of Srebrenica, held that genocide was committed in any of the situations cited by the Applicant. He also called attention to the criticisms already made by Respondent's counsel of the relevant judgment concerning General Krstić who was found guilty of aiding and abetting genocide at Srebrenica.

216. The Court was referred to actions and decisions taken at various stages of the ICTY processes:

(1) The Prosecutor's decision to include or not certain changes in an indictment;
(2) The decision of a judge on reviewing the indictment to confirm it and issue an arrest warrant or not;
(3) If such warrant is not executed, a decision of a Trial Chamber (of three judges) to issue an international arrest warrant, provided the Chamber is satisfied that there are reasonable grounds for believing that the accused has committed all or any of the crimes charged;
(4) The decision of a Trial Chamber on the accused's motion for acquittal at the end of the prosecution case;
(5) The judgment of a Trial Chamber following the full hearings;
(6) The sentencing judgment of a Trial Chamber following a guilty plea.

The Court was also referred to certain decisions of the Appeals Chamber.

217. The Court will consider these stages in turn. The Applicant placed some weight on indictments filed by the Prosecutor. But the claims made by the Prosecutor in the indictments are just that — allegations made by one party. They have still to proceed through the various phases outlined earlier. The Prosecutor may, instead, decide to withdraw charges of genocide or they may be dismissed at trial. Accordingly, as a general proposition the inclusion of charges in an indictment cannot be given weight. What may however be significant is the decision of the Prosecutor, either initially or in an amendment to an indictment, not to include or to exclude a charge of genocide.

218. The second and third stages, relating to the confirmation of the indictment, issues of arrest warrants and charges, are the responsibility of the judges (one in the second stage and three in the third) rather than the Prosecutor, and witnesses may also be called in the third, but the accused is generally not involved. Moreover, the grounds for a judge to act are, at the second stage, that a prima facie case has been established, and at the

third, that reasonable grounds exist for belief that the accused has committed crimes charged.

219. The accused does have a role at the fourth stage — motions for acquittal made by the defence at the end of the prosecution's case and after the defence has had the opportunity to cross-examine the prosecution's witnesses, on the basis that "there is no evidence capable of supporting a conviction". This stage is understood to require a decision, not that the Chamber trying the facts *would* be satisfied beyond reasonable doubt by the prosecution's evidence (if accepted), but rather that it *could* be so satisfied (*Jelisić*, IT-95-10-A, Appeals Chamber Judgment, 5 July 2001, para. 37). The significance of that lesser standard for present purposes appears from one case on which the Applicant relied. The Trial Chamber in August 2005 in *Krajišnik* dismissed the defence motion that the accused who was charged with genocide and other crimes had no case to answer (IT-00-39-T, transcript of 19 August 2005, pp. 17112-17132). But following the full hearing the accused was found not guilty of genocide nor of complicity in genocide. While the *actus reus* of genocide was established, the specific intent *(dolus specialis)* was not (Trial Chamber Judgment, 27 September 2006, paras. 867-869). Because the judge or the Chamber does not make definitive findings at any of the four stages described, the Court does not consider that it can give weight to those rulings. The standard of proof which the Court requires in this case would not be met.

220. The processes of the Tribunal at the fifth stage, leading to a judgment of the Trial Chamber following the full hearing are to be contrasted with those earlier stages. The processes of the Tribunal leading to final findings are rigorous. Accused are presumed innocent until proved guilty beyond reasonable doubt. They are entitled to listed minimum guarantees (taken from the International Covenant on Civil and Political Rights), including the right to counsel, to examine witness against them, to obtain the examination of witness on their behalf, and not to be compelled to testify against themselves or to confess guilt. The Tribunal has powers to require Member States of the United Nations to co-operate with it, among other things, in the taking of testimony and the production of evidence. Accused are provided with extensive pre-trial disclosure including materials gathered by the prosecution and supporting the indictment, relevant witness statements and the pre-trial brief summarizing the evidence against them. The prosecutor is also to disclose exculpatory material to the accused and to make available in electronic form the collections of relevant material which the prosecution holds.

221. In practice, now extending over ten years, the trials, many of important military or political figures for alleged crimes committed over long periods and involving complex allegations, usually last for months, even years, and can involve thousands of documents and numerous witnesses. The Trial Chamber may admit any relevant evidence which has probative value. The Chamber is to give its reasons in writing and separate and dissenting opinions may be appended.

222. Each party has a right of appeal from the judgment of the Trial Chamber to the Appeals Chamber on the grounds of error of law invalidating the decision or error of fact occasioning a miscarriage of justice. The Appeals Chamber of five judges does not rehear the evidence, but it does have power to hear additional evidence if it finds that it was not available at trial, is relevant and credible and could have been a decisive factor in the trial. It too is to give a reasoned opinion in writing to which separate or dissenting opinions may be appended.

223. In view of the above, the Court concludes that it should in principle accept as highly persuasive relevant findings of fact made by the Tribunal at trial, unless of course they have been upset on appeal. For the same reasons, any evaluation by the Tribunal based on the facts as so found for instance about the existence of the required intent, is also entitled to due weight.

224. There remains for consideration the sixth stage, that of sentencing judgments given following a guilty plea. The process involves a statement of agreed facts and a sentencing judgment. Notwithstanding the guilty plea the Trial Chamber must be satisfied that there is sufficient factual basis for the crime and the accused's participation in it. It must also be satisfied that the guilty plea has been made voluntarily, is informed and is not equivocal. Accordingly the agreed statement and the sentencing judgment may when relevant be given a certain weight.

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225. The Court will now comment in a general way on some of the other evidence submitted to it. Some of that evidence has been produced to prove that a particular statement was made so that the Party may make use of its content. In many of these cases the accuracy of the document as a record is not in doubt; rather its significance is. That is often the case for instance with official documents, such as the record of parliamentary bodies and budget and financial statements. Another instance is when the statement was recorded contemporaneously on audio or videotape. Yet another is the evidence recorded by the ICTY.

226. In some cases the account represents the speaker's own knowledge of the fact to be determined or evaluated. In other cases the account may set out the speaker's opinion or understanding of events after they have occurred and in some cases the account will not be based on direct observation but may be hearsay. In fact the Parties rarely disagreed about the authenticity of such material but rather about whether it was being accurately presented (for instance with contention that passages were being taken out of context) and what weight or significance should be given to it.

227. The Court was also referred to a number of reports from official or independent bodies, giving accounts of relevant events. Their value depends, among other things, on (1) the source of the item of evidence (for instance partisan, or neutral), (2) the process by which it has been generated (for instance an anonymous press report or the product of a careful court or court-like process), and (3) the quality or character of the item (such as statements against interest, and agreed or uncontested facts).

228. One particular instance is the comprehensive report, "The Fall of Srebrenica", which the United Nations Secretary-General submitted in November 1999 to the General Assembly (United Nations doc. A/54/549). It was prepared at the request of the General Assembly, and covered the events from the establishing by the Security Council of the "safe area" on 16 April 1993 (Security Council resolution 819 (1993)) until the endorsement by the Security Council on 15 December 1995 of the Dayton Agreement. Member States and others concerned had been encouraged to provide relevant information. The Secretary-General was in a very good position to prepare a comprehensive report, some years after the events, as appears in part from this description of the method of preparation:

> "This report has been prepared on the basis of archival research within the United Nations system, as well as on the basis of interviews with individuals who, in one capacity or another, participated in or had knowledge of the events in question. In the interest of gaining a clearer understanding of these events, I have taken the exceptional step of entering into the public record information from the classified files of the United Nations. In addition, I would like to record my thanks to those Member States, organizations and individuals who provided information for this report. A list of persons interviewed in this connection is attached as annex 1. While that list is fairly extensive, time, as well as budgetary and other constraints, precluded interviewing many other individuals who would be in a position to offer important perspectives on the subject at hand. In most cases, the interviews were conducted on a non-attribution basis to encourage as candid a disclosure as possible. I have also honoured the request of those individuals who provided informa-

tion for this report on the condition that they not be identified." (A/54/549, para. 8.)

229. The chapter, "Fall of Srebrenica: 6-11 July 1995", is preceded by this note:

> "The United Nations has hitherto not publicly disclosed the full details of the attack carried out on Srebrenica from 6 to 11 July 1995. The account which follows has now been reconstructed mainly from reports filed at that time by Dutchbat and the United Nations military observers. The accounts provided have also been supplemented with information contained in the Netherlands report on the debriefing of Dutchbat, completed in October 1995, and by information provided by Bosniac, Bosnian Serb and international sources. In order to independently examine the information contained in various secondary sources published over the past four years, as well to corroborate key information contained in the Netherlands debriefing report, interviews were conducted during the preparation of this report with a number of key personnel who were either in Srebrenica at the time, or who were involved in decision-making at higher levels in the United Nations chain of command." (A/54/549, Chap. VII, p. 57.)

The introductory note to the next chapter, "The Aftermath of the fall of Srebrenica: 12-20 July 1995", contains this description of the sources:

> "The following section attempts to describe in a coherent narrative how thousands of men and boys were summarily executed and buried in mass graves within a matter of days while the international community attempted to negotiate access to them. It details how evidence of atrocities taking place gradually came to light, but too late to prevent the tragedy which was unfolding. In 1995, the details of the tragedy were told in piecemeal fashion, as survivors of the mass executions began to provide accounts of the horrors they had witnessed; satellite photos later gave credence to their accounts.
>
> The first official United Nations report which signalled the possibility of mass executions having taken place was the report of the Special Rapporteur of the Commission on Human Rights, dated 22 August 1995 (E/CN.4/1996/9). It was followed by the Secretary-General's reports to the Security Council, pursuant to resolution 1010 (1995), of 30 August (S/1995/755) and 27 November 1995 (S/1995/988). Those reports included information obtained from governmental and non-governmental organizations, as well as information that had appeared in the international and local press. By the end of 1995, however, the International Tribunal for the Former

Yugoslavia had still not been granted access to the area to corroborate the allegations of mass executions with forensic evidence.

The Tribunal first gained access to the crime scenes in January 1996. The details of many of their findings were made public in July 1996, during testimony under rule 60 of the Tribunal's rules of procedure, in the case against Ratio [*sic:* Ratko] Mladić and Radovan Karadžić. Between that time and the present, the Tribunal has been able to conduct further investigations in the areas where the executions were reported to have taken place and where the primary and secondary mass graves were reported to have been located. On the basis of the forensic evidence obtained during those investigations, the Tribunal has now been able to further corroborate much of the testimony of the survivors of the massacres. On 30 October 1998, the Tribunal indicted Radislav Krstić, Commander of the BSA's Drina Corps, for his alleged involvement in those massacres. The text of the indictment provides a succinct summary of the information obtained to date on where and when the mass executions took place.

The aforementioned sources of information, coupled with certain additional confidential information that was obtained during the preparation of this report, form the basis of the account which follows. Sources are purposely not cited in those instances where such disclosure could potentially compromise the Tribunal's ongoing work." (A/54/549, Chap. VIII, p. 77.)

230. The care taken in preparing the report, its comprehensive sources and the independence of those responsible for its preparation all lend considerable authority to it. As will appear later in this Judgment, the Court has gained substantial assistance from this report.

* * *

VI. The Facts Invoked by the Applicant, in Relation to Article II

(1) The Background

231. In this case the Court is seised of a dispute between two sovereign States, each of which is established in part of the territory of the former State known as the Socialist Federal Republic of Yugoslavia, concerning the application and fulfilment of an international convention to which they are parties, the Convention on the Prevention and Punishment of the Crime of Genocide. The task of the Court is to deal with the legal claims and factual allegations advanced by Bosnia and Herzegovina against Serbia and Montenegro; the counter-claim advanced earlier in the proceedings by Serbia and Montenegro against Bosnia and Herzegovina has been withdrawn.

232. Following the death on 4 May 1980 of President Tito, a rotating presidency was implemented in accordance with the 1974 Constitution of the SFRY. After almost ten years of economic crisis and the rise of nationalism within the republics and growing tension between different ethnic and national groups, the SFRY began to break up. On 25 June 1991, Slovenia and Croatia declared independence, followed by Macedonia on 17 September 1991. (Slovenia and Macedonia are not concerned in the present proceedings; Croatia has brought a separate case against Serbia and Montenegro, which is still pending on the General List.) On the eve of the war in Bosnia and Herzegovina which then broke out, according to the last census (31 March 1991), some 44 per cent of the population of the country described themselves as Muslims, some 31 per cent as Serbs and some 17 per cent as Croats (*Krajišnik*, IT-00-39-T and 40-T, Trial Chamber Judgment, 27 September 2006, para. 15).

233. By a "sovereignty" resolution adopted on 14 October 1991, the Parliament of Bosnia and Herzegovina declared the independence of the Republic. The validity of this resolution was contested at the time by the Serbian community of Bosnia and Herzegovina (Opinion No. 1 of the Arbitration Commission of the Conference on Yugoslavia (the Badinter Commission), p. 3). On 24 October 1991, the Serb Members of the Bosnian Parliament proclaimed a separate Assembly of the Serb Nation/Assembly of the Serb People of Bosnia and Herzegovina. On 9 January 1992, the Republic of the Serb People of Bosnia and Herzegovina (subsequently renamed the Republika Srpska on 12 August 1992) was declared with the proviso that the declaration would come into force upon international recognition of the Republic of Bosnia and Herzegovina. On 28 February 1992, the Constitution of the Republic of the Serb People of Bosnia and Herzegovina was adopted. The Republic of the Serb People of Bosnia and Herzegovina (and subsequently the Republika Srpska) was not and has not been recognized internationally as a State; it has however enjoyed some *de facto* independence.

234. On 29 February and 1 March 1992, a referendum was held on the question of independence in Bosnia and Herzegovina. On 6 March 1992, Bosnia and Herzegovina officially declared its independence. With effect from 7 April 1992, Bosnia and Herzegovina was recognized by the European Community. On 7 April 1992, Bosnia and Herzegovina was recognized by the United States. On 27 April 1992, the Constitution of the Federal Republic of Yugoslavia was adopted consisting of the Republic of Serbia and the Republic of Montenegro. As explained above (paragraph 67), Montenegro declared its independence on 3 June 2006. All three States have been admitted to membership of the United Nations: Bosnia and Herzegovina on 22 May 1992; Serbia and Montenegro, under the name of the Federal Republic of Yugoslavia on 1 November 2000; and the Republic of Montenegro on 28 June 2006.

* *

(2) The Entities Involved in the Events Complained of

235. It will be convenient next to define the institutions, organizations or groups that were the actors in the tragic events that were to unfold in Bosnia and Herzegovina. Of the independent sovereign States that had emerged from the break-up of the SFRY, two are concerned in the present proceedings: on the one side, the FRY (later to be called Serbia and Montenegro), which was composed of the two constituent republics of Serbia and Montenegro; on the other, the Republic of Bosnia and Herzegovina. At the time when the latter State declared its independence (15 October 1991), the independence of two other entities had already been declared: in Croatia, the Republika Srpska Krajina, on 26 April 1991, and the Republic of the Serb People of Bosnia and Herzegovina, later to be called the Republika Srpska, on 9 January 1992 (paragraph 233 above). The Republika Srpska never attained international recognition as a sovereign State, but it had *de facto* control of substantial territory, and the loyalty of large numbers of Bosnian Serbs.

236. The Parties both recognize that there were a number of entities at a lower level the activities of which have formed part of the factual issues in the case, though they disagree as to the significance of those activities. Of the military and paramilitary units active in the hostilities, there were in April 1992 five types of armed formations involved in Bosnia: first, the Yugoslav People's Army (JNA), subsequently the Yugoslav Army (VJ); second, volunteer units supported by the JNA and later by the VJ, and the Ministry of the Interior (MUP) of the FRY; third, municipal Bosnian Serb Territorial Defence (TO) detachments; and, fourth, police forces of the Bosnian Serb Ministry of the Interior. The MUP of the Republika Srpska controlled the police and the security services, and operated, according to the Applicant, in close co-operation and co-ordination with the MUP of the FRY. On 15 April 1992, the Bosnian Government established a military force, based on the former Territorial Defence of the Republic, the Army of the Republic of Bosnia and Herzegovina (ARBiH), merging several non-official forces, including a number of paramilitary defence groups, such as the Green Berets, and the Patriotic League, being the military wing of the Muslim Party of Democratic Action. The Court does not overlook the evidence suggesting the existence of Muslim organizations involved in the conflict, such as foreign Mujahideen, although as a result of the withdrawal of the Respondent's counter-claims, the activities of these bodies are not the subject of specific claims before the Court.

237. The Applicant has asserted the existence of close ties between the Government of the Respondent and the authorities of the Republika Srpska, of a political and financial nature, and also as regards administra-

tion and control of the army of the Republika Srpska (VRS). The Court observes that insofar as the political sympathies of the Respondent lay with the Bosnian Serbs, this is not contrary to any legal rule. It is however argued by the Applicant that the Respondent, under the guise of protecting the Serb population of Bosnia and Herzegovina, in fact conceived and shared with them the vision of a "Greater Serbia", in pursuit of which it gave its support to those persons and groups responsible for the activities which allegedly constitute the genocidal acts complained of. The Applicant bases this contention first on the "Strategic Goals" articulated by President Karadžić at the 16th Session of the FRY Assembly on 12 May 1992, and subsequently published in the *Official Gazette* of the Republika Srpska (paragraph 371), and secondly on the consistent conduct of the Serb military and paramilitary forces vis-à-vis the non-Serb Bosnians showing, it is suggested, an overall specific intent *(dolus specialis)*. These activities will be examined below.

238. As regards the relationship between the armies of the FRY and the Republika Srpska, the Yugoslav Peoples' Army (JNA) of the SFRY had, during the greater part of the period of existence of the SFRY, been effectively a federal army, composed of soldiers from all the constituent republics of the Federation, with no distinction between different ethnic and religious groups. It is however contended by the Applicant that even before the break-up of the SFRY arrangements were being made to transform the JNA into an effectively Serb army. The Court notes that on 8 May 1992, all JNA troops who were not of Bosnian origin were withdrawn from Bosnia-Herzegovina. However, JNA troops of Bosnian Serb origin who were serving in Bosnia and Herzegovina were transformed into, or joined, the army of the Republika Srpska (the VRS) which was established on 12 May 1992, or the VRS Territorial Defence. Moreover, Bosnian Serb soldiers serving in JNA units elsewhere were transferred to Bosnia and Herzegovina and subsequently joined the VRS. The remainder of the JNA was transformed into the Yugoslav army (VJ) and became the army of the Federal Republic of Yugoslavia. On 15 May 1992 the Security Council, by resolution 752, demanded that units of the JNA in Bosnia and Herzegovina "be withdrawn, or be subject to the authority of the Government of Bosnia and Herzegovina, or be disbanded and disarmed". On 19 May 1992, the Yugoslav army was officially withdrawn from Bosnia and Herzegovina. The Applicant contended that from 1993 onwards, around 1,800 VRS officers were "administered" by the 30th Personnel Centre of the VJ in Belgrade; this meant that matters like their payment, promotions, pensions, etc., were handled, not by the Republika Srpska, but by the army of the Respondent. According to the Respondent, the importance of this fact was greatly exaggerated by the Applicant: the VRS had around 14,000 officers and thus only a small number of them were dealt with by the 30th Personnel Centre; this Centre only gave a certain degree of assistance to the VRS. The Applicant maintains that all VRS officers remained members of the

FRY army — only the label changed; according to the Respondent, there is no evidence for this last allegation. The Court takes note however of the comprehensive description of the processes involved set out in paragraphs 113 to 117 of the Judgment of 7 May 1997 of the ICTY Trial Chamber in the *Tadić* case (IT-94-1-T) quoted by the Applicant which mainly corroborate the account given by the latter. Insofar as the Respondent does not deny the fact of these developments, it insists that they were normal reactions to the threat of civil war, and there was no premeditated plan behind them.

239. The Court further notes the submission of the Applicant that the VRS was armed and equipped by the Respondent. The Applicant contends that when the JNA formally withdrew on 19 May 1992, it left behind all its military equipment which was subsequently taken over by the VRS. This claim is supported by the Secretary-General's report of 3 December 1992 in which he concluded that "[t]hough the JNA has completely withdrawn from Bosnia and Herzegovina, former members of Bosnian Serb origin have been left behind with their equipment and constitute the Army of the 'Serb Republic' " (A/47/747, para. 11). Moreover, the Applicant submits that Belgrade actively supplied the VRS with arms and equipment throughout the war in Bosnia and Herzegovina. On the basis of evidence produced before the ICTY, the Applicant contended that up to 90 per cent of the material needs of the VRS were supplied by Belgrade. General Dannatt, one of the experts called by the Applicant (paragraph 57 above), testified that, according to a "consumption review" given by General Mladić at the Bosnian Serb Assembly on 16 April 1995, 42.2 per cent of VRS supplies of infantry ammunition were inherited from the former JNA and 47 per cent of VRS requirements were supplied by the VJ. For its part, the Respondent generally denies that it supplied and equipped the VRS but maintains that, even if that were the case, such assistance "is very familiar and is an aspect of numerous treaties of mutual security, both bilateral and regional". The Respondent adds that moreover it is a matter of public knowledge that the armed forces of Bosnia and Herzegovina received external assistance from friendly sources. However, one of the witnesses called by the Respondent, Mr. Vladimir Lukić, who was the Prime Minister of the Republika Srpska from 20 January 1993 to 18 August 1994 testified that the army of the Republika Srpska was supplied from different sources "including but not limited to the Federal Republic of Yugoslavia" but asserted that the Republika Srpska "mainly paid for the military materiel which it obtained" from the States that supplied it.

240. As regards effective links between the two Governments in the financial sphere, the Applicant maintains that the economies of the FRY, the Republika Srpska, and the Republika Srpska Krajina were integrated through the creation of a single economic entity, thus enabling the FRY Government to finance the armies of the two other bodies in addition to its own. The Applicant argued that the National Banks of the

Republika Srpska and of the Republika Srpska Krajina were set up as under the control of, and directly subordinate to, the National Bank of Yugoslavia in Belgrade. The national budget of the FRY was to a large extent financed through primary issues from the National Bank of Yugoslavia, which was said to be entirely under governmental control, i.e. in effect through creating money by providing credit to the FRY budget for the use of the JNA. The same was the case for the budgets of the Republika Srpska and the Republika Srpska Krajina, which according to the Applicant had virtually no independent sources of income; the Respondent asserts that income was forthcoming from various sources, but has not specified the extent of this. The National Bank of Yugoslavia was making available funds (80 per cent of those available from primary issues) for "special purposes", that is to say "to avoid the adverse effects of war on the economy of the Serbian Republic of Bosnia and Herzegovina". The Respondent has denied that the budget deficit of the Republika Srpska was financed by the FRY but has not presented evidence to show how it was financed. Furthermore, the Respondent emphasizes that any financing supplied was simply on the basis of credits, to be repaid, and was therefore quite normal, particularly in view of the economic isolation of the FRY, the Republika Srpska and the Republika Srpska Krajina; it also suggested that any funds received would have been under the sole control of the recipient, the Republika Srpska or the Republika Srpska Krajina.

241. The Court finds it established that the Respondent was thus making its considerable military and financial support available to the Republika Srpska, and had it withdrawn that support, this would have greatly constrained the options that were available to the Republika Srpska authorities.

* *

(3) Examination of Factual Evidence: Introduction

242. The Court will therefore now examine the facts alleged by the Applicant, in order to satisfy itself, first, whether the alleged atrocities occurred; secondly, whether such atrocities, if established, fall within the scope of Article II of the Genocide Convention, that is to say whether the facts establish the existence of an intent, on the part of the perpetrators of those atrocities, to destroy, in whole or in part, a defined group *(dolus specialis)*. The group taken into account for this purpose will, for the reasons explained above (paragraphs 191-196), be that of the Bosnian Muslims; while the Applicant has presented evidence said to relate to the wider group of non-Serb Bosnians, the Bosnian Muslims formed such a substantial part of this wider group that that evidence appears to have equal probative value as regards the facts, in relation to the more restricted

group. The Court will also consider the facts alleged in the light of the question whether there is persuasive and consistent evidence for a pattern of atrocities, as alleged by the Applicant, which would constitute evidence of *dolus specialis* on the part of the Respondent. For this purpose it is not necessary to examine every single incident reported by the Applicant, nor is it necessary to make an exhaustive list of the allegations; the Court finds it sufficient to examine those facts that would illuminate the question of intent, or illustrate the claim by the Applicant of a pattern of acts committed against members of the group, such as to lead to an inference from such pattern of the existence of a specific intent *(dolus specialis)*.

243. The Court will examine the evidence following the categories of prohibited acts to be found in Article II of the Genocide Convention. The nature of the events to be described is however such that there is considerable overlap between these categories: thus, for example, the conditions of life in the camps to which members of the protected group were confined have been presented by the Applicant as violations of Article II, paragraph *(c)*, of the Convention (the deliberate infliction of destructive conditions of life), but since numerous inmates of the camps died, allegedly as a result of those conditions, or were killed there, the camps fall to be mentioned also under paragraph *(a)*, killing of members of the protected group.

244. In the evidentiary material submitted to the Court, and that referred to by the ICTY, frequent reference is made to the actions of "Serbs" or "Serb forces", and it is not always clear what relationship, if any, the participants are alleged to have had with the Respondent. In some cases it is contended, for example, that the JNA, as an organ *de jure* of the Respondent, was involved; in other cases it seems clear that the participants were Bosnian Serbs, with no *de jure* link with the Respondent, but persons whose actions are, it is argued, attributable to the Respondent on other grounds. Furthermore, as noted in paragraph 238 above, it appears that JNA troops of Bosnian Serb origin were transformed into, or joined the VRS. At this stage of the present Judgment, the Court is not yet concerned with the question of the attributability to the Respondent of the atrocities described; it will therefore use the terms "Serb" and "Serb forces" purely descriptively, without prejudice to the status they may later, in relation to each incident, be shown to have had. When referring to documents of the ICTY, or to the Applicant's pleadings or oral argument, the Court will use the terminology of the original.

* *

(4) Article II (a)*: Killing Members of the Protected Group*

245. Article II *(a)* of the Convention deals with acts of killing members of the protected group. The Court will first examine the evidence of killings of members of the protected group in the principal areas of Bosnia and in the various detention camps, and ascertain whether there is evidence of a specific intent *(dolus specialis)* in one or more of them. The Court will then consider under this heading the evidence of the massacres reported to have occurred in July 1995 at Srebrenica.

Sarajevo

246. The Court notes that the Applicant refers repeatedly to killings, by shelling and sniping, perpetrated in Sarajevo. The Fifth Periodic Report of the United Nations Special Rapporteur is presented by the Applicant in support of the allegation that between 1992 and 1993 killings of Muslim civilians were perpetrated in Sarajevo, partly as a result of continuous shelling by Bosnian Serb forces. The Special Rapporteur stated that on 9 and 10 November 1993 mortar attacks killed 12 people (E/CN.4/1994/47, 17 November 1992, p. 4, para. 14). In his periodic Report of 5 July 1995, the Special Rapporteur observed that as from late February 1995 numerous civilians were killed by sniping activities of Bosnian Serb forces and that "one local source reported that a total of 41 civilians were killed . . . in Sarajevo during the month of May 1995" (Report of 5 July 1995, para. 69). The Report also noted that, in late June and early July 1995, there was further indiscriminate shelling and rocket attacks on Sarajevo by Bosnian Serb forces as a result of which many civilian deaths were reported (Report of 5 July 1995, para. 70).

247. The Report of the Commission of Experts gives a detailed account of the battle and siege of Sarajevo. The Commission estimated that over the course of the siege nearly 10,000 persons had been killed or were missing in the city of Sarajevo (Report of the Commission of Experts, Vol. II, Ann. VI, p. 8). According to the estimates made in a report presented by the Prosecution before the ICTY in the *Galić* case (IT-98-29-T, Trial Chamber Judgment, 5 December 2003, paras. 578 and 579), the monthly average of civilians killed fell from 105 in September to December 1992, to around 64 in 1993 and to around 28 in the first six months of 1994.

248. The Trial Chamber of the ICTY, in its Judgment of 5 December 2003 in the *Galić* case examined specific incidents in the area of Sarajevo, for instance the shelling of the Markale market on 5 February 1994 which resulted in the killing of 60 persons. The majority of the Trial

Chamber found that "civilians in ARBiH-held areas of Sarajevo were directly or indiscriminately attacked from SRK-controlled territory during the Indictment Period, and that as a result and as a minimum, hundreds of civilians were killed and thousands others were injured" (*Galić*, IT-98-29-T, Judgment, 5 December 2003, para. 591), the Trial Chamber further concluded that "[i]n sum, the Majority of the Trial Chamber finds that each of the crimes alleged in the Indictment — crime of terror, attacks on civilians, murder and inhumane acts — were committed by SRK forces during the Indictment Period" (*ibid.*, para. 600).

249. In this connection, the Respondent makes the general point that in a civil war it is not always possible to differentiate between military personnel and civilians. It does not deny that crimes were committed during the siege of Sarajevo, crimes that "could certainly be characterized as war crimes and certain even as crimes against humanity", but it does not accept that there was a strategy of targeting civilians.

Drina River Valley

(a) *Zvornik*

250. The Applicant made a number of allegations with regard to killings that occurred in the area of Drina River Valley. The Applicant, relying on the Report of the Commission of Experts, claims that at least 2,500 Muslims died in Zvornik from April to May 1992. The Court notes that the findings of the Report of the Commission of Experts are based on individual witness statements and one declassified United States State Department document No. 94-11 (Vol. V, Ann. X, para. 387; Vol. IV, Ann. VIII, p. 342 and para. 2884; Vol. I, Ann. III.A, para. 578). Further, a video reporting on massacres in Zvornik was shown during the oral proceedings (excerpts from "The Death of Yugoslavia", BBC documentary). With regard to specific incidents, the Applicant alleges that Serb soldiers shot 36 Muslims and mistreated 27 Muslim children in the local hospital of Zvornik in the second half of May 1992.

251. The Respondent contests those allegations and contends that all three sources used by the Applicant are based solely on the account of one witness. It considers that the three reports cited by the Applicant cannot be used as evidence before the Court. The Respondent produced the statement of a witness made before an investigating judge in Zvornik which claimed that the alleged massacre in the local hospital of Zvornik had never taken place. The Court notes that the Office of the Prosecutor of the ICTY had never indicted any of the accused for the alleged massacres in the hospital.

(b) *Camps*

(i) *Sušica camp*

252. The Applicant further presents claims with regard to killings perpetrated in detention camps in the area of Drina River Valley. The Report of the Commission of Experts includes the statement of an ex-guard at the Sušica camp who personally witnessed 3,000 Muslims being killed (Vol. IV, Ann. VIII, p. 334) and the execution of the last 200 surviving detainees (Vol. I, Ann. IV, pp. 31-32). In proceedings before the ICTY, the Commander of that camp, Dragan Nikolić, pleaded guilty to murdering nine non-Serb detainees and, according to the Sentencing Judgment of 18 December 2003, "the Accused persecuted Muslim and other non-Serb detainees by subjecting them to murders, rapes and torture as charged specifically in the Indictment" (*Nikolić*, IT-94-2-S, para. 67).

(ii) *Foča Kazneno-Popravní Dom camp*

253. The Report of the Commission of Experts further mentions numerous killings at the camp of Foča Kazneno-Popravní Dom (Foča KP Dom). The Experts estimated that the number of prisoners at the camp fell from 570 to 130 over two months (Vol. IV, Ann. VIII, p. 129). The United States State Department reported one eye-witness statement of regular executions in July 1992 and mass graves at the camp.

254. The Trial Chamber of the ICTY made the following findings on several killings at this camp in its Judgment in the *Krnojelac* case:

> "The Trial Chamber is satisfied beyond reasonable doubt that all but three of the persons listed in Schedule C to the Indictment were killed at the KP Dom. The Trial Chamber is satisfied that these persons fell within the pattern of events that occurred at the KP Dom during the months of June and July 1992, and that the only reasonable explanation for the disappearance of these persons since that time is that they died as a result of acts or omissions, with the relevant state of mind [sc. that required to establish murder], at the KP Dom." (IT-97-25-T, Judgment, 15 March 2002, para. 330.)

(iii) *Batković camp*

255. As regards the detention camp of Batković, the Applicant claims that many prisoners died at this camp as a result of mistreatment by the Serb guards. The Report of the Commission of Experts reports one witness statement according to which there was a mass grave located next to the Batković prison camp. At least 15 bodies were buried next to a cow stable, and the prisoners neither knew the identity of those buried at the stable nor the circumstances of their deaths (Report of the Commission

of Experts, Vol. V, Ann. X, p. 9). The Report furthermore stresses that

> "[b]ecause of the level of mistreatment, many prisoners died. One man stated that during his stay, mid-July to mid-August, 13 prisoners were beaten to death. Another prisoner died because he had gangrene which went untreated. Five more may have died from hunger. Allegedly, 20 prisoners died prior to September." (Vol. IV, Ann. VIII, p. 63.)

Killings at the Batković camp are also mentioned in the Dispatch of the United States State Department of 19 April 1993. According to a witness, several men died as a result of bad conditions and beatings at the camp (United States Dispatch, 19 April 1993, Vol. 4, No. 30, p. 538).

256. On the other hand, the Respondent stressed that, when the United Nations Special Rapporteur visited the Batković prison camp, he found that: "The prisoners did not complain of ill-treatment and, in general appeared to be in good health." (Report of 17 November 1992, para. 29) However, the Applicant contends that "it is without any doubt that Mazowiecki was shown a 'model' camp".

Prijedor

(a) *Kozarac and Hambarine*

257. With regard to the area of the municipality of Prijedor, the Applicant has placed particular emphasis on the shelling and attacks on Kozarac, 20 km east of Prijedor, and on Hambarine in May 1992. The Applicant contends that after the shelling, Serb forces shot people in their homes and that those who surrendered were taken to a soccer stadium in Kozarac where some men were randomly shot. The Report of the Commission of Experts (Vol. I, Ann. III, pp. 154-155) states that:

> "The attack on Kozarac lasted three days and caused many villagers to flee to the forest while the soldiers were shooting at 'every moving thing'. Survivors calculated that at least 2,000 villagers were killed in that period. The villagers' defence fell on 26 May . . .
>
> Serbs then reportedly announced that the villagers had 10 minutes to reach the town's soccer stadium. However, many people were shot in their homes before given a chance to leave. One witness reported that several thousand people tried to surrender by carrying white flags, but three Serb tanks opened fire on them, killing many."

The Respondent submits that the number of killings is exaggerated and that "there was severe fighting in Kozarac, which took place on 25 and 26 May, and naturally, it should be concluded that a certain number of the victims were Muslim combatants".

258. As regards Hambarine, the Report of the Commission of Experts (Vol. I, p. 39) states that:

> "Following an incident in which less than a handful of Serb[ian] soldiers were shot dead under unclear circumstances, the village of Hambarine was given an ultimatum to hand over a policeman who lived where the shooting had occurred. As it was not met, Hambarine was subjected to several hours of artillery bombardment on 23 May 1992.
>
> The shells were fired from the aerodrome Urije just outside Prijedor town. When the bombardment stopped, the village was stormed by infantry, including paramilitary units, which sought out the inhabitants in every home. Hambarine had a population of 2,499 in 1991."

The Report of the Special Rapporteur of 17 November 1992, states that:

> "Between 23 and 25 May, the Muslim village of Hambarine, 5 km south of Prijedor, received an ultimatum: all weapons must be surrendered by 11 a.m. Then, alleging that a shot was fired at a Serbian patrol, heavy artillery began to shell the village and tanks appeared, firing at homes. The villagers fled to Prijedor. Witnesses reported many deaths, probably as many as 1,000." (Periodic Report of 17 November 1992, p. 8, para. 17 *(c)*.)

The Respondent says, citing the indictment in the *Stakić* case, that "merely 11 names of the victims are known" and that it is therefore impossible that the total number of victims in Hambarine was "as many as 1,000".

259. The Report of the Commission of Experts found that on 26, 27 or 28 May, the Muslim village of Kozarac, came under attack of heavy Serb artillery. It furthermore notes that:

> "The population, estimated at 15,000, suffered a great many summary executions, possibly as many as 5,000 persons according to some witnesses." (Report of the Commission of Experts, Vol. IV, pt. 4.)

260. The Applicant also claimed that killings of members of the protected group were perpetrated in Prijedor itself. The Report of the Commission of Experts, as well as the United Nations Special Rapporteur collected individual witness statements on several incidents of killing in the town of Prijedor (Report of the Commission of Experts, Vol. I, Ann. V, pp. 54 *et seq.*). In particular, the Special Rapporteur received

testimony "from a number of reliable sources" that 200 people were killed in Prijedor on 29 May 1992 (Report of 17 November 1992, para. 17).

261. In the *Stakić* case, the ICTY Trial Chamber found that "many people were killed during the attacks by the Bosnian Serb army on predominantly Bosnian Muslim villages and towns throughout the Prijedor municipality and several massacres of Muslims took place", and that "a comprehensive pattern of atrocities against Muslims in Prijedor municipality in 1992 ha[d] been proved beyond reasonable doubt" (IT-97-24-T, Judgment, 31 July 2003, paras. 544 and 546). Further, in the *Brđanin* case, the Trial Chamber was satisfied that "at least 80 Bosnian Muslim civilians were killed when Bosnian Serb soldiers and police entered the villages of the Kozarac area" (IT-99-36, Judgment, 1 September 2004, para. 403).

(b) *Camps*

(i) *Omarska camp*

262. With respect to the detention camps in the area of Prijedor, the Applicant has stressed that the camp of Omarska was "arguably the cruellest camp in Bosnia and Herzegovina". The Report of the Commission of Experts gives an account of seven witness statements reporting between 1,000 to 3,000 killings (Vol. IV, Ann. VIII, p. 222). The Report noted that

> "[s]ome prisoners estimate that on an average there may have been 10 to 15 bodies displayed on the grass each morning, when the first prisoners went to receive their daily food rations. But there were also other dead bodies observed in other places at other times. Some prisoners died from their wounds or other causes in the rooms where they were detained. Constantly being exposed to the death and suffering of fellow prisoners made it impossible for anyone over any period of time to forget in what setting he or she was. Given the length of time Logor Omarska was used, the numbers of prisoners detained in the open, and the allegations that dead bodies were exhibited there almost every morning."

The Report of the Commission of Experts concludes that "all information available . . . seems to indicate that [Omarska] was more than anything else a death camp" (Vol. I, Ann. V, p. 80). The United Nations Secretary-General also received submissions from Canada, Austria and the United States, containing witness statements about the killings at Omarska.

263. In the Opinion and Judgment of the Trial Chamber in the *Tadić* case, the ICTY made the following findings on Omarska: "Perhaps the most notorious of the camps, where the most horrific conditions existed,

was the Omarska camp." (IT-94-1-T, Judgment, 7 May 1997, para. 155.) "The Trial Chamber heard from 30 witnesses who survived the brutality to which they were systematically subjected at Omarska. By all accounts, the conditions at the camp were horrendous; killings and torture were frequent." (*Ibid.*, para. 157.) The Trial Chamber in the *Stakić* Judgment found that "over a hundred people were killed in late July 1992 in the Omarska camp" and that

> "[a]round late July 1992, 44 people were taken out of Omarska and put in a bus. They were told that they would be exchanged in the direction of Bosanska Krupa; they were never seen again. During the exhumation in Jama Lisac, 56 bodies were found: most of them had died from gunshot injuries." (IT-97-24-T, Judgment, 31 July 2003, paras. 208 and 210).

At least 120 people detained at Omarska were killed after having been taken away by bus.

> "The corpses of some of those taken away on the buses were later found in Hrastova Glavica and identified. A large number of bodies, 126, were found in this area, which is about 30 kilometres away from Prijedor. In 121 of the cases, the forensic experts determined that the cause of death was gunshot wounds." (*Ibid.*, para. 212.)

264. In the *Brđanin* case, the Trial Chamber, in its Judgment of 1 September 2004 held that between 28 May and 6 August, a massive number of people were killed at Omarska camp. The Trial Chamber went on to say specifically that "[a]s of late May 1992, a camp was set up at Omarska, where evidence shows that several hundred Bosnian Muslim and Bosnian Croat civilians from the Prijedor area were detained, and where killings occurred on a massive scale" (IT-99-36-T, Trial Chamber Judgment, 1 September 2004, para. 441). "The Trial Chamber is unable to precisely identify all detainees that were killed at Omarska camp. It is satisfied beyond reasonable doubt however that, at a minimum, 94 persons were killed, including those who disappeared." (*Ibid.*, para. 448.)

(ii) *Keraterm camp*

265. A second detention camp in the area of Prijedor was the Keraterm camp where, according to the Applicant, killings of members of the protected group were also perpetrated. Several corroborating accounts of a mass execution on the morning of 25 July 1992 in Room 3 at Keraterm camp were presented to the Court. This included the United States Dispatch of the State Department and a letter from the Permanent Repre-

sentative of Austria to the United Nations dated 5 March 1993, addressed to the Secretary-General. The Report of the Commission of Experts cites three separate witness statements to the effect that ten prisoners were killed per day at Keraterm over three months (Vol. IV, para. 1932; see also Vol. I, Ann. V, para. 445).

266. The Trial Chamber of the ICTY, in the *Sikirica et al.* case, concerning the Commander of Keraterm camp, found that 160 to 200 men were killed or wounded in the so-called Room 3 massacre (IT-95-8-S, Sentencing Judgment, 13 November 2001, para. 103). According to the Judgment, Sikirica himself admitted that there was considerable evidence "concerning the murder and killing of other named individuals at Keraterm during the period of his duties". There was also evidence that "others were killed because of their rank and position in society and their membership of a particular ethnic group or nationality" (*ibid.*, para. 122). In the *Stakić* case, the Trial Chamber found that "from 30 April 1992 to 30 September 1992 . . . killings occurred frequently in the Omarska, Keraterm and Trnopolje camps" (IT-97-24-T, Judgment, 31 July 2003, para. 544).

(iii) *Trnopolje camp*

267. The Applicant further contends that there is persuasive evidence of killing at Trnopolje camp, with individual eye-witnesses corroborating each other. The Report of the Commission of Experts found that "[i]n Trnopolje, the regime was far better than in Omarska and Keraterm. Nonetheless, harassment and malnutrition was a problem for all the inmates. Rapes, beatings and other kinds of torture, and even killings, were not rare." (Report of the Commission of Experts, Vol. IV, Ann. V, p. 10.)

> "The first period was allegedly the worst in Trnopolje, with the highest numbers of inmates killed, raped, and otherwise mistreated and tortured . . .
>
> The people killed in the camp were usually removed soon after by some camp inmates who were ordered by the Serbs to take them away and bury them . . .
>
> Albeit *Logor* Trnopolje was not a death camp like *Logor* Omarska or *Logor* Keraterm, the label 'concentration camp' is none the less justified for *Logor* Trnopolje due to the regime prevailing in the camp." (*Ibid.*, Vol. I, Ann. V, pp. 88-90.)

268. With regard to the number of killings at Trnopolje, the ICTY considered the period between 25 May and 30 September 1992, the relevant period in the *Stakić* case (IT-97-24-T, Trial Chamber Judgment, 31 July 2003, paras. 226-227). The Trial Chamber came to the conclusion that "killings occurred frequently in the Omarska, Keraterm and Trno-

polje camps and other detention centres" (IT-97-24-T, para. 544). In the Judgment in the *Brđanin* case, the Trial Chamber found that in the period from 28 May to October 1992,

> "numerous killings occurred in Trnopolje camp. A number of detainees died as a result of the beatings received by the guards. Others were killed by camp guards with rifles. The Trial Chamber also [found] that at least 20 inmates were taken outside the camp and killed there." (IT-99-36-T, Judgment, 1 September 2004, para. 450.)

269. In response to the allegations of killings at the detention camps in the area of Prijedor, the Respondent questions the number of victims, but not the fact that killings occurred. It contends that killings in Prijedor "were committed sporadically and against individuals who were not a significant part of the group". It further observed that the ICTY had not characterized the acts committed in the Prijedor region as genocide.

Banja Luka

Manjača camp

270. The Applicant further contends that killings were also frequent at Manjača camp in Banja Luka. The Court notes that multiple witness accounts of killings are contained in the Report of the Commission of Experts (Vol. IV, paras. 370-376) and a mass grave of 540 bodies, "presumably" from prisoners at Manjača, is mentioned in a report on missing persons submitted by Manfred Nowak, the United Nations Expert on Missing Persons:

> "In September 1995, mass graves were discovered near Krasulje in northwest Bosnia and Herzegovina. The Government has exhumed 540 bodies of persons who were presumably detained at Manjaca concentration camp in 1992. In January 1996, a mass grave containing 27 bodies of Bosnian Muslims was discovered near Sanski Most; the victims were reportedly killed in July 1992 during their transfer from Sanski Most to Manjaca concentration camp (near Banja Luka)." (E/CN.4/1996/36 of 4 March 1996, para. 52.)

Brčko

Luka camp

271. The Applicant claims that killings of members of the protected group were also perpetrated at Luka camp and Brčko. The Report of the Commission of Experts confirms these allegations. One witness reported that "[s]hootings often occurred at 4.00 a.m. The witness estimates that during his first week at Luka more than 2,000 men were killed and

thrown into the Sava River." (Report of the Commission of Experts Vol. IV, Ann. VIII, p. 93.) The Report further affirms that "[a]pparently, murder and torture were a daily occurrence" (*ibid.*, p. 96), and that it was reported that

> "[t]he bodies of the dead or dying internees were often taken to the camp dump or moved behind the prisoner hangars. Other internees were required to move the bodies. Sometimes the prisoners who carried the dead were killed while carrying such bodies to the dump. The dead were also taken and dumped outside the Serbian Police Station located on Majevička Brigada Road in Brčko." (*Ibid.*)

These findings are corroborated by evidence of a mass grave being found near the site (Report of the Commission of Experts, Vol. IV, Ann. VIII, p. 101, and United States State Department Dispatch).

272. In the *Jelisić* case, eight of the 13 murders to which the accused pleaded guilty were perpetrated at Luka camp and five were perpetrated at the Brčko police station (IT-95-10-T, Trial Chamber Judgment, 14 December 1999, paras. 37-38). The Trial Chamber further held that "[a]lthough the Trial Chamber is not in a position to establish the precise number of victims ascribable to Goran Jelisić for the period in the indictment, it notes that, in this instance, the material element of the crime of genocide has been satisfied" (*ibid.*, para. 65).

273. In the *Milošević* Decision on Motion for Judgment of Acquittal, the Trial Chamber found that many Muslims were detained in Luka camp in May and June 1992 and that many killings were observed by witnesses (IT-02-54-T, Decision on Motion for Judgment of Acquittal, 16 June 2004, paras. 159, 160-168), it held that "[t]he conditions and treatment to which the detainees at Luka Camp were subjected were terrible and included regular beatings, rapes, and killings" (*ibid.*, para. 159). "At Luka Camp . . . The witness personally moved about 12 to 15 bodies and saw approximately 100 bodies stacked up like firewood at Luka Camp; each day a refrigerated meat truck from the local Bimeks Company in Brčko would come to take away the dead bodies." (*Ibid.*, para. 161.)

274. The Court notes that the *Brđanin* Trial Chamber Judgment of 1 September 2004 made a general finding as to killings of civilians in camps and municipalities at Banja Luka, Prijedor, Sanski Most, Ključ, Kotor Varoš and Bosanski Novi. It held that:

> "In sum, the Trial Chamber is satisfied beyond reasonable doubt that, considering all the incidents described in this section of the judgment, at least 1,669 Bosnian Muslims and Bosnian Croats were killed by Bosnian Serb forces, all of whom were non-combatants." (IT-99-36-T, Judgment, 1 September 2004, para. 465.)

There are contemporaneous Security Council and General Assembly resolutions condemning the killing of civilians in connection with ethnic cleansing, or expressing alarm at reports of mass killings (Security Council resolution 819 (1993), Preamble, paras. 6 and 7; General Assembly resolution 48/153 (1993), paras. 5 and 6; General Assembly resolution 49/196 (1994), para. 6).

275. The Court further notes that several resolutions condemn specific incidents. These resolutions, *inter alia*, condemn "the Bosnian Serb forces for their continued offensive against the safe area of Goražde, which has resulted in the death of numerous civilians" (Security Council resolution 913 (1994), Preamble, para. 5); condemn ethnic cleansing "perpetrated in Banja Luka, Bijeljina and other areas of the Republic of Bosnia and Herzegovina under the control of Bosnian Serb forces" (Security Council resolution 941 (1994), para. 2); express concern at "grave violations of international humanitarian law and of human rights in and around Srebrenica, and in the areas of Banja Luka and Sanski Most, including reports of mass murder" (Security Council resolution 1019 (1995), Preamble, para. 2); and condemn "the indiscriminate shelling of civilians in the safe areas of Sarajevo, Tuzla, Bihać and Goražde and the use of cluster bombs on civilian targets by Bosnian Serb and Croatian Serb forces" (General Assembly resolution 50/193 (1995) para. 5).

*

276. On the basis of the facts set out above, the Court finds that it is established by overwhelming evidence that massive killings in specific areas and detention camps throughout the territory of Bosnia and Herzegovina were perpetrated during the conflict. Furthermore, the evidence presented shows that the victims were in large majority members of the protected group, which suggests that they may have been systematically targeted by the killings. The Court notes in fact that, while the Respondent contested the veracity of certain allegations, and the number of victims, or the motives of the perpetrators, as well as the circumstances of the killings and their legal qualification, it never contested, as a matter of fact, that members of the protected group were indeed killed in Bosnia and Herzegovina. The Court thus finds that it has been established by conclusive evidence that massive killings of members of the protected group occurred and that therefore the requirements of the material element, as defined by Article II *(a)* of the Convention, are fulfilled. At this stage of its reasoning, the Court is not called upon to list the specific killings, nor even to make a conclusive finding on the total number of victims.

277. The Court is however not convinced, on the basis of the evidence before it, that it has been conclusively established that the massive killings of members of the protected group were committed with the specific intent *(dolus specialis)* on the part of the perpetrators to destroy, in whole or in part, the group as such. The Court has carefully examined the criminal proceedings of the ICTY and the findings of its Chambers, cited above, and observes that none of those convicted were found to have acted with specific intent *(dolus specialis)*. The killings outlined above may amount to war crimes and crimes against humanity, but the Court has no jurisdiction to determine whether this is so. In the exercise of its jurisdiction under the Genocide Convention, the Court finds that it has not been established by the Applicant that the killings amounted to acts of genocide prohibited by the Convention. As to the Applicant's contention that the specific intent *(dolus specialis)* can be inferred from the overall pattern of acts perpetrated throughout the conflict, examination of this must be reserved until the Court has considered all the other alleged acts of genocide (violations of Article II, paragraphs *(b)* to *(e)*) (see paragraph 370 below).

* *

(5) The Massacre at Srebrenica

278. The atrocities committed in and around Srebrenica are nowhere better summarized than in the first paragraph of the Judgment of the Trial Chamber in the *Krstić* case:

> "The events surrounding the Bosnian Serb take-over of the United Nations ('UN') 'safe area' of Srebrenica in Bosnia and Herzegovina, in July 1995, have become well known to the world. Despite a UN Security Council resolution declaring that the enclave was to be 'free from armed attack or any other hostile act', units of the Bosnian Serb Army ('VRS') launched an attack and captured the town. Within a few days, approximately 25,000 Bosnian Muslims, most of them women, children and elderly people who were living in the area, were uprooted and, in an atmosphere of terror, loaded onto overcrowded buses by the Bosnian Serb forces and transported across the confrontation lines into Bosnian Muslim-held territory. The military-aged Bosnian Muslim men of Srebrenica, however, were consigned to a separate fate. As thousands of them attempted to flee the area, they were taken prisoner, detained in brutal conditions and then executed. More than 7,000 people were never seen again." (IT-98-33-T, Judgment, 2 August 2001, para. 1; footnotes omitted.)

While the Respondent raises a question about the number of deaths, it does not essentially question that account. What it does question is whether specific intent *(dolus specialis)* existed and whether the acts complained of can be attributed to it. It also calls attention to the attacks carried out by the Bosnian army from within Srebrenica and the fact that the enclave was never demilitarized. In the Respondent's view the military action taken by the Bosnian Serbs was in revenge and part of a war for territory.

279. The Applicant contends that the planning for the final attack on Srebrenica must have been prepared quite some time before July 1995. It refers to a report of 4 July 1994 by the commandant of the Bratunac Brigade. He outlined the "final goal" of the VRS: "an entirely Serbian Podrinje. The enclaves of Srebrenica, Žepa and Goražde must be militarily defeated." The report continued:

> "We must continue to arm, train, discipline, and prepare the RS Army for the execution of this crucial task — the expulsion of Muslims from the Srebrenica enclave. There will be no retreat when it comes to the Srebrenica enclave, we must advance. The enemy's life has to be made unbearable and their temporary stay in the enclave impossible so that they leave *en masse* as soon as possible, realising that they cannot survive there."

The Chamber in the *Blagojević* case mentioned testimony showing that some "members of the Bratunac Brigade . . . did not consider this report to be an order. Testimony of other witnesses and documentary evidence show that the strategy was in fact implemented." (IT-02-60-T, Trial Chamber Judgment, 17 January 2005, para. 104; footnotes omitted.) The Applicant sees the "final goal" described here as "an entirely Serbian Podrinje", in conformity with the objective of a Serbian region 50 km to the west of the Drina river identified in an April or a May 1991 meeting of the political and State leadership of Yugoslavia. The Court observes that the object stated in the report, like the 1992 Strategic Objectives, does not envisage the destruction of the Muslims in Srebrenica, but rather their departure. The Chamber did not give the report any particular significance.

280. The Applicant, like the Chamber, refers to a meeting on 7 March 1995 between the Commander of the United Nations Protection Force (UNPROFOR) and General Mladić, at which the latter expressed dissatisfaction with the safe area régime and indicated that he might take military action against the eastern enclaves. He gave assurances however for the safety of the Bosnian Muslim population of those enclaves. On the following day, 8 March 1995, President Karadžić issued the Directive for Further Operations 7, also quoted by the Chamber and the Applicant: "'Planned and well-thought-out combat operations' were

to create 'an unbearable situation of total insecurity with no hope of further survival or life for the inhabitants of both enclaves'." The *Blagojević* Chamber continues as follows:

> "The separation of the Srebrenica and Žepa enclaves became the task of the Drina Corps. As a result of this directive, General Ratko Mladić on 31 March 1995 issued Directive for Further Operations, Operative No. 7/1, which further directive specified the Drina Corps' tasks." (IT-02-60-T, pp. 38-39, para. 106.)

281. Counsel for the Applicant asked in respect of the first of those directives "[w]hat could be a more clear-cut definition of the genocidal intent to destroy on the part of the authorities in Pale?". As with the July 1994 report, the Court observes that the expulsion of the inhabitants would achieve the purpose of the operation. That observation is supported by the ruling of the Appeals Chamber in the *Krstić* case that the directives were "insufficiently clear" to establish specific intent *(dolus specialis)* on the part of the members of the Main Staff who issued them. "Indeed, the Trial Chamber did not even find that those who issued Directives 7 and 7.1 had genocidal intent, concluding instead that the genocidal plan crystallized at a later stage." (IT-98-33-A, Judgment, 19 April 2004, para. 90.)

282. A Netherlands Battalion (Dutchbat) was deployed in the Srebrenica safe area. Within that area in January 1995 it had about 600 personnel. By February and through the spring the VRS was refusing to allow the return of Dutch soldiers who had gone on leave, causing their numbers to drop by at least 150, and were restricting the movement of international convoys of aid and supplies to Srebrenica and to other enclaves. It was estimated that without new supplies about half of the population of Srebrenica would be without food after mid-June.

283. On 2 July the Commander of the Drina Corps issued an order for active combat operations; its stated objective on the Srebrenica enclave was to reduce "the enclave to its urban area". The attack began on 6 July with rockets exploding near the Dutchbat headquarters in Potočari; 7 and 8 July were relatively quiet because of poor weather, but the shelling intensified around 9 July. Srebrenica remained under fire until 11 July when it fell, with the Dutchbat observation posts having been taken by the VRS. Contrary to the expectations of the VRS, the Bosnia and Herzegovina army showed very little resistance (*Blagojević*, IT-02-60-T, Trial Chamber Judgment, 17 January 2005, para. 125). The United Nations Secretary-General's report quotes an assessment made by United Nations military observers on the afternoon of 9 July which concluded as follows:

"'the BSA offensive will continue until they achieve their aims. These aims may even be widening since the United Nations response has been almost non-existent and the BSA are now in a position to overrun the enclave if they wish.' Documents later obtained from Serb sources appear to suggest that this assessment was correct. Those documents indicate that the Serb attack on Srebrenica initially had limited objectives. Only after having advanced with unexpected ease did the Serbs decide to overrun the entire enclave. Serb civilian and military officials from the Srebrenica area have stated the same thing, adding, in the course of discussions with a United Nations official, that they decided to advance all the way to Srebrenica town when they assessed that UNPROFOR was not willing or able to stop them." (A/54/549, para. 264.)

Consistently with that conclusion, the Chamber in the *Blagojević* case says this:

"As the operation progressed its military object changed from 'reducing the enclave to the urban area' [the objective stated in a Drina Corps order of 2 July] to the taking-over of Srebrenica town and the enclave as a whole. The Trial Chamber has heard no direct evidence as to the exact moment the military objective changed. The evidence does show that President Karadžić was 'informed of successful combat operations around Srebrenica . . . which enable them to occupy the very town of Srebrenica' on 9 July. According to Miroslav Deronjić, the President of the Executive Board of the Bratunac Municipality, President Karadžić told him on 9 July that there were two options in relation to the operation, one of which was the complete take-over of Srebrenica. Later on 9 July, President Karadžić 'agreed with continuation of operations for the takeover of Srebrenica'. By the morning of 11 July the change of objective of the 'Krivaja 95' operation had reached the units in the field; and by the middle of the afternoon, the order to enter Srebrenica had reached the Bratunac Brigade's IKM in Pribićevac and Colonel Blagojević. Miroslav Deronjić visited the Bratunac Brigade IKM in Pribićevac on 11 July. He briefly spoke with Colonel Blagojević about the Srebrenica operation. According to Miroslav Deronjić, the VRS had just received the order to enter Srebrenica town." (IT-02-60-T, Trial Chamber Judgment, 17 January 2005, para. 130.)

284. The Chamber then begins an account of the dreadful aftermath of the fall of Srebrenica. A Dutchbat Company on 11 July started directing the refugees to the UNPROFOR headquarters in Potočari which was

considered to be the only safe place for them. Not all the refugees went towards Potočari; many of the Bosnian Muslim men took to the woods. Refugees were soon shelled and shot at by the VRS despite attempts to find a safe route to Potočari where, to quote the ICTY, chaos reigned:

> "The crowd outside the UNPROFOR compound grew by the thousands during the course of 11 July. By the end of the day, an estimated 20,000 to 30,000 Bosnian Muslims were in the surrounding area and some 4,000 to 5,000 refugees were in the UNPROFOR compound.
>
> *(b)* Conditions in Potočari
>
> The standards of hygiene within Potočari had completely deteriorated. Many of the refugees seeking shelter in the UNPROFOR headquarters were injured. Medical assistance was given to the extent possible; however, there was a dramatic shortage of medical supplies. As a result of the VRS having prevented aid convoys from getting through during the previous months, there was hardly any fresh food in the DutchBat headquarters. There was some running water available outside the compound. From 11 to 13 July 1995 the temperature was very high, reaching 35 degrees centigrade and this small water supply was insufficient for the 20,000 to 30,000 refugees who were outside the UNPROFOR compound." (IT-02-60-T, paras. 146-147.)

The Tribunal elaborates on those matters and some efforts made by Bosnian Serb and Serbian authorities, i.e., the local Municipal Assembly, the Bratunac Brigade and the Drina Corps, as well as UNHCR, to assist the Bosnian Muslim refugees (*ibid.*, para. 148).

285. On 10 July at 10.45 p.m., according to the Secretary-General's 1999 Report, the delegate in Belgrade of the Secretary-General's Special Representative telephoned the Representative to say that he had seen President Milošević who had responded that not much should be expected of him because "the Bosnian Serbs did not listen to him" (A/54/549, para. 292). At 3 p.m. the next day, the President rang the Special Representative and, according to the same report, "stated that the Dutchbat soldiers in Serb-held areas had retained their weapons and equipment, and were free to move about. This was not true." (*Ibid.*, para. 307.) About 20 minutes earlier two NATO aircraft had dropped two bombs on what were thought to be Serb vehicles advancing towards the town from the south. The Secretary-General's report gives the VRS reaction:

> "Immediately following this first deployment of NATO close air support, the BSA radioed a message to Dutchbat. They threatened

to shell the town and the compound where thousands of inhabitants had begun to gather, and to kill the Dutchbat soldiers being held hostage, if NATO continued with its use of air power. The Special Representative of the Secretary-General recalled having received a telephone call from the Netherlands Minister of Defence at this time, requesting that the close air support action be discontinued, because Serb soldiers on the scene were too close to Netherlands troops, and their safety would be jeopardized. The Special Representative considered that he had no choice but to comply with this request." (A/54/549, para. 306.)

286. The Trial Chamber in the *Blagojević* case recorded that on 11 July at 8 p.m. there was a meeting between a Dutch colonel and General Mladić and others. The former said that he had come to negotiate the withdrawal of the refugees and to ask for food and medicine for them. He sought assurances that the Bosnian Muslim population and Dutchbat would be allowed to withdraw from the area. General Mladić said that the civilian population was not the target of his actions and the goal of the meeting was to work out an arrangement. He then said "'you can all leave, all stay, or all die here' . . . 'we can work out an agreement for all this to stop and for the issues of the civilian population, your soldiers and the Muslim military to be resolved in a peaceful way'" (*Blagojević*, IT-02-60-T, Trial Chamber Judgment, 17 January 2005, paras. 150-152). Later that night at a meeting beginning at 11 p.m., attended by a representative of the Bosnian Muslim community, General Mladić said:

"'Number one, you need to lay down your weapons and I guarantee that all those who lay down their weapon will live. I give you my word, as a man and a General, that I will use my influence to help the innocent Muslim population which is not the target of the combat operations carried out by the VRS . . . In order to make a decision as a man and a Commander, I need to have a clear position of the representatives of your people on whether you want to survive . . . stay or vanish. I am prepared to receive here tomorrow at 10 a.m. hrs. a delegation of officials from the Muslim side with whom I can discuss the salvation of your people from . . . the former enclave of Srebrenica . . . Nesib [a Muslim representative], the future of your people is in your hands, not only in this territory . . . Bring the people who can secure the surrender of weapons and save your people from destruction.'

The Trial Chamber finds, based on General Mladić's comments, that he was unaware that the Bosnian Muslim men had left the Srebrenica enclave in the column.

General Mladić also stated that he would provide the vehicles to transport the Bosnian Muslims out of Potočari. The Bosnian

Muslim and Bosnian Serb sides were not on equal terms and Nesib Mandžić felt his presence was only required to put up a front for the international public. Nesib Mandžić felt intimidated by General Mladić. There was no indication that anything would happen the next day." (IT-02-60-T, paras. 156-158.)

287. A third meeting was held the next morning, 12 July. The Tribunal in the *Blagojević* case gives this account:

"After the Bosnian Muslim representatives had introduced themselves, General Mladić stated:

> 'I want to help you, but I want absolute co-operation from the civilian population because your army has been defeated. There is no need for your people to get killed, your husband, your brothers or your neighbours . . . As I told this gentleman last night, you can either survive or disappear. For your survival, I demand that all your armed men, even those who committed crimes, and many did, against our people, surrender their weapons to the VRS . . . You can choose to stay or you can choose to leave. If you wish to leave, you can go anywhere you like. When the weapons have been surrendered every individual will go where they say they want to go. The only thing is to provide the needed gasoline. You can pay for it if you have the means. If you can't pay for it, UNPROFOR should bring four or five tanker trucks to fill up trucks . . .'

Čamila Omanović [one of the Muslim representatives] interpreted this to mean that if the Bosnian Muslim population left they would be saved, but that if they stayed they would die. General Mladić did not give a clear answer in relation to whether a safe transport of the civilian population out of the enclave would be carried out. General Mladić stated that the male Bosnian Muslim population from the age of 16 to 65 would be screened for the presence of war criminals. He indicated that after this screening, the men would be returned to the enclave. This was the first time that the separation of men from the rest of the population was mentioned. The Bosnian Muslim representatives had the impression that 'everything had been prepared in advance, that there was a team of people working together in an organized manner' and that 'Mladić was the chief organizer.'

The third Hotel Fontana meeting ended with an agreement that the VRS would transport the Bosnian Muslim civilian population out of the enclave to ARBiH-held territory, with the assistance of UNPROFOR to ensure that the transportation was carried out in a humane manner." (*Ibid.*, paras. 160-161.)

The Court notes that the accounts of the statements made at the meetings come from transcripts of contemporary video recordings.

288. The VRS and MUP of the Republika Srpska from 12 July separated men aged 16 to approximately 60 or 70 from their families. The Bosnian Muslim men were directed to various locations but most were sent to a particular house ("The White House") near the UNPROFOR headquarters in Potočari, where they were interrogated. During the afternoon of 12 July a large number of buses and other vehicles arrived in Potočari including some from Serbia. Only women, children and the elderly were allowed to board the buses bound for territory held by the Bosnia and Herzegovina military. Dutchbat vehicles escorted convoys to begin with, but the VRS stopped that and soon after stole 16-18 Dutchbat jeeps, as well as around 100 small arms, making further escorts impossible. Many of the Bosnian Muslim men from Srebrenica and its surroundings including those who had attempted to flee through the woods were detained and killed.

289. Mention should also be made of the activities of certain paramilitary units, the "Red Berets" and the "Scorpions", who are alleged by the Applicant to have participated in the events in and around Srebrenica. The Court was presented with certain documents by the Applicant, which were said to show that the "Scorpions" were indeed sent to the Trnovo area near Srebrenica and remained there through the relevant time period. The Respondent cast some doubt on the authenticity of these documents (which were copies of intercepts, but not originals) without ever formally denying their authenticity. There was no denial of the fact of the relocation of the "Scorpions" to Trnovo. The Applicant during the oral proceedings presented video material showing the execution by paramilitaries of six Bosnian Muslims, in Trnovo, in July 1995.

290. The Trial Chambers in the *Krstić* and *Blagojević* cases both found that Bosnian Serb forces killed over 7,000 Bosnian Muslim men following the takeover of Srebrenica in July 1995 (*Krstić*, IT-98-33-T, Judgment, 2 August 2001, paras. 426-427 and *Blagojević*, IT-02-60-T, Judgment, 17 January 2005, para. 643). Accordingly they found that the *actus reus* of killings in Article II *(a)* of the Convention was satisfied. Both also found that actions of Bosnian Serb forces also satisfied the *actus reus* of causing serious bodily or mental harm, as defined in Article II *(b)* of the Convention — both to those who where about to be executed, and to the others who were separated from them in respect of their forced displacement and the loss suffered by survivors among them (*Krstić*, *ibid.*, para. 543, and *Blagojević*, *ibid.*, paras. 644-654).

291. The Court is fully persuaded that both killings within the terms of Article II *(a)* of the Convention, and acts causing serious bodily or men-

tal harm within the terms of Article II *(b)* thereof occurred during the Srebrenica massacre. Three further aspects of the ICTY decisions relating to Srebrenica require closer examination — the specific intent *(dolus specialis)*, the date by which the intent was formed, and the definition of the "group" in terms of Article II. A fourth issue which was not directly before the ICTY but which this Court must address is the involvement, if any, of the Respondent in the actions.

292. The issue of intent has been illuminated by the *Krstić* Trial Chamber. In its findings, it was convinced of the existence of intent by the evidence placed before it. Under the heading "A Plan to Execute the Bosnian Muslim Men of Srebrenica", the Chamber "finds that, following the takeover of Srebrenica in July 1995, the Bosnian Serbs devised and implemented a plan to execute as many as possible of the military aged Bosnian Muslim men present in the enclave" (IT-98-33-T, Judgment, 2 August 2001, para. 87). All the executions, the Chamber decided, "systematically targeted Bosnian Muslim men of military age, regardless of whether they were civilians or soldiers" (*ibid.*, para. 546). While "[t]he VRS may have initially considered only targeting military men for execution, . . . [the] evidence shows, however, that a decision was taken, at some point, to capture and kill all the Bosnian Muslim men indiscriminately. No effort was made to distinguish the soldiers from the civilians." (*Ibid.*, para. 547.) Under the heading "Intent to Destroy", the Chamber reviewed the Parties' submissions and the documents, concluding that it would "adhere to the characterization of genocide which encompass[es] only acts committed with the *goal* of destroying all or part of a group" (*ibid.*, para. 571; original emphasis). The acts of genocide need not be premeditated and the intent may become the goal later in an operation (*ibid.*, para. 572).

> "Evidence presented in this case has shown that the killings were planned: the number and nature of the forces involved, the standardized coded language used by the units in communicating information about the killings, the scale of the executions, the invariability of the killing methods applied, indicate that a decision was made to kill all the Bosnian Muslim military aged men.
>
> The Trial Chamber is unable to determine the precise date on which the decision to kill all the military aged men was taken. Hence, it cannot find that the killings committed in Potočari on 12 and 13 July 1995 formed part of the plan to kill all the military aged men. Nevertheless, the Trial Chamber is confident that the mass executions and other killings committed from 13 July onwards were part of this plan." (*Ibid.*, paras. 572-573; see also paras. 591-598.)

293. The Court has already quoted (paragraph 281) the passage from the Judgment of the Appeals Chamber in the *Krstić* case rejecting the Prosecutor's attempted reliance on the Directives given earlier in July, and it would recall the evidence about the VRS's change of plan in the course of the operation in relation to the complete takeover of the enclave. The Appeals Chamber also rejected the appeal by General Krstić against the finding that genocide occurred in Srebrenica. It held that the Trial Chamber was entitled to conclude that the destruction of such a sizeable number of men, one fifth of the overall Srebrenica community, "'would inevitably result in the physical disappearance of the Bosnian Muslim population at Srebrenica'" (IT-98-33-A, Appeals Chamber Judgment, 19 April 2004, paras. 28-33); and the Trial Chamber, as the best assessor of the evidence presented at trial, was entitled to conclude that the evidence of the transfer of the women and children supported its finding that some members of the VRS Main Staff intended to destroy the Bosnian Muslims in Srebrenica. The Appeals Chamber concluded this part of its Judgment as follows:

> "The gravity of genocide is reflected in the stringent requirements which must be satisfied before this conviction is imposed. These requirements — the demanding proof of specific intent and the showing that the group was targeted for destruction in its entirety or in substantial part — guard against a danger that convictions for this crime will be imposed lightly. Where these requirements are satisfied, however, the law must not shy away from referring to the crime committed by its proper name. By seeking to eliminate a part of the Bosnian Muslims, the Bosnian Serb forces committed genocide. They targeted for extinction the forty thousand Bosnian Muslims living in Srebrenica, a group which was emblematic of the Bosnian Muslims in general. They stripped all the male Muslim prisoners, military and civilian, elderly and young, of their personal belongings and identification, and deliberately and methodically killed them solely on the basis of their identity. The Bosnian Serb forces were aware, when they embarked on this genocidal venture, that the harm they caused would continue to plague the Bosnian Muslims. The Appeals Chamber states unequivocally that the law condemns, in appropriate terms, the deep and lasting injury inflicted, and calls the massacre at Srebrenica by its proper name: genocide. Those responsible will bear this stigma, and it will serve as a warning to those who may in future contemplate the commission of such a heinous act.
>
> In concluding that some members of the VRS Main Staff intended to destroy the Bosnian Muslims of Srebrenica, the Trial Chamber

did not depart from the legal requirements for genocide. The Defence appeal on this issue is dismissed." (*Ibid.*, paras. 37-38.)

294. On one view, taken by the Applicant, the *Blagojević* Trial Chamber decided that the specific intent *(dolus specialis)* was formed earlier than 12 or 13 July, the time chosen by the *Krstić* Chamber. The Court has already called attention to that Chamber's statement that at some point (it could not determine "the exact moment") the military objective in Srebrenica changed, from "reducing the enclave to the urban area" (stated in a Drina Corps order of 2 July 1995 referred to at times as the "Krivaja 95 operation") to taking over Srebrenica town and the enclave as a whole. Later in the Judgment, under the heading "Findings: was genocide committed?", the Chamber refers to the 2 July document:

> "The Trial Chamber is convinced that the criminal acts committed by the Bosnian Serb forces were all parts of one single scheme to commit genocide of the Bosnian Muslims of Srebrenica, as reflected in the 'Krivaja 95 operation', the ultimate objective of which was to eliminate the enclave and, therefore, the Bosnian Muslim community living there." (*Blagojević*, IT-02-60-T, Judgment, 17 January 2005, para. 674.)

The Chamber immediately goes on to refer only to the events — the massacres and the forcible transfer of the women and children — after the fall of Srebrenica, that is sometime after the change of military objective on 9 or 10 July. The conclusion on intent is similarly focused:

> "The Trial Chamber has no doubt that all these acts constituted a single operation executed with the intent to destroy the Bosnian Muslim population of Srebrenica. The Trial Chamber finds that the Bosnian Serb forces not only knew that the combination of the killings of the men with the forcible transfer of the women, children and elderly, would inevitably result in the physical disappearance of the Bosnian Muslim population of Srebrenica, but clearly intended through these acts to physically destroy this group." (*Ibid.*, para. 677.) (See similarly all but the first item in the list in paragraph 786.)

295. The Court's conclusion, fortified by the Judgments of the Trial Chambers in the *Krstić* and *Blagojević* cases, is that the necessary intent was not established until after the change in the military objective and after the takeover of Srebrenica, on about 12 or 13 July. This may be significant for the application of the obligations of the Respondent under

the Convention (paragraph 423 below). The Court has no reason to depart from the Tribunal's determination that the necessary specific intent *(dolus specialis)* was established and that it was not established until that time.

296. The Court now turns to the requirement of Article II that there must be the intent to destroy a protected "group" in whole or in part. It recalls its earlier statement of the law and in particular the three elements there discussed: substantiality (the primary requirement), relevant geographic factors and the associated opportunity available to the perpetrators, and emblematic or qualitative factors (paragraphs 197-201). Next, the Court recalls the assessment it made earlier in the Judgment of the persuasiveness of the ICTY's findings of facts and its evaluation of them (paragraph 223). Against that background it turns to the findings in the *Krstić* case (IT-98-33-T, Trial Chamber Judgment, 2 August 2001, paras. 551-599 and IT-98-33-A, Appeals Chamber Judgment, 19 April 2004, paras. 6-22), in which the Appeals Chamber endorsed the findings of the Trial Chamber in the following terms.

> "In this case, having identified the protected group as the national group of Bosnian Muslims, the Trial Chamber concluded that the part the VRS Main Staff and Radislav Krstić targeted was the Bosnian Muslims of Srebrenica, or the Bosnian Muslims of Eastern Bosnia. This conclusion comports with the guidelines outlined above. The size of the Bosnian Muslim population in Srebrenica prior to its capture by the VRS forces in 1995 amounted to approximately forty thousand people. This represented not only the Muslim inhabitants of the Srebrenica municipality but also many Muslim refugees from the surrounding region. Although this population constituted only a small percentage of the overall Muslim population of Bosnia and Herzegovina at the time, the importance of the Muslim community of Srebrenica is not captured solely by its size." (IT-98-33-A, Judgment, 19 April 2004, para. 15; footnotes omitted.)

The Court sees no reason to disagree with the concordant findings of the Trial Chamber and the Appeals Chamber.

297. The Court concludes that the acts committed at Srebrenica falling within Article II *(a)* and *(b)* of the Convention were committed with the specific intent to destroy in part the group of the Muslims of Bosnia and Herzegovina as such; and accordingly that these were acts of genocide, committed by members of the VRS in and around Srebrenica from about 13 July 1995.

* *

(6) Article II (b)*: Causing Serious Bodily or Mental Harm to Members of the Protected Group*

298. The Applicant contends that besides the massive killings, systematic serious harm was caused to the non-Serb population of Bosnia and Herzegovina. The Applicant includes the practice of terrorizing the non-Serb population, the infliction of pain and the administration of torture as well as the practice of systematic humiliation into this category of acts of genocide. Further, the Applicant puts a particular emphasis on the issue of systematic rapes of Muslim women, perpetrated as part of genocide against the Muslims in Bosnia during the conflict.

299. The Respondent does not dispute that, as a matter of legal qualification, the crime of rape may constitute an act of genocide, causing serious bodily or mental harm. It disputes, however, that the rapes in the territory of Bosnia and Herzegovina were part of a genocide perpetrated therein. The Respondent, relying on the Report of the Commission of Experts, maintains that the rapes and acts of sexual violence committed during the conflict, were not part of genocide, but were committed on all sides of the conflict, without any specific intent *(dolus specialis)*.

300. The Court notes that there is no dispute between the Parties that rapes and sexual violence could constitute acts of genocide, if accompanied by a specific intent to destroy the protected group. It notes also that the ICTR, in its Judgment of 2 September 1998 in the *Akayesu* case, addressed the issue of acts of rape and sexual violence as acts of genocide in the following terms:

> "Indeed, rape and sexual violence certainly constitute infliction of serious bodily and mental harm on the victims and are even, according to the Chamber, one of the worst ways of inflicting harm on the victim as he or she suffers both bodily and mental harm." (ICTR-96-4-T, Trial Chamber Judgment, 2 September 1998, para. 731.)

The ICTY, in its Judgment of 31 July 2003 in the *Stakić* case, recognized that:

> "'Causing serious bodily and mental harm' in subparagraph *(b)* [of Article 4 (2) of the Statute of the ICTY] is understood to mean, *inter alia*, acts of torture, inhumane or degrading treatment, sexual violence including rape, interrogations combined with beatings, threats of death, and harm that damages health or causes disfigurement or injury. The harm inflicted need not be permanent and irremediable." (IT-97-24-T, Trial Chamber Judgment, 31 July 2003, para. 516.)

301. The Court notes furthermore that Security Council and General Assembly resolutions contemporary with the facts are explicit in referring

to sexual violence. These resolutions were in turn based on reports before the General Assembly and the Security Council, such as the Reports of the Secretary-General, the Commission of Experts, the Special Rapporteur for Human Rights, Tadeusz Mazowiecki, and various United Nations agencies in the field. The General Assembly stressed the "extraordinary suffering of the victims of rape and sexual violence" (General Assembly resolution 48/143 (1993), Preamble; General Assembly resolution 50/192 (1995), para. 8). In resolution 48/143 (1993), the General Assembly declared it was:

> "*Appalled* at the recurring and substantiated reports of widespread rape and abuse of women and children in the areas of armed conflict in the former Yugoslavia, in particular its systematic use against the Muslim women and children in Bosnia and Herzegovina by Serbian forces" (Preamble, para. 4).

302. Several Security Council resolutions expressed alarm at the "massive, organised and systematic detention and rape of women", in particular Muslim women in Bosnia and Herzegovina (Security Council resolutions 798 (1992), Preamble, para. 2; resolution 820 (1993), para. 6; 827 (1993), Preamble, para. 3). In terms of other kinds of serious harm, Security Council resolution 1034 (1995) condemned

> "in the strongest possible terms the violations of international humanitarian law and of human rights by Bosnian Serb and paramilitary forces in the areas of Srebrenica, Žepa, Banja Luka and Sanski Most as described in the report of the Secretary-General of 27 November 1995 and showing a consistent pattern of summary executions, rape, mass expulsions, arbitrary detentions, forced labour and large-scale disappearances" (para. 2).

The Security Council further referred to a "persistent and systematic campaign of terror" in Banja Luka, Bijeljina and other areas under the control of Bosnian Serb forces (Security Council resolution 941 (1994), Preamble, para. 4). It also expressed concern at reports of mass murder, unlawful detention and forced labour, rape and deportation of civilians in Banja Luka and Sanski Most (Security Council resolution 1019 (1995), Preamble, para. 2).

303. The General Assembly also condemned specific violations including torture, beatings, rape, disappearances, destruction of houses, and other acts or threats of violence aimed at forcing individuals to leave their homes (General Assembly resolution 47/147 (1992), para. 4; see also General Assembly resolution 49/10 (1994), Preamble, para. 14, and General Assembly resolution 50/193 (1995), para. 2).

304. The Court will now examine the specific allegations of the Applicant under this heading, in relation to the various areas and camps identified as having been the scene of acts causing "bodily or mental harm" within the meaning of the Convention. As regards the events of Srebrenica, the Court has already found it to be established that such acts were committed (paragraph 291 above).

Drina River Valley

(a) *Zvornik*

305. As regards the area of the Drina River Valley, the Applicant has stressed the perpetration of acts and abuses causing serious bodily or mental harm in the events at Zvornik. In particular, the Court has been presented with a report on events at Zvornik which is based on eyewitness accounts and extensive research (Hannes Tretter *et al.*, "'Ethnic cleansing' Operations in the Northeast Bosnian-City of Zvornik from April through June 1992", Ludwig Boltzmann Institute of Human Rights (1994), p. 48). The report of the Ludwig Boltzmann Institute gives account of a policy of terrorization, forced relocation, torture, rape during the takeover of Zvornik in April-June 1992. The Report of the Commission of Experts received 35 reports of rape in the area of Zvornik in May 1992 (Vol. V, Ann. IX, p. 54).

(b) *Foča*

306. Further acts causing serious bodily and mental harm were perpetrated in the municipality of Foča. The Applicant, relying on the Judgment in the *Kunarac et al.* case (IT-96-23-T and IT-96-23/1-T, Trial Chamber Judgment, 22 February 2001, paras. 574 and 592), claims, in particular, that many women were raped repeatedly by Bosnian Serb soldiers or policemen in the city of Foča.

(c) *Camps*

(i) *Batković camp*

307. The Applicant further claims that in Batković camp, prisoners were frequently beaten and mistreated. The Report of the Commission of Experts gives an account of a witness statement according to which "prisoners were forced to perform sexual acts with each other, and sometimes with guards". The Report continues: "Reports of the frequency of beatings vary from daily beatings to beatings 10 times each day." (Report of the Commission of Experts, Vol. IV, Ann. VIII, p. 62, para. 469.) Individual witness accounts reported by the Commission of Experts (Report of the Commission of Experts, Vol. IV, Ann. VIII, pp. 62-63, and Ann. X, p. 9) provide second-hand testimony that beatings occurred and prisoners lived in terrible conditions. As already noted

above (paragraph 256), however, the periodic Report of Special Rapporteur Mazowiecki of 17 November 1992 stated that "[t]he prisoners . . . appeared to be in good health" (p. 13); but according to the Applicant, Mazowiecki was shown a "model" camp and therefore his impression was inaccurate. The United States Department of State Dispatch of 19 April 1993 (Vol. 4, No. 16), alleges that in Batković camp, prisoners were frequently beaten and mistreated. In particular, the Dispatch records two witness statements according to which "[o]n several occasions, they and other prisoners were forced to remove their clothes and perform sex acts on each other and on some guards".

(ii) *Sušica camp*

308. According to the Applicant, rapes and physical assaults were also perpetrated at Sušica camp; it pointed out that in the proceedings before the ICTY, in the "Rule 61 Review of the Indictment" and the Sentencing Judgment, in the *Nikolić* case, the accused admitted that many Muslim women were raped and subjected to degrading physical and verbal abuse in the camp and at locations outside of it (*Nikolić*, IT-94-2-T, Sentencing Judgment, 18 December 2003, paras. 87-90), and that several men were tortured in that same camp.

(iii) *Foča Kazneno-Popravní Dom camp*

309. With regard to the Foča Kazneno-Popravní Dom camp, the Applicant asserts that beatings, rapes of women and torture were perpetrated. The Applicant bases these allegations mainly on the Report of the Commission of Experts and the United States State Department Dispatch. The Commission of Experts based its findings on information provided by a Helsinki Watch Report. A witness claimed that some prisoners were beaten in Foča KP Dom (Report of the Commission of Experts, Vol. IV, pp. 128-132); similar accounts are contained in the United States State Department Dispatch. One witness stated that

> "Those running the center instilled fear in the Muslim prisoners by selecting certain prisoners for beatings. From his window in Room 13, the witness saw prisoners regularly being taken to a building where beatings were conducted. This building was close enough for him to hear the screams of those who were being beaten." (Dispatch of the United States Department of State, 19 April 1993, No. 16, p. 262.)

310. The ICTY Trial Chamber in its *Kunarac* Judgment of 22 February 2001, described the statements of several witnesses as to the poor and brutal living conditions in Foča KP Dom. These seem to confirm that the Muslim men and women from Foča, Gacko and Kalinovik municipalities were arrested, rounded up, separated from each other, and imprisoned or detained at several detention centres like the Foča KP

Dom where some of them were killed, raped or severely beaten (*Kunarac et al*, IT-96-23-T and IT-96-23/1-T, Trial Chamber Judgment, 22 February 2001).

Prijedor

(a) *Municipality*

311. Most of the allegations of abuses said by the Applicant to have occurred in Prijedor have been examined in the section of the present Judgment concerning the camps situated in Prijedor. However, the Report of the Commission of Experts refers to a family of nine found dead in Stara Rijeka in Prijedor, who had obviously been tortured (Vol. V, Ann. X, p. 41). The Trial Chamber of the ICTY, in its Judgment in the *Tadić* case made the following factual finding as to an attack on two villages in the Kozarac area, Jaskići and Sivci:

> "On 14 June 1992 both villages were attacked. In the morning the approaching sound of shots was heard by the inhabitants of Sivci and soon after Serb tanks and Serb soldiers entered the village . . . There they were made to run along that road, hands clasped behind their heads, to a collecting point in the yard of one of the houses. On the way there they were repeatedly made to stop, lie down on the road and be beaten and kicked by soldiers as they lay there, before being made to get up again and run some distance further, where the whole performance would be repeated . . . In all some 350 men, mainly Muslims but including a few Croats, were treated in this way in Sivci.
>
> On arrival at the collecting point, beaten and in many cases covered with blood, some men were called out and questioned about others, and were threatened and beaten again. Soon buses arrived, five in all, and the men were made to run to them, hands again behind the head, and to crowd on to them. They were then taken to the Keraterm camp.
>
> The experience of the inhabitants of the smaller village of Jaskići, which contained only 11 houses, on 14 June 1992 was somewhat similar but accompanied by the killing of villagers. Like Sivci, Jaskići had received refugees after the attack on Kozarac but by 14 June 1992 many of those refugees had left for other villages. In the afternoon of 14 June 1992 gunfire was heard and Serb soldiers arrived in Jaskići and ordered men out of their homes and onto the village street, their hands clasped behind their heads; there they were made to lie down and were severely beaten." (IT-94-1-T, Judgment, 7 May 1997, paras. 346-348.)

(b) *Camps*

(i) *Omarska camp*

312. As noted above in connection with the killings (paragraph 262), the Applicant has been able to present abundant and persuasive evidence of physical abuses causing serious bodily harm in Omarska camp. The Report of the Commission of Experts contains witness accounts regarding the "white house" used for physical abuses, rapes, torture and, occasionally, killings, and the "red house" used for killings (Vol. IV, Ann. VIII, pp. 207-222). Those accounts of the sadistic methods of killing are corroborated by United States submissions to the Secretary-General. The most persuasive and reliable source of evidence may be taken to be the factual part of the Opinion and Judgment of the ICTY in the *Tadić* case (IT-94-1-T, Trial Chamber Judgment, 7 May 1997). Relying on the statements of 30 witnesses, the *Tadić* Trial Judgment made findings as to interrogations, beatings, rapes, as well as the torture and humiliation of Muslim prisoners in Omarska camp (in particular: *ibid.*, paras. 155-158, 163-167). The Trial Chamber was satisfied beyond reasonable doubt of the fact that several victims were mistreated and beaten by Tadić and suffered permanent harm, and that he had compelled one prisoner to sexually mutilate another (*ibid.*, paras. 194-206). Findings of mistreatment, torture, rape and sexual violence at Omarska camp were also made by the ICTY in other cases; in particular, the Trial Judgment of 2 November 2001 in the *Kvočka et al.* case (IT-98-30/1-T, Trial Chamber Judgment, paras. 21-50, and 98-108) — upheld on appeal, the Trial Judgment of 1 September 2004 in the *Brđanin* case (IT-99-36-T, Trial Chamber Judgment, paras. 515-517) and the Trial Judgment of 31 July 2003 in the *Stakić* case (IT-97-24-T, Trial Chamber Judgment, paras. 229-336).

(ii) *Keraterm camp*

313. The Applicant also pointed to evidence of beatings and rapes at Keraterm camp. Several witness accounts are reported in the Report of the Commission of Experts (Vol. IV, Ann. VIII, pp. 225, 231, 233, 238) and corroborated by witness accounts reported by the Permanent Mission of Austria to the United Nations and Helsinki Watch. The attention of the Court has been drawn to several judgments of the ICTY which also document the severe physical abuses, rapes and sexual violence that occurred at this camp. The Trial Judgment of 1 September 2004 in the *Brđanin* case found that:

> "At Keraterm camp, detainees were beaten on arrival . . . Beatings were carried out with wooden clubs, baseball bats, electric cables and police batons . . .

In some cases the beatings were so severe as to result in serious injury and death. Beatings and humiliation were often administered in front of other detainees. Female detainees were raped in Keraterm camp." (IT-99-36-T, Trial Chamber Judgment, paras. 851-852.)

The Trial Chamber in its Judgment of 31 July 2003 in the *Stakić* case found that

> "the detainees at the Keraterm camp were subjected to terrible abuse. The evidence demonstrates that many of the detainees at the Keraterm camp were beaten on a daily basis. Up until the middle of July, most of the beatings happened at night. After the detainees from Brdo arrived, around 20 July 1992, there were 'no rules', with beatings committed both day and night. Guards and others who entered the camp, including some in military uniforms carried out the beatings. There were no beatings in the rooms since the guards did not enter the rooms — people were generally called out day and night for beatings." (IT-97-24-T, Trial Chamber Judgment, para. 237.)

The Chamber also found that there was convincing evidence of further beatings and rape perpetrated in Keraterm camp (*ibid.*, paras. 238-241).

In the Trial Judgment in the *Kvočka et al.* case, the Chamber held that, in addition to the "dreadful" general conditions of life, detainees at Keraterm camp were "mercilessly beaten" and "women were raped" (IT-98-30/1-T, Trial Chamber Judgment, 2 November 2001, para. 114).

(iii) *Trnopolje camp*

314. The Court has furthermore been presented with evidence that beatings and rapes occurred at Trnopolje camp. The rape of 30-40 prisoners on 6 June 1992 is reported by both the Report of the Commission of Experts (Vol. IV, Ann. VIII, pp. 251-253) and a publication of the United States State Department. In the *Tadić* case the Trial Chamber of the ICTY concluded that at Trnopolje camp beatings occurred and that "[b]ecause this camp housed the largest number of women and girls, there were more rapes at this camp than at any other" (IT-94-1-T, Judgment, 7 May 1997, paras. 172-177 (para. 175)). These findings concerning beatings and rapes are corroborated by other Judgments of the ICTY, such as the Trial Judgment in the *Stakić* case where it found that,

> "although the scale of the abuse at the Trnopolje camp was less than that in the Omarska camp, mistreatment was commonplace. The

> Serb soldiers used baseball bats, iron bars, rifle butts and their hands and feet or whatever they had at their disposal to beat the detainees. Individuals were who taken out for questioning would often return bruised or injured" (IT-97-24-T, Trial Chamber Judgment, 31 July 2003, para. 242);

and that, having heard the witness statement of a victim, it was satisfied beyond reasonable doubt "that rapes did occur in the Trnopolje camp" (*ibid.*, para. 244). Similar conclusions were drawn in the Judgment of the Trial Chamber in the *Brđanin* case (IT-99-36-T, 1 September 2004, paras. 513-514 and 854-857).

Banja Luka

Manjača camp

315. With regard to the Manjača camp in Banja Luka, the Applicant alleges that beatings, torture and rapes were occurring at this camp. The Applicant relies mainly on the witnesses cited in the Report of the Commission of Experts (Vol. IV, Ann. VIII, pp. 50-54). This evidence is corroborated by the testimony of a former prisoner at the Joint Hearing before the Select Committee on Intelligence in the United States Senate on 9 August 1995, and a witness account reported in the Memorial of the Applicant (United States State Department Dispatch, 2 November 1992, p. 806). The Trial Chamber, in its Decision on Motion for Judgment of Acquittal of 16 June 2004, in the *Milošević* case reproduced the statement of a witness who testified that,

> "at the Manjaca camp, they were beaten with clubs, cables, bats, or other similar items by the military police. The men were placed in small, bare stables, which were overcrowded and contained no toilet facilities. While at the camp, the detainees received inadequate food and water. Their heads were shaved, and they were severely beaten during interrogations." (IT-02-54-T, Decision on Motion for Judgment of Acquittal, 16 June 2004, para. 178.)

316. The Applicant refers to the Report of the Commission of Experts, which contains reports that the Manjača camp held a limited number of women and that during their stay they were "raped repeatedly". Muslim male prisoners were also forced to rape female prisoners (Report of the Commission of Experts, Vol. IV, Annex VIII, pp. 53-54). The Respondent points out that the *Brđanin* Trial Judgment found no evidence had been presented that detainees were subjected to "acts of sexual degradation" in Manjača.

Brčko

Luka camp

317. The Applicant alleges that torture, rape and beatings occurred at Luka camp (Brčko). The Report of the Commission of Experts contains multiple witness accounts, including the evidence of a local guard forced into committing rape (Vol. IV, Ann. VIII, pp. 93-97). The account of the rapes is corroborated by multiple sources (United States State Department Dispatch, 19 April 1993). The Court notes in particular the findings of the ICTY Trial Chamber in the *Češić* case, with regard to acts perpetrated in the Luka camp. In his plea agreement the accused admitted several grave incidents, such as beatings and compelling two Muslim brothers to perform sexual acts with each other (IT-95-10/1-S, Sentencing Judgment, 11 March 2004, paras. 8-17). These findings are corroborated by witness statements and the guilty plea in the *Jelisić* case.

318. The Respondent does not deny that the camps in Bosnia and Herzegovina were "in breach of humanitarian law and, in most cases, in breach of the law of war", but argues that the conditions in all the camps were not of the kind described by the Applicant. It stated that all that had been demonstrated was "the existence of serious crimes, committed in a particularly complex situation, in a civil and fratricidal war", but not the requisite specific intent *(dolus specialis)*.

*

319. Having carefully examined the evidence presented before it, and taken note of that presented to the ICTY, the Court considers that it has been established by fully conclusive evidence that members of the protected group were systematically victims of massive mistreatment, beatings, rape and torture causing serious bodily and mental harm, during the conflict and, in particular, in the detention camps. The requirements of the material element, as defined by Article II *(b)* of the Convention are thus fulfilled. The Court finds, however, on the basis of the evidence before it, that it has not been conclusively established that those atrocities, although they too may amount to war crimes and crimes against humanity, were committed with the specific intent *(dolus specialis)* to destroy the protected group, in whole or in part, required for a finding that genocide has been perpetrated.

* *

(7) Article II (c)*: Deliberately Inflicting on the Group Conditions of Life Calculated to Bring about Its Physical Destruction in Whole or in Part*

320. Article II *(c)* of the Genocide Convention concerns the deliberate infliction on the group of conditions of life calculated to bring about its physical destruction in whole or in part. Under this heading, the Applicant first points to an alleged policy by the Bosnian Serb forces to encircle civilians of the protected group in villages, towns or entire regions and to subsequently shell those areas and cut off all supplies in order to starve the population. Secondly, the Applicant claims that Bosnian Serb forces attempted to deport and expel the protected group from the areas which those forces occupied. Finally, the Applicant alleges that Bosnian Serb forces attempted to eradicate all traces of the culture of the protected group through the destruction of historical, religious and cultural property.

321. The Respondent argues that the events referred to by the Applicant took place in a context of war which affected the entire population, whatever its origin. In its view, "it is obvious that in any armed conflict the conditions of life of the civilian population deteriorate". The Respondent considers that, taking into account the civil war in Bosnia and Herzegovina which generated inhuman conditions of life for the entire population in the territory of that State, "it is impossible to speak of the deliberate infliction on the Muslim group alone or the non-Serb group alone of conditions of life calculated to bring about its destruction".

322. The Court will examine in turn the evidence concerning the three sets of claims made by the Applicant: encirclement, shelling and starvation; deportation and expulsion; destruction of historical, religious and cultural property. It will also go on to consider the evidence presented regarding the conditions of life in the detention camps already extensively referred to above (paragraphs 252-256, 262-273, 307-310 and 312-318).

Alleged encirclement, shelling and starvation

323. The principal incident referred to by the Applicant in this regard is the siege of Sarajevo by Bosnian Serb forces. Armed conflict broke out in Sarajevo at the beginning of April 1992 following the recognition by the European Community of Bosnia and Herzegovina as an independent State. The Commission of Experts estimated that, between the beginning of April 1992 and 28 February 1994, in addition to those killed or missing in the city (paragraph 247 above), 56,000 persons had been wounded (Report of the Commission of Experts, Vol. II, Ann. VI, p. 8). It was further estimated that, "over the course of the siege, the city [was] hit by an average of approximately 329 shell impacts per day, with a high of 3,777 shell impacts on 22 July 1993" *(ibid.)*. In his report of 28 August 1992, the Special Rapporteur observed that:

> "The city is shelled on a regular basis . . . Snipers shoot innocent civilians . . .
> The civilian population lives in a constant state of anxiety, leaving their homes or shelters only when necessary . . . The public systems for distribution of electrical power and water no longer function. Food and other basic necessities are scarce, and depend on the airlift organized by UNHCR and protected by UNPROFOR." (Report of 28 August 1992, paras. 17-18.)

324. The Court notes that, in resolutions adopted on 16 April and 6 May 1993, the Security Council declared Sarajevo, together with Tuzla, Žepa, Goražde, Bihać and Srebrenica, to be "safe areas" which should be free from any armed attack or any other hostile act and fully accessible to UNPROFOR and international humanitarian agencies (resolutions 819 of 16 April 1993 and 824 of 6 May 1993). However, these resolutions were not adhered to by the parties to the conflict. In his report of 26 August 1993, the Special Rapporteur noted that

> "Since May 1993 supplies of electricity, water and gas to Sarajevo have all but stopped . . . a significant proportion of the damage caused to the supply lines has been deliberate, according to United Nations Protection Force engineers who have attempted to repair them. Repair crews have been shot at by both Bosnian Serb and government forces . . ." (Report of 26 August 1993, para. 6.)

He further found that UNHCR food and fuel convoys had been "obstructed or attacked by Bosnian Serb and Bosnian Croat forces and sometimes also by governmental forces" (Report of 26 August 1993, para. 15). The Commission of Experts also found that the "blockade of humanitarian aid ha[d] been used as an important tool in the siege" (Report of the Commission of Experts, Ann. VI, p. 17). According to the Special Rapporteur, the targeting of the civilian population by shelling and sniping continued and even intensified throughout 1994 and 1995 (Report of 4 November 1994, paras. 27-28; Report of 16 January 1995, para. 13; Report of 5 July 1995, paras. 67-70). The Special Rapporteur noted that

> "[a]ll sides are guilty of the use of military force against civilian populations and relief operations in Sarajevo. However, one cannot lose sight of the fact that the main responsibility lies with the [Bosnian Serb] forces, since it is they who have adopted the tactic of laying siege to the city." (Report of 17 November 1992, para. 42.)

325. The Court notes that in the *Galić* case, the Trial Chamber of the ICTY found that the Serb forces (the SRK) conducted a campaign of sniping and shelling against the civilian population of Sarajevo (*Galić*, IT-98-29-T, Judgment, 5 December 2003, para. 583). It was

> "convinced by the evidence in the Trial Record that civilians in ARBiH-held areas of Sarajevo were directly or indiscriminately attacked from SRK-controlled territory . . ., and that as a result and as a minimum, hundreds of civilians were killed and thousands others were injured" (*ibid.*, para. 591).

These findings were subsequently confirmed by the Appeals Chamber (*Galić*, IT-98-29-A, Judgment, 30 November 2006, paras. 107-109). The ICTY also found that the shelling which hit the Markale market on 5 February 1994, resulting in 60 persons killed and over 140 injured, came from behind Bosnian Serb lines, and was deliberately aimed at civilians (*ibid.*, paras. 333 and 335 and *Galić*, IT-98-29-T, Trial Chamber Judgment, 5 December 2003, para. 496).

326. The Respondent argues that the safe areas proclaimed by the Security Council had not been completely disarmed by the Bosnian army. For instance, according to testimony given in the *Galić* case by the Deputy Commander of the Bosnian army corps covering the Sarajevo area, the Bosnian army had deployed 45,000 troops within Sarajevo. The Respondent also pointed to further testimony in that case to the effect that certain troops in the Bosnian army were wearing civilian clothes and that the Bosnian army was using civilian buildings for its bases and positioning its tanks and artillery in public places. Moreover, the Respondent observes that, in his book, *Fighting for Peace*, General Rose was of the view that military equipment was installed in the vicinity of civilians, for instance, in the grounds of the hospital in Sarajevo and that "[t]he Bosnians had evidently chosen this location with the intention of attracting Serb fire, in the hope that the resulting carnage would further tilt international support in their favour" (Michael Rose, *Fighting for Peace*, 1998, p. 254).

327. The Applicant also points to evidence of sieges of other towns in Bosnia and Herzegovina. For instance, with regard to Goražde, the Special Rapporteur found that the enclave was being shelled and had been denied convoys of humanitarian aid for two months. Although food was being air-dropped, it was insufficient (Report of 5 May 1992, para. 42). In a later report, the Special Rapporteur noted that, as of spring 1994, the town had been subject to a military offensive by Bosnian Serb forces, during which civilian objects including the hospital had been targeted and the water supply had been cut off (Report of 10 June 1994, paras. 7-12). Humanitarian convoys were harassed including by the detention of UNPROFOR personnel and the theft of equipment (Report of

19 May 1994, paras. 17 *et seq.*). Similar patterns occurred in Bihać, Tuzla, Cerska and Maglaj (Bihać: Special Rapporteur's Report of 28 August 1992, para. 20; Report of the Secretary-General pursuant to resolution 959 (1994), para. 17; Special Rapporteur's Report of 16 January 1995, para. 12; Tuzla: Report of the Secretary-General pursuant to resolutions 844 (1993), 836 (1993) and 776 (1992), paras. 2-4; Special Rapporteur's Report of 5 July 1995; Cerska: Special Rapporteur's Report of 5 May 1993, paras. 8-17; Maglaj: Special Rapporteur's Report of 17 November 1993, para. 93).

328. The Court finds that virtually all the incidents recounted by the Applicant have been established by the available evidence. It takes account of the assertion that the Bosnian army may have provoked attacks on civilian areas by Bosnian Serb forces, but does not consider that this, even if true, can provide any justification for attacks on civilian areas. On the basis of a careful examination of the evidence presented by the Parties, the Court concludes that civilian members of the protected group were deliberately targeted by Serb forces in Sarajevo and other cities. However, reserving the question whether such acts are in principle capable of falling within the scope of Article II, paragraph *(c)*, of the Convention, the Court does not find sufficient evidence that the alleged acts were committed with the specific intent to destroy the protected group in whole or in part. For instance, in the *Galić* case, the ICTY found that

> "the attacks on civilians were numerous, but were not consistently so intense as to suggest an attempt by the SRK to wipe out or even deplete the civilian population through attrition . . . the only reasonable conclusion in light of the evidence in the Trial Record is that the primary purpose of the campaign was to instil in the civilian population a state of extreme fear" (*Galić*, IT-98-29-T, Trial Chamber Judgment, 5 December 2003, para. 593).

These findings were not overruled by the judgment of the Appeals Chamber of 30 November 2006 (*Galić*, IT-98-29-A, Judgment: see e.g., paras. 107-109, 335 and 386-390). The Special Rapporteur of the United Nations Commission on Human Rights was of the view that "[t]he siege, including the shelling of population centres and the cutting off of supplies of food and other essential goods, is another tactic used to force Muslims and ethnic Croatians to flee" (Report of 28 August 1992, para. 17). The Court thus finds that it has not been conclusively established that the acts were committed with the specific intent *(dolus specialis)* to destroy the protected group in whole or in part.

Deportation and expulsion

329. The Applicant claims that deportations and expulsions occurred systematically all over Bosnia and Herzegovina. With regard to Banja Luka, the Special Rapporteur noted that since late November 1993, there had been a "sharp rise in repossessions of apartments, whereby Muslim and Croat tenants [were] summarily evicted" and that "a form of housing agency ha[d] been established . . . which chooses accommodation for incoming Serb displaced persons, evicts Muslim or Croat residents and reputedly receives payment for its services in the form of possessions left behind by those who have been evicted" (Report of 21 February 1994, para. 8). In a report dated 21 April 1995 dedicated to the situation in Banja Luka, the Special Rapporteur observed that since the beginning of the war, there had been a 90 per cent reduction in the local Muslim population (Report of 21 April 1995, para. 4). He noted that a forced labour obligation imposed by the *de facto* authorities in Banja Luka, as well as "the virulence of the ongoing campaign of violence" had resulted in "practically all non-Serbs fervently wishing to leave the Banja Luka area" (Report of 21 April 1995, para. 24). Those leaving Banja Luka were required to pay fees and to relinquish in writing their claim to their homes, without reimbursement (Report of 21 April 1995, para. 26). The displacements were "often very well organized, involving the bussing of people to the Croatian border, and involve[d] large numbers of people" (Report of 4 November 1994, para. 23). According to the Special Rapporteur, "[o]n one day alone in mid-June 1994, some 460 Muslims and Croats were displaced" *(ibid.)*.

330. As regards Bijeljina, the Special Rapporteur observed that, between mid-June and 17 September 1994, some 4,700 non-Serbs were displaced from the Bijeljina and Janja regions. He noted that many of the displaced, "whether forced or choosing to depart, were subject to harassment and theft by the Bosnian Serb forces orchestrating the displacement" (Report of 4 November 1994, para. 21). These reports were confirmed by those of non-governmental organizations based on witness statements taken on the ground (Amnesty International, "Bosnia and Herzegovina: Living for the Day — Forced expulsions from Bijeljina and Janja", December 1994, p. 2).

331. As for Zvornik, the Commission of Experts, relying on a study carried out by the Ludwig Boltzmann Institute of Human Rights based on an evaluation of 500 interviews of individuals who had fled the area, found that a systematic campaign of forced deportation had occurred (Report of the Commission of Experts, Vol. I, Ann. IV, pp. 55 *et seq*). The study observed that Bosnian Muslims obtained an official stamp on their identity card indicating a change of domicile in exchange for transferring their property to an "agency for the exchange of houses" which was subsequently a prerequisite for being able to leave the town (Lud-

wig Boltzmann Institute of Human Rights, "'Ethnic Cleansing Operations' in the northeast Bosnian city of Zvornik from April through June 1992", pp. 28-29). According to the study, forced deportations of Bosnian Muslims began in May/June 1992 by bus to Mali Zvornik and from there to the Bosnian town of Tuzla or to Subotica on the Serbian-Hungarian border (*ibid.*, pp. 28 and 35-36). The Special Rapporteur's report of 10 February 1993 supports this account, stating that deportees from Zvornik had been "ordered, some at gunpoint, to board buses and trucks and later trains", provided with Yugoslav passports and subsequently taken to the Hungarian border to be admitted as refugees (Report of 10 February 1993, para. 99).

332. According to the Trial Chamber of the ICTY in its review of the indictment in the cases against *Karadžić and Mladić*, "[t]housands of civilians were unlawfully expelled or deported to other places inside and outside the Republic of Bosnia and Herzegovina" and "[t]he result of these expulsions was the partial or total elimination of Muslims and Bosnian Croats in some of [the] Bosnian Serb-held regions of Bosnia and Herzegovina". The Chamber further stated that "[i]n the municipalities of Prijedor, Foča, Vlasenica, Brčko and Bosanski Šamac, to name but a few, the once non-Serbian majority was systematically exterminated or expelled by force or intimidation" (*Karadžić and Mladić*, IT-95-5-R61 and IT-95-18-R61, Review of the Indictment pursuant to Rule 61 of the Rules of Procedure and Evidence, 11 July 1996, para. 16).

333. The Respondent argues that displacements of populations may be necessary according to the obligations set down in Articles 17 and 49, paragraph 2, of the Geneva Convention relative to the Protection of Civilian Persons in Time of War, for instance if the security of the population or imperative military reasons so demand. It adds that the displacement of populations has always been a way of settling certain conflicts between opposing parties and points to a number of examples of forced population displacements in history following an armed conflict. The Respondent also argues that the mere expulsion of a group cannot be characterized as genocide, but that, according to the ICTY Judgment in the *Stakić* case, "[a] clear distinction must be drawn between physical destruction and mere dissolution of a group" and "[t]he expulsion of a group or part of a group does not in itself suffice for genocide" (*Stakić*, IT-97-24-T, Trial Chamber Judgment, 31 July 2003, para. 519).

334. The Court considers that there is persuasive and conclusive evidence that deportations and expulsions of members of the protected group occurred in Bosnia and Herzegovina. With regard to the Respondent's argument that in time of war such deportations or expulsions may be justified under the Geneva Convention, or may be a normal way of settling a conflict, the Court would observe that no such justification

could be accepted in the face of proof of specific intent *(dolus specialis)*. However, even assuming that deportations and expulsions may be categorized as falling within Article II, paragraph *(c)*, of the Genocide Convention, the Court cannot find, on the basis of the evidence presented to it, that it is conclusively established that such deportations and expulsions were accompanied by the intent to destroy the protected group in whole or in part (see paragraph 190 above).

Destruction of historical, religious and cultural property

335. The Applicant claims that throughout the conflict in Bosnia and Herzegovina, Serb forces engaged in the deliberate destruction of historical, religious and cultural property of the protected group in "an attempt to wipe out the traces of their very existence".

336. In the *Tadić* case, the ICTY found that "[n]on-Serb cultural and religious symbols throughout the region were targeted for destruction" in the Banja Luka area (*Tadić*, IT-94-1-T, Trial Chamber Judgment, 7 May 1997, para. 149). Further, in reviewing the indictments of Karadžić and Mladić, the Trial Chamber stated that:

> "Throughout the territory of Bosnia and Herzegovina under their control, Bosnian Serb forces . . . destroyed, quasi-systematically, the Muslim and Catholic cultural heritage, in particular, sacred sites. According to estimates provided at the hearing by an expert witness, Dr. Kaiser, a total of 1.123 mosques, 504 Catholic churches and five synagogues were destroyed or damaged, for the most part, in the absence of military activity or after the cessation thereof.
>
> This was the case in the destruction of the entire Islamic and Catholic heritage in the Banja Luka area, which had a Serbian majority and the nearest area of combat to which was several dozen kilometres away. All of the mosques and Catholic churches were destroyed. Some mosques were destroyed with explosives and the ruins were then levelled and the rubble thrown in the public dumps in order to eliminate any vestige of Muslim presence.
>
> Aside from churches and mosques, other religious and cultural symbols like cemeteries and monasteries were targets of the attacks." (*Karadžić and Mladić*, Review of the Indictment Pursuant to Rule 61 of the Rules of Procedure and Evidence, 11 July 1996, para. 15.)

In the *Brđanin* case, the Trial Chamber was "satisfied beyond reasonable doubt that there was wilful damage done to both Muslim and Roman Catholic religious buildings and institutions in the relevant municipalities by Bosnian Serb forces" (*Brđanin*, IT-99-36-T, Judgment, 1 September 2004, paras. 640 and 658). On the basis of the findings regarding a number of incidents in various regions of Bosnia and Herzegovina, the

Trial Chamber concluded that a "campaign of devastation of institutions dedicated to religion took place throughout the conflict" but "intensified in the summer of 1992" and that this concentrated period of significant damage was "indicative that the devastation was targeted, controlled and deliberate" (*Brđanin*, IT-99-36-T, paras. 642-657). For instance, the Trial Chamber found that the Bosanska Krupa town mosque was mined by Bosnian Serb forces in April 1992, that two mosques in Bosanski Petrovac were destroyed by Bosnian Serb forces in July 1992 and that the mosques in Staro Šipovo, Bešnjevo and Pljeva were destroyed on 7 August 1992 (*ibid.*, paras. 644, 647 and 656).

337. The Commission of Experts also found that religious monuments especially mosques and churches had been destroyed by Bosnian Serb forces (Report of the Commission of Experts, Vol. I, Ann. IV, pp. 5, 9, 21 ff.). In its report on the Prijedor region, the Commission found that at least five mosques and associated buildings in Prijedor town had been destroyed and noted that it was claimed that all 16 mosques in the Kozarac area had been destroyed and that not a single mosque, or other Muslim religious building, remained intact in the Prijedor region (Report of the Commission of Experts, Vol. I, Ann. V, p. 106). The report noted that those buildings were "allegedly not desecrated, damaged and destroyed for any military purpose nor as a side-effect of the military operations as such" but rather that the destruction "was due to later separate operations of dynamiting" *(ibid.)*.

338. The Special Rapporteur found that, during the conflict, "many mosques, churches and other religious sites, including cemeteries and monasteries, have been destroyed or profaned" (Report of 17 November 1992, para. 26). He singled out the "systematic destruction and profanation of mosques and Catholic churches in areas currently or previously under [Bosnian Serb] control" (Report of 17 November 1992, para. 26).

339. Bosnia and Herzegovina called as an expert Mr. András Riedlmayer, who had carried out a field survey on the destruction of cultural heritage in 19 municipalities in Bosnia and Herzegovina for the Prosecutor of the ICTY in the *Milošević* case and had subsequently studied seven further municipalities in two other cases before the ICTY ("Destruction of Cultural Heritage in Bosnia and Herzegovina, 1992-1996: A Post-war Survey of Selected Municipalities", *Milošević*, IT-02-54-T, Exhibit Number P486). In his report prepared for the *Milošević* case, Mr. Riedlmayer documented 392 sites, 60 per cent of which were inspected first hand while for the other 40 per cent his assessment was based on photographs and information obtained from other sources judged to be reliable and where there was corroborating documentation (Riedlmayer Report, p. 5).

340. The report compiled by Mr. Riedlmayer found that of the 277 mosques surveyed, none were undamaged and 136 were almost or entirely destroyed (Riedlmayer Report, pp. 9-10). The report found that:

> "The damage to these monuments was clearly the result of attacks directed against them, rather than incidental to the fighting. Evidence of this includes signs of blast damage indicating explosives placed inside the mosques or inside the stairwells of minarets; many mosques [were] burnt out. In a number of towns, including Bijeljina, Janja (Bijeljina municipality), Foča, Banja Luka, Sanski Most, Zvornik and others, the destruction of mosques took place while the area was under the control of Serb forces, at times when there was no military action in the immediate vicinity." (*Ibid.*, p. 11.)

The report also found that, following the destruction of mosques:

> "the ruins [of the mosques] were razed and the sites levelled with heavy equipment, and all building materials were removed from the site . . . Particularly well-documented instances of this practice include the destruction and razing of 5 mosques in the town of Bijeljina; of 2 mosques in the town of Janja (in Bijeljina municipality); of 12 mosques and 4 turbes in Banja Luka; and of 3 mosques in the city of Brčko." (*Ibid.*, p. 12.)

Finally, the Report noted that the sites of razed mosques had been "turned into rubbish tips, bus stations, parking lots, automobile repair shops, or flea markets" (*ibid.*, p. 14), for example, a block of flats and shops had been erected on the site of the Zamlaz Mosque in Zvornik and a new Serbian Orthodox church was built on the site of the destroyed Divic Mosque (*ibid.*, p. 14).

341. Mr. Riedlmayer's report together with his testimony before the Court and other corroborative sources detail the destruction of the cultural and religious heritage of the protected group in numerous locations in Bosnia and Herzegovina. For instance, according to the evidence before the Court, 12 of the 14 mosques in Mostar were destroyed or damaged and there are indications from the targeting of the minaret that the destruction or damage was deliberate (Council of Europe, *Information Report: The Destruction by War of the Cultural Heritage in Croatia and Bosnia-Herzegovina*, Parliamentary Assembly doc. 6756, 2 February 1993, paras. 129 and 155). In Foča, the town's 14 historic mosques were allegedly destroyed by Serb forces. In Banja Luka, all 16 mosques were destroyed by Serb forces including the city's two largest mosques,

the Ferhadija Mosque (built in 1578) and the Arnaudija Mosque (built in 1587) (United States Department of State, Bureau of Public Affairs, *Dispatch*, 26 July 1993, Vol. 4, No. 30, pp. 547-548; "War Crimes in Bosnia-Herzegovina: UN Cease-Fire Won't Help Banja Luka", Human Rights Watch/Helsinki Watch, June 1994, Vol. 6, No. 8, pp. 15-16; The Humanitarian Law Centre, Spotlight Report, No. 14, August 1994, pp. 143-144).

342. The Court notes that archives and libraries were also subjected to attacks during the war in Bosnia and Herzegovina. On 17 May 1992, the Institute for Oriental Studies in Sarajevo was bombarded with incendiary munitions and burnt, resulting in the loss of 200,000 documents including a collection of over 5,000 Islamic manuscripts (Riedlmayer Report, p. 18; Council of Europe, Parliamentary Assembly; Second Information Report on War Damage to the Cultural Heritage in Croatia and Bosnia-Herzegovina, doc. 6869, 17 June 1993, p. 11, Ann. 38). On 25 August 1992, Bosnia's National Library was bombarded and an estimated 1.5 million volumes were destroyed (Riedlmayer Report, p. 19). The Court observes that, although the Respondent considers that there is no certainty as to who shelled these institutions, there is evidence that both the Institute for Oriental Studies in Sarajevo and the National Library were bombarded from Serb positions.

343. The Court notes that, in cross-examination of Mr. Riedlmayer, counsel for the Respondent pointed out that the municipalities included in Mr. Riedlmayer's report only amounted to 25 per cent of the territory of Bosnia and Herzegovina. Counsel for the Respondent also called into question the methodology used by Mr. Riedlmayer in compiling his report. However, having closely examined Mr. Riedlmayer's report and having listened to his testimony, the Court considers that Mr. Riedlmayer's findings do constitute persuasive evidence as to the destruction of historical, cultural and religious heritage in Bosnia and Herzegovina albeit in a limited geographical area.

344. In light of the foregoing, the Court considers that there is conclusive evidence of the deliberate destruction of the historical, cultural and religious heritage of the protected group during the period in question. The Court takes note of the submission of the Applicant that the destruction of such heritage was "an essential part of the policy of ethnic purification" and was "an attempt to wipe out the traces of [the] very existence" of the Bosnian Muslims. However, in the Court's view, the destruction of historical, cultural and religious heritage cannot be considered to constitute the deliberate infliction of conditions of life calculated to bring about the physical destruction of the group. Although such destruction may be highly significant inasmuch as it is directed to the elimination of all traces of the cultural or religious presence of a group,

and contrary to other legal norms, it does not fall within the categories of acts of genocide set out in Article II of the Convention. In this regard, the Court observes that, during its consideration of the draft text of the Convention, the Sixth Committee of the General Assembly decided not to include cultural genocide in the list of punishable acts. Moreover, the ILC subsequently confirmed this approach, stating that:

> "As clearly shown by the preparatory work for the Convention . . ., the destruction in question is the material destruction of a group either by physical or by biological means, not the destruction of the national, linguistic, religious, cultural or other identity of a particular group." (Report of the International Law Commission on the work of its Forty-eighth Session, *Yearbook of the International Law Commission 1996*, Vol. II, Part Two, pp. 45-46, para. 12.)

Furthermore, the ICTY took a similar view in the *Krstić* case, finding that even in customary law, "despite recent developments", the definition of acts of genocide is limited to those seeking the physical or biological destruction of a group (*Krstić*, IT-98-33-T, Trial Chamber Judgment, 2 August 2001, para. 580). The Court concludes that the destruction of historical, religious and cultural heritage cannot be considered to be a genocidal act within the meaning of Article II of the Genocide Convention. At the same time, it also endorses the observation made in the *Krstić* case that "where there is physical or biological destruction there are often simultaneous attacks on the cultural and religious property and symbols of the targeted group as well, attacks which may legitimately be considered as evidence of an intent to physically destroy the group" *(ibid.)*.

Camps

345. The Court notes that the Applicant has presented substantial evidence as to the conditions of life in the detention camps and much of this evidence has already been discussed in the sections regarding Articles II *(a)* and *(b)*. The Court will briefly examine the evidence presented by the Applicant which relates specifically to the conditions of life in the principal camps.

(a) *Drina River Valley*

(i) *Sušica camp*

346. In the Sentencing Judgment in the case of Dragan Nikolić, the Commander of Sušica camp, the ICTY found that he subjected detainees to inhumane living conditions by depriving them of adequate food, water, medical care, sleeping and toilet facilities (*Nikolić*, IT-94-2-S, Sentencing Judgment, 18 December 2003, para. 69).

(ii) *Foča Kazneno-Popravní Dom camp*

347. In the *Krnojelac* case, the ICTY Trial Chamber made the following findings regarding the conditions at the camp:

> "the non-Serb detainees were forced to endure brutal and inadequate living conditions while being detained at the KP Dom, as a result of which numerous individuals have suffered lasting physical and psychological problems. Non-Serbs were locked in their rooms or in solitary confinement at all times except for meals and work duty, and kept in overcrowded rooms even though the prison had not reached its capacity. Because of the overcrowding, not everyone had a bed or even a mattress, and there were insufficient blankets. Hygienic conditions were poor. Access to baths or showers, with no hot water, was irregular at best. There were insufficient hygienic products and toiletries. The rooms in which the non-Serbs were held did not have sufficient heating during the harsh winter of 1992. Heaters were deliberately not placed in the rooms, windowpanes were left broken and clothes made from blankets to combat the cold were confiscated. Non-Serb detainees were fed starvation rations leading to severe weight loss and other health problems. They were not allowed to receive visits after April 1992 and therefore could not supplement their meagre food rations and hygienic supplies". (*Krnojelac*, IT-97-25-T, Judgment, 15 March 2002, para. 440.)

(b) *Prijedor*

(i) *Omarska camp*

348. In the Trial Judgment in the *Kvočka et al.* case, the ICTY Trial Chamber provided the following description of the poor conditions in the Omarska camp based on the accounts of detainees:

> "Detainees were kept in inhuman conditions and an atmosphere of extreme mental and physical violence pervaded the camp. Intimidation, extortion, beatings, and torture were customary practices. The arrival of new detainees, interrogations, mealtimes, and use of the toilet facilities provided recurrent opportunities for abuse. Outsiders entered the camp and were permitted to attack the detainees at random and at will . . .
>
> . . . .
>
> The Trial Chamber finds that the detainees received poor quality food that was often rotten or inedible, caused by the high temperatures and sporadic electricity during the summer of 1992. The food

was sorely inadequate in quantity. Former detainees testified of the acute hunger they suffered in the camp: most lost 25 to 35 kilograms in body weight during their time at Omarska; some lost considerably more." (*Kvočka et al.*, IT-98-30/1-T, Trial Chamber Judgment, 2 November 2001, paras. 45 and 55.)

(ii) *Keraterm camp*

349. The *Stakić* Trial Judgment contained the following description of conditions in the Keraterm camp based on multiple witness accounts:

"The detainees slept on wooden pallets used for the transport of goods or on bare concrete in a big storage room. The conditions were cramped and people often had to sleep on top of each other. In June 1992, Room 1, which according to witness statements was slightly larger than Courtroom 2 of this Tribunal (98.6 m^2), held 320 people and the number continued to grow. The detainees were given one meal a day, made up of two small slices of bread and some sort of stew. The rations were insufficient for the detainees. Although families tried to deliver food and clothing every day they rarely succeeded. The detainees could see their families walking to the camp and leaving empty-handed, so in all likelihood someone at the gates of the camp took the food and prevented it from being distributed to the detainees." (*Stakić*, IT-97-24-T, Trial Chamber Judgment, 31 July 2003, para. 163.)

(iii) *Trnopolje camp*

350. With respect to the Trnopolje camp, the *Stakić* Trial Judgment described the conditions as follows, noting that they were slightly better than at Omarska and Keraterm:

"The detainees were provided with food at least once a day and, for some time, the families of detainees were allowed to bring food. However the quantity of food available was insufficient and people often went hungry. Moreover, the water supply was insufficient and the toilet facilities inadequate. The majority of the detainees slept in the open air. Some devised makeshift . . . shelters of blankets and plastic bags. While clearly inadequate, the conditions in the Trnopolje camp were not as appalling as those that prevailed in Omarska and Keraterm." (*Ibid.*, para. 190.)

(c) *Banja Luka*

Manjača camp

351. According to ICTY Trial Chamber in the *Plavšić* Sentencing Judgment:

> "the sanitary conditions in Manjača were 'disastrous . . . inhuman and really brutal': the concept of sanitation did not exist. The temperature inside was low, the inmates slept on the concrete floor and they relieved themselves in the compound or in a bucket placed by the door at night. There was not enough water, and any water that became available was contaminated. In the first three months of Adil Draganović's detention, Manjača was a 'camp of hunger' and when there was food available, it was of a very poor quality. The inmates were given two small meals per day, which usually consisted of half a cup of warm tea, which was more like warm water, and a small piece of thin, 'transparent' bread. Between two and a half thousand men there were only 90 loaves of bread, with each loaf divided into 20 or 40 pieces. Most inmates lost between 20 and 30 kilograms of body weight while they were detained at Manjača. The witness believes that had the ICRC and UNHCR not arrived, the inmates would have died of starvation." (*Plavšić*, IT-00-39-S and 40/1-S, Sentencing Judgment, 27 February 2003, para. 48.)

(d) *Bosanski Šamac*

352. In its Judgment in the *Simić* case, the Trial Chamber made the following findings:

> "the detainees who were imprisoned in the detention centres in Bosanski Šamac were confined under inhumane conditions. The prisoners were subjected to humiliation and degradation. The forced singing of 'Chetnik' songs and the verbal abuse of being called 'ustasha' or 'balija' were forms of such abuse and humiliation of the detainees. They did not have sufficient space, food or water. They suffered from unhygienic conditions, and they did not have appropriate access to medical care. These appalling detention conditions, the cruel and inhumane treatment through beatings and the acts of torture caused severe physical suffering, thus attacking the very fundamentals of human dignity . . . This was done because of the non-Serb ethnicity of the detainees." (*Simić*, IT-95-9-T, Judgment, 17 October 2003, para. 773.)

353. The Respondent does not deny that the camps in Bosnia and Herzegovina were in breach of humanitarian law and, in most cases, in breach of the law of war. However, it notes that, although a number of

detention camps run by the Serbs in Bosnia and Herzegovina were the subject of investigation and trials at the ICTY, no conviction for genocide was handed down on account of any criminal acts committed in those camps. With specific reference to the Manjača camp, the Respondent points out that the Special Envoy of the United Nations Secretary-General visited the camp in 1992 and found that it was being run correctly and that a Muslim humanitarian organization also visited the camp and found that "material conditions were poor, especially concerning hygiene [b]ut there were no signs of maltreatment or execution of prisoners".

354. On the basis of the elements presented to it, the Court considers that there is convincing and persuasive evidence that terrible conditions were inflicted upon detainees of the camps. However, the evidence presented has not enabled the Court to find that those acts were accompanied by specific intent *(dolus specialis)* to destroy the protected group, in whole or in part. In this regard, the Court observes that, in none of the ICTY cases concerning camps cited above, has the Tribunal found that the accused acted with such specific intent *(dolus specialis)*.

* *

(8) Article II (d)*: Imposing Measures to Prevent Births within the Protected Group*

355. The Applicant invoked several arguments to show that measures were imposed to prevent births, contrary to the provision of Article II, paragraph *(d)*, of the Genocide Convention. First, the Applicant claimed that the

> "forced separation of male and female Muslims in Bosnia and Herzegovina, as systematically practised when various municipalities were occupied by the Serb forces . . . in all probability entailed a decline in the birth rate of the group, given the lack of physical contact over many months".

The Court notes that no evidence was provided in support of this statement.

356. Secondly, the Applicant submitted that rape and sexual violence against women led to physical trauma which interfered with victims' reproductive functions and in some cases resulted in infertility. However, the only evidence adduced by the Applicant was the indictment in the *Gagović* case before the ICTY in which the Prosecutor stated that one witness could no longer give birth to children as a result of the sexual abuse she suffered (*Gagović et al.*, IT-96-23-I, Initial Indictment, 26 June 1996, para. 7.10). In the Court's view, an indictment by the Prosecutor

does not constitute persuasive evidence (see paragraph 217 above). Moreover, it notes that the *Gagović* case did not proceed to trial due to the death of the accused.

357. Thirdly, the Applicant referred to sexual violence against men which prevented them from procreating subsequently. In support of this assertion, the Applicant noted that, in the *Tadić* case, the Trial Chamber found that, in Omarska camp, the prison guards forced one Bosnian Muslim man to bite off the testicles of another Bosnian Muslim man (*Tadić*, IT-94-1-T, Judgment, 7 May 1997, para. 198). The Applicant also cited a report in the newspaper, *Le Monde*, on a study by the World Health Organization and the European Union on sexual assaults on men during the conflict in Bosnia and Herzegovina, which alleged that sexual violence against men was practically always accompanied by threats to the effect that the victim would no longer produce Muslim children. The article in *Le Monde* also referred to a statement by the President of a non-governmental organization called the Medical Centre for Human Rights to the effect that approximately 5,000 non-Serb men were the victims of sexual violence. However, the Court notes that the article in *Le Monde* is only a secondary source. Moreover, the results of the World Health Organization and European Union study were only preliminary, and there is no indication as to how the Medical Centre for Human Rights arrived at the figure of 5,000 male victims of sexual violence.

358. Fourthly, the Applicant argued that rape and sexual violence against men and women led to psychological trauma which prevented victims from forming relationships and founding a family. In this regard, the Applicant noted that in the *Akayesu* case, the ICTR considered that "rape can be a measure intended to prevent births when the person raped refuses subsequently to procreate" (*Akayesu*, ICTR-96-4-T, Trial Chamber Judgment, 2 September 1998, para. 508). However, the Court notes that the Applicant presented no evidence that this was the case for women in Bosnia and Herzegovina.

359. Fifthly, the Applicant considered that Bosnian Muslim women who suffered sexual violence might be rejected by their husbands or not be able to find a husband. Again, the Court notes that no evidence was presented in support of this statement.

360. The Respondent considers that the Applicant "alleges no fact, puts forward no serious argument, and submits no evidence" for its allegations that rapes were committed in order to prevent births within a group and notes that the Applicant's contention that there was a decline in births within the protected group is not supported by any evidence concerning the birth rate in Bosnia and Herzegovina either before or after the war.

361. Having carefully examined the arguments of the Parties, the Court finds that the evidence placed before it by the Applicant does not enable it to conclude that Bosnian Serb forces committed acts which could be qualified as imposing measures to prevent births in the protected group within the meaning of Article II *(d)* of the Convention.

* *

(9) Article II (e)*: Forcibly Transferring Children of the Protected Group to Another Group*

362. The Applicant claims that rape was used "as a way of affecting the demographic balance by impregnating Muslim women with the sperm of Serb males" or, in other words, as "procreative rape". The Applicant argues that children born as a result of these "forced pregnancies" would not be considered to be part of the protected group and considers that the intent of the perpetrators was to transfer the unborn children to the group of Bosnian Serbs.

363. As evidence for this claim, the Applicant referred to a number of sources including the following. In the indictment in the *Gagović et al.* case, the Prosecutor alleged that one of the witnesses was raped by two Bosnian Serb soldiers and that "[b]oth perpetrators told her that she would now give birth to Serb babies" (*Gagović et al.*, IT-96-23-I, Initial Indictment, 26 June 1996, para. 9.3). However, as in paragraph 356 above, the Court notes that an indictment cannot constitute persuasive evidence for the purposes of the case now before it and that the *Gagović* case did not proceed to trial. The Applicant further referred to the Report of the Commission of Experts which stated that one woman had been detained and raped daily by three or four soldiers and that "[s]he was told that she would give birth to a chetnik boy" (Report of the Commission of Experts, Vol. I, p. 59, para. 248).

364. The Applicant also cited the Review of the Indictment in the *Karadžić and Mladić* cases in which the Trial Chamber stated that "[s]ome camps were specially devoted to rape, with the aim of forcing the birth of Serbian offspring, the women often being interned until it was too late to undergo an abortion" and that "[i]t would seem that the aim of many rapes was enforced impregnation" (*Karadžić and Mladić*, IT-95-5-R61 and IT-95-18-R61, Review of the Indictment pursuant to Rule 61 of the Rules of Procedure and Evidence, 11 July 1996, para. 64). However, the Court notes that this finding of the Trial Chamber was based only on the testimony of one *amicus curiae* and on the above-mentioned incident reported by the Commission of Experts (*ibid.*, para. 64, footnote 154).

365. Finally, the Applicant noted that in the *Kunarac* case, the ICTY Trial Chamber found that, after raping one of the witnesses, the accused had told her that "she would now carry a Serb baby and would not know who the father would be" (*Kunarac et al.* cases, Nos. IT-96-23-T and IT-96-23/1-T, Judgment, 22 February 2001, para. 583).

366. The Respondent points out that Muslim women who had been raped gave birth to their babies in Muslim territory and consequently the babies would have been brought up not by Serbs but, on the contrary, by Muslims. Therefore, in its view, it cannot be claimed that the children were transferred from one group to the other.

367. The Court, on the basis of the foregoing elements, finds that the evidence placed before it by the Applicant does not establish that there was any form of policy of forced pregnancy, nor that there was any aim to transfer children of the protected group to another group within the meaning of Article II *(e)* of the Convention.

* *

(10) Alleged Genocide outside Bosnia and Herzegovina

368. In the submissions in its Reply, the Applicant has claimed that the Respondent has violated its obligations under the Genocide Convention "by destroying in part, and attempting to destroy in whole, national, ethnical or religious groups within the, *but not limited to* the, territory of Bosnia and Herzegovina, including in particular the Muslim population . . ." (emphasis added). The Applicant devoted a section in its Reply to the contention that acts of genocide, for which the Respondent was allegedly responsible, also took place on the territory of the FRY; these acts were similar to those perpetrated on Bosnian territory, and the constituent elements of "ethnic cleansing as a policy" were also found in the territory of the FRY. This question of genocide committed within the FRY was not actively pursued by the Applicant in the course of the oral argument before the Court; however, the submission quoted above was maintained in the final submissions presented at the hearings, and the Court must therefore address it. It was claimed by the Applicant that the genocidal policy was aimed not only at citizens of Bosnia and Herzegovina, but also at Albanians, Sandžak Muslims, Croats, Hungarians and other minorities; however, the Applicant has not established to the satisfaction of the Court any facts in support of that allegation. The Court has already found (paragraph 196 above) that, for purposes of establishing genocide, the targeted group must be defined positively, and not as a "non-Serb" group.

369. The Applicant has not in its arguments dealt separately with the question of the nature of the specific intent *(dolus specialis)* alleged to accompany the acts in the FRY complained of. It does not appear to be

contending that actions attributable to the Respondent, and committed on the territory of the FRY, were accompanied by a specific intent *(dolus specialis)*, peculiar to or limited to that territory, in the sense that the objective was to eliminate the presence of non-Serbs in the FRY itself. The Court finds in any event that the evidence offered does not in any way support such a contention. What the Applicant has sought to do is to convince the Court of a pattern of acts said to evidence specific intent *(dolus specialis)* inspiring the actions of Serb forces in Bosnia and Herzegovina, involving the destruction of the Bosnian Muslims in that territory; and that same pattern lay, it is contended, behind the treatment of Bosnian Muslims in the camps established in the FRY, so that that treatment supports the pattern thesis. The Applicant has emphasized that the same treatment was meted out to those Bosnian Muslims as was inflicted on their compatriots in Bosnia and Herzegovina. The Court will thus now turn to the question whether the specific intent *(dolus specialis)* can be deduced, as contended by the Applicant, from the pattern of actions against the Bosnian Muslims taken as a whole.

* *

(11) The Question of Pattern of Acts Said to Evidence an Intent to Commit Genocide

370. In the light of its review of the factual evidence before it of the atrocities committed in Bosnia and Herzegovina in 1991-1995, the Court has concluded that, save for the events of July 1995 at Srebrenica, the necessary intent required to constitute genocide has not been conclusively shown in relation to each specific incident. The Applicant however relies on the alleged existence of an overall plan to commit genocide, indicated by the pattern of genocidal or potentially acts of genocide committed throughout the territory, against persons identified everywhere and in each case on the basis of their belonging to a specified group. In the case, for example, of the conduct of Serbs in the various camps (described in paragraphs 252-256, 262-273, 307-310 and 312-318 above), it suggests that "[t]he genocidal intent of the Serbs becomes particularly clear in the description of camp practices, due to their striking similarity all over the territory of Bosnia and Herzegovina". Drawing attention to the similarities between actions attributed to the Serbs in Croatia, and the later events at, for example, Kosovo, the Applicant observed that

> "it is not surprising that the picture of the takeovers and the following human and cultural destruction looks indeed similar from 1991

through 1999. These acts were perpetrated as the expression of one single project, which basically and effectively included the destruction in whole or in part of the non-Serb group, wherever this ethnically and religiously defined group could be conceived as obstructing the all-Serbs-in-one-State group concept."

371. The Court notes that this argument of the Applicant moves from the intent of the individual perpetrators of the alleged acts of genocide complained of to the intent of higher authority, whether within the VRS or the Republika Srpska, or at the level of the Government of the Respondent itself. In the absence of an official statement of aims reflecting such an intent, the Applicant contends that the specific intent *(dolus specialis)* of those directing the course of events is clear from the consistency of practices, particularly in the camps, showing that the pattern was of acts committed "within an organized institutional framework". However, something approaching an official statement of an overall plan is, the Applicant contends, to be found in the Decision on Strategic Goals issued on 12 May 1992 by Momčilo Krajišnik as the President of the National Assembly of Republika Srpska, published in the *Official Gazette* of the Republika Srpska, and the Court will first consider what significance that Decision may have in this context. The English translation of the Strategic Goals presented by the Parties during the hearings, taken from the Report of Expert Witness Donia in the *Milošević* case before the ICTY, Exhibit No. 537, reads as follows:

"DECISION ON THE STRATEGIC GOALS OF THE SERBIAN PEOPLE IN BOSNIA AND HERZEGOVINA

The Strategic Goals, i.e., the priorities, of the Serbian people in Bosnia and Herzegovina are:

1. Separation as a state from the other two ethnic communities.
2. A corridor between Semberija and Krajina.
3. The establishment of a corridor in the Drina River valley, i.e., the elimination of the border between Serbian states.
4. The establishment of a border on the Una and Neretva rivers.
5. The division of the city of Sarajevo into a Serbian part and a Muslim part, and the establishment of effective state authorities within each part.
6. An outlet to the sea for the Republika Srpska."

While the Court notes that this document did not emanate from the Government of the Respondent, evidence before the Court of intercepted exchanges between President Milošević of Serbia and President Karadžić of the Republika Srpska is sufficient to show that the objectives defined represented their joint view.

372. The Parties have drawn the Court's attention to statements in the Assembly by President Karadžić which appear to give conflicting interpretations of the first and major goal of these objectives, the first on the day they were adopted, the second two years later. On that first occasion, the Applicant contended, he said: "It would be much better to solve this situation by political means. It would be best if a truce could be established right away and the borders set up, even if we lose something." Two years later he said (according to the translation of his speech supplied by the Applicant):

> "We certainly know that we must give up something — that is beyond doubt in so far as we want to achieve our first strategic goal: to drive our enemies by the force of war from their homes, that is the Croats and Muslims, so that we will no longer be together [with them] in a State."

The Respondent disputes the accuracy of the translation, claiming that the stated goal was not "to drive our enemies by the force of war from their homes" but "to free the homes from the enemy". The 1992 objectives do not include the elimination of the Bosnian Muslim population. The 1994 statement even on the basis of the Applicant's translation, however shocking a statement, does not necessarily involve the intent to destroy in whole or in part the Muslim population in the enclaves. The Applicant's argument does not come to terms with the fact that an essential motive of much of the Bosnian Serb leadership — to create a larger Serb State, by a war of conquest if necessary — did not necessarily require the destruction of the Bosnian Muslims and other communities, but their expulsion. The 1992 objectives, particularly the first one, were capable of being achieved by the displacement of the population and by territory being acquired, actions which the Respondent accepted (in the latter case at least) as being unlawful since they would be at variance with the inviolability of borders and the territorial integrity of a State which had just been recognized internationally. It is significant that in cases in which the Prosecutor has put the Strategic Goals in issue, the ICTY has not characterized them as genocidal (see *Brđanin*, IT-99-36-T, Trial Chamber Judgment, 1 September 2004, para. 303, and *Stakić*, IT-97-24-T, Trial Chamber Judgment, 31 July 2003, paras. 546-561 (in particular para. 548)). The Court does not see the 1992 Strategic Goals as establishing the specific intent.

373. Turning now to the Applicant's contention that the very pattern of the atrocities committed over many communities, over a lengthy period, focused on Bosnian Muslims and also Croats, demonstrates the necessary intent, the Court cannot agree with such a broad proposition. The *dolus specialis*, the specific intent to destroy the group in whole or in part, has to be convincingly shown by reference to particular circumstances, unless a general plan to that end can be convincingly demon-

strated to exist; and for a pattern of conduct to be accepted as evidence of its existence, it would have to be such that it could only point to the existence of such intent.

374. Furthermore, and again significantly, the proposition is not consistent with the findings of the ICTY relating to genocide or with the actions of the Prosecutor, including decisions not to charge genocide offences in possibly relevant indictments, and to enter into plea agreements, as in the *Plavšić* and *Sikirica et al.* cases (IT-00-40 and IT-95-8), by which the genocide-related charges were withdrawn. Those actions of the Prosecution and the Tribunal can be conveniently enumerated here. Prosecutions for genocide and related crimes before the ICTY can be grouped in the following way:

(a) convictions in respect of charges involving genocide relating to Srebrenica in July 1995: *Krstić* (IT-98-33) (conviction of genocide at trial was reduced to aiding and abetting genocide on appeal) and *Blagojević* (IT-02-60) (conviction of complicity in genocide "through aiding and abetting" at trial is currently on appeal);

(b) plea agreements in which such charges were withdrawn, with the accused pleading guilty to crimes against humanity: *Obrenović* (IT-02-60/2) and *Momir Nikolić* (IT-02-60/1);

(c) acquittals on genocide-related charges in respect of events occurring elsewhere: *Krajišnik* (paragraph 219 above) (on appeal), *Jelisić* (IT-95-10) (completed), *Stakić* (IT-97-24) (completed), *Brđanin* (IT-99-36) (on appeal) and *Sikirica* (IT-95-8) (completed);

(d) cases in which genocide-related charges in respect of events occurring elsewhere were withdrawn: *Plavšić* (IT-00-39 and 40/1) (plea agreement), *Župljanin* (IT-99-36) (genocide-related charges withdrawn) and *Mejakić* (IT-95-4) (genocide-related charges withdrawn);

(e) case in which the indictment charged genocide and related crimes in Srebrenica and elsewhere in which the accused died during the proceedings: *Milošević* (IT-02-54);

(f) cases in which indictments charge genocide or related crimes in respect of events occurring elsewhere, in which accused have died before or during proceedings: *Kovačević and Drljača* (IT-97-24) and *Talić* (IT-99-36/1);

(g) pending cases in which the indictments charge genocide and related crimes in Srebrenica and elsewhere: *Karadžić and Mladić* (IT-95-5/18); and

(h) pending cases in which the indictments charge genocide and related crimes in Srebrenica: *Popović, Beara, Drago Nikolić, Borovčanin, Pandurević and Trbić* (IT-05-88/1) and *Tolimir* (IT-05-88/2).

375. In the cases of a number of accused, relating to events in July 1995 in Srebrenica, charges of genocide or its related acts have not been brought: *Erdemović* (IT-96-22) (completed), *Jokić* (IT-02-60) (on appeal), *Miletić and Gvero* (IT-05-88, part of the *Popović et al.* proceeding referred to in paragraph 374 *(h)* above), *Perišić* (IT-04-81) (pending) and *Stanišić and Simatović* (IT-03-69) (pending).

376. The Court has already concluded above that — save in the case of Srebrenica — the Applicant has not established that any of the widespread and serious atrocities, complained of as constituting violations of Article II, paragraphs *(a)* to *(e)*, of the Genocide Convention, were accompanied by the necessary specific intent *(dolus specialis)* on the part of the perpetrators. It also finds that the Applicant has not established the existence of that intent on the part of the Respondent, either on the basis of a concerted plan, or on the basis that the events reviewed above reveal a consistent pattern of conduct which could only point to the existence of such intent. Having however concluded (paragraph 297 above), in the specific case of the massacres at Srebrenica in July 1995, that acts of genocide were committed in operations led by members of the VRS, the Court now turns to the question whether those acts are attributable to the Respondent.

* * *

VII. The Question of Responsibility for Events at Srebrenica under Article III, Paragraph *(a)*, of the Genocide Convention

(1) The Alleged Admission

377. The Court first notes that the Applicant contends that the Respondent has in fact recognized that genocide was committed at Srebrenica, and has accepted legal responsibility for it. The Applicant called attention to the following official declaration made by the Council of Ministers of the Respondent on 15 June 2005, following the showing on a Belgrade television channel on 2 June 2005 of a video-recording of the murder by a paramilitary unit of six Bosnian Muslim prisoners near Srebrenica (paragraph 289 above). The statement reads as follows:

> "Those who committed the killings in Srebrenica, as well as those who ordered and organized that massacre represented neither Serbia

nor Montenegro, but an undemocratic regime of terror and death, against whom the majority of citizens of Serbia and Montenegro put up the strongest resistance.

Our condemnation of crimes in Srebrenica does not end with the direct perpetrators. We demand the criminal responsibility of all who committed war crimes, organized them or ordered them, and not only in Srebrenica.

Criminals must not be heroes. Any protection of the war criminals, for whatever reason, is also a crime."

The Applicant requests the Court to declare that this declaration "be regarded as a form of admission and as having decisive probative force regarding the attributability to the Yugoslav State of the Srebrenica massacre".

378. It is for the Court to determine whether the Respondent is responsible for any acts of genocide which may be established. For purposes of a finding of this kind the Court may take into account any statements made by either party that appear to bear upon the matters in issue, and have been brought to its attention (cf. *Nuclear Tests (Australia* v. *France), Judgment, I.C.J. Reports 1974*, pp. 263 ff., paras. 32 ff., and *Nuclear Tests (New Zealand* v. *France), Judgment, I.C.J. Reports 1974*, pp. 465ff., paras. 27ff.; *Frontier Dispute (Burkina Faso/Republic of Mali), Judgment, I.C.J. Reports 1986*, pp. 573-574, paras. 38-39), and may accord to them such legal effect as may be appropriate. However, in the present case, it appears to the Court that the declaration of 15 June 2005 was of a political nature; it was clearly not intended as an admission, which would have had a legal effect in complete contradiction to the submissions made by the Respondent before this Court, both at the time of the declaration and subsequently. The Court therefore does not find the statement of 15 June 2005 of assistance to it in determining the issues before it in the case.

* *

(2) The Test of Responsibility

379. In view of the foregoing conclusions, the Court now must ascertain whether the international responsibility of the Respondent can have been incurred, on whatever basis, in connection with the massacres committed in the Srebrenica area during the period in question. For the reasons set out above, those massacres constituted the crime of genocide within the meaning of the Convention. For this purpose, the Court may be required to consider the following three issues in turn. First, it needs to be determined whether the acts of genocide could be attributed to the Respondent under the rules of customary international law of State responsibility; this means ascertaining whether the acts were committed by persons or organs whose conduct is attributable, specifically in the case of the events at Srebrenica, to the Respondent. Second, the Court

will need to ascertain whether acts of the kind referred to in Article III of the Convention, other than genocide itself, were committed by persons or organs whose conduct is attributable to the Respondent under those same rules of State responsibility: that is to say, the acts referred to in Article III, paragraphs *(b)* to *(e)*, one of these being complicity in genocide. Finally, it will be for the Court to rule on the issue as to whether the Respondent complied with its twofold obligation deriving from Article I of the Convention to prevent and punish genocide.

380. These three issues must be addressed in the order set out above, because they are so interrelated that the answer on one point may affect the relevance or significance of the others. Thus, if and to the extent that consideration of the first issue were to lead to the conclusion that some acts of genocide are attributable to the Respondent, it would be unnecessary to determine whether it may also have incurred responsibility under Article III, paragraphs *(b)* to *(e),* of the Convention for the same acts. Even though it is theoretically possible for the same acts to result in the attribution to a State of acts of genocide (contemplated by Art. III, para. *(a)*), conspiracy to commit genocide (Art. III, para. *(b)*), and direct and public incitement to commit genocide (Art. III, para. *(c)*), there would be little point, where the requirements for attribution are fulfilled under *(a)*, in making a judicial finding that they are also satisfied under *(b)* and *(c)*, since responsibility under *(a)* absorbs that under the other two. The idea of holding the same State responsible by attributing to it acts of "genocide" (Art. III, para. *(a)*), "attempt to commit genocide" (Art. III, para. *(d)*), and "complicity in genocide" (Art. III, para. *(e)*), in relation to the same actions, must be rejected as untenable both logically and legally.

381. On the other hand, there is no doubt that a finding by the Court that no acts that constitute genocide, within the meaning of Article II and Article III, paragraph *(a),* of the Convention, can be attributed to the Respondent will not free the Court from the obligation to determine whether the Respondent's responsibility may nevertheless have been incurred through the attribution to it of the acts, or some of the acts, referred to in Article III, paragraphs *(b)* to *(e)*. In particular, it is clear that acts of complicity in genocide can be attributed to a State to which no act of genocide could be attributed under the rules of State responsibility, the content of which will be considered below.

382. Furthermore, the question whether the Respondent has complied with its obligations to prevent and punish genocide arises in different terms, depending on the replies to the two preceding questions. It is only if the Court answers the first two questions in the negative that it will have to consider whether the Respondent fulfilled its obligation of pre-

vention, in relation to the whole accumulation of facts constituting genocide. If a State is held responsible for an act of genocide (because it was committed by a person or organ whose conduct is attributable to the State), or for one of the other acts referred to in Article III of the Convention (for the same reason), then there is no point in asking whether it complied with its obligation of prevention in respect of the same acts, because logic dictates that a State cannot have satisfied an obligation to prevent genocide in which it actively participated. On the other hand, it is self-evident, as the Parties recognize, that if a State is not responsible for any of the acts referred to in Article III, paragraphs *(a)* to *(e)*, of the Convention, this does not mean that its responsibility cannot be sought for a violation of the obligation to prevent genocide and the other acts referred to in Article III.

383. Finally, it should be made clear that, while, as noted above, a State's responsibility deriving from any of those acts renders moot the question whether it satisfied its obligation of prevention in respect of the same conduct, it does not necessarily render superfluous the question whether the State complied with its obligation to punish the perpetrators of the acts in question. It is perfectly possible for a State to incur responsibility at once for an act of genocide (or complicity in genocide, incitement to commit genocide, or any of the other acts enumerated in Article III) committed by a person or organ whose conduct is attributable to it, and for the breach by the State of its obligation to punish the perpetrator of the act: these are two distinct internationally wrongful acts attributable to the State, and both can be asserted against it as bases for its international responsibility.

384. Having thus explained the interrelationship among the three issues set out above (paragraph 379), the Court will now proceed to consider the first of them. This is the question whether the massacres committed at Srebrenica during the period in question, which constitute the crime of genocide within the meaning of Articles II and III, paragraph *(a)*, of the Convention, are attributable, in whole or in part, to the Respondent. This question has in fact two aspects, which the Court must consider separately. First, it should be ascertained whether the acts committed at Srebrenica were perpetrated by organs of the Respondent, i.e., by persons or entities whose conduct is necessarily attributable to it, because they are in fact the instruments of its action. Next, if the preceding question is answered in the negative, it should be ascertained whether the acts in question were committed by persons who, while not organs of the Respondent, did nevertheless act on the instructions of, or under the direction or control of, the Respondent.

* *

(3) The Question of Attribution of the Srebrenica Genocide to the Respondent on the Basis of the Conduct of Its Organs

385. The first of these two questions relates to the well-established rule, one of the cornerstones of the law of State responsibility, that the conduct of any State organ is to be considered an act of the State under international law, and therefore gives rise to the responsibility of the State if it constitutes a breach of an international obligation of the State. This rule, which is one of customary international law, is reflected in Article 4 of the ILC Articles on State Responsibility as follows:

> "*Article 4*
>
> *Conduct of organs of a State*
>
> 1. The conduct of any State organ shall be considered an act of that State under international law, whether the organ exercises legislative, executive, judicial or any other functions, whatever position it holds in the organization of the State, and whatever its character as an organ of the central Government or of a territorial unit of the State.
>
> 2. An organ includes any person or entity which has that status in accordance with the internal law of the State."

386. When applied to the present case, this rule first calls for a determination whether the acts of genocide committed in Srebrenica were perpetrated by "persons or entities" having the status of organs of the Federal Republic of Yugoslavia (as the Respondent was known at the time) under its internal law, as then in force. It must be said that there is nothing which could justify an affirmative response to this question. It has not been shown that the FRY army took part in the massacres, nor that the political leaders of the FRY had a hand in preparing, planning or in any way carrying out the massacres. It is true that there is much evidence of direct or indirect participation by the official army of the FRY, along with the Bosnian Serb armed forces, in military operations in Bosnia and Herzegovina in the years prior to the events at Srebrenica. That participation was repeatedly condemned by the political organs of the United Nations, which demanded that the FRY put an end to it (see, for example, Security Council resolutions 752 (1992), 757 (1992), 762 (1992), 819 (1993), 838 (1993)). It has however not been shown that there was any such participation in relation to the massacres committed at Srebrenica (see also paragraphs 278 to 297 above). Further, neither the Republika Srpska, nor the VRS were *de jure* organs of the FRY, since none of them had the status of organ of that State under its internal law.

387. The Applicant has however claimed that all officers in the VRS, including General Mladić, remained under FRY military administration, and that their salaries were paid from Belgrade right up to 2002, and

accordingly contends that these officers "were *de jure* organs of [the FRY], intended by their superiors to serve in Bosnia and Herzegovina with the VRS". On this basis it has been alleged by the Applicant that those officers, in addition to being officers of the VRS, remained officers of the VJ, and were thus *de jure* organs of the Respondent (paragraph 238 above). The Respondent however asserts that only some of the VRS officers were being "administered" by the 30th Personnel Centre in Belgrade, so that matters like their payment, promotion, pension, etc., were being handled from the FRY (paragraph 238 above); and that it has not been clearly established whether General Mladić was one of them. The Applicant has shown that the promotion of Mladić to the rank of Colonel General on 24 June 1994 was handled in Belgrade, but the Respondent emphasizes that this was merely a verification for administrative purposes of a promotion decided by the authorities of the Republika Srpska.

388. The Court notes first that no evidence has been presented that either General Mladić or any of the other officers whose affairs were handled by the 30th Personnel Centre were, according to the internal law of the Respondent, officers of the army of the Respondent — a *de jure* organ of the Respondent. Nor has it been conclusively established that General Mladić was one of those officers; and even on the basis that he might have been, the Court does not consider that he would, for that reason alone, have to be treated as an organ of the FRY for the purposes of the application of the rules of State responsibility. There is no doubt that the FRY was providing substantial support, *inter alia*, financial support, to the Republika Srpska (cf. paragraph 241 above), and that one of the forms that support took was payment of salaries and other benefits to some officers of the VRS, but this did not automatically make them organs of the FRY. Those officers were appointed to their commands by the President of the Republika Srpska, and were subordinated to the political leadership of the Republika Srpska. In the absence of evidence to the contrary, those officers must be taken to have received their orders from the Republika Srpska or the VRS, not from the FRY. The expression "State organ", as used in customary international law and in Article 4 of the ILC Articles, applies to one or other of the individual or collective entities which make up the organization of the State and act on its behalf (cf. ILC Commentary to Art. 4, para. (1)). The functions of the VRS officers, including General Mladić, were however to act on behalf of the Bosnian Serb authorities, in particular the Republika Srpska, not on behalf of the FRY; they exercised elements of the public authority of the Republika Srpska. The particular situation of General Mladić, or of any other VRS officer present at Srebrenica who may have been being "administered" from Belgrade, is not therefore such as to lead the Court to modify the conclusion reached in the previous paragraph.

389. The issue also arises as to whether the Respondent might bear responsibility for the acts of the "Scorpions" in the Srebrenica area. In this connection, the Court will consider whether it has been proved that the Scorpions were a *de jure* organ of the Respondent. It is in dispute between the Parties as to when the "Scorpions" became incorporated into the forces of the Respondent. The Applicant has claimed that incorporation occurred by a decree of 1991 (which has not been produced as an Annex). The Respondent states that "these regulations [were] relevant exclusively for the war in Croatia in 1991" and that there is no evidence that they remained in force in 1992 in Bosnia and Herzegovina. The Court observes that, while the single State of Yugoslavia was disintegrating at that time, it is the status of the "Scorpions" in mid-1995 that is of relevance to the present case. In two of the intercepted documents presented by the Applicant (the authenticity of which was queried — see paragraph 289 above), there is reference to the "Scorpions" as "MUP of Serbia" and "a unit of Ministry of Interiors of Serbia". The Respondent identified the senders of these communications, Ljubiša Borovčanin and Savo Cvjetinović, as being "officials of the police forces of Republika Srpska". The Court observes that neither of these communications was addressed to Belgrade. Judging on the basis of these materials, the Court is unable to find that the "Scorpions" were, in mid-1995, *de jure* organs of the Respondent. Furthermore, the Court notes that in any event the act of an organ placed by a State at the disposal of another public authority shall not be considered an act of that State if the organ was acting on behalf of the public authority at whose disposal it had been placed.

390. The argument of the Applicant however goes beyond mere contemplation of the status, under the Respondent's internal law, of the persons who committed the acts of genocide; it argues that Republika Srpska and the VRS, as well as the paramilitary militias known as the "Scorpions", the "Red Berets", the "Tigers" and the "White Eagles" must be deemed, notwithstanding their apparent status, to have been "*de facto* organs" of the FRY, in particular at the time in question, so that all of their acts, and specifically the massacres at Srebrenica, must be considered attributable to the FRY, just as if they had been organs of that State under its internal law; reality must prevail over appearances. The Respondent rejects this contention, and maintains that these were not *de facto* organs of the FRY.

391. The first issue raised by this argument is whether it is possible in principle to attribute to a State conduct of persons — or groups of persons — who, while they do not have the legal status of State organs, in fact act under such strict control by the State that they must be treated as its organs for purposes of the necessary attribution leading to the State's responsibility for an internationally wrongful act. The Court has in fact already addressed this question, and given an answer to it in principle, in

its Judgment of 27 June 1986 in the case concerning *Military and Paramilitary Activities in and against Nicaragua (Nicaragua* v. *United States of America)* (*Merits, Judgment, I.C.J. Reports 1986*, pp. 62-64). In paragraph 109 of that Judgment the Court stated that it had to

> "determine . . . whether or not the relationship of the *contras* to the United States Government was so much one of dependence on the one side and control on the other that it would be right to equate the *contras*, for legal purposes, with an organ of the United States Government, or as acting on behalf of that Government" (p. 62).

Then, examining the facts in the light of the information in its possession, the Court observed that "there is no clear evidence of the United States having actually exercised such a degree of control in all fields as to justify treating the *contras* as acting on its behalf" (para. 109), and went on to conclude that "the evidence available to the Court . . . is insufficient to demonstrate [the *contras*'] complete dependence on United States aid", so that the Court was "unable to determine that the *contra* force may be equated for legal purposes with the forces of the United States" (pp. 62-63, para. 110).

392. The passages quoted show that, according to the Court's jurisprudence, persons, groups of persons or entities may, for purposes of international responsibility, be equated with State organs even if that status does not follow from internal law, provided that in fact the persons, groups or entities act in "complete dependence" on the State, of which they are ultimately merely the instrument. In such a case, it is appropriate to look beyond legal status alone, in order to grasp the reality of the relationship between the person taking action, and the State to which he is so closely attached as to appear to be nothing more than its agent: any other solution would allow States to escape their international responsibility by choosing to act through persons or entities whose supposed independence would be purely fictitious.

393. However, so to equate persons or entities with State organs when they do not have that status under internal law must be exceptional, for it requires proof of a particularly great degree of State control over them, a relationship which the Court's Judgment quoted above expressly described as "complete dependence". It remains to be determined in the present case whether, at the time in question, the persons or entities that committed the acts of genocide at Srebrenica had such ties with the FRY that they can be deemed to have been completely dependent on it; it is only if this condition is met that they can be equated with organs of the Respondent for the purposes of its international responsibility.

394. The Court can only answer this question in the negative. At the relevant time, July 1995, neither the Republika Srpska nor the VRS could

be regarded as mere instruments through which the FRY was acting, and as lacking any real autonomy. While the political, military and logistical relations between the federal authorities in Belgrade and the authorities in Pale, between the Yugoslav army and the VRS, had been strong and close in previous years (see paragraph 238 above), and these ties undoubtedly remained powerful, they were, at least at the relevant time, not such that the Bosnian Serbs' political and military organizations should be equated with organs of the FRY. It is even true that differences over strategic options emerged at the time between Yugoslav authorities and Bosnian Serb leaders; at the very least, these are evidence that the latter had some qualified, but real, margin of independence. Nor, notwithstanding the very important support given by the Respondent to the Republika Srpska, without which it could not have "conduct[ed] its crucial or most significant military and paramilitary activities" (*I.C.J. Reports 1986*, p. 63, para. 111), did this signify a total dependence of the Republika Srpska upon the Respondent.

395. The Court now turns to the question whether the "Scorpions" were in fact acting in complete dependence on the Respondent. The Court has not been presented with materials to indicate this. The Court also notes that, in giving his evidence, General Dannatt, when asked under whose control or whose authority the paramilitary groups coming from Serbia were operating, replied, "they would have been under the command of Mladić and part of the chain of the command of the VRS". The Parties referred the Court to the *Stanišić and Simatović* case (IT-03-69, pending); notwithstanding that the defendants are not charged with genocide in that case, it could have its relevance for illuminating the status of the "Scorpions" as Serbian MUP or otherwise. However, the Court cannot draw further conclusions as this case remains at the indictment stage. In this respect, the Court recalls that it can only form its opinion on the basis of the information which has been brought to its notice at the time when it gives its decision, and which emerges from the pleadings and documents in the case file, and the arguments of the Parties made during the oral exchanges.

The Court therefore finds that the acts of genocide at Srebrenica cannot be attributed to the Respondent as having been committed by its organs or by persons or entities wholly dependent upon it, and thus do not on this basis entail the Respondent's international responsibility.

* *

(4) The Question of Attribution of the Srebrenica Genocide to the Respondent on the Basis of Direction or Control

396. As noted above (paragraph 384), the Court must now determine whether the massacres at Srebrenica were committed by persons who,

though not having the status of organs of the Respondent, nevertheless acted on its instructions or under its direction or control, as the Applicant argues in the alternative; the Respondent denies that such was the case.

397. The Court must emphasize, at this stage in its reasoning, that the question just stated is not the same as those dealt with thus far. It is obvious that it is different from the question whether the persons who committed the acts of genocide had the status of organs of the Respondent under its internal law; nor however, and despite some appearance to the contrary, is it the same as the question whether those persons should be equated with State organs *de facto*, even though not enjoying that status under internal law. The answer to the latter question depends, as previously explained, on whether those persons were in a relationship of such complete dependence on the State that they cannot be considered otherwise than as organs of the State, so that all their actions performed in such capacity would be attributable to the State for purposes of international responsibility. Having answered that question in the negative, the Court now addresses a completely separate issue: whether, in the specific circumstances surrounding the events at Srebrenica the perpetrators of genocide were acting on the Respondent's instructions, or under its direction or control. An affirmative answer to this question would in no way imply that the perpetrators should be characterized as organs of the FRY, or equated with such organs. It would merely mean that the FRY's international responsibility would be incurred owing to the conduct of those of its own organs which gave the instructions or exercised the control resulting in the commission of acts in breach of its international obligations. In other words, it is no longer a question of ascertaining whether the persons who directly committed the genocide were acting as organs of the FRY, or could be equated with those organs — this question having already been answered in the negative. What must be determined is whether FRY organs — incontestably having that status under the FRY's internal law — originated the genocide by issuing instructions to the perpetrators or exercising direction or control, and whether, as a result, the conduct of organs of the Respondent, having been the cause of the commission of acts in breach of its international obligations, constituted a violation of those obligations.

398. On this subject the applicable rule, which is one of customary law of international responsibility, is laid down in Article 8 of the ILC Articles on State Responsibility as follows:

> "*Article 8*
>
> *Conduct directed or controlled by a State*
>
> The conduct of a person or group of persons shall be considered an act of a State under international law if the person or group of

persons is in fact acting on the instructions of, or under the direction or control of, that State in carrying out the conduct."

399. This provision must be understood in the light of the Court's jurisprudence on the subject, particularly that of the 1986 Judgment in the case concerning *Military and Paramilitary Activities in and against Nicaragua (Nicaragua* v. *United States of America)* referred to above (paragraph 391). In that Judgment the Court, as noted above, after having rejected the argument that the *contras* were to be equated with organs of the United States because they were "completely dependent" on it, added that the responsibility of the Respondent could still arise if it were proved that it had itself "directed or enforced the perpetration of the acts contrary to human rights and humanitarian law alleged by the applicant State" (*I.C.J. Reports 1986*, p. 64, para. 115); this led to the following significant conclusion:

> "For this conduct to give rise to legal responsibility of the United States, it would in principle have to be proved that that State had effective control of the military or paramilitary operations in the course of which the alleged violations were committed." (*Ibid.*, p. 65.)

400. The test thus formulated differs in two respects from the test — described above — to determine whether a person or entity may be equated with a State organ even if not having that status under internal law. First, in this context it is not necessary to show that the persons who performed the acts alleged to have violated international law were in general in a relationship of "complete dependence" on the respondent State; it has to be proved that they acted in accordance with that State's instructions or under its "effective control". It must however be shown that this "effective control" was exercised, or that the State's instructions were given, in respect of each operation in which the alleged violations occurred, not generally in respect of the overall actions taken by the persons or groups of persons having committed the violations.

401. The Applicant has, it is true, contended that the crime of genocide has a particular nature, in that it may be composed of a considerable number of specific acts separate, to a greater or lesser extent, in time and space. According to the Applicant, this particular nature would justify, among other consequences, assessing the "effective control" of the State allegedly responsible, not in relation to each of these specific acts, but in relation to the whole body of operations carried out by the direct perpetrators of the genocide. The Court is however of the view that the particular characteristics of genocide do not justify the Court in departing from the criterion elaborated in the Judgment in the case concerning *Military and Paramilitary Activities in and against Nicaragua (Nicaragua* v. *United States of America)* (see paragraph 399 above). The rules

for attributing alleged internationally wrongful conduct to a State do not vary with the nature of the wrongful act in question in the absence of a clearly expressed *lex specialis*. Genocide will be considered as attributable to a State if and to the extent that the physical acts constitutive of genocide that have been committed by organs or persons other than the State's own agents were carried out, wholly or in part, on the instructions or directions of the State, or under its effective control. This is the state of customary international law, as reflected in the ILC Articles on State Responsibility.

402. The Court notes however that the Applicant has further questioned the validity of applying, in the present case, the criterion adopted in the *Military and Paramilitary Activities* Judgment. It has drawn attention to the Judgment of the ICTY Appeals Chamber in the *Tadić* case (IT-94-1-A, Judgment, 15 July 1999). In that case the Chamber did not follow the jurisprudence of the Court in the *Military and Paramilitary Activities* case: it held that the appropriate criterion, applicable in its view both to the characterization of the armed conflict in Bosnia and Herzegovina as international, and to imputing the acts committed by Bosnian Serbs to the FRY under the law of State responsibility, was that of the "overall control" exercised over the Bosnian Serbs by the FRY; and further that that criterion was satisfied in the case (on this point, *ibid.*, para. 145). In other words, the Appeals Chamber took the view that acts committed by Bosnian Serbs could give rise to international responsibility of the FRY on the basis of the overall control exercised by the FRY over the Republika Srpska and the VRS, without there being any need to prove that each operation during which acts were committed in breach of international law was carried out on the FRY's instructions, or under its effective control.

403. The Court has given careful consideration to the Appeals Chamber's reasoning in support of the foregoing conclusion, but finds itself unable to subscribe to the Chamber's view. First, the Court observes that the ICTY was not called upon in the *Tadić* case, nor is it in general called upon, to rule on questions of State responsibility, since its jurisdiction is criminal and extends over persons only. Thus, in that Judgment the Tribunal addressed an issue which was not indispensable for the exercise of its jurisdiction. As stated above, the Court attaches the utmost importance to the factual and legal findings made by the ICTY in ruling on the criminal liability of the accused before it and, in the present case, the Court takes fullest account of the ICTY's trial and appellate judgments dealing with the events underlying the dispute. The situation is not the same for positions adopted by the ICTY on issues of general international law which do not lie within the specific purview of its jurisdiction and, moreover, the resolution of which is not always necessary for deciding the criminal cases before it.

404. This is the case of the doctrine laid down in the *Tadić* Judgment. Insofar as the "overall control" test is employed to determine whether or not an armed conflict is international, which was the sole question which the Appeals Chamber was called upon to decide, it may well be that the test is applicable and suitable; the Court does not however think it appropriate to take a position on the point in the present case, as there is no need to resolve it for purposes of the present Judgment. On the other hand, the ICTY presented the "overall control" test as equally applicable under the law of State responsibility for the purpose of determining — as the Court is required to do in the present case — when a State is responsible for acts committed by paramilitary units, armed forces which are not among its official organs. In this context, the argument in favour of that test is unpersuasive.

405. It should first be observed that logic does not require the same test to be adopted in resolving the two issues, which are very different in nature: the degree and nature of a State's involvement in an armed conflict on another State's territory which is required for the conflict to be characterized as international, can very well, and without logical inconsistency, differ from the degree and nature of involvement required to give rise to that State's responsibility for a specific act committed in the course of the conflict.

406. It must next be noted that the "overall control" test has the major drawback of broadening the scope of State responsibility well beyond the fundamental principle governing the law of international responsibility: a State is responsible only for its own conduct, that is to say the conduct of persons acting, on whatever basis, on its behalf. That is true of acts carried out by its official organs, and also by persons or entities which are not formally recognized as official organs under internal law but which must nevertheless be equated with State organs because they are in a relationship of complete dependence on the State. Apart from these cases, a State's responsibility can be incurred for acts committed by persons or groups of persons — neither State organs nor to be equated with such organs — only if, assuming those acts to be internationally wrongful, they are attributable to it under the rule of customary international law reflected in Article 8 cited above (paragraph 398). This is so where an organ of the State gave the instructions or provided the direction pursuant to which the perpetrators of the wrongful act acted or where it exercised effective control over the action during which the wrong was committed. In this regard the "overall control" test is unsuitable, for it stretches too far, almost to breaking point, the connection which must exist between the conduct of a State's organs and its international responsibility.

407. Thus it is on the basis of its settled jurisprudence that the Court will determine whether the Respondent has incurred responsibility under

the rule of customary international law set out in Article 8 of the ILC Articles on State Responsibility.

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408. The Respondent has emphasized that in the final judgments of the Chambers of the ICTY relating to genocide in Srebrenica, none of its leaders have been found to have been implicated. The Applicant does not challenge that reading, but makes the point that that issue has not been before the ICTY for decision. The Court observes that the ICTY has indeed not up to the present been directly concerned in final judgments with the question whether those leaders might bear responsibility in that respect. The Court notes the fact that the report of the United Nations Secretary-General does not establish any direct involvement by President Milošević with the massacre. The Court has already recorded the contacts between Milošević and the United Nations on 10 and 11 July (paragraph 285). On 14 July, as recorded in the Secretary-General's Report,

> "the European Union negotiator, Mr. Bildt, travelled to Belgrade to meet with President Milošević. The meeting took place at Dobanovci, the hunting lodge outside Belgrade, where Mr. Bildt had met President Milošević and General Mladić one week earlier. According to Mr. Bildt's public account of that second meeting, he pressed the President to arrange immediate access for UNHCR to assist the people of Srebrenica, and for ICRC to start to register those who were being treated by the BSA as prisoners of war. He also insisted that the Netherlands soldiers be allowed to leave at will. Mr. Bildt added that the international community would not tolerate an attack on Goražde, and that a 'green light' would have to be secured for free and unimpeded access to the enclaves. He also demanded that the road between Kiseljak and Sarajevo ('Route Swan') be opened to all non-military transport. President Milošević apparently acceded to the various demands, but also claimed that he did not have control over the matter. Milošević had also apparently explained, earlier in the meeting, that the whole incident had been provoked by escalating Muslim attacks from the enclave, in violation of the 1993 demilitarization agreement.
>
> A few hours into the meeting, General Mladić arrived at Dobanovci. Mr. Bildt noted that General Mladić readily agreed to most of the demands on Srebrenica, but remained opposed to some of the arrangements pertaining to the other enclaves, Sarajevo in particular. Eventually, with President Milošević's intervention, it appeared that an agreement in principle had been reached. It was decided that

another meeting would be held the next day in order to confirm the arrangements. Mr. Bildt had already arranged with Mr. Stoltenberg and Mr. Akashi [the Special Representative of the Secretary-General] that they would join him in Belgrade. He also requested that the UNPROFOR Commander also come to Belgrade in order to finalize some of the military details with Mladić." (A/54/549, paras. 372-373.)

409. By 19 July, on the basis of the Belgrade meeting, Mr. Akashi was hopeful that both President Milošević and General Mladić might show some flexibility. The UNPROFOR Commander met with Mladić on 19 July and throughout the meeting kept in touch with Mr. Bildt who was holding parallel negotiations with President Milošević in Belgrade. Mladić gave his version of the events of the preceding days (his troops had "'finished [it] in a correct way'"; some "'unfortunate small incidents' had occurred"). The UNPROFOR Commander and Mladić then signed an agreement which provided for

"ICRC access to all 'reception centres' where the men and boys of Srebrenica were being held, by the next day;

UNHCR and humanitarian aid convoys to be given access to Srebrenica;

The evacuation of wounded from Potočari, as well as the hospital in Bratunac;

The return of Dutchbat weapons and equipment taken by the BSA;

The transfer of Dutchbat out of the enclave commencing on the afternoon of 21 July, following the evacuation of the remaining women, children and elderly who wished to leave.

Subsequent to the signing of this agreement, the Special Representative wrote to President Milošević, reminding him of the agreement, that had not yet been honoured, to allow ICRC access to Srebrenica. The Special Representative later also telephoned President Milošević to reiterate the same point." (*Ibid.*, para. 392.)

410. The Court was referred to other evidence supporting or denying the Respondent's effective control over, participation in, involvement in, or influence over the events in and around Srebrenica in July 1995. The Respondent quotes two substantial reports prepared seven years after the events, both of which are in the public domain, and readily accessible. The first, *Srebrenica — a "Safe" Area*, published in 2002 by the Netherlands Institute for War Documentation was prepared over a lengthy period by an expert team. The Respondent has drawn attention to the fact that this report contains no suggestion that the FRY leadership was involved in planning the attack or inciting the killing of non-Serbs; nor

any hard evidence of assistance by the Yugoslav army to the armed forces of the Republika Srpska before the attack; nor any suggestion that the Belgrade Government had advance knowledge of the attack. The Respondent also quotes this passage from point 10 of the Epilogue to the Report relating to the "mass slaughter" and "the executions" following the fall of Srebrenica: "There is no evidence to suggest any political or military liaison with Belgrade, and in the case of this mass murder such a liaison is highly improbable." The Respondent further observes that the Applicant's only response to this submission is to point out that "the report, by its own admission, is not exhaustive", and that this Court has been referred to evidence not used by the authors.

411. The Court observes, in respect of the Respondent's submissions, that the authors of the Report do conclude that Belgrade was aware of the intended attack on Srebrenica. They record that the Dutch Military Intelligence Service and another Western intelligence service concluded that the July 1995 operations were co-ordinated with Belgrade (Part III, Chap. 7, Sect. 7). More significantly for present purposes, however, the authors state that "there is no evidence to suggest participation in the preparations for executions on the part of Yugoslav military personnel or the security agency (RDB). In fact there is some evidence to support the opposite view . . ." (Part IV, Chap. 2, Sect. 20). That supports the passage from point 10 of the Epilogue quoted by the Respondent, which was preceded by the following sentence: "Everything points to a central decision by the General Staff of the VRS."

412. The second report is *Balkan Battlegrounds*, prepared by the United States Central Intelligence Agency, also published in 2002. The first volume under the heading "The Possibility of Yugoslav involvement" arrives at the following conclusion:

> "No basis has been established to implicate Belgrade's military or security forces in the post-Srebrenica atrocities. While there are indications that the VJ or RDB [the Serbian State Security Department] may have contributed elements to the Srebrenica battle, there is no similar evidence that Belgrade-directed forces were involved in any of the subsequent massacres. Eyewitness accounts by survivors may be imperfect recollections of events, and details may have been overlooked. Narrations and other available evidence suggest that only Bosnian Serb troops were employed in the atrocities and executions that followed the military conquest of Srebrenica." (*Balkan Battlegrounds*, p. 353.)

The response of the Applicant was to quote an earlier passage which refers to reports which "suggest" that VJ troops and possibly elements of the Serbian State Security Department may have been engaged in the battle in Srebrenica — as indeed the second sentence of the passage quoted by the Respondent indicates. It is a cautious passage, and significantly gives no indication of any involvement by the Respondent in the post-conflict atrocities which are the subject of genocide-related convictions. Counsel for the Respondent also quoted from the evidence of the Deputy Commander of Dutchbat, given in the *Milošević* trial, in which the accused put to the officer the point quoted earlier from the Epilogue to the Netherlands report. The officer responded:

> "At least for me, I did not have any evidence that it was launched in co-operation with Belgrade. And again, I read all kinds of reports and opinions and papers where all kinds of scenarios were analysed, and so forth. Again, I do not have any proof that the action, being the attack on the enclave, was launched in co-operation with Belgrade."

The other evidence on which the Applicant relied relates to the influence, rather than the control, that President Milošević had or did not have over the authorities in Pale. It mainly consists of the evidence given at the *Milošević* trial by Lord Owen and General Wesley Clark and also Lord Owen's publications. It does not establish a factual basis for finding the Respondent responsible on a basis of direction or control.

* *

(5) Conclusion as to Responsibility for Events at Srebrenica under Article III, Paragraph (a)*, of the Genocide Convention*

413. In the light of the information available to it, the Court finds, as indicated above, that it has not been established that the massacres at Srebrenica were committed by persons or entities ranking as organs of the Respondent (see paragraph 395 above). It finds also that it has not been established that those massacres were committed on the instructions or under the direction of organs of the respondent State, nor that the Respondent exercised effective control over the operations in the course of which those massacres, which, as indicated in paragraph 297 above, constituted the crime of genocide, were perpetrated.

The Applicant has not proved that instructions were issued by the federal authorities in Belgrade, or by any other organ of the FRY, to commit the massacres, still less that any such instructions were given with the specific intent *(dolus specialis)* characterizing the crime of genocide, which would have had to be present in order for the Respondent to be held responsible on this basis. All indications are to the contrary: that the

decision to kill the adult male population of the Muslim community in Srebrenica was taken by some members of the VRS Main Staff, but without instructions from or effective control by the FRY.

As for the killings committed by the "Scorpions" paramilitary militias, notably at Trnovo (paragraph 289 above), even if it were accepted that they were an element of the genocide committed in the Srebrenica area, which is not clearly established by the decisions thus far rendered by the ICTY (see, in particular, the Trial Chamber's decision of 12 April 2006 in the *Stanišić and Simatović* case, IT-03-69), it has not been proved that they took place either on the instructions or under the control of organs of the FRY.

414. Finally, the Court observes that none of the situations, other than those referred to in Articles 4 and 8 of the ILC's Articles on State Responsibility, in which specific conduct may be attributed to a State, matches the circumstances of the present case in regard to the possibility of attributing the genocide at Srebrenica to the Respondent. The Court does not see itself required to decide at this stage whether the ILC's Articles dealing with attribution, apart from Articles 4 and 8, express present customary international law, it being clear that none of them apply in this case. The acts constituting genocide were not committed by persons or entities which, while not being organs of the FRY, were empowered by it to exercise elements of the governmental authority (Art. 5), nor by organs placed at the Respondent's disposal by another State (Art. 6), nor by persons in fact exercising elements of the governmental authority in the absence or default of the official authorities of the Respondent (Art. 9); finally, the Respondent has not acknowledged and adopted the conduct of the perpetrators of the acts of genocide as its own (Art. 11).

415. The Court concludes from the foregoing that the acts of those who committed genocide at Srebrenica cannot be attributed to the Respondent under the rules of international law of State responsibility: thus, the international responsibility of the Respondent is not engaged on this basis.

* * *

VIII. The Question of Responsibility, in Respect of Srebrenica, for Acts Enumerated in Article III, Paragraphs *(b)* to *(e)*, of the Genocide Convention

416. The Court now comes to the second of the questions set out in paragraph 379 above, namely, that relating to the Respondent's possible responsibility on the ground of one of the acts related to genocide enumerated in Article III of the Convention. These are: conspiracy to

commit genocide (Art. III, para. *(b)*), direct and public incitement to commit genocide (Art. III, para. *(c)*), attempt to commit genocide (Art. III, para. *(d)*) — though no claim is made under this head in the Applicant's final submissions in the present case — and complicity in genocide (Art. III, para. *(e)*). For the reasons already stated (paragraph 380 above), the Court must make a finding on this matter inasmuch as it has replied in the negative to the previous question, that of the Respondent's responsibility in the commission of the genocide itself.

417. It is clear from an examination of the facts of the case that subparagraphs *(b)* and *(c)* of Article III are irrelevant in the present case. It has not been proved that organs of the FRY, or persons acting on the instructions or under the effective control of that State, committed acts that could be characterized as "[c]onspiracy to commit genocide"(Art. III, para. *(b)*), or as "[d]irect and public incitement to commit genocide" (Art. III, para. *(c)*), if one considers, as is appropriate, only the events in Srebrenica. As regards paragraph *(b)*, what was said above regarding the attribution to the Respondent of acts of genocide, namely that the massacres were perpetrated by persons and groups of persons (the VRS in particular) who did not have the character of organs of the Respondent, and did not act on the instructions or under the effective control of the Respondent, is sufficient to exclude the latter's responsibility in this regard. As regards subparagraph *(c)*, none of the information brought to the attention of the Court is sufficient to establish that organs of the Respondent, or persons acting on its instructions or under its effective control, directly and publicly incited the commission of the genocide in Srebrenica; nor is it proven, for that matter, that such organs or persons incited the commission of acts of genocide anywhere else on the territory of Bosnia and Herzegovina. In this respect, the Court must only accept precise and incontrovertible evidence, of which there is clearly none.

418. A more delicate question is whether it can be accepted that acts which could be characterized as "complicity in genocide", within the meaning of Article III, paragraph *(e)*, can be attributed to organs of the Respondent or to persons acting under its instructions or under its effective control.

This question calls for some preliminary comment.

419. First, the question of "complicity" is to be distinguished from the question, already considered and answered in the negative, whether the perpetrators of the acts of genocide committed in Srebrenica acted on the instructions of or under the direction or effective control of the organs of the FRY. It is true that in certain national systems of criminal law, giving instructions or orders to persons to commit a criminal act is considered as the mark of complicity in the commission of that act. However, in the particular context of the application of the law of international responsibility in the domain of genocide, if it were established that a genocidal act had been committed on the instructions or under the direction of a

State, the necessary conclusion would be that the genocide was attributable to the State, which would be directly responsible for it, pursuant to the rule referred to above (paragraph 398), and no question of complicity would arise. But, as already stated, that is not the situation in the present case.

However there is no doubt that "complicity", in the sense of Article III, paragraph *(e)*, of the Convention, includes the provision of means to enable or facilitate the commission of the crime; it is thus on this aspect that the Court must focus. In this respect, it is noteworthy that, although "complicity", as such, is not a notion which exists in the current terminology of the law of international responsibility, it is similar to a category found among the customary rules constituting the law of State responsibility, that of the "aid or assistance" furnished by one State for the commission of a wrongful act by another State.

420. In this connection, reference should be made to Article 16 of the ILC's Articles on State Responsibility, reflecting a customary rule, which reads as follows:

> "*Article 16*
>
> *Aid or assistance in the commission of an internationally wrongful act*
>
> A State which aids or assists another State in the commission of an internationally wrongful act by the latter is internationally responsible for doing so if:
>
> *(a)* That State does so with knowledge of the circumstances of the internationally wrongful act; and
>
> *(b)* The act would be internationally wrongful if committed by that State."

Although this provision, because it concerns a situation characterized by a relationship between two States, is not directly relevant to the present case, it nevertheless merits consideration. The Court sees no reason to make any distinction of substance between "complicity in genocide", within the meaning of Article III, paragraph *(e)*, of the Convention, and the "aid or assistance" of a State in the commission of a wrongful act by another State within the meaning of the aforementioned Article 16 — setting aside the hypothesis of the issue of instructions or directions or the exercise of effective control, the effects of which, in the law of international responsibility, extend beyond complicity. In other words, to ascertain whether the Respondent is responsible for "complicity in genocide" within the meaning of Article III, paragraph *(e)*, which is what the Court now has to do, it must examine whether organs of the respondent State, or persons acting on its instructions or under its direction or effective control, furnished "aid or assistance" in the commission of the genocide in Srebrenica, in a sense not significantly different from that of those concepts in the general law of international responsibility.

421. Before the Court turns to an examination of the facts, one further comment is required. It concerns the link between the specific intent *(dolus specialis)* which characterizes the crime of genocide and the motives which inspire the actions of an accomplice (meaning a person providing aid or assistance to the direct perpetrators of the crime): the question arises whether complicity presupposes that the accomplice shares the specific intent *(dolus specialis)* of the principal perpetrator. But whatever the reply to this question, there is no doubt that the conduct of an organ or a person furnishing aid or assistance to a perpetrator of the crime of genocide cannot be treated as complicity in genocide unless at the least that organ or person acted knowingly, that is to say, in particular, was aware of the specific intent *(dolus specialis)* of the principal perpetrator. If that condition is not fulfilled, that is sufficient to exclude categorization as complicity. The Court will thus first consider whether this latter condition is met in the present case. It is only if it replies to that question of fact in the affirmative that it will need to determine the legal point referred to above.

422. The Court is not convinced by the evidence furnished by the Applicant that the above conditions were met. Undoubtedly, the quite substantial aid of a political, military and financial nature provided by the FRY to the Republika Srpska and the VRS, beginning long before the tragic events of Srebrenica, continued during those events. There is thus little doubt that the atrocities in Srebrenica were committed, at least in part, with the resources which the perpetrators of those acts possessed as a result of the general policy of aid and assistance pursued towards them by the FRY. However, the sole task of the Court is to establish the legal responsibility of the Respondent, a responsibility which is subject to very specific conditions. One of those conditions is not fulfilled, because it is not established beyond any doubt in the argument between the Parties whether the authorities of the FRY supplied — and continued to supply — the VRS leaders who decided upon and carried out those acts of genocide with their aid and assistance, at a time when those authorities were clearly aware that genocide was about to take place or was under way; in other words that not only were massacres about to be carried out or already under way, but that their perpetrators had the specific intent characterizing genocide, namely, the intent to destroy, in whole or in part, a human group, as such.

423. A point which is clearly decisive in this connection is that it was not conclusively shown that the decision to eliminate physically the adult male population of the Muslim community from Srebrenica was brought to the attention of the Belgrade authorities when it was taken; the Court has found (paragraph 295 above) that that decision was taken shortly before it was actually carried out, a process which took a very short time (essentially between 13 and 16 July 1995), despite the exceptionally high number of victims. It has therefore not been conclusively established

that, at the crucial time, the FRY supplied aid to the perpetrators of the genocide in full awareness that the aid supplied would be used to commit genocide.

424. The Court concludes from the above that the international responsibility of the Respondent is not engaged for acts of complicity in genocide mentioned in Article III, paragraph *(e)*, of the Convention. In the light of this finding, and of the findings above relating to the other paragraphs of Article III, the international responsibility of the Respondent is not engaged under Article III as a whole.

* * *

IX. The Question of Responsibility for Breach of the Obligations to Prevent and Punish Genocide

425. The Court now turns to the third and last of the questions set out in paragraph 379 above: has the respondent State complied with its obligations to prevent and punish genocide under Article I of the Convention?

Despite the clear links between the duty to prevent genocide and the duty to punish its perpetrators, these are, in the view of the Court, two distinct yet connected obligations, each of which must be considered in turn.

426. It is true that, simply by its wording, Article I of the Convention brings out the close link between prevention and punishment: "The Contracting Parties confirm that genocide, whether committed in time of peace or in time of war, is a crime under international law which they undertake to prevent and to punish." It is also true that one of the most effective ways of preventing criminal acts, in general, is to provide penalties for persons committing such acts, and to impose those penalties effectively on those who commit the acts one is trying to prevent. Lastly, it is true that, although in the subsequent Articles, the Convention includes fairly detailed provisions concerning the duty to punish (Articles III to VII), it reverts to the obligation of prevention, stated as a principle in Article I, only in Article VIII:

> "Any Contracting Party may call upon the competent organs of the United Nations to take such action under the Charter of the United Nations as they consider appropriate for the prevention and suppression of acts of genocide or any of the other acts enumerated in article III."

427. However, it is not the case that the obligation to prevent has no separate legal existence of its own; that it is, as it were, absorbed by the

obligation to punish, which is therefore the only duty the performance of which may be subject to review by the Court. The obligation on each contracting State to prevent genocide is both normative and compelling. It is not merged in the duty to punish, nor can it be regarded as simply a component of that duty. It has its own scope, which extends beyond the particular case envisaged in Article VIII, namely reference to the competent organs of the United Nations, for them to take such action as they deem appropriate. Even if and when these organs have been called upon, this does not mean that the States parties to the Convention are relieved of the obligation to take such action as they can to prevent genocide from occurring, while respecting the United Nations Charter and any decisions that may have been taken by its competent organs.

This is the reason why the Court will first consider the manner in which the Respondent has performed its obligation to prevent before examining the situation as regards the obligation to punish.

(1) The Obligation to Prevent Genocide

428. As regards the obligation to prevent genocide, the Court thinks it necessary to begin with the following introductory remarks and clarifications, amplifying the observations already made above.

429. First, the Genocide Convention is not the only international instrument providing for an obligation on the States parties to it to take certain steps to prevent the acts it seeks to prohibit. Many other instruments include a similar obligation, in various forms: see, for example, the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment of 10 December 1984 (Art. 2); the Convention on the Prevention and Punishment of Crimes against Internationally Protected Persons, Including Diplomatic Agents, of 14 December 1973 (Art. 4); the Convention on the Safety of United Nations and Associated Personnel of 9 December 1994 (Art. 11); the International Convention on the Suppression of Terrorist Bombings of 15 December 1997 (Art. 15). The content of the duty to prevent varies from one instrument to another, according to the wording of the relevant provisions, and depending on the nature of the acts to be prevented.

The decision of the Court does not, in this case, purport to establish a general jurisprudence applicable to all cases where a treaty instrument, or other binding legal norm, includes an obligation for States to prevent certain acts. Still less does the decision of the Court purport to find whether, apart from the texts applicable to specific fields, there is a general obligation on States to prevent the commission by other persons or entities of acts contrary to certain norms of general international law. The Court will therefore confine itself to determining the specific scope of the duty to prevent in the Genocide Convention, and to the extent that such a

determination is necessary to the decision to be given on the dispute before it. This will, of course, not absolve it of the need to refer, if need be, to the rules of law whose scope extends beyond the specific field covered by the Convention.

430. Secondly, it is clear that the obligation in question is one of conduct and not one of result, in the sense that a State cannot be under an obligation to succeed, whatever the circumstances, in preventing the commission of genocide: the obligation of States parties is rather to employ all means reasonably available to them, so as to prevent genocide so far as possible. A State does not incur responsibility simply because the desired result is not achieved; responsibility is however incurred if the State manifestly failed to take all measures to prevent genocide which were within its power, and which might have contributed to preventing the genocide. In this area the notion of "due diligence", which calls for an assessment *in concreto*, is of critical importance. Various parameters operate when assessing whether a State has duly discharged the obligation concerned. The first, which varies greatly from one State to another, is clearly the capacity to influence effectively the action of persons likely to commit, or already committing, genocide. This capacity itself depends, among other things, on the geographical distance of the State concerned from the scene of the events, and on the strength of the political links, as well as links of all other kinds, between the authorities of that State and the main actors in the events. The State's capacity to influence must also be assessed by legal criteria, since it is clear that every State may only act within the limits permitted by international law; seen thus, a State's capacity to influence may vary depending on its particular legal position vis-à-vis the situations and persons facing the danger, or the reality, of genocide. On the other hand, it is irrelevant whether the State whose responsibility is in issue claims, or even proves, that even if it had employed all means reasonably at its disposal, they would not have sufficed to prevent the commission of genocide. As well as being generally difficult to prove, this is irrelevant to the breach of the obligation of conduct in question, the more so since the possibility remains that the combined efforts of several States, each complying with its obligation to prevent, might have achieved the result — averting the commission of genocide — which the efforts of only one State were insufficient to produce.

431. Thirdly, a State can be held responsible for breaching the obligation to prevent genocide only if genocide was actually committed. It is at the time when commission of the prohibited act (genocide or any of the other acts listed in Article III of the Convention) begins that the breach

of an obligation of prevention occurs. In this respect, the Court refers to a general rule of the law of State responsibility, stated by the ILC in Article 14, paragraph 3, of its Articles on State Responsibility:

> ". . . . .
>
> 3. The breach of an international obligation requiring a State to prevent a given event occurs when the event occurs and extends over the entire period during which the event continues and remains not in conformity with that obligation."

This obviously does not mean that the obligation to prevent genocide only comes into being when perpetration of genocide commences; that would be absurd, since the whole point of the obligation is to prevent, or attempt to prevent, the occurrence of the act. In fact, a State's obligation to prevent, and the corresponding duty to act, arise at the instant that the State learns of, or should normally have learned of, the existence of a serious risk that genocide will be committed. From that moment onwards, if the State has available to it means likely to have a deterrent effect on those suspected of preparing genocide, or reasonably suspected of harbouring specific intent *(dolus specialis)*, it is under a duty to make such use of these means as the circumstances permit. However, if neither genocide nor any of the other acts listed in Article III of the Convention are ultimately carried out, then a State that omitted to act when it could have done so cannot be held responsible *a posteriori*, since the event did not happen which, under the rule set out above, must occur for there to be a violation of the obligation to prevent.

In consequence, in the present case the Court will have to consider the Respondent's conduct, in the light of its duty to prevent, solely in connection with the massacres at Srebrenica, because these are the only acts in respect of which the Court has concluded in this case that genocide was committed.

432. Fourth and finally, the Court believes it especially important to lay stress on the differences between the requirements to be met before a State can be held to have violated the obligation to prevent genocide — within the meaning of Article I of the Convention — and those to be satisfied in order for a State to be held responsible for "complicity in genocide" — within the meaning of Article III, paragraph *(e)* — as previously discussed. There are two main differences; they are so significant as to make it impossible to treat the two types of violation in the same way.

In the first place, as noted above, complicity always requires that some positive action has been taken to furnish aid or assistance to the perpetrators of the genocide, while a violation of the obligation to prevent

results from mere failure to adopt and implement suitable measures to prevent genocide from being committed. In other words, while complicity results from commission, violation of the obligation to prevent results from omission; this is merely the reflection of the notion that the ban on genocide and the other acts listed in Article III, including complicity, places States under a negative obligation, the obligation not to commit the prohibited acts, while the duty to prevent places States under positive obligations, to do their best to ensure that such acts do not occur.

In the second place, as also noted above, there cannot be a finding of complicity against a State unless at the least its organs were aware that genocide was about to be committed or was under way, and if the aid and assistance supplied, from the moment they became so aware onwards, to the perpetrators of the criminal acts or to those who were on the point of committing them, enabled or facilitated the commission of the acts. In other words, an accomplice must have given support in perpetrating the genocide with full knowledge of the facts. By contrast, a State may be found to have violated its obligation to prevent even though it had no certainty, at the time when it should have acted, but failed to do so, that genocide was about to be committed or was under way; for it to incur responsibility on this basis it is enough that the State was aware, or should normally have been aware, of the serious danger that acts of genocide would be committed. As will be seen below, this latter difference could prove decisive in the present case in determining the responsibility incurred by the Respondent.

433. In light of the foregoing, the Court will now consider the facts of the case. For the reasons stated above (paragraph 431), it will confine itself to the FRY's conduct vis-à-vis the Srebrenica massacres.

434. The Court would first note that, during the period under consideration, the FRY was in a position of influence over the Bosnian Serbs who devised and implemented the genocide in Srebrenica, unlike that of any of the other States parties to the Genocide Convention owing to the strength of the political, military and financial links between the FRY on the one hand and the Republika Srpska and the VRS on the other, which, though somewhat weaker than in the preceding period, nonetheless remained very close.

435. Secondly, the Court cannot but note that, on the relevant date, the FRY was bound by very specific obligations by virtue of the two Orders indicating provisional measures delivered by the Court in 1993. In particular, in its Order of 8 April 1993, the Court stated, *inter alia*, that although not able, at that early stage in the proceedings, to make "definitive findings of fact or of imputability" (*I.C.J. Reports 1993*, p. 22, para. 44) the FRY was required to ensure:

"that any military, paramilitary or irregular armed units which may be directed or supported by it, as well as any organizations and persons which may be subject to its control, direction or influence, do not commit any acts of genocide, of conspiracy to commit genocide, of direct and public incitement to commit genocide, or of complicity in genocide . . ." (*I.C.J. Reports 1993*, p. 24, para. 52 A (2)).

The Court's use, in the above passage, of the term "influence" is particularly revealing of the fact that the Order concerned not only the persons or entities whose conduct was attributable to the FRY, but also all those with whom the Respondent maintained close links and on which it could exert a certain influence. Although in principle the two issues are separate, and the second will be examined below, it is not possible, when considering the way the Respondent discharged its obligation of prevention under the Convention, to fail to take account of the obligation incumbent upon it, albeit on a different basis, to implement the provisional measures indicated by the Court.

436. Thirdly, the Court recalls that although it has not found that the information available to the Belgrade authorities indicated, as a matter of certainty, that genocide was imminent (which is why complicity in genocide was not upheld above: paragraph 424), they could hardly have been unaware of the serious risk of it once the VRS forces had decided to occupy the Srebrenica enclave. Among the documents containing information clearly suggesting that such an awareness existed, mention should be made of the above-mentioned report (see paragraphs 283 and 285 above) of the United Nations Secretary-General prepared pursuant to General Assembly resolution 53/35 on the "fall of Srebrenica" (United Nations doc. A/54/549), which recounts the visit to Belgrade on 14 July 1995 of the European Union negotiator Mr. Bildt to meet Mr. Milošević. Mr. Bildt, in substance, informed Mr. Milošević of his serious concern and

"pressed the President to arrange immediate access for the UNHCR to assist the people of Srebrenica, and for the ICRC to start to register those who were being treated by the BSA [Bosnian Serb Army] as prisoners of war".

437. The Applicant has drawn attention to certain evidence given by General Wesley Clark before the ICTY in the *Milošević* case. General Clark referred to a conversation that he had had with Milošević during the negotiation of the Dayton Agreement. He stated that

"I went to Milošević and I asked him. I said, 'If you have so much influence over these [Bosnian] Serbs, how could you have allowed

> General Mladić to have killed all those people at Srebrenica?' And he looked to me — at me. His expression was very grave. He paused before he answered, and he said, 'Well, General Clark, I warned him not to do this, but he didn't listen to me.' And it was in the context of all the publicity at the time about the Srebrenica massacre." (*Milošević*, IT-02-54-T, Transcript, 16 December 2003, pp. 30494-30495).

General Clark gave it as his opinion, in his evidence before the ICTY, that the circumstances indicated that Milošević had foreknowledge of what was to be "a military operation combined with a massacre" (*ibid.*, p. 30497). The ICTY record shows that Milošević denied ever making the statement to which General Clark referred, but the Trial Chamber nevertheless relied on General Clark's testimony in its Decision of 16 June 2004 when rejecting the Motion for Judgment of Acquittal (*Milošević*, IT-02-54-T, Decision on Motion for Judgment of Acquittal, 16 June 2004, para. 280).

438. In view of their undeniable influence and of the information, voicing serious concern, in their possession, the Yugoslav federal authorities should, in the view of the Court, have made the best efforts within their power to try and prevent the tragic events then taking shape, whose scale, though it could not have been foreseen with certainty, might at least have been surmised. The FRY leadership, and President Milošević above all, were fully aware of the climate of deep-seated hatred which reigned between the Bosnian Serbs and the Muslims in the Srebrenica region. As the Court has noted in paragraph 423 above, it has not been shown that the decision to eliminate physically the whole of the adult male population of the Muslim community of Srebrenica was brought to the attention of the Belgrade authorities. Nevertheless, given all the international concern about what looked likely to happen at Srebrenica, given Milošević's own observations to Mladić, which made it clear that the dangers were known and that these dangers seemed to be of an order that could suggest intent to commit genocide, unless brought under control, it must have been clear that there was a serious risk of genocide in Srebrenica. Yet the Respondent has not shown that it took any initiative to prevent what happened, or any action on its part to avert the atrocities which were committed. It must therefore be concluded that the organs of the Respondent did nothing to prevent the Srebrenica massacres, claiming that they were powerless to do so, which hardly tallies with their known influence over the VRS. As indicated above, for a State to be held responsible for breaching its obligation of prevention, it does not need to be proven that the State concerned definitely had the power to prevent the genocide; it is sufficient that it had the means to do so and that it manifestly refrained from using them.

Such is the case here. In view of the foregoing, the Court concludes that the Respondent violated its obligation to prevent the Srebrenica genocide in such a manner as to engage its international responsibility.

* *

(2) The Obligation to Punish Genocide

439. The Court now turns to the question of the Respondent's compliance with its obligation to punish the crime of genocide stemming from Article I and the other relevant provisions of the Convention.

440. In its fifth final submission, Bosnia and Herzegovina requests the Court to adjudge and declare:

> "5. That Serbia and Montenegro has violated and is violating its obligations under the Convention on the Prevention and Punishment of the Crime of Genocide for having failed and for failing to punish acts of genocide or any other act prohibited by the Convention on the Prevention and Punishment of the Crime of Genocide, and for having failed and for failing to transfer individuals accused of genocide or any other act prohibited by the Convention to the International Criminal Tribunal for the former Yugoslavia and to fully co-operate with this Tribunal."

441. This submission implicitly refers to Article VI of the Convention, according to which:

> "Persons charged with genocide or any of the other acts enumerated in article III shall be tried by a competent tribunal of the State in the territory of which the act was committed, or by such international penal tribunal as may have jurisdiction with respect to those Contracting Parties which shall have accepted its jurisdiction."

442. The Court would first recall that the genocide in Srebrenica, the commission of which it has established above, was not carried out in the Respondent's territory. It concludes from this that the Respondent cannot be charged with not having tried before its own courts those accused of having participated in the Srebrenica genocide, either as principal perpetrators or as accomplices, or of having committed one of the other acts mentioned in Article III of the Convention in connection with the Srebrenica genocide. Even if Serbian domestic law granted jurisdiction to its criminal courts to try those accused, and even supposing such proceedings were compatible with Serbia's other international obligations, *inter alia* its obligation to co-operate with the ICTY, to which the Court will revert below, an obligation to try the perpetrators of the Srebrenica massacre in Serbia's domestic courts cannot be deduced from Article VI. Article VI only obliges the Contracting Parties to institute and exercise

territorial criminal jurisdiction; while it certainly does not prohibit States, with respect to genocide, from conferring jurisdiction on their criminal courts based on criteria other than where the crime was committed which are compatible with international law, in particular the nationality of the accused, it does not oblige them to do so.

443. It is thus to the obligation for States parties to co-operate with the "international penal tribunal" mentioned in the above provision that the Court must now turn its attention. For it is certain that once such a court has been established, Article VI obliges the Contracting Parties "which shall have accepted its jurisdiction" to co-operate with it, which implies that they will arrest persons accused of genocide who are in their territory — even if the crime of which they are accused was committed outside it — and, failing prosecution of them in the parties' own courts, that they will hand them over for trial by the competent international tribunal.

444. In order to determine whether the Respondent has fulfilled its obligations in this respect, the Court must first answer two preliminary questions: does the ICTY constitute an "international penal tribunal" within the meaning of Article VI? And must the Respondent be regarded as having "accepted the jurisdiction" of the tribunal within the meaning of that provision?

445. As regards the first question, the Court considers that the reply must definitely be in the affirmative. The notion of an "international penal tribunal" within the meaning of Article VI must at least cover all international criminal courts created after the adoption of the Convention (at which date no such court existed) of potentially universal scope, and competent to try the perpetrators of genocide or any of the other acts enumerated in Article III. The nature of the legal instrument by which such a court is established is without importance in this respect. When drafting the Genocide Convention, its authors probably thought that such a court would be created by treaty: a clear pointer to this lies in the reference to "those Contracting Parties which shall have accepted [the] jurisdiction" of the international penal tribunal. Yet, it would be contrary to the object of the provision to interpret the notion of "international penal tribunal" restrictively in order to exclude from it a court which, as in the case of the ICTY, was created pursuant to a United Nations Security Council resolution adopted under Chapter VII of the Charter. The Court has found nothing to suggest that such a possibility was considered by the authors of the Convention, but no intention of seeking to exclude it can be imputed to them.

446. The question whether the Respondent must be regarded as having "accepted the jurisdiction" of the ICTY within the meaning of Article VI must consequently be formulated as follows: is the Respondent obliged to accept the jurisdiction of the ICTY, and to co-operate with the Tribunal by virtue of the Security Council resolution which established it, or of

some other rule of international law? If so, it would have to be concluded that, for the Respondent, co-operation with the ICTY constitutes both an obligation stemming from the resolution concerned and from the United Nations Charter, or from another norm of international law obliging the Respondent to co-operate, and an obligation arising from its status as a party to the Genocide Convention, this last clearly being the only one of direct relevance in the present case.

447. For the purposes of the present case, the Court only has to determine whether the FRY was under an obligation to co-operate with the ICTY, and if so, on what basis, from when the Srebrenica genocide was committed in July 1995. To that end, suffice it to note that the FRY was under an obligation to co-operate with the ICTY from 14 December 1995 at the latest, the date of the signing and entry into force of the Dayton Agreement between Bosnia and Herzegovina, Croatia and the FRY. Annex 1A of that treaty, made binding on the parties by virtue of its Article II, provides that they must fully co-operate, notably with the ICTY. Thus, from 14 December 1995 at the latest, and at least on the basis of the Dayton Agreement, the FRY must be regarded as having "accepted [the] jurisdiction" of the ICTY within the meaning of Article VI of the Convention. This fact is sufficient for the Court in its consideration of the present case, since its task is to rule upon the Respondent's compliance with the obligation resulting from Article VI of the Convention in relation to the Srebrenica genocide, from when it was perpetrated to the present day, and since the Applicant has not invoked any failure to respect the obligation to co-operate alleged to have occurred specifically between July and December 1995. Similarly, the Court is not required to decide whether, between 1995 and 2000, the FRY's obligation to co-operate had any legal basis besides the Dayton Agreement. Needless to say, the admission of the FRY to the United Nations in 2000 provided a further basis for its obligation to co-operate: but while the legal basis concerned was thereby confirmed, that did not change the scope of the obligation. There is therefore no need, for the purposes of assessing how the Respondent has complied with its obligation under Article VI of the Convention, to distinguish between the period before and the period after its admission as a Member of the United Nations, at any event from 14 December 1995 onwards.

448. Turning now to the facts of the case, the question the Court must answer is whether the Respondent has fully co-operated with the ICTY, in particular by arresting and handing over to the Tribunal any persons accused of genocide as a result of the Srebrenica genocide and finding themselves on its territory. In this connection, the Court would first observe that, during the oral proceedings, the Respondent asserted that the duty to co-operate had been complied with following the régime change in Belgrade in the year 2000, thus implicitly admitting that such had not been the case during the preceding period. The conduct of the

organs of the FRY before the régime change however engages the Respondent's international responsibility just as much as it does that of its State authorities from that date. Further, the Court cannot but attach a certain weight to the plentiful, and mutually corroborative, information suggesting that General Mladić, indicted by the ICTY for genocide, as one of those principally responsible for the Srebrenica massacres, was on the territory of the Respondent at least on several occasions and for substantial periods during the last few years and is still there now, without the Serb authorities doing what they could and can reasonably do to ascertain exactly where he is living and arrest him. In particular, counsel for the Applicant referred during the hearings to recent statements made by the Respondent's Minister for Foreign Affairs, reproduced in the national press in April 2006, and according to which the intelligence services of that State knew where Mladić was living in Serbia, but refrained from informing the authorities competent to order his arrest because certain members of those services had allegedly remained loyal to the fugitive. The authenticity and accuracy of those statements has not been disputed by the Respondent at any time.

449. It therefore appears to the Court sufficiently established that the Respondent failed in its duty to co-operate fully with the ICTY. This failure constitutes a violation by the Respondent of its duties as a party to the Dayton Agreement, and as a Member of the United Nations, and accordingly a violation of its obligations under Article VI of the Genocide Convention. The Court is of course without jurisdiction in the present case to declare that the Respondent has breached any obligations other than those under the Convention. But as the Court has jurisdiction to declare a breach of Article VI insofar as it obliges States to co-operate with the "international penal tribunal", the Court may find for that purpose that the requirements for the existence of such a breach have been met. One of those requirements is that the State whose responsibility is in issue must have "accepted [the] jurisdiction" of that "international penal tribunal"; the Court thus finds that the Respondent was under a duty to co-operate with the tribunal concerned pursuant to international instruments other than the Convention, and failed in that duty. On this point, the Applicant's submissions relating to the violation by the Respondent of Articles I and VI of the Convention must therefore be upheld.

450. It follows from the foregoing considerations that the Respondent failed to comply both with its obligation to prevent and its obligation to punish genocide deriving from the Convention, and that its international responsibility is thereby engaged.

* * *

X. The Question of Responsibility for Breach of the Court's Orders Indicating Provisional Measures

451. In its seventh submission Bosnia and Herzegovina requests the Court to adjudge and declare:

> "7. That in failing to comply with the Orders for indication of provisional measures rendered by the Court on 8 April 1993 and 13 September 1993 Serbia and Montenegro has been in breach of its international obligations and is under an obligation to Bosnia and Herzegovina to provide for the latter violation symbolic compensation, the amount of which is to be determined by the Court."

452. The Court observes that its "orders on provisional measures under Article 41 [of the Statute] have binding effect" (*LaGrand (Germany* v. *United States of America), Judgment, I.C.J. Reports 2001*, p. 506, para. 109). Although the Court only had occasion to make such a finding in a judgment subsequent to the Orders that it made in the present dispute, this does not affect the binding nature of those Orders, since in the Judgment referred to the Court did no more than give the provisions of the Statute the meaning and scope that they had possessed from the outset. It notes that provisional measures are aimed at preserving the rights of each of the parties pending the final decision of the Court. The Court's Orders of 8 April and 13 September 1993 indicating provisional measures created legal obligations which both Parties were required to satisfy.

453. The Court indicated the following provisional measures in the *dispositif*, paragraph 52, of its Order of 8 April 1993:

> "A. (1). . . . .
>
> The Government of the Federal Republic of Yugoslavia (Serbia and Montenegro) should immediately, in pursuance of its undertaking in the Convention on the Prevention and Punishment of the Crime of Genocide of 9 December 1948, take all measures within its power to prevent commission of the crime of genocide;
>
> (2). . . . .
>
> The Government of the Federal Republic of Yugoslavia (Serbia and Montenegro) should in particular ensure that any military, paramilitary or irregular armed units which may be directed or supported by it, as well as any organizations and persons which may be subject to its control, direction or influence, do not commit any acts of genocide, of conspiracy to commit genocide, of direct and public incitement to commit genocide, or of complicity in genocide, whether directed against the Muslim population of Bosnia and Herzegovina or against any other national, ethnical, racial or religious group;
>
> . . . .

> B. . . . .
>
> The Government of the Federal Republic of Yugoslavia (Serbia and Montenegro) and the Government of the Republic of Bosnia and Herzegovina should not take any action and should ensure that no action is taken which may aggravate or extend the existing dispute over the prevention or punishment of the crime of genocide, or render it more difficult of solution."

454. The Court reaffirmed these measures in the *dispositif* of its Order of 13 September 1993.

455. From the Applicant's written and oral pleadings as a whole, it is clear that the Applicant is not accusing the Respondent of failing to respect measure B above, and that its submissions relate solely to the measures indicated in paragraph A, subparagraphs (1) and (2). It is therefore only to that extent that the Court will consider whether the Respondent has fully complied with its obligation to respect the measures ordered by the Court.

456. The answer to this question may be found in the reasoning in the present Judgment relating to the Applicant's other submissions to the Court. From these it is clear that in respect of the massacres at Srebrenica in July 1995 the Respondent failed to fulfil its obligation indicated in paragraph 52 A (1) of the Order of 8 April 1993 and reaffirmed in the Order of 13 September 1993 to "take all measures within its power to prevent commission of the crime of genocide". Nor did it comply with the measure indicated in paragraph 52 A (2) of the Order of 8 April 1993, reaffirmed in the Order of 13 September 1993, insofar as that measure required it to "ensure that any . . . organizations and persons which may be subject to its . . . influence . . . do not commit any acts of genocide".

457. However, the remainder of the Applicant's seventh submission claiming that the Respondent failed to comply with the provisional measures indicated must be rejected for the reasons set out above in respect of the Applicant's other submissions (paragraphs 415 and 424).

458. As for the request that the Court hold the Respondent to be under an obligation to the Applicant to provide symbolic compensation, in an amount to be determined by the Court, for the breach thus found, the Court observes that the question of compensation for the injury caused to the Applicant by the Respondent's breach of aspects of the Orders indicating provisional measures merges with the question of compensation for the injury suffered from the violation of the corresponding obligations under the Genocide Convention. It will therefore be dealt with below, in connection with consideration of points *(b)* and *(c)* of the Respondent's sixth submission, which concern the financial compensation which the Applicant claims to be owed by the Respondent.

* * *

XI. The Question of Reparation

459. Having thus found that the Respondent has failed to comply with its obligations under the Genocide Convention in respect of the prevention and punishment of genocide, the Court turns to the question of reparation. The Applicant, in its final submissions, has asked the Court to decide that the Respondent

> "must redress the consequences of its international wrongful acts and, as a result of the international responsibility incurred for . . . violations of the Convention on the Prevention and Punishment of the Crime of Genocide, must pay, and Bosnia and Herzegovina is entitled to receive, in its own right and as *parens patriae* for its citizens, full compensation for the damages and losses caused" (submission 6 *(b)*).

The Applicant also asks the Court to decide that the Respondent

> "shall immediately take effective steps to ensure full compliance with its obligation to punish acts of genocide under the Convention on the Prevention and Punishment of the Crime of Genocide or any other act prohibited by the Convention and to transfer individuals accused of genocide or any other act prohibited by the Convention to the International Criminal Tribunal for the former Yugoslavia and to fully co-operate with this Tribunal" (submission 6 *(a)*),

and that the Respondent "shall provide specific guarantees and assurances that it will not repeat the wrongful acts complained of, the form of which guarantees and assurances is to be determined by the Court" (submission 6 *(d)*). These submissions, and in particular that relating to compensation, were however predicated on the basis that the Court would have upheld, not merely that part of the Applicant's claim as relates to the obligation of prevention and punishment, but also the claim that the Respondent has violated its substantive obligation not to commit genocide, as well as the ancillary obligations under the Convention concerning complicity, conspiracy and incitement, and the claim that the Respondent has aided and abetted genocide. The Court has now to consider what is the appropriate form of reparation for the other forms of violation of the Convention which have been alleged against the Respondent and which the Court has found to have been established, that is to say breaches of the obligations to prevent and punish.

460. The principle governing the determination of reparation for an internationally wrongful act is as stated by the Permanent Court of International Justice in the *Factory at Chorzów* case: that "reparation must, so far as possible, wipe out all the consequences of the illegal act and reestablish the situation which would, in all probability, have existed if that act had not been committed" (*P.C.I.J., Series A, No. 17*, p. 47: see

also Article 31 of the ILC's Articles on State Responsibility). In the circumstances of this case, as the Applicant recognizes, it is inappropriate to ask the Court to find that the Respondent is under an obligation of *restitutio in integrum*. Insofar as restitution is not possible, as the Court stated in the case of the *Gabčíkovo-Nagymaros Project (Hungary/Slovakia)*, "[i]t is a well-established rule of international law that an injured State is entitled to obtain compensation from the State which has committed an internationally wrongful act for the damage caused by it" (*I.C.J. Reports 1997*, p. 81, para. 152.; cf. *Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory, Advisory Opinion, I.C.J. Reports 2004*, p. 198, paras. 152-153; see also Article 36 of the ILC's Articles on State Responsibility). It is therefore appropriate to consider what were the consequences of the failure of the Respondent to comply with its obligations under the Genocide Convention to prevent and punish the crime of genocide, committed in Bosnia and Herzegovina, and what damage can be said to have been caused thereby.

461. The Court has found that the authorities of the Respondent could not have been unaware of the grave risk of genocide once the VRS forces had decided to take possession of the Srebrenica enclave, and that in view of its influence over the events, the Respondent must be held to have had the means of action by which it could seek to prevent genocide, and to have manifestly refrained from employing them (paragraph 438). To that extent therefore it failed to comply with its obligation of prevention under the Convention. The obligation to prevent the commission of the crime of genocide is imposed by the Genocide Convention on any State party which, in a given situation, has it in its power to contribute to restraining in any degree the commission of genocide. To make this finding, the Court did not have to decide whether the acts of genocide committed at Srebrenica would have occurred anyway even if the Respondent had done as it should have and employed the means available to it. This is because, as explained above, the obligation to prevent genocide places a State under a duty to act which is not dependent on the certainty that the action to be taken will succeed in preventing the commission of acts of genocide, or even on the likelihood of that outcome. It therefore does not follow from the Court's reasoning above in finding a violation by the Respondent of its obligation of prevention that the atrocious suffering caused by the genocide committed at Srebrenica would not have occurred had the violation not taken place.

462. The Court cannot however leave it at that. Since it now has to rule on the claim for reparation, it must ascertain whether, and to what extent, the injury asserted by the Applicant is the consequence of wrongful conduct by the Respondent with the consequence that the Respondent should be required to make reparation for it, in accordance with the

principle of customary international law stated above. In this context, the question just mentioned, whether the genocide at Srebrenica would have taken place even if the Respondent had attempted to prevent it by employing all means in its possession, becomes directly relevant, for the definition of the extent of the obligation of reparation borne by the Respondent as a result of its wrongful conduct. The question is whether there is a sufficiently direct and certain causal nexus between the wrongful act, the Respondent's breach of the obligation to prevent genocide, and the injury suffered by the Applicant, consisting of all damage of any type, material or moral, caused by the acts of genocide. Such a nexus could be considered established only if the Court were able to conclude from the case as a whole and with a sufficient degree of certainty that the genocide at Srebrenica would in fact have been averted if the Respondent had acted in compliance with its legal obligations. However, the Court clearly cannot do so. As noted above, the Respondent did have significant means of influencing the Bosnian Serb military and political authorities which it could, and therefore should, have employed in an attempt to prevent the atrocities, but it has not been shown that, in the specific context of these events, those means would have sufficed to achieve the result which the Respondent should have sought. Since the Court cannot therefore regard as proven a causal nexus between the Respondent's violation of its obligation of prevention and the damage resulting from the genocide at Srebrenica, financial compensation is not the appropriate form of reparation for the breach of the obligation to prevent genocide.

463. It is however clear that the Applicant is entitled to reparation in the form of satisfaction, and this may take the most appropriate form, as the Applicant itself suggested, of a declaration in the present Judgment that the Respondent has failed to comply with the obligation imposed by the Convention to prevent the crime of genocide. As in the *Corfu Channel (United Kingdom* v. *Albania)* case, the Court considers that a declaration of this kind is "in itself appropriate satisfaction" (*Merits, Judgment, I.C.J. Reports 1949*, pp. 35, 36), and it will, as in that case, include such a declaration in the operative clause of the present Judgment. The Applicant acknowledges that this failure is no longer continuing, and accordingly has withdrawn the request made in the Reply that the Court declare that the Respondent "has violated *and is violating* the Convention" (emphasis added).

464. The Court now turns to the question of the appropriate reparation for the breach by the Respondent of its obligation under the Convention to punish acts of genocide; in this respect, the Applicant asserts the existence of a continuing breach, and therefore maintains *(inter alia)* its request for a declaration in that sense. As noted above (paragraph 440), the Applicant includes under this heading the failure "to transfer individuals accused of genocide or any other act prohibited by the Conven-

tion to the International Criminal Tribunal for the former Yugoslavia and to fully co-operate with this Tribunal"; and the Court has found that in that respect the Respondent is indeed in breach of Article VI of the Convention (paragraph 449 above). A declaration to that effect is therefore one appropriate form of satisfaction, in the same way as in relation to the breach of the obligation to prevent genocide. However, the Applicant asks the Court in this respect to decide more specifically that

> "Serbia and Montenegro shall immediately take effective steps to ensure full compliance with its obligation to punish acts of genocide under the Convention on the Prevention and Punishment of the Crime of Genocide or any other act prohibited by the Convention and to transfer individuals accused of genocide or any other act prohibited by the Convention to the International Criminal Tribunal for the former Yugoslavia and to fully co-operate with this Tribunal."

465. It will be clear from the Court's findings above on the question of the obligation to punish under the Convention that it is satisfied that the Respondent has outstanding obligations as regards the transfer to the ICTY of persons accused of genocide, in order to comply with its obligations under Articles I and VI of the Genocide Convention, in particular in respect of General Ratko Mladić (paragraph 448). The Court will therefore make a declaration in these terms in the operative clause of the present Judgment, which will in its view constitute appropriate satisfaction.

466. In its final submissions, the Applicant also requests the Court to decide "that Serbia and Montenegro shall provide specific guarantees and assurances that it will not repeat the wrongful acts complained of, the form of which guarantees and assurances is to be determined by the Court". As presented, this submission relates to all the wrongful acts, i.e. breaches of the Genocide Convention, attributed by the Applicant to the Respondent, thus including alleged breaches of the Respondent's obligation not itself to commit genocide, as well as the ancillary obligations under the Convention concerning complicity, conspiracy and incitement. Insofar as the Court has not upheld these claims, the submission falls. There remains however the question whether it is appropriate to direct that the Respondent provide guarantees and assurances of non-repetition in relation to the established breaches of the obligations to prevent and punish genocide. The Court notes the reasons advanced by counsel for the Applicant at the hearings in support of the submission, which relate for the most part to "recent events [which] cannot fail to cause concern as to whether movements in Serbia and Montenegro calling for genocide have disappeared". It considers that these indications do not constitute sufficient grounds for requiring guarantees of non-repetition. The Applicant also referred in this connection to the question of non-compliance with provisional measures, but this matter has already been examined above (paragraphs 451 to 458), and will be mentioned further below. In

the circumstances, the Court considers that the declaration referred to in paragraph 465 above is sufficient as regards the Respondent's continuing duty of punishment, and therefore does not consider that this is a case in which a direction for guarantees of non-repetition would be appropriate.

467. Finally, the Applicant has presented the following submission:

> "That in failing to comply with the Orders for indication of provisional measures rendered by the Court on 8 April 1993 and 13 September 1993 Serbia and Montenegro has been in breach of its international obligations and is under an obligation to Bosnia and Herzegovina to provide for the latter violation symbolic compensation, the amount of which is to be determined by the Court."

The provisional measures indicated by the Court's Order of 8 April 1993, and reiterated by the Order of 13 September 1993, were addressed specifically to the Respondent's obligation "to prevent commission of the crime of genocide" and to certain measures which should "in particular" be taken to that end (*I.C.J. Reports 1993*, p. 24, para. 52 (A) (1) and (2)).

468. Provisional measures under Article 41 of the Statute are indicated "pending [the] final decision" in the case, and the measures indicated in 1993 will thus lapse on the delivery of the present Judgment (cf. *Anglo-Iranian Oil Co. (United Kingdom* v. *Iran), Preliminary Objections, Judgment, I.C.J. Reports 1952*, p. 114; *Military and Paramilitary Activities in and against Nicaragua (Nicaragua* v. *United States of America), Jurisdiction and Admissibility, Judgment, I.C.J. Reports 1984*, p. 442, para. 112). However, as already observed (paragraph 452 above), orders made by the Court indicating provisional measures under Article 41 of the Statute have binding effect, and their purpose is to protect the rights of either party, pending the final decision in the case.

469. The Court has found above (paragraph 456) that, in respect of the massacres at Srebrenica in July 1995, the Respondent failed to take measures which would have satisfied the requirements of paragraphs 52 (A) (1) and (2) of the Court's Order of 8 April 1993 (reaffirmed in the Order of 13 September 1993). The Court however considers that, for purposes of reparation, the Respondent's non-compliance with the provisional measures ordered is an aspect of, or merges with, its breaches of the substantive obligations of prevention and punishment laid upon it by the Convention. The Court does not therefore find it appropriate to give effect to the Applicant's request for an order for symbolic compensation in this respect. The Court will however include in the operative clause of the present Judgment, by way of satisfaction, a declaration that the Respondent has failed to comply with the Court's Orders indicating provisional measures.

470. The Court further notes that one of the provisional measures indicated in the Order of 8 April and reaffirmed in that of 13 September 1993 was addressed to both Parties. The Court's findings in paragraphs 456 to 457 and 469 are without prejudice to the question whether the Applicant did not also fail to comply with the Orders indicating provisional measures.

* * *

XII. Operative Clause

471. For these reasons,

The Court,

(1) by ten votes to five,

Rejects the objections contained in the final submissions made by the Respondent to the effect that the Court has no jurisdiction; and *affirms* that it has jurisdiction, on the basis of Article IX of the Convention on the Prevention and Punishment of the Crime of Genocide, to adjudicate upon the dispute brought before it on 20 March 1993 by the Republic of Bosnia and Herzegovina;

in favour: *President* Higgins; *Vice-President* Al-Khasawneh; *Judges* Owada, Simma, Tomka, Abraham, Keith, Sepúlveda-Amor, Bennouna; *Judge* ad hoc Mahiou;

against: *Judges* Ranjeva, Shi, Koroma, Skotnikov; *Judge* ad hoc Kreća;

(2) by thirteen votes to two,

Finds that Serbia has not committed genocide, through its organs or persons whose acts engage its responsibility under customary international law, in violation of its obligations under the Convention on the Prevention and Punishment of the Crime of Genocide;

in favour: *President* Higgins; *Judges* Ranjeva, Shi, Koroma, Owada, Simma, Tomka, Abraham, Keith, Sepúlveda-Amor, Bennouna, Skotnikov; *Judge* ad hoc Kreća;

against: *Vice-President* Al-Khasawneh; *Judge* ad hoc Mahiou;

(3) by thirteen votes to two,

Finds that Serbia has not conspired to commit genocide, nor incited the commission of genocide, in violation of its obligations under the Convention on the Prevention and Punishment of the Crime of Genocide;

in favour: *President* Higgins; *Judges* Ranjeva, Shi, Koroma, Owada, Simma, Tomka, Abraham, Keith, Sepúlveda-Amor, Bennouna, Skotnikov; *Judge* ad hoc Kreća;

against: *Vice-President* Al-Khasawneh; *Judge* ad hoc Mahiou;

(4) by eleven votes to four,

Finds that Serbia has not been complicit in genocide, in violation of its obligations under the Convention on the Prevention and Punishment of the Crime of Genocide;

IN FAVOUR: *President* Higgins; *Judges* Ranjeva, Shi, Koroma, Owada, Simma, Tomka, Abraham, Sepúlveda-Amor, Skotnikov; *Judge* ad hoc Kreća;

AGAINST: *Vice-President* Al-Khasawneh; *Judges* Keith, Bennouna; *Judge* ad hoc Mahiou;

(5) by twelve votes to three,

Finds that Serbia has violated the obligation to prevent genocide, under the Convention on the Prevention and Punishment of the Crime of Genocide, in respect of the genocide that occurred in Srebrenica in July 1995;

IN FAVOUR: *President* Higgins; *Vice-President* Al-Khasawneh; *Judges* Ranjeva, Shi, Koroma, Owada, Simma, Abraham, Keith, Sepúlveda-Amor, Bennouna; *Judge* ad hoc Mahiou;

AGAINST: *Judges* Tomka, Skotnikov; *Judge* ad hoc Kreća;

(6) by fourteen votes to one,

Finds that Serbia has violated its obligations under the Convention on the Prevention and Punishment of the Crime of Genocide by having failed to transfer Ratko Mladić, indicted for genocide and complicity in genocide, for trial by the International Criminal Tribunal for the former Yugoslavia, and thus having failed fully to co-operate with that Tribunal;

IN FAVOUR: *President* Higgins; *Vice-President* Al-Khasawneh; *Judges* Ranjeva, Shi, Koroma, Owada, Simma, Tomka, Abraham, Keith, Sepúlveda-Amor, Bennouna, Skotnikov; *Judge* ad hoc Mahiou;

AGAINST: *Judge* ad hoc Kreća;

(7) by thirteen votes to two,

Finds that Serbia has violated its obligation to comply with the provisional measures ordered by the Court on 8 April and 13 September 1993 in this case, inasmuch as it failed to take all measures within its power to prevent genocide in Srebrenica in July 1995;

IN FAVOUR: *President* Higgins; *Vice-President* Al-Khasawneh; *Judges* Ranjeva, Shi, Koroma, Owada, Simma, Tomka, Abraham, Keith, Sepúlveda-Amor, Bennouna; *Judge* ad hoc Mahiou;

AGAINST: *Judge* Skotnikov; *Judge* ad hoc Kreća;

(8) by fourteen votes to one,

Decides that Serbia shall immediately take effective steps to ensure full compliance with its obligation under the Convention on the Prevention

and Punishment of the Crime of Genocide to punish acts of genocide as defined by Article II of the Convention, or any of the other acts proscribed by Article III of the Convention, and to transfer individuals accused of genocide or any of those other acts for trial by the International Criminal Tribunal for the former Yugoslavia, and to co-operate fully with that Tribunal;

IN FAVOUR: *President* Higgins; *Vice-President* Al-Khasawneh; *Judges* Ranjeva, Shi, Koroma, Owada, Simma, Tomka, Abraham, Keith, Sepúlveda-Amor, Bennouna, Skotnikov; *Judge* ad hoc Mahiou;

AGAINST: *Judge* ad hoc Kreća;

(9) by thirteen votes to two,

Finds that, as regards the breaches by Serbia of the obligations referred to in subparagraphs (5) and (7) above, the Court's findings in those paragraphs constitute appropriate satisfaction, and that the case is not one in which an order for payment of compensation, or, in respect of the violation referred to in subparagraph (5), a direction to provide assurances and guarantees of non-repetition, would be appropriate.

IN FAVOUR: *President* Higgins; *Judges* Ranjeva, Shi, Koroma, Owada, Simma, Tomka, Abraham, Keith, Sepúlveda-Amor, Bennouna, Skotnikov; *Judge* ad hoc Kreća;

AGAINST: *Vice-President* Al-Khasawneh; *Judge* ad hoc Mahiou.

Done in English and in French, the English text being authoritative, at the Peace Palace, The Hague, this twenty-sixth day of February, two thousand and seven, in three copies, one of which will be placed in the archives of the Court and the others transmitted to the Government of Bosnia and Herzegovina and the Government of Serbia, respectively.

(Signed) Rosalyn HIGGINS,
President.

(Signed) Philippe COUVREUR,
Registrar.

Vice-President AL-KHASAWNEH appends a dissenting opinion to the Judgment of the Court; Judges RANJEVA, SHI and KOROMA append a joint dissenting opinion to the Judgment of the Court; Judge RANJEVA appends a separate opinion to the Judgment of the Court; Judges SHI and KOROMA append a joint declaration to the Judgment of the Court; Judges OWADA and TOMKA append separate opinions to the Judgment of the Court; Judges KEITH, BENNOUNA and SKOTNIKOV append declarations

to the Judgment of the Court; Judge *ad hoc* MAHIOU appends a dissenting opinion to the Judgment of the Court; Judge *ad hoc* KREĆA appends a separate opinion to the Judgment of the Court.

(Initialled) R.H.

(Initialled) Ph.C.

Annex 21

COUR INTERNATIONALE DE JUSTICE

RECUEIL DES ARRÊTS,
AVIS CONSULTATIFS ET ORDONNANCES

ACTIVITÉS ARMÉES SUR LE TERRITOIRE DU CONGO

(RÉPUBLIQUE DÉMOCRATIQUE DU CONGO *c.* OUGANDA)

RÉPARATIONS

ARRÊT DU 9 FÉVRIER 2022

2022

INTERNATIONAL COURT OF JUSTICE

REPORTS OF JUDGMENTS,
ADVISORY OPINIONS AND ORDERS

ARMED ACTIVITIES ON THE TERRITORY OF THE CONGO

(DEMOCRATIC REPUBLIC OF THE CONGO *v.* UGANDA)

REPARATIONS

JUDGMENT OF 9 FEBRUARY 2022

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9 FÉVRIER 2022

ARRÊT

ACTIVITÉS ARMÉES
SUR LE TERRITOIRE DU CONGO

(RÉPUBLIQUE DÉMOCRATIQUE DU CONGO c. OUGANDA)

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ON THE TERRITORY OF THE CONGO

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REPARATIONS

9 FEBRUARY 2022

JUDGMENT

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ABBREVIATIONS, ACRONYMS AND SHORT FORMS

ACLED	Armed Conflict Location and Event Data Project
ADRASS	Association pour le développement de la recherche appliquée en sciences sociales (Association for the Development of Applied Research in Social Sciences)
ALC	Armée de libération du Congo (Congo Liberation Army)
Collier and Hoeffler assessment	Assessment prepared by Mr. Paul Collier and Ms Anke Hoeffler, at the request of Uganda, on a study carried out in 2016, at the request of the DRC, estimating the macroeconomic damage caused by the 1998-2003 war
Congolese Commission of Inquiry	Expert Commission established by the Congolese Government in 2008 to identify the victims and assess the damage they suffered as a result of Uganda's unlawful armed activities
DRC	Democratic Republic of the Congo
EECC	Eritrea-Ethiopia Claims Commission
FRPI	Force de résistance patriotique en Ituri (Patriotic Resistance Force in Ituri)
HRW	Human Rights Watch
ICC	International Criminal Court
ICCN	Institut congolais pour la conservation de la nature (Congolese Institute for Nature Conservation)
ILC	International Law Commission
ILC Articles on State Responsibility	The International Law Commission's Articles on Responsibility of States for Internationally Wrongful Acts
Inter-Agency Report	Report of the (United Nations) inter-agency assessment mission to Kisangani
IRC	International Rescue Committee
Kinshasa study	Study carried out in 2016, at the request of the DRC, by two experts from the University of Kinshasa to estimate the macroeconomic damage caused by the 1998-2003 war

Mapping Report	Report of the Mapping Exercise documenting the most serious violations of human rights and international humanitarian law committed within the territory of the Democratic Republic of the Congo between March 1993 and June 2003, published in 2010 by the Office of the United Nations High Commissioner for Human Rights
MLC	Mouvement de libération du Congo (Congo Liberation Movement)
MONUC	Mission de l'Organisation des Nations Unies en République démocratique du Congo (United Nations Organization Mission in the Democratic Republic of the Congo)
Porter Commission Report	Final Report of the Judicial Commission of Inquiry into Allegations into Illegal Exploitation of Natural Resources and Other Forms of Wealth in the Democratic Republic of Congo 2001 (November 2002)
SNEL	Société nationale d'électricité (National Electricity Company)
UBOS	Ugandan Bureau of Statistics
UCDP	Uppsala Conflict Data Program
UNCC	United Nations Compensation Commission
UNPE	United Nations Panel of Experts on the Illegal Exploitation of Natural Resources and Other Forms of Wealth of the Democratic Republic of the Congo
UPC	Union des patriotes congolais (Union of Congolese Patriots)
UPDF	Uganda Peoples' Defence Forces
2005 Judgment	Judgment of the Court on the merits in the case concerning *Armed Activities on the Territory of the Congo (Democratic Republic of the Congo* v. *Uganda)* (*I.C.J. Reports 2005*, p. 168)

INTERNATIONAL COURT OF JUSTICE

YEAR 2022

2022
9 February
General List
No. 116

9 February 2022

ARMED ACTIVITIES ON THE TERRITORY OF THE CONGO

(DEMOCRATIC REPUBLIC OF THE CONGO *v.* UGANDA)

REPARATIONS

Determination of the amount of reparation by the Court following failure by the Parties to settle this question by agreement — 2005 Judgment and elements on which it was based.

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Context.

Case concerning one of the most complex and deadliest armed conflicts on the African continent — Numerous actors involved in conflict, including armed forces of various States and irregular forces — Violation of fundamental principles and rules of international law — Difficulty of establishing the course of events due to the passage of time.

* *

Principles and rules applicable to the assessment of reparations.

Article 31 of the ILC Articles on State Responsibility — Status of Ituri as an occupied territory and duty of vigilance of Uganda — For Uganda to establish that a particular injury in Ituri was not caused by failure to meet its obligations as an occupying Power — No reparation for damage caused by rebel groups outside Ituri since they were not under Uganda's control — Reparation for damage caused by Uganda's unlawful support of armed groups.

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Causal nexus.

Must be sufficiently direct and certain — May vary depending on the primary

rule violated and nature and extent of the injury — Difficulties of establishing causal nexus in case of damage resulting from war and in case of concurrent causes or multiple actors — Importance of distinguishing between Ituri and other areas when analysing causal nexus.

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Nature, form and amount of reparation.

Obligation to make full reparation — Compensatory nature of reparation — Intended to benefit all those who suffered injury — Absence of adequate evidence of extent of material damage does not necessarily preclude award of compensation — Court may, on an exceptional basis, award compensation in the form of a global sum where the evidence leaves no doubt that an internationally wrongful act has caused a substantial injury, but does not allow a precise evaluation of the extent or scale of such injury — Less rigorous standards of proof adopted by judicial or other bodies in proceedings with large numbers of victims who have suffered serious injury in situations of armed conflict and, in this context, levels of compensation reduced in order to account for lower standard of proof — Question whether account should be taken of financial burden imposed on responsible State.

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Questions of proof.

Court may form an appreciation of extent of damage without specific information about each victim or property affected.

Burden of proof — Party alleging a fact generally bears burden of proof — Rule must be applied flexibly in situations where respondent may be in better position to establish certain facts — Burden of proof varies depending on subject-matter and nature of dispute — It is for the Court to evaluate all evidence produced by the Parties — In occupied Ituri, it is for Uganda to establish that a given injury was not caused by its failure to meet its obligations as occupying Power — In other areas, litigant seeking to establish a fact generally bears burden of proof.

Standard of proof — May vary from case to case and may depend on gravity of acts alleged — Question of weight to be given to different kinds of evidence — Practice of international bodies that have addressed reparation for mass violations in context of armed conflict — Standard of proof at merits phase higher than at phase on reparation — Evidence in case file often insufficient to reach precise determination of amount of compensation due — Court must take account of investigative reports, in particular those from United Nations organs — Porter Commission Report — Mapping Report — Reports by Court-appointed experts.

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Forms of damage subject to reparation.

2005 Judgment determined Uganda's obligation to repair — Court's task at

present stage is to rule on nature and amount of reparation owed — Claims for reparation must fall within scope of prior findings on liability.

* *

Compensation claimed by the DRC.

Damage to persons.

Loss of life — On the basis of evidence reviewed, Court's conclusion that neither the materials presented by the DRC, nor the reports provided by the Court-appointed experts or prepared by United Nations bodies are sufficient to determine a precise or even approximate number of civilian deaths for which Uganda owes reparation — Evidence presented to Court suggests number of deaths attributable to Uganda falls in range of 10,000 to 15,000 persons — Valuation — Court will award compensation for loss of civilian lives as part of global sum for all damage to persons.

Injuries to persons — On the basis of evidence, Court is unable to determine an approximate estimate of number of civilians injured — Available evidence confirms occurrence of significant number of injuries in many localities — Valuation — Court will award compensation for personal injuries as part of global sum for all damage to persons.

Rape and sexual violence — Sexual violence is frequently underreported and difficult to document — Impossible to derive even broad estimate of number of victims from the available evidence — Rape and other forms of sexual violence committed on large and widespread scale — Valuation — Court will award compensation for rape and sexual violence as part of global sum for all damage to persons.

Recruitment and deployment of child soldiers — Limited evidence supporting DRC's claims regarding number of child soldiers — Various indications confirm that a significant number of children were recruited or deployed as child soldiers in Ituri — Claim not limited to Ituri — Valuation — Court will award compensation for recruitment and deployment of child soldiers as part of global sum for all damage to persons.

Displacement of populations — Evidence presented does not establish a sufficiently certain number of displaced persons for whom compensation could be awarded separately —Uganda owes reparations in relation to significant number of displaced persons — Displacements in Ituri alone appear to have been in range of 100,000 to 500,000 persons — Valuation — Court will award compensation for displacement of populations as part of global sum for all damage to persons.

Global sum of US$225,000,000 awarded for loss of life and other damage to persons.

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Damage to property.

Ituri — Evidence presented does not permit even to approximate extent of dam-

age — Report of Court-appointed expert does not provide any relevant additional information — Mapping Report and other United Nations reports establish convincing record of large-scale pillaging in Ituri — Valuation.

Outside Ituri — Insufficient evidence regarding which damage to property was caused by Uganda — Evidence presented does not permit even to approximate extent of damage — Report of Court-appointed expert does not provide any relevant additional information — Valuation — Account taken of available evidence in arriving at global sum for all damage to property.

Société nationale d'électricité (SNEL) — Given Government's close relationship with SNEL, DRC could have been expected to provide evidence substantiating its claim — DRC has not discharged its burden of proof regarding claim for damage to SNEL.

Military property — Given direct authority of Government over its armed forces, DRC can be expected to substantiate its claims more fully — Claim dismissed for lack of evidence.

Global sum of US$40,000,000 awarded for damage to property.

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Damage related to natural resources.

Outside Ituri, Uganda owes reparation for damage related to natural resources where UPDF involved — In Ituri, Uganda owes reparation for all acts of looting, plundering or exploitation of natural resources — Methodological approach of Court-appointed expert is convincing — Value extracted by civilians from natural resources in Ituri.

Minerals — Uganda responsible for damage resulting from looting, plundering and exploitation of gold, diamonds and coltan — Methodological approach taken by the Court-appointed expert is convincing overall — Court to award compensation for gold, diamonds and coltan as part of global sum for damage to natural resources — Given limited evidence relating to tin and tungsten, these two minerals not taken into account in determining compensation.

Flora — Inclusion of coffee in expert report permissible — Uganda owes reparation for looting, plundering and exploitation of timber — Expert calculations based on rougher estimates than with gold — Amount of compensation at level lower than expert's estimate — Court to award compensation for coffee and timber as part of global sum for damage to natural resources — DRC did not provide Court any basis for assessing damage to environment through deforestation — Claim for damage resulting from deforestation dismissed for lack of evidence.

Fauna — Uganda liable to make reparation for damage in part of Okapi Wildlife Reserve and Virunga National Park in Ituri, where it was occupying Power — Court to take damage to fauna into account when awarding global sum for damage to natural resources.

Global sum of US$60,000,000 awarded for damage to natural resources.

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Macroeconomic damage.

DRC has not demonstrated sufficiently direct and certain causal nexus between the conduct of Uganda and alleged macroeconomic damage — DRC has not provided a basis for arriving at even rough estimate of possible macroeconomic damage — Claim rejected.

* *

Satisfaction.

Request relating to conduct of criminal investigations or prosecutions — No need for the Court to order any additional specific measure of satisfaction — Request to order payment for creation of fund to promote reconciliation between Hema and Lendu in Ituri — Material damage caused by ethnic conflicts in Ituri already covered by compensation awarded for damage to persons and property — Request to order payment for non-material harm — No basis for such request as non-material harm is already included in the claims for compensation for different forms of damage.

* *

Other requests.

No sufficient reason that would justify departing from the general rule in Article 64 of the Statute — No need to award pre-judgment interest — Post-judgment interest of 6 per cent will accrue on any overdue amount — No reason for the Court to remain seised of the case.

* *

Total sum of US$325,000,000 awarded — Sum to be paid in five annual instalments of US$65,000,000 — Court satisfied that total sum and terms of payment remain within capacity of Uganda to pay; therefore no need to consider the question whether account should be taken of financial burden imposed on responsible State.

JUDGMENT

Present: *President* Donoghue; *Vice-President* Gevorgian; *Judges* Tomka, Abraham, Bennouna, Yusuf, Xue, Sebutinde, Bhandari, Robinson, Salam, Iwasawa, Nolte; *Judge* ad hoc Daudet; *Registrar* Gautier.

In the case concerning armed activities on the territory of the Congo,

between

the Democratic Republic of the Congo,

represented by

H.E. Mr. Bernard Takaishe Ngumbi, Deputy Prime Minister, Minister of Justice, Keeper of the Seals a.i.,

as Head of Delegation;

H.E. Mr. Paul-Crispin Kakhozi, Ambassador of the Democratic Republic of the Congo to the Kingdom of Belgium, the Kingdom of the Netherlands, the Grand Duchy of Luxembourg and the European Union,

as Agent;

Mr. Ivon Mingashang, member of the Brussels and Kinshasa/Gombe Bars, Professor and Head of the Department of Public International Law and International Relations at the Faculty of Law, University of Kinshasa,

as Co-Agent and Legal Counsel;

Ms Monique Chemillier-Gendreau, Emeritus Professor of Public Law and Political Science at the University Paris Diderot,
Mr. Mathias Forteau, Professor of Public Law at the University Paris Nanterre,
Mr. Pierre Bodeau-Livinec, Professor of Public Law at the University Paris Nanterre,
Ms Muriel Ubéda-Saillard, Professor of Public Law at the University of Lille,
Ms Raphaëlle Nollez-Goldbach, Director of Studies in Law and Public Administration at the Ecole normale supérieure, Paris, in charge of research at the French National Centre for Scientific Research (CNRS),
Mr. Pierre Klein, Professor of International Law at the Université libre de Bruxelles,
Mr. Nicolas Angelet, member of the Brussels Bar and Professor of International Law at the Université libre de Bruxelles,
Mr. Olivier Corten, Professor of International Law at the Université libre de Bruxelles,
Mr. Auguste Mampuya Kanunk'a-Tshiabo, Emeritus Professor of International Law at the University of Kinshasa,
Mr. Jean-Paul Segihobe Bigira, Professor of International Law at the University of Kinshasa and member of the Kinshasa/Gombe Bar,
Mr. Philippe Sands, QC, Professor of International Law, University College London, Barrister, Matrix Chambers, London,
Ms Michelle Butler, Barrister, Matrix Chambers, London,

as Counsel and Advocates;

Mr. Jacques Mbokani Bateghana, Doctor of Law of the Université catholique de Louvain and Professor of International Law at the University of Goma,
Mr. Paul Clark, Barrister, Garden Court Chambers, London,

as Counsel;

Mr. François Habiyaremye Muhashy Kayagwe, Professor at the University of Goma,
Mr. Justin Okana Nsiawi Lebun, Professor of Economics at the University of Kinshasa,
Mr. Pierre Ebbe Monga, Legal Counsel at the Ministry of Foreign Affairs of the Democratic Republic of the Congo,

Ms Nicole Ntumba Bwatshia, Professor of International Law at the University of Kinshasa and Principal Adviser to the President of the Republic in Legal and Administrative Matters,
Mr. Andrew Maclay, Managing Director, Secretariat International, London,

as Advisers;

Mr. Sylvain Lumu Mbaya, PhD student in international law at the University of Bordeaux and the University of Kinshasa, and member of the Kinshasa/Matete Bar (Eureka Law Firm SCPA),
Mr. Jean-Paul Mwanza Kambongo, Lecturer at the University of Kinshasa and member of the Kinshasa/Gombe Bar (Eureka Law Firm SCPA),
Mr. Jean-Jacques Tshiamala wa Tshiamala, member of the Kongo Central Bar (Eureka Law Firm SCPA) and Lecturer in International Law at the Centre de recherche en sciences humaines in Kinshasa,
Ms Blandine Merveille Mingashang, member of the Kinshasa/Matete Bar (Eureka Law Firm SCPA) and Lecturer in International Law at the Centre de recherche en sciences humaines in Kinshasa,
Mr. Glodie Kinsemi Malambu, member of the Kongo Central Bar and Lecturer in International Law at the Centre de recherche en sciences humaines in Kinshasa,
Ms Espérance Mujinga Mutombo, member of the Kinshasa/Matete Bar (Eureka Law Firm SCPA) and Lecturer in International Law at the Centre de recherche en sciences humaines in Kinshasa,
Mr. Trésor Lungungu Kidimba, PhD student in international law and Lecturer at the University of Kinshasa, member of the Kinshasa/Gombe Bar,
Mr. Amani Cirimwami Ezéchiel, Research Fellow at the Max Planck Institute Luxembourg for Procedural Law and PhD student at the Université catholique de Louvain and the Vrije Universiteit Brussel,
Mr. Stefano D'Aloia, PhD student at the Université libre de Bruxelles,
Ms Marta Duch Gimenéz, Lecturer at the Université catholique de Louvain,

as Assistants,

and

the Republic of Uganda,

represented by

The Honourable William Byaruhanga, SC, Attorney General of the Republic of Uganda,

as Agent (until 4 February 2022);

The Honourable Kiryowa Kiwanuka, Attorney General of the Republic of Uganda,

as Agent (from 4 February 2022);

H.E. Ms Mirjam Blaak Sow, Ambassador of the Republic of Uganda to the Kingdom of Belgium, the Kingdom of the Netherlands, the Grand Duchy of Luxembourg and the European Union,

as Deputy Agent;

Mr. Francis Atoke, Solicitor General,
Mr. Christopher Gashirabake, Deputy Solicitor General,
Ms Christine Kaahwa, acting Director Civil Litigation,

Mr. John Bosco Rujagaata Suuza, Commissioner Contracts and Negotiations,
Mr. Jeffrey Ian Atwine, Principal State Attorney,
Mr. Richard Adrole, Principal State Attorney,
Mr. Fadhil Mawanda, Principal State Attorney,
Mr. Geoffrey Wangolo Madete, Senior State Attorney,
Mr. Alex Byaruhanga, Senior State Attorney,

as Counsel;

Mr. Dapo Akande, Professor of Public International Law, University of Oxford, Essex Court Chambers, member of the Bar of England and Wales,

Mr. Pierre d'Argent, Professor of International Law at the Université catholique de Louvain, member of the Institut de droit international, Foley Hoag LLP, member of the Brussels Bar,
Mr. Lawrence H. Martin, Attorney at Law, Foley Hoag LLP, member of the Bars of the United States Supreme Court, the District of Columbia and the Commonwealth of Massachusetts,
Mr. Sean Murphy, Manatt/Ahn Professor of International Law, The George Washington University Law School, member of the Bar of Virginia,

Mr. Yuri Parkhomenko, Attorney at Law, Foley Hoag LLP, member of the Bar of the District of Columbia,
Mr. Alain Pellet, Emeritus Professor of the University Paris Nanterre, former Chairman of the International Law Commission, member of the Institut de droit international,

as Counsel and Advocates;

Ms Rebecca Gerome, Attorney at Law, Foley Hoag LLP, member of the Bars of the District of Columbia and New York,
Mr. Peter Tzeng, Attorney at Law, Foley Hoag LLP, member of the Bars of the District of Columbia and New York,
Mr. Benjamin Salas Kantor, Attorney at Law, Foley Hoag LLP, member of the Bar of the Supreme Court of the Republic of Chile,
Mr. Ysam Soualhi, Researcher, Centre Jean Bodin, University of Angers,

as Counsel;

H.E. Mr. Arthur Sewankambo Kafeero, acting Director, Regional and International Affairs, Ministry of Foreign Affairs,
Colonel Timothy Nabaasa Kanyogonya, Director of Legal Affairs, Chieftaincy of Military Intelligence — Uganda Peoples' Defence Forces, Ministry of Defence,

as Advisers,

The Court,

composed as above,

after deliberation,

delivers the following Judgment:

1. On 23 June 1999, the Democratic Republic of the Congo (hereinafter the "DRC") filed in the Registry of the Court an Application instituting proceedings against the Republic of Uganda (hereinafter "Uganda") in respect of a dispute concerning "acts of *armed aggression* perpetrated by Uganda on the territory of

the Democratic Republic of the Congo, in flagrant violation of the United Nations Charter and of the Charter of the Organization of African Unity" (emphasis in the original). In order to found the jurisdiction of the Court, the Application relied on the declarations made by the two Parties accepting the Court's compulsory jurisdiction under Article 36, paragraph 2, of the Statute of the Court.

2. Since the Court included upon the Bench no judge of the nationality of the Parties at the time of the filing of the Application, each Party availed itself of its right under Article 31 of the Statute to choose a judge *ad hoc* to sit in the case. The DRC first chose Mr. Joe Verhoeven, who resigned on 15 May 2019, and then Mr. Yves Daudet. Uganda chose Mr. James L. Kateka. Following the election to the Court, with effect from 6 February 2012, of Ms Julia Sebutinde, a Ugandan national, Mr. Kateka ceased to sit as judge *ad hoc* in the case, in accordance with Article 35, paragraph 6, of the Rules of Court.

3. By an Order of 21 October 1999, the Court fixed 21 July 2000 and 21 April 2001, respectively, as the time-limits for the filing of the Memorial of the DRC and the Counter-Memorial of Uganda. Those pleadings were filed within the time-limits thus prescribed.

4. Uganda's Counter-Memorial included counter-claims. By an Order of 29 November 2001, the Court found that two of the three counter-claims submitted by Uganda were admissible as such and formed part of the proceedings on the merits. By the same Order, the Court directed the submission of a Reply by the DRC and a Rejoinder by Uganda. By an Order of 29 January 2003, it authorized the submission of an additional pleading by the DRC relating solely to the counter-claims. Those pleadings were filed within the time-limits fixed by the Court.

5. Public hearings were held on the merits of the case from 11 to 29 April 2005.

6. In its Judgment dated 19 December 2005 (hereinafter the "2005 Judgment"), the Court found, *inter alia*, with respect to the claims brought by the DRC, that

> "the Republic of Uganda, by engaging in military activities against the Democratic Republic of the Congo on the latter's territory, by occupying Ituri and by actively extending military, logistic, economic and financial support to irregular forces having operated on the territory of the DRC, violated the principle of non-use of force in international relations and the principle of non-intervention" (*Armed Activities on the Territory of the Congo (Democratic Republic of the Congo* v. *Uganda), Judgment, I.C.J. Reports 2005*, p. 280, para. 345, subpara. (1) of the operative part);
>
> . . . .
>
> "the Republic of Uganda, by the conduct of its armed forces, which committed acts of killing, torture and other forms of inhumane treatment of the Congolese civilian population, destroyed villages and civilian buildings, failed to distinguish between civilian and military targets and to protect the civilian population in fighting with other combatants, trained child soldiers, incited ethnic conflict and failed to take measures to put an end to such conflict; as well as by its failure, as an occupying Power, to take measures to respect and ensure respect for human rights and international humanitarian law in Ituri district, violated its obligations under international

> human rights law and international humanitarian law" (*I.C.J. Reports 2005*, p. 280, para. 345, subpara. (3) of the operative part); and
>
> . . . .
>
> "the Republic of Uganda, by acts of looting, plundering and exploitation of Congolese natural resources committed by members of the Ugandan armed forces in the territory of the Democratic Republic of the Congo and by its failure to comply with its obligations as an occupying Power in Ituri district to prevent acts of looting, plundering and exploitation of Congolese natural resources, violated obligations owed to the Democratic Republic of the Congo under international law" (*ibid.*, pp. 280-281, para. 345, subpara. (4) of the operative part).

With respect to these violations, the Court found that Uganda was under an obligation to make reparation to the DRC for the injury caused (*ibid.*, p. 281, para. 345, subpara. (5) of the operative part).

7. In relation to the counter-claims presented by Uganda, the Court found that

> "the Democratic Republic of the Congo, by the conduct of its armed forces, which attacked the Ugandan Embassy in Kinshasa, maltreated Ugandan diplomats and other individuals on the Embassy premises, maltreated Ugandan diplomats at Ndjili International Airport, as well as by its failure to provide the Ugandan Embassy and Ugandan diplomats with effective protection and by its failure to prevent archives and Ugandan property from being seized from the premises of the Ugandan Embassy, violated obligations owed to the Republic of Uganda under the Vienna Convention on Diplomatic Relations of 1961" (*ibid.*, p. 282, para. 345, subpara. (12) of the operative part).

With respect to these violations, the Court found that the DRC was under an obligation to make reparation to Uganda for the injury caused (*ibid.*, subpara. (13) of the operative part).

8. The Court further decided in its 2005 Judgment that, failing agreement between the Parties, the question of reparations due would be settled by the Court (*ibid.*, pp. 281-282, para. 345, subparas. (6) and (14) of the operative part).

9. By letters dated 26 January and 3 July 2009, the Registrar asked the Parties to provide information concerning any negotiations they might be holding for the purpose of settling the question of reparations. Information was received from the DRC by a letter dated 6 July 2009 and from Uganda by a letter dated 18 July 2009. In particular, Uganda referred to an agreement concluded by the Parties at Ngurdoto (Tanzania) on 8 September 2007, which established a framework for an amicable settlement of the question of reparations.

10. Between 2009 and 2015, the Parties continued to keep the Court informed about the status of their negotiations. They held various meetings, including four at the ministerial level. At the end of the fourth and final ministerial meeting, held in Pretoria, South Africa, from 17 to 19 March 2015, the Parties acknowledged that they had been unable to agree on the principles and modalities to be applied in order to determine the amount of reparation due. Given the lack of consensus at the ministerial level, the matter was referred to the Heads

of State for further guidance, within the framework of the Ngurdoto Agreement.

11. On 13 May 2015, the DRC submitted to the Court a document dated 8 May 2015 and entitled "New Application to the International Court of Justice", in which its Government stated in particular that

> "the negotiations on the question of reparation owed to the Democratic Republic of the Congo by Uganda must now be deemed to have failed, as is made clear in the joint communiqué signed by both Parties in Pretoria, South Africa, on 19 March 2015; it therefore behoves the Court, as provided for in paragraph 345 (6) of the Judgment of 19 December 2005, to reopen the proceedings that it suspended in the case, in order to determine the amount of reparation owed by Uganda to the Democratic Republic of the Congo, on the basis of the evidence already transmitted to Uganda and which will be made available to the Court".

12. At a meeting held by the President of the Court with the representatives of the Parties on 9 June 2015, pursuant to Article 31 of the Rules, the Co-Agent of the DRC, after outlining the history of the negotiations held by the Parties with a view to reaching an amicable settlement on the question of reparations, stated that his Government was of the view that the said negotiations had failed and that it was because of that failure that the DRC had decided to seise the Court again. At the same meeting, the Agent of Uganda indicated that his Government was of the view that the conditions for referring the question of reparations to the Court had not been met and that the request made by the DRC in the Application filed on 13 May 2015 was therefore premature.

13. During the meeting of 9 June 2015, the President ascertained the views of the Parties on how much time they would need for the preparation of the written pleadings on the question of reparations, should the Court decide to authorize such pleadings. The Co-Agent of the DRC stated that a time-limit of three and a half to four months would be sufficient for his Government to prepare its Memorial. The Agent of Uganda, citing the highly complex nature of the questions to be decided, mentioned a time-limit of 18 months from the filing of the DRC's Memorial for the preparation of a Counter-Memorial by his Government.

14. By an Order of 1 July 2015, the Court decided to resume the proceedings in the case with respect to the question of reparations. It fixed 6 January 2016 as the time-limit for the filing of a Memorial by the DRC on the reparations which it considers to be owed to it by Uganda, and for the filing of a Memorial by Uganda on the reparations which it considers to be owed to it by the DRC.

15. By an Order of 10 December 2015, the President of the Court, at the request of the DRC, extended to 28 April 2016 the time-limit for the filing of the Parties' Memorials on the question of reparations. Following an additional request from the DRC, by an Order of 11 April 2016, the Court extended that time-limit to 28 September 2016. The Memorials were filed within the time-limit thus extended.

16. By an Order of 6 December 2016, the Court fixed 6 February 2018 as the time-limit for the filing, by each Party, of a Counter-Memorial responding to the claims presented by the other Party in its Memorial. The Counter-Memorials of the Parties were filed within the time-limit thus fixed.

17. By letters dated 11 June 2018, the Registrar informed the Parties that, pursuant to Article 62, paragraph 1, of its Rules, the Court wished to obtain further information on certain issues it had identified. A list of questions was attached to the Registrar's letter and the Parties were asked to provide their responses to those questions by 11 September 2018 at the latest. The Parties were further informed that they would then each have until 11 October 2018 to communicate any comments they might wish to make on the responses of the other Party. Those time-limits were subsequently extended at the request of the Parties. Both Parties filed their responses on 1 November 2018. The DRC, however, transmitted reorganized versions of its responses on 12 and 20 November 2018, in view of certain problems with the annexes that had been submitted. By a letter dated 24 November 2018, the DRC indicated that the document filed on 20 November 2018 constituted the "final version" of its responses. The DRC then submitted comments on Uganda's responses on 4 January 2019, and Uganda submitted comments on the DRC's responses on 7 January 2019.

18. By letters dated 4 September 2018, the Parties were informed that the hearings on the question of reparations would take place from 18 to 22 March 2019. By a letter dated 11 February 2019, the DRC asked the Court to postpone the hearings by some six months. By a letter dated 12 February 2019, Uganda indicated that it neither opposed nor consented to the DRC's request, and that it was content to commit the matter to the Court's judgment. By letters dated 27 February 2019, the Parties were notified that the Court had decided to postpone the opening of the hearings to 18 November 2019.

19. By a joint letter dated 9 November 2019 and filed in the Registry on 12 November 2019, the Parties requested that the hearings due to open on 18 November 2019 be postponed for a period of four months "in order to afford [their] countries a further opportunity to attempt to amicably settle the question of reparations by bilateral agreement". By letters dated 12 November 2019, the Parties were informed that the Court had decided to postpone the opening of the oral proceedings and that it would determine, at the appropriate time, new dates for the hearings, taking into account the Parties' request and its own schedule of work for 2020.

20. By letters dated 9 January 2020, the Registrar indicated to the Parties that the Court would appreciate receiving information from either or both of them on the status of their negotiations. The Court subsequently received several communications from the Parties providing such information. Having regard to those communications and taking into account the fact that the four-month period of negotiations requested by the Parties had lapsed, the Parties were informed, by letters dated 23 April 2020, that the Court intended to hold hearings in the case during the first trimester of 2021.

21. By letters dated 8 July 2020, the Registrar informed the Parties that, while continuing to examine the full range of heads of damage claimed by the Applicant and the defences invoked by the Respondent, the Court considered it necessary to arrange for an expert opinion, pursuant to Article 67, paragraph 1, of its Rules, with respect to the following three heads of damage for the period between 6 August 1998 and 2 June 2003: loss of human life, loss of natural resources and property damage. The Parties were also informed that the Court had fixed 29 July 2020 as the time-limit within which they could present, in accordance with Article 67, paragraph 1, of the Rules of Court, their respective positions regarding any such appointment, in particular their views on the subject of the expert opinion, the number and mode of appointment of the experts and the procedure to be followed. By the same letter, the Registrar indicated

that any comments that either Party might wish to make on the response of the other Party should be communicated by 12 August 2020 at the latest.

22. By a letter dated 15 July 2020, Uganda observed that "the questions before the Court are not of the sort contemplated" under Article 50 of the Statute of the Court and Article 67, paragraph 1, of the Rules relating to the appointment of experts. Therefore, it

> "strongly object[ed] to the proposal to appoint an expert or experts for the stated purpose because it amounts to relieving the DRC of the primary responsibility to prove her claim (or any particular heads of claim), and assigning that responsibility to third parties, to the prejudice of Uganda and in violation of the relevant principles of international law".

23. By a letter dated 24 July 2020, the DRC stated that it was "favourably disposed towards the Court's proposal that, for the three heads of damage referred to [in the Registrar's letter of 8 July 2020], there should be recourse to an expert opinion". It added that recourse to an expert opinion was "without prejudice to the judicial role of the Court" and that it was "ultimately for the Court, and not the experts, to decide on the compensation owed by Uganda to the Democratic Republic of the Congo". The DRC also transmitted its views on the mode of appointment of the experts and expressed the opinion that the procedure to be followed should correspond to the established practice of the Court.

24. By a letter dated 12 August 2020, Uganda provided its comments on the views expressed by the DRC regarding the expert opinion envisaged by the Court in the case, reiterating its objections to the appointment of experts. It stated that

> "there is no evidence for the experts to assess or opine on. What remains is for the Court to make the determination as to whether the evidence submitted by the DRC meets the required standard based on its own assessment of the evidence vis-à-vis the applicable principles of international law".

25. By an Order dated 8 September 2020, having duly taken into account the views of the Parties, the Court decided to arrange for an expert opinion, pursuant to Article 67 of its Rules, regarding certain heads of damage alleged by the Applicant, namely, loss of human life, loss of natural resources and property damage. The Order set out the following terms of reference for the experts:

"*I. Loss of Human Life*

(a) Based on the evidence available in the case file and documents publicly available, particularly the United Nations Reports mentioned in the 2005 Judgment, what is the global estimate of the lives lost among the civilian population (broken down by manner of death) due to the armed conflict on the territory of the Democratic Republic of the Congo in the relevant period?

(b) What was, according to the prevailing practice in the Democratic Republic of the Congo in terms of loss of human life during the period in question, the scale of compensation due for the loss of individual human life?

II. Loss of Natural Resources

(a) Based on the evidence available in the case file and documents publicly available, particularly the United Nations Reports mentioned in the 2005 Judgment, what is the approximate quantity of natural resources, such as gold, diamond, coltan and timber, unlawfully exploited during the occupation by Ugandan armed forces of the district of Ituri in the relevant period?

(b) Based on the answer to the question above, what is the valuation of the damage suffered by the Democratic Republic of the Congo for the unlawful exploitation of natural resources, such as gold, diamond, coltan and timber, during the occupation by Ugandan armed forces of the district of Ituri?

(c) Based on the evidence available in the case file and documents publicly available, particularly the United Nations Reports mentioned in the 2005 Judgment, what is the approximate quantity of natural resources, such as gold, diamond, coltan and timber, plundered and exploited by Ugandan armed forces in the Democratic Republic of the Congo, except for the district of Ituri, and what is the valuation of those resources?

III. Property Damage

(a) Based on the evidence available in the case file and documents publicly available, particularly the United Nations Reports mentioned in the 2005 Judgment, what is the approximate number and type of properties damaged or destroyed by Ugandan armed forces in the relevant period in the district of Ituri and in June 2000 in Kisangani?

(b) What is the approximate cost of rebuilding the kind of schools, hospitals and private dwellings destroyed in the district of Ituri and in Kisangani?"

26. By the same Order, the Court decided that the expert opinion would be "entrusted to four independent experts appointed by Order of the Court after hearing the Parties". It was also noted that, before taking up their duties, the experts would make the following declaration:

> "I solemnly declare, upon my honour and conscience, that I will perform my duties as expert honourably and faithfully, impartially and conscientiously, and will refrain from divulging or using, outside the Court, any documents or information of a confidential character which may come to my knowledge in the course of the performance of my task."

27. By letters dated 10 September 2020, the Registrar informed the Parties of the Court's decision and of the fact that the Court had identified four potential experts to carry out the expert mission, namely, in alphabetical order, Ms Debarati Guha-Sapir, Mr. Michael Nest, Mr. Geoffrey Senogles and Mr. Henrik Urdal, whose curricula vitae were appended to those letters. The Registrar invited the Parties to communicate to the Court any observations

they might wish to make on the choice of experts by 18 September 2020 at the latest.

28. By a letter dated 17 September 2020, the DRC indicated that it had no objection to the four experts proposed by the Court.

29. By a letter dated 18 September 2020, Uganda asked the Court, *inter alia*, to extend the time-limit for its observations on the potential experts identified by the Court. The President of the Court decided to extend that time-limit to 25 September 2020.

30. By a letter dated 25 September 2020, Uganda presented its observations on the experts proposed by the Court, stating that it objected to the selection of three of them on various grounds.

31. By an Order dated 12 October 2020, having duly considered the views of the Parties, the Court decided to appoint the following four experts:

— Ms Debarati Guha-Sapir, of Belgian nationality, Professor of Public Health at the University of Louvain (Belgium), Director of the Centre for Research on the Epidemiology of Disasters, Brussels (Belgium), member of the Belgian Royal Academy of Medicine;
— Mr. Michael Nest, of Australian nationality, Environmental Governance Adviser for the European Union's Accountability, Rule of Law and Anti-Corruption Programme in Ghana and former conflict minerals analyst for United States Agency for International Development and Deutsche Gesellschaft für Internationale Zusammenarbeit projects in the Great Lakes Region of Africa;
— Mr. Geoffrey Senogles, of British nationality, Partner at Senogles & Co, Chartered Accountants, Nyon (Switzerland); and
— Mr. Henrik Urdal, of Norwegian nationality, Research Professor and Director of the Peace Research Institute Oslo (Norway).

The experts subsequently made the solemn declaration provided for in the Order of 8 September 2020 (see paragraph 26 above).

32. By letters dated 1 December 2020, the Parties were informed that the Court had fixed 22 February 2021 as the date for the opening of the hearings on the question of reparations.

33. By letters dated 21 December 2020, the Registrar communicated to the Parties copies of the report filed by the experts appointed in the case. Each Party was given until 21 January 2021 to submit any written observations it might wish to make on that report.

34. By letters dated 24 December 2020, the Registrar transmitted to the Parties corrigenda received from the Court-appointed experts to their report.

35. By a letter dated 23 December 2020, Uganda requested that the hearings due to open on 22 February 2021 be postponed to "after 17 March 2021". By a letter dated 7 January 2021, the DRC indicated that its Government had no objection to the postponement. Taking into account the above-mentioned request and the views expressed by the DRC on this question, the Court decided to postpone to 20 April 2021 the opening of the hearings in the case.

36. By a letter dated 13 January 2021, Uganda requested that the time-limit for the submission to the Court of any observations the Parties might wish to make on the experts' report, originally fixed for 21 January 2021, be extended to 14 February 2021. By a letter dated 17 January 2021, the DRC indicated that it "c[ould] see no justification for extending the time-limit for the submission by each Party of its written observations on the experts' report". By letters dated

18 January 2021, the Registrar informed the Parties that, in view of the fact that, with the agreement of the Parties, the hearings had been postponed to April 2021, the President of the Court had decided to extend to 15 February 2021 the time-limit for the submission, by the Parties, of their observations on the said report.

37. Under cover of a letter dated 14 February 2021, the Co-Agent of the DRC communicated to the Court his Government's written observations on the experts' report. Uganda furnished its written observations on the said report on 15 February 2021. Each Party's observations were communicated to the experts, who responded to them in writing on 1 March 2021; their response was immediately transmitted to the Parties. The latter were asked to indicate to the Registry, by 15 March 2021 at the latest, whether they wished to put questions to the experts at the hearings.

38. By a letter dated 6 March 2021, the Co-Agent of the DRC indicated that his Government wished to put questions to the experts at the hearings.

39. By a letter dated 16 March 2021, the Agent of Uganda stated that his Government reserved the right to put questions to the experts at the hearings. By a letter dated 6 April 2021, he indicated that his Government wished to put questions to the experts during the hearings.

40. Pursuant to Article 53, paragraph 2, of its Rules, the Court, after ascertaining the views of the Parties, decided that copies of the written pleadings on reparations and the documents annexed thereto, the responses of the Parties to the questions put by the Court and the comments on those responses would be made accessible to the public at the opening of the oral proceedings. It subsequently decided to make the experts' report and related documents accessible to the public.

41. Public hearings on the question of reparations were held from 20 to 30 April 2021. The oral proceedings were conducted in a hybrid format, in accordance with Article 59, paragraph 2, of the Rules of Court and on the basis of the Court's Guidelines for the parties on the organization of hearings by video link, adopted on 13 July 2020 and communicated to the Parties on 23 December 2020. Prior to the opening of the hybrid hearings, the Parties were invited to participate in comprehensive technical tests. During the oral proceedings, a number of judges were present in the Great Hall of Justice, while others joined the proceedings via video link, allowing them to view and hear the speaker and see any demonstrative exhibits displayed. Each Party was permitted to have up to four representatives present in the Great Hall of Justice at any one time and was offered the use of an additional room in the Peace Palace from which members of the delegation were able to participate via video link. Members of the delegations were also given the opportunity to participate via video link from other locations of their choice.

42. During the above-mentioned hearings, the Court heard the oral arguments and replies of:

For the DRC: H.E. Mr. Paul-Crispin Kakhozi,
Ms Monique Chemillier-Gendreau,
Ms Muriel Ubéda-Saillard,
Ms Raphaëlle Nollez-Goldbach,
Mr. Jean-Paul Segihobe Bigira,
Mr. Pierre Bodeau-Livinec,
Mr. Nicolas Angelet,

Mr. Auguste Mampuya Kanunk'a-Tshiabo,
Mr. Ivon Mingashang,
Mr. Mathias Forteau,
Mr. Philippe Sands,
Mr. Olivier Corten.

For Uganda: The Honourable William Byaruhanga,
Mr. Sean Murphy,
Mr. Pierre d'Argent,
Mr. Lawrence H. Martin,
Mr. Dapo Akande,
Mr. Yuri Parkhomenko,
Mr. Alain Pellet.

43. The experts appointed in the case (see paragraph 31 above) were heard at two public hearings, in accordance with Article 65 of the Rules of Court. Questions were put by counsel of the Parties to each of the experts. Members of the Court put questions to Mr. Urdal and Ms Guha-Sapir.

44. At the hearings, a Member of the Court put a question to the Parties, to which replies were given orally, in accordance with Article 61, paragraph 4, of the Rules of Court.

*

45. In the written proceedings on the question of reparations, the following submissions were presented by the Parties:

On behalf of the Government of the DRC,

in the Memorial:

"For the reasons set out above, and subject to any changes made to its claims in the course of the proceedings, the Democratic Republic of the Congo requests the Court to adjudge and declare that:

(a) Uganda is required to pay the DRC the sum of US$13,478,122,950 (thirteen [billion] four hundred and seventy-eight million one hundred and twenty-two thousand nine hundred and fifty United States dollars) in compensation for the damage resulting from the violations of international law found by the Court in its Judgment of 19 December 2005;
(b) compensatory interest will be due on that amount at a rate of 6 per cent, payable from the date on which the present Memorial was filed;
(c) Uganda is required to pay the DRC the sum of US$125 million by way of giving satisfaction for all non-material damage resulting from the violations of international law found by the Court in its Judgment of 19 December 2005;
(d) Uganda is required, by way of giving satisfaction, to conduct criminal investigations and prosecutions of the officers and soldiers of the UPDF involved in the violations of international humanitarian law or international human rights norms committed in Congolese territory between 1998 and 2003;
(e) in the event of non-payment of the compensation awarded by the Court on the date of the judgment, moratory interest will accrue on the principal sum at a rate to be determined by the Court;

(f) Uganda is required to reimburse the DRC for all the costs incurred by the latter in the context of the present case."

in the Counter-Memorial:

"For the reasons set out above, the Democratic Republic of the Congo requests the Court, without any prejudicial recognition by the Democratic Republic of the Congo of the legal principles set out in the Memorial of Uganda, to adjudge and declare that:

(a) the Court's finding of the DRC's international responsibility in its Judgment of 19 December 2005 constitutes an appropriate form of reparation for the injury arising from the following wrongful acts as found in that same Judgment: *(a)* the maltreatment by Congolese forces of individuals on Uganda's diplomatic premises and of Ugandan diplomats at Ndjili International Airport; *(b)* the invasion, seizure and long-term occupation of the official residence of the Ambassador of Uganda in Kinshasa; and *(c)* the seizure of public and personal property from Uganda's diplomatic premises in Kinshasa;

(b) Uganda is entitled to payment of a sum of US$982,797.73 by the DRC, an amount not contested by the DRC in the context of the proceedings before the Court, in compensation for the injury resulting from the invasion, seizure and long-term occupation of Uganda's Chancery compound in Kinshasa;

(c) the compensation thus awarded to Uganda will be offset against that awarded to the DRC on the basis of its principal claims in the present case."

On behalf of the Government of Uganda,

in the Memorial:

"On the basis of the facts and law set forth in this Memorial, Uganda respectfully requests the Court to adjudge and declare that:

(1) With respect to the loss, damage or injury arising from *(a)* the maltreatment of persons by Congolese forces on Uganda's diplomatic premises and of Ugandan diplomats at Ndjili Airport; *(b)* the invasion, seizure and long-term occupation of the residence of the Ambassador of Uganda in Kinshasa; and *(c)* the seizure of public and personal property from Uganda's diplomatic premises in Kinshasa, the Court's formal findings of the DRC's international responsibility in the 2005 Judgment constitute an appropriate form of satisfaction, providing reparation for the injury suffered.

(2) With respect to the loss, damage or injury arising from the invasion, seizure and long-term occupation of Uganda's Chancery compound in Kinshasa, the DRC is obligated to make monetary compensation to the Republic of Uganda in the total amount of US$982,797.73."

in the Counter-Memorial:

"On the basis of the facts and law set forth in this Counter-Memorial, Uganda respectfully requests the Court to adjudge and declare that:

(1) the Court's formal findings of Uganda's international responsibility in the 2005 Judgment constitute an appropriate form of satisfaction, providing reparation for the injury suffered;

(2) all other reparation sought by the DRC is denied; and

(3) each Party shall bear its own costs of these proceedings."

46. At the oral proceedings, the following submissions were presented by the Parties:

On behalf of the Government of the DRC,

"For the reasons set out in its written pleadings and oral arguments, the Democratic Republic of the Congo requests the Court to adjudge and declare that:

(1) With regard to the claims of the Democratic Republic of the Congo:

(a) Uganda is required to pay the Democratic Republic of the Congo in compensation for the damage resulting from the violations of international law found by the Court in its Judgment of 19 December 2005:

— no less than four billion three hundred and fifty million four hundred and twenty-one thousand eight hundred United States dollars (US$4,350,421,800) for personal injury;

— no less than two hundred and thirty-nine million nine hundred and seventy-one thousand nine hundred and seventy United States dollars (US$239,971,970) for damage to property;

— no less than one billion forty-three million five hundred and sixty-three thousand eight hundred and nine United States dollars (US$1,043,563,809) for damage to natural resources;

— no less than five billion seven hundred and fourteen million seven hundred and seventy-five United States dollars (US$5,714,000,775) for macroeconomic damage.

(b) compensatory interest will be due on heads of claim other than those for which the amount of compensation awarded by the Court, based on an overall assessment, already takes account of the passage of time, at a rate of 4 per cent, payable from the date of the filing of the Memorial on reparation;

(c) Uganda is required, by way of giving satisfaction, to pay the Democratic Republic of the Congo the sum of US$25 million for the creation of a fund to promote reconciliation between the Hema and Lendu in Ituri, and the sum of US$100 million for the non-material harm suffered by the Congolese State as a result of the violations of international law found by the Court in its Judgment of 19 December 2005;

(d) Uganda is required, by way of giving satisfaction, to conduct criminal investigations and prosecutions of the individuals involved in the violations of international humanitarian law or international human rights norms committed in Congolese territory between 1998 and 2003 for which Uganda has been found responsible;

(e) in the event of non-payment of the compensation awarded by the Court on the date of the judgment, moratory interest will accrue on the principal sum at a rate of 6 per cent;

(f) Uganda is required to reimburse the Democratic Republic of the Congo for all the costs incurred by the latter in the context of the present case.

(2) With regard to Uganda's counter-claim, and without any prejudicial recognition by the Democratic Republic of the Congo of the legal principles set out in the Memorial of Uganda:

(a) the Court's finding of the Democratic Republic of the Congo's international responsibility in its Judgment of 19 December 2005 constitutes an appropriate form of reparation for the injury arising from the wrongful acts as found in the same Judgment;

(b) Uganda is otherwise entitled to payment of the sum of US$982,797.73 (nine hundred and eighty-two thousand seven hundred and ninety-seven United States dollars and seventy-three cents) by the Democratic Republic of the Congo, an amount not contested by the Democratic Republic of the Congo in the context of the proceedings before the Court, in compensation for the injury resulting from the invasion, seizure and long-term occupation of Uganda's Chancery compound in Kinshasa;

(c) the compensation thus awarded to Uganda will be offset against that awarded to the Democratic Republic of the Congo on the basis of its principal claims in the present case.

(3) The Court is further requested to declare that the present dispute will not be fully and finally resolved until Uganda has actually paid the reparations and compensation ordered by the Court. Until that time, the Court will remain seised of the present case."

On behalf of the Government of Uganda,

"The Republic of Uganda respectfully requests that the Court:

(1) Adjudge and declare that:

(a) The DRC is entitled to reparation in the form of compensation only to the extent it has discharged the burden the Court placed on it in paragraph 260 of the 2005 Judgment 'to demonstrate and prove the exact injury that was suffered as a result of specific actions of Uganda constituting internationally wrongful acts for which it is responsible';

(b) The Court's finding of Uganda's international responsibility in the 2005 Judgment otherwise constitutes an appropriate form of satisfaction; and

(c) Each Party shall bear its own costs of these proceedings; and

(2) Reject all other submissions of the DRC."

*

47. At the end of the hearings, the Agent of Uganda informed the Court that his Government "officially waive[d] its counter-claim for reparation for the injury caused by the conduct of the DRC's armed forces, including attacks on the Ugandan diplomatic premises in Kinshasa and the maltreatment of Ugandan diplomats".

* * *

I. Introduction

48. In view of the failure by the Parties to settle the question of reparations by agreement, it now falls to the Court to determine the nature and amount of reparations to be awarded to the DRC for injury caused by Uganda's violations of its international obligations, pursuant to the findings of the Court set out in the 2005 Judgment. The Court begins by recalling certain elements on which it based that Judgment.

49. In its 2005 Judgment, the Court first pointed to the "complex and tragic situation which ha[d] long prevailed in the Great Lakes region" and also noted that there had been "much suffering by the local population and destabilization of much of the region". The Court explained, however, that its task was "to respond, on the basis of international law, to the particular legal dispute brought before it" and that, "[a]s it interpret[ed] and applie[d] the law, it w[ould] be mindful of context, but its task [could] not go beyond that" (*I.C.J. Reports 2005*, p. 190, para. 26).

50. The Court found, in that Judgment, that Uganda had violated several obligations incumbent on it under international law and that it was therefore under an obligation to make reparation to the DRC for the injury caused (see paragraph 6 above). The Court will recall here only the basic facts and conclusions that led it to hold Uganda internationally responsible. The Court will recall the context and other relevant facts of the case in more detail when setting out certain general considerations with respect to the question of reparations (Part II, Section A, paragraphs 61-68 below) and when addressing the DRC's claims for various forms of damage (Parts III and IV, paragraphs 132-392 below).

51. In its 2005 Judgment, the Court found that, from mid-1997 to the first half of 1998, Uganda was allowed by the Government of the DRC to engage in military action against anti-Ugandan rebels in the eastern part of Congolese territory. However, the Court concluded that any consent by the DRC to the presence of Ugandan troops on its territory had been withdrawn by 8 August 1998 at the latest. From August 1998 until June 2003, Uganda conducted unlawful military operations in the east of the DRC, as well as in other parts of the country. In so doing, it took control of several locations in the provinces of North Kivu, Orientale and Equa-

teur (*I.C.J. Reports 2005*, pp. 206-207, paras. 78-81). The Uganda Peoples' Defence Forces (hereinafter the "UPDF") conducted military operations in a large number of locations (*ibid.*, p. 224, para. 153), including in Kisangani, where it engaged in large-scale fighting against Rwandan forces, particularly in August 1999 and in May and June 2000 (*ibid.*, p. 207, para. 80). From August 1998 until June 2003, the forces of other States were also present on the DRC's territory, as were irregular forces, some of which were supported by Uganda.

52. The Court concluded that Uganda was an "occupying Power", within the meaning of the term as understood in the *jus in bello*, in Ituri district at the relevant time (*ibid.*, p. 231, para. 178). It found that Uganda's responsibility was thus engaged both for any acts of its military that violated its international obligations and for any lack of vigilance in preventing violations of human rights and international humanitarian law by other actors present in the occupied territory, including rebel groups acting on their own account (*ibid.*, para. 179). The Court also found that Uganda was internationally responsible for acts of looting, plundering and exploitation of the DRC's natural resources committed by members of the UPDF in the territory of the DRC, including in Ituri, and for failing to comply with its obligations as an occupying Power in Ituri in respect of all acts of looting, plundering and exploitation of natural resources in the occupied territory (*ibid.*, p. 253, para. 250).

53. The Court further concluded that Uganda,

> "by engaging in military activities against the Democratic Republic of the Congo on the latter's territory, by occupying Ituri and by actively extending military, logistic, economic and financial support to irregular forces having operated on the territory of the DRC, violated the principle of non-use of force in international relations and the principle of non-intervention" (*ibid.*, p. 280, para. 345, subpara. (1) of the operative part).

54. The Court found that "massive human rights violations and grave breaches of international humanitarian law were committed by the UPDF on the territory of the DRC" during the conflict (*ibid.*, p. 239, para. 207). The Court further found that the UPDF had failed to protect the civilian population and to distinguish between combatants and non-combatants in the course of fighting against other troops (*ibid.*, p. 240, para. 208). It considered that there was persuasive evidence that, in Ituri district, the UPDF had incited ethnic conflicts and taken no action to prevent such conflicts (*ibid.*, para. 209). Moreover, the Court found that there was convincing evidence that child soldiers had been trained in UPDF training camps and that the UPDF had failed to prevent the recruitment of child soldiers in areas under its control (*ibid.*, p. 241, para. 210).

55. The Court concluded on the basis of these findings that Uganda,

> "by the conduct of its armed forces, which committed acts of killing, torture and other forms of inhumane treatment of the Congolese civilian population, destroyed villages and civilian buildings, failed to distinguish between civilian and military targets and to protect the civilian population in fighting with other combatants, trained child soldiers, incited ethnic conflict and failed to take measures to put an end to such conflict; as well as by its failure, as an occupying Power, to take measures to respect and ensure respect for human rights and international humanitarian law in Ituri district, violated its obligations under international human rights law and international humanitarian law" (2005 Judgment, *I.C.J. Reports 2005*, p. 280, para. 345, subpara. (3) of the operative part).

56. Finally, the Court found that "officers and soldiers of the UPDF, including the most high-ranking officers, [had been] involved in the looting, plundering and exploitation of the DRC's natural resources and that the military authorities [had] not take[n] any measures to put an end to these acts" (*ibid.*, p. 251, para. 242). It also held that Uganda's obligations as an occupying Power in Ituri district required it to take appropriate measures to prevent the looting, plundering and exploitation of natural resources in the occupied territory, not only by members of its military but also by private persons. In the view of the Court, it was apparent "that rather than preventing the illegal traffic in natural resources, including diamonds, high-ranking members of the UPDF facilitated such activities by commercial entities" (*ibid.*, p. 253, paras. 248-249).

57. In this regard, the Court concluded that Uganda,

> "by acts of looting, plundering and exploitation of Congolese natural resources committed by members of the Ugandan armed forces in the territory of the Democratic Republic of the Congo and by its failure to comply with its obligations as an occupying Power in Ituri district to prevent acts of looting, plundering and exploitation of Congolese natural resources, violated obligations owed to the Democratic Republic of the Congo under international law" (*ibid.*, pp. 280-281, para. 345, subpara. (4) of the operative part).

58. In its 2005 Judgment, the Court also ruled that the DRC had violated obligations owed to Uganda under the Vienna Convention on Diplomatic Relations of 1961 and that the DRC was under an obligation to make reparation to Uganda for the injury caused (see paragraph 7 above). In this regard, however, as recalled above, at the hearing of 30 April 2021,

the Agent of Uganda stated that Uganda had decided to waive its counter-claim for reparation (see paragraph 47). Therefore, the Court is now seised of the sole question of the reparation owed by Uganda to the DRC.

*

59. In the present phase of the proceedings, the DRC asks the Court to adjudge and declare that Uganda must pay compensation under four heads of damage, namely damage to persons, damage to property, damage related to natural resources, and macroeconomic damage. Under each of the first three heads of damage, the DRC makes claims with respect to several forms of damage. In particular, the first head of damage (damage to persons) includes the DRC's claims for loss of life, injuries to persons, rape and sexual violence, recruitment and deployment of child soldiers and displacement of populations. The DRC also seeks several measures of satisfaction.

II. General Considerations

60. The Court will first recall the context of the present case (Section A). It will then examine, in light of that context, the principles and rules applicable to the assessment of reparations in this case (Section B), questions of proof (Section C) and the forms of damage subject to reparation (Section D).

A. Context

61. The Court notes that the Parties have attached great importance to the context in which Uganda's internationally wrongful acts and the injury suffered by the DRC occurred. However, they disagree about how much weight should be attached to that context by the Court in assessing the various forms of damage and the amounts of compensation owed.

* *

62. The DRC, which regards this case as "unprecedented" before the Court, argues that the Court must take the context into consideration when assessing the evidence relating to each head of damage. It highlights the time that has elapsed since the events concerned occurred, its lack of resources, the continuing conflict on its territory, the trauma suffered by a large number of victims and their low level of education, the destruction and loss of evidence and other related difficulties. Finally, it contends

that, "in view of the particular nature of war-related damage, which, by definition, cannot be identified and evaluated systematically, the DRC has . . . been obliged to make assessments which, while general, are based on a variety of solid and reliable evidence".

63. Uganda is of the view that the DRC cannot simply plead difficulties in gathering evidence in order not to have to do so or to shift the burden of proof onto Uganda. The Respondent considers demonstrably untrue the assertion that it is not possible to gather evidence of damage relating to war. It cites as examples Iraq's invasion and occupation of Kuwait and Eritrea's invasion and occupation of northern Ethiopia, which did not prevent evidence or witness testimony from being presented before the relevant commissions. Uganda also contends that such evidence was gathered for certain reparation claims before the International Criminal Court (hereinafter the "ICC") for the same conflict as that at issue in these proceedings.

* *

64. The Court considers that the context of the present case is particularly relevant for the analysis of the facts. First and foremost, this case concerns one of the most complex and deadliest armed conflicts to have taken place on the African continent. There were numerous actors operating on the territory of the DRC between 1998 and 2003, including the armed forces of various States, as well as irregular armed forces that often acted in collaboration with the intervening States. The Court recalls that the DRC filed Applications instituting proceedings against Burundi and Rwanda in 1999. At the request of the DRC, the proceedings against Burundi were discontinued (see *Armed Activities on the Territory of the Congo (Democratic Republic of the Congo* v. *Burundi), Order of 30 January 2001, I.C.J. Reports 2001*, p. 4), while the Court ruled that it did not have jurisdiction to entertain the Application instituting proceedings against Rwanda (*Armed Activities on the Territory of the Congo (New Application: 2002) (Democratic Republic of the Congo* v. *Rwanda), Jurisdiction and Admissibility, Judgment, I.C.J. Reports 2006*, p. 53, para. 128).

65. The Court emphasizes that this case is characterized by Uganda's violation of some of the most fundamental principles and rules of international law, namely the principles of non-use of force and of non-intervention, international humanitarian law and basic human rights. Its actions resulted in massive infringements of those rights and serious violations of international humanitarian law, in the form of, *inter alia*, killings, injuries, cruel and inhuman treatment, damage to property and the plundering of Congolese natural resources. The entire district of Ituri fell under the military occupation and effective control of Uganda. In Kisangani, Uganda engaged in large-scale fighting against Rwandan forces.

66. The Court observes that the time that has elapsed between the current phase of the proceedings and the unfolding of the conflict, namely some 20 years, makes the task of establishing the course of events and their legal characterization even more difficult. The Court notes, however, that the Parties have been aware since the 2005 Judgment that they could be called upon to provide evidence in reparation proceedings.

67. The Court is mindful of the fact that evidentiary difficulties arise, to a certain extent, in most situations of international armed conflict. However, questions of reparation are often resolved through negotiations between the parties concerned. The Court can only regret the failure, in this case, of the negotiations through which the Parties were to "seek in good faith an agreed solution" based on the findings of the 2005 Judgment (*I.C.J. Reports 2005*, p. 257, para. 261).

68. The Court will take the context of this case into account when determining the extent of the injury and assessing the reparation owed (see Parts III and IV below). It will first examine the principles and rules applicable to the assessment of reparations in the present case, before addressing questions of proof and the forms of damage subject to reparation.

B. The Principles and Rules Applicable to the Assessment of Reparations in the Present Case

69. The Court recalls that, in its 2005 Judgment, it found that Uganda was under an obligation to make reparation for the damage caused by internationally wrongful acts (actions and omissions) attributable to it:

> "The Court observes that it is well established in general international law that a State which bears responsibility for an internationally wrongful act is under an obligation to make full reparation for the injury caused by that act (see *Factory at Chorzów, Jurisdiction, 1927, P.C.I.J., Series A, No. 9*, p. 21; *Gabčíkovo-Nagymaros Project (Hungary/Slovakia), Judgment, I.C.J. Reports 1997*, p. 81, para. 152; *Avena and Other Mexican Nationals (Mexico* v. *United States of America), Judgment, I.C.J. Reports 2004*, p. 59, para. 119). Upon examination of the case file, given the character of the internationally wrongful acts for which Uganda has been found responsible (illegal use of force, violation of sovereignty and territorial integrity, military intervention, occupation of Ituri, violations of international human rights law and of international humanitarian law, looting, plunder and exploitation of the DRC's natural resources), the Court considers that those acts resulted in injury to the DRC and to persons on its territory. Having satisfied itself that this injury was caused to the DRC by Uganda, the Court finds that Uganda has an obligation to make reparation accordingly." (*Ibid.*, p. 257, para. 259.)

70. As regards reparation, Article 31 of the International Law Commission's Articles on Responsibility of States for Internationally Wrongful Acts (hereinafter the "ILC Articles on State Responsibility"), which reflects customary international law, provides that:

> "1. The responsible State is under an obligation to make full reparation for the injury caused by the internationally wrongful act.
> 2. Injury includes any damage, whether material or moral, caused by the internationally wrongful act of a State."

71. In its 2005 Judgment, the Court set out the scope of the subsequent phase of the proceedings, should the Parties fail to agree on reparations:

> "The Court further considers appropriate the request of the DRC for the nature, form and amount of the reparation due to it to be determined by the Court, failing agreement between the Parties, in a subsequent phase of the proceedings. The DRC would thus be given the opportunity to demonstrate and prove the exact injury that was suffered as a result of specific actions of Uganda constituting internationally wrongful acts for which it is responsible. It goes without saying, however, as the Court has had the opportunity to state in the past, 'that in the phase of the proceedings devoted to reparation, neither Party may call in question such findings in the present Judgment as have become *res judicata*' (*Military and Paramilitary Activities in and against Nicaragua (Nicaragua* v. *United States of America), Merits, Judgment, I.C.J. Reports 1986*, p. 143, para. 284)." (*I.C.J. Reports 2005*, p. 257, para. 260.)

72. In view of the foregoing, the Court will determine the principles and rules applicable to the assessment of reparations in the present case, first, by distinguishing between the different situations that arose during the conflict in Ituri and in other areas of the DRC (Subsection 1); second, by analysing the required causal nexus between Uganda's internationally wrongful acts and the injury suffered by the Applicant (Subsection 2); and, finally, by examining the nature, form and amount of reparation (Subsection 3).

1. The principles and rules applicable to the different situations that arose during the conflict

73. The Parties disagree about the scope of Uganda's obligation to make reparation for the injury suffered in two different situations: in the district of Ituri, under Ugandan occupation, and in other areas of the DRC outside Ituri, including Kisangani where Ugandan and Rwandan armed forces were operating simultaneously.

(a) *In Ituri*

74. The Parties hold opposing views on whether the reparation owed by Uganda to the DRC extends to damage caused by third parties in the district of Ituri.

75. Recalling Uganda's status as an occupying Power, as established by the Court in its 2005 Judgment, the DRC contends that the Respondent's responsibility is engaged for all the damage caused by third parties in Ituri. In the Applicant's view, Uganda violated its duty of vigilance as an occupying Power. The DRC adds that, as an occupying Power, the Respondent was under an obligation to uphold international law by protecting the population, including from the acts of rebel groups in Ituri.

76. According to the DRC, Uganda cannot demand from it precise and detailed evidence of the injury suffered in Ituri when, as the occupying Power in that district, Uganda was itself at the root of the situation that led to the disappearance of evidence.

77. Uganda, for its part, claims that the conflict between the Hema and the Lendu in Ituri predated its intervention by over a century. It submits that the DRC must prove the causal nexus between Uganda's breaches of its obligations as an occupying Power in Ituri and the damage inflicted in that district by individuals or groups, whether or not they were supported by the Respondent. Relying on the Court's decision in the case concerning *Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina* v. *Serbia and Montenegro)*, the Respondent argues that it is necessary to demonstrate with a sufficient degree of certainty that the damage caused by third parties, whose conduct is not attributable to it, would not have occurred had it duly discharged its obligations as an occupying Power.

* *

78. The Court considers that the status of the district of Ituri as an occupied territory has a direct bearing on questions of proof and the requisite causal nexus. As an occupying Power, Uganda had a duty of vigilance in preventing violations of human rights and international humanitarian law by other actors present in the occupied territory, including rebel groups acting on their own account. Given this duty of vigilance, the Court concluded that the Respondent's responsibility was engaged "by its failure . . . to take measures to . . . ensure respect for human rights and international humanitarian law in Ituri district" (2005 Judgment, *I.C.J. Reports 2005*, p. 231, paras. 178-179, p. 245, para. 211, and p. 280, para. 345, subpara. (3) of the operative part). Taking into account this conclusion, it is for Uganda to establish, in this phase of the proceedings, that a particular injury alleged by the DRC in Ituri was not

caused by Uganda's failure to meet its obligations as an occupying Power. In the absence of evidence to that effect, it may be concluded that Uganda owes reparation in relation to such injury.

79. With respect to natural resources, the Court recalls that, in its 2005 Judgment, it considered that Uganda, as an occupying Power, had an "obligation to take appropriate measures to prevent the looting, plundering and exploitation of natural resources in the occupied territory [by] private persons in [Ituri] district" (*I.C.J. Reports 2005*, p. 253, para. 248). The Court found that Uganda had "fail[ed] to comply with its obligations under Article 43 of the Hague Regulations of 1907 as an occupying Power in Ituri in respect of all acts of looting, plundering and exploitation of natural resources in the occupied territory" (*ibid.*, para. 250) and that its international responsibility was thereby engaged (*ibid.*, p. 281, para. 345, subpara. (4) of the operative part). The reparation owed by Uganda in respect of acts of looting, plundering and exploitation of natural resources in Ituri is addressed below (see paragraph 275).

(b) *Outside Ituri*

80. As regards damage that occurred outside Ituri, the DRC is of the view that Uganda must make good any damage caused by Ugandan forces or by irregular forces supported by Uganda, namely the Congo Liberation Movement (hereinafter the "MLC") and its armed wing, the Congo Liberation Army (hereinafter the "ALC"). According to the Applicant, this damage could not have been caused without Uganda's support. The Applicant adds that the reparation owed by Uganda must also cover damage resulting from the actions of other irregular forces in the area that received support from the Respondent. While the Applicant acknowledges that some of the damage that occurred in Kisangani may be the result of a multiplicity of causes, including the actions of Uganda, it contends that this damage would not have occurred had Uganda not entered Congolese territory in breach of international law. The DRC claims compensation for the entirety of this injury. Furthermore, the Applicant mentions other damage caused by both the internationally wrongful conduct of Uganda and that of other States or certain groups that were not supported by Uganda, damage for which the DRC seeks partial (45 per cent) reparation from Uganda.

81. Uganda claims that reparation must be limited to the injury caused directly by members of its armed forces and that the burden of proof rests with the Applicant in this regard. With respect to injury caused by the actions of irregular forces, the Respondent contends that even when it provided support to those groups, Uganda can be found to owe reparation for such injury only if the Applicant proves that it "was suffered as a result of" Uganda's illegal support. It adds that it is not enough to assert

in abstracto that the injury attributable to the rebel groups would not have occurred without Uganda's support.

* *

82. The Court recalls the findings in its 2005 Judgment that the rebel groups operating in the territory of the DRC outside of Ituri were not under Uganda's control, that their conduct was not attributable to it and that Uganda was not in breach of its duty of vigilance with regard to the illegal activities of such groups (*I.C.J. Reports 2005*, p. 226, paras. 160-161, pp. 230-231, para. 177 and p. 253, para. 247). Consequently, no reparation can be awarded for damage caused by the actions of those groups.

83. The Court found, in the same Judgment, that, even if the MLC was not under the Respondent's control, the latter provided support to the group (*ibid.*, p. 226, para. 160), and that Uganda's training and support of the ALC violated certain obligations of international law (*ibid.*, para. 161). The Court will take this finding into account when it considers the DRC's claims for reparation.

84. It falls to the Court to assess each category of alleged damage on a case-by-case basis and to examine whether Uganda's support of the relevant rebel group was a sufficiently direct and certain cause of the injury. The extent of the damage and the consequent reparation must be determined by the Court when examining each injury concerned. The same applies in respect of the damage suffered specifically in Kisangani, which the Court will consider in Part III.

2. The causal nexus between the internationally wrongful acts and the injury suffered

85. The Parties differ on whether reparation should be limited to the injury directly linked to an internationally wrongful act or should also cover the indirect consequences of that act.

* *

86. The DRC argues that the Respondent must make good any damage demonstrated to be a consequence of its internationally wrongful conduct. It adds that Uganda is obliged to make reparation for the entire injury, whether it resulted directly from its internationally wrongful conduct or was caused by an uninterrupted chain of events. In the Applicant's view, the perpetrator of the internationally wrongful act is bound to make reparation for any damage that would not have occurred had the internationally wrongful act not been committed, regardless of the existence of intervening causes between the internationally wrongful act and the damage. It holds Uganda responsible for all the damage inflicted,

including that resulting from acts committed by irregular forces such as the MLC. According to the DRC, whatever the location of the armed rebel groups, they would not have been able to commit acts of looting, destruction and other atrocities without support from Uganda.

87. The Applicant considers that the foreseeability of the damage should be taken into account. In its view, Uganda could not have failed to foresee that its acts would produce damage, and it should therefore be required to make reparation. The DRC adds that this reparation is owed even if certain intervening causes attributable to third parties occurred between the internationally wrongful act and the damage.

88. Uganda contends that the causal nexus must be assessed differently depending on the internationally wrongful act at issue.

89. As regards the principle of non-intervention, Uganda draws attention to the imputability of the acts committed by irregular armed groups. It points out that the Court, in its 2005 Judgment, ruled that the wrongful acts committed by various armed groups supported by Uganda could not be attributed to it. It further asserts that the DRC has failed to establish that Uganda's support for those groups was the direct and certain cause of a specific injury attributable to them. Although the Respondent admits that the political or financial support provided to certain groups, to the extent that it was established, could be characterized as wrongful, it contends that this does not automatically and without further proof make such support the direct and certain cause of the wrongful acts committed by these groups. Uganda relies on the 2005 Judgment to argue that it has in no way been established that it created those armed groups or controlled their operations, nor has it been established that those groups were acting on its instructions or under its direction or control. The Respondent adds that it did not have a duty of vigilance on Congolese territory outside Ituri and, consequently, that the damage inflicted by other forces on that territory could not be connected to an alleged lack of vigilance on the part of Uganda.

90. As regards the régime of occupation in the district of Ituri, the Respondent insists that it falls to the DRC to demonstrate a causal nexus between Uganda's breach of its obligations as an occupying Power and the damage inflicted in that district by individuals or groups. It adds that the DRC has failed to show that certain measures were not taken by Uganda to prevent damage by third parties.

91. With respect to the principle of non-use of force, the Respondent argues that it falls to the DRC to demonstrate a direct and certain causal nexus between the internationally wrongful act and the injury. It considers unfounded the DRC's position that a causal nexus can be established simply by the fact that the damage would not have occurred "but for" Uganda's violation of the *jus ad bellum*.

92. Finally, relying on the Judgment rendered by the Court on 26 February 2007 in the case concerning *Application of the Convention on the*

Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina v. *Serbia and Montenegro)* (*I.C.J. Reports 2007 (I)*, p. 234, para. 462), Uganda claims that even if it had taken the necessary measures, the damage caused by third parties in Ituri would still have occurred.

* *

93. The Court may award compensation only when an injury is caused by the internationally wrongful act of a State. As a general rule, it falls to the party seeking compensation to prove the existence of a causal nexus between the internationally wrongful act and the injury suffered. In accordance with the jurisprudence of the Court, compensation can be awarded only if there is "a sufficiently direct and certain causal nexus between the wrongful act . . . and the injury suffered by the Applicant, consisting of all damage of any type, material or moral" *(ibid.)*. The Court applied this same criterion in two other cases in which the question of reparation arose (*Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua), Compensation, Judgment, I.C.J. Reports 2018 (I)*, p. 26, para. 32; *Ahmadou Sadio Diallo (Republic of Guinea* v. *Democratic Republic of the Congo), Compensation, Judgment, I.C.J. Reports 2012 (I)*, pp. 331-332, para. 14). However, it should be noted that the causal nexus required may vary depending on the primary rule violated and the nature and extent of the injury.

94. In particular, in the case of damage resulting from war, the question of the causal nexus can raise certain difficulties. In a situation of a long-standing and large-scale armed conflict, as in this case, the causal nexus between the wrongful conduct and certain injuries for which an applicant seeks reparation may be readily established. For some other injuries, the link between the internationally wrongful act and the alleged injury may be insufficiently direct and certain to call for reparation. It may be that the damage is attributable to several concurrent causes, including the actions or omissions of the respondent. It is also possible that several internationally wrongful acts of the same nature, but attributable to different actors, may result in a single injury or in several distinct injuries. The Court will consider these questions as they arise, in light of the facts of this case and the evidence available. Ultimately, it is for the Court to decide if there is a sufficiently direct and certain causal nexus between Uganda's internationally wrongful acts and the various forms of damage allegedly suffered by the DRC (see Part II, Section A above).

95. The Court is of the opinion that, in analysing the causal nexus, it must make a distinction between the alleged actions and omissions that took place in Ituri, which was under the occupation and effective control of Uganda, and those that occurred in other areas of the DRC, where

Uganda did not necessarily have effective control, notwithstanding the support it provided to several rebel groups whose actions gave rise to damage. The Court recalls that Uganda is under an obligation to make reparation for all damage resulting from the conflict in Ituri, even that resulting from the conduct of third parties, unless it has established, with respect to a particular injury, that it was not caused by Uganda's failure to meet its obligations as an occupying Power (see paragraph 78 above).

96. Lastly, the Court cannot accept the Respondent's argument based on an analogy with the 2007 Judgment in the case concerning *Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina* v. *Serbia and Montenegro), I.C.J. Reports 2007 (I)*, p. 234, para. 462, in which the Court expressly "confine[d] itself to determining the specific scope of the duty to prevent in the Genocide Convention" and did not "purport to establish a general jurisprudence applicable to all cases where a treaty instrument, or other binding legal norm, includes an obligation for States to prevent certain acts" (*ibid.*, pp. 220-221, para. 429). The Court considers that the legal régimes and factual circumstances in question are not comparable, given that, unlike the above-mentioned *Genocide* case, the present case concerns a situation of occupation.

97. As regards the injury suffered outside Ituri, the Court must take account of the fact that some of this damage occurred as a result of a combination of actions and omissions attributable to other States and to rebel groups operating on Congolese territory. The Court cannot accept the Applicant's assessment that Uganda is obliged to make reparation for 45 per cent of all the damage that occurred during the armed conflict on Congolese territory. This assessment, which purports to correspond to the proportion of Congolese territory under Ugandan influence, has no basis in law or in fact. However, the fact that the damage was the result of concurrent causes is not sufficient to exempt the Respondent from any obligation to make reparation.

98. The Parties have also addressed the applicable law in situations in which multiple actors engage in conduct that gives rise to injury, which has particular relevance to the events in Kisangani, where the damage alleged by the DRC arose out of conflict between the forces of Uganda and those of Rwanda. The Court recalls that, in certain situations in which multiple causes attributable to two or more actors have resulted in injury, a single actor may be required to make full reparation for the damage suffered (*Corfu Channel (United Kingdom* v. *Albania), Merits, Judgment, I.C.J. Reports 1949*, pp. 22-23; see commentary to Article 31 of the ILC Articles on State Responsibility, *Yearbook of the International Law Commission (YILC)*, 2001, Vol. II, Part Two, p. 91, and particularly pp. 93-94, paras. 12-13, as well as the commentary to Article 47, *ibid.*, pp. 124-125, paras. 1-8). In other situations, in which the conduct of

multiple actors has given rise to injury, responsibility for part of such injury should instead be allocated among those actors (see commentary to Article 31, *YILC*, 2001, Vol. II, Part Two, p. 93, para. 13, and to Article 47, *ibid.*, p. 125, para. 5). The Court will return to this issue in assessing the DRC's claims for compensation in relation to Kisangani (see paragraphs 177, 221 and 253 below).

3. The nature, form and amount of reparation

99. The Court will recall certain international legal principles that inform the determination of the nature, form and amount of reparation under the law on the international responsibility of States in general and in situations of mass violations in the context of armed conflict in particular.

100. It is well established in international law that "the breach of an engagement involves an obligation to make reparation in an adequate form" (*Factory at Chorzów, Jurisdiction, Judgment No. 8, 1927, P.C.I.J., Series A, No. 9*, p. 21). This is an obligation to make full reparation for the damage caused by an internationally wrongful act (*Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua), Compensation, Judgment, I.C.J. Reports 2018 (I)*, p. 26, para. 30; *Ahmadou Sadio Diallo (Republic of Guinea* v. *Democratic Republic of the Congo), Merits, Judgment, I.C.J. Reports 2010 (II)*, p. 691, para. 161; *Avena and Other Mexican Nationals (Mexico* v. *United States of America), Judgment, I.C.J. Reports 2004 (I)*, p. 59, para. 119; *Gabčíkovo-Nagymaros Project (Hungary/Slovakia), Judgment, I.C.J. Reports 1997*, p. 80, para. 150).

101. As stated in Article 34 of the ILC Articles on State Responsibility, "[f]ull reparation for the injury caused by the internationally wrongful act shall take the form of restitution, compensation and satisfaction, either singly or in combination". Thus, compensation may be an appropriate form of reparation, particularly in those cases where restitution is materially impossible (*Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua), Compensation, Judgment, I.C.J. Reports 2018 (I)*, p. 26, para. 31; *Pulp Mills on the River Uruguay (Argentina* v. *Uruguay), Judgment, I.C.J. Reports 2010 (I)*, pp. 103-104, para. 273).

102. In view of the circumstances of the present case, the Court emphasizes that it is well established in international law that reparation due to a State is compensatory in nature and should not have a punitive character (*Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua), Compensation, Judgment, I.C.J. Reports 2018 (I)*, p. 26, para. 31). The Court observes, moreover, that any reparation is intended, as far as possible, to benefit all those who suffered injury resulting from internationally wrongful acts (see *Ahmadou Sadio Diallo (Republic of Guinea* v. *Democratic Republic of the Congo), Compensation, Judgment, I.C.J. Reports 2012 (I)*, p. 344, para. 57).

103. The Court notes that the Parties do not agree on the principles and methodologies applicable to the assessment of damage resulting from an armed conflict or to the quantification of compensation due.

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104. The DRC contends that it reached an estimate, in good faith, of the damage caused, by applying a well-defined method and taking account of the circumstances of the case, where the damage suffered was on a massive scale. Thus, in such circumstances, according to the DRC, the Court's jurisprudence does not require a precise assessment of the damage caused. The Applicant contests the Respondent's claim that every injury suffered by every victim has to be specifically demonstrated in order to calculate the quantum. The DRC relies on the standard of proof applicable to mass claims. According to the Applicant, consistent international jurisprudence supports the proposition that international law does not require the specific injuries caused to each victim or group of victims to be established in order to calculate compensation in the context of mass claims. The Applicant also draws attention to the difficulties involved in gathering evidence. The DRC thus argues that it will be necessary to mitigate the effects of the general rule that it is for the party that alleges a fact to prove its existence, in order to take account of situations where the respondent is in a better position to provide evidence of the facts at issue. The Applicant contends that international jurisprudence, particularly in the context of mass injury, has introduced a certain amount of flexibility as regards the establishment of detailed and precise evidence. The DRC relies in this regard on the practice of the European Court of Human Rights, the Eritrea-Ethiopia Claims Commission (hereinafter the "EECC") and the ICC.

105. Uganda, for its part, contends that the Court must demand a high degree of certainty to establish the damage caused. The Respondent thus argues that the DRC must prove the damage, by stating precisely which persons or property, in specific places and at specific times, incurred loss, damage or injury. In addition, Uganda claims that the fact that Ituri was occupied does not relieve the DRC of the obligation to submit some evidence.

* *

106. The Court recalls that "reparation must, as far as possible, wipe out all the consequences of the illegal act" (*Factory at Chorzów, Merits, Judgment No. 13, 1928, P.C.I.J., Series A, No. 17*, p. 47). The Court has recognized in other cases that the absence of adequate evidence of the extent of material damage will not, in all situations, preclude an award of compensation for that damage (*Certain Activities Carried Out by Nicaragua in the*

Border Area (Costa Rica v. *Nicaragua), Compensation, Judgment, I.C.J. Reports 2018 (I)*, pp. 26-27, para. 35). While the Court recognizes that there is some uncertainty about the exact extent of the damage caused, this does not preclude it from determining the amount of compensation. The Court may, on an exceptional basis, award compensation in the form of a global sum, within the range of possibilities indicated by the evidence and taking account of equitable considerations. Such an approach may be called for where the evidence leaves no doubt that an internationally wrongful act has caused a substantiated injury, but does not allow a precise evaluation of the extent or scale of such injury (see *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua), Compensation, Judgment, I.C.J. Reports 2018 (I)*, pp. 26-27, para. 35; *Ahmadou Sadio Diallo (Republic of Guinea* v. *Democratic Republic of the Congo), Compensation, Judgment, I.C.J. Reports 2012 (I)*, p. 334, para. 21, pp. 334-335, para. 24 and p. 337, para. 33).

107. The Court observes that, in most instances, when compensation has been granted in cases involving a large group of victims who have suffered serious injury in situations of armed conflict, the judicial or other bodies concerned have awarded a global sum, for certain categories of injury, on the basis of the evidence at their disposal. The EECC, for example, noted the intrinsic difficulties faced by judicial bodies in such situations. It acknowledged that the compensation it awarded reflected "the damage that could be established with sufficient certainty through the available evidence" (*Final Award, Eritrea's Damages Claims, Decision of 17 August 2009*, United Nations, *Reports of International Arbitral Awards (RIAA)*, Vol. XXVI, p. 516, para. 2), even though the awards "probably d[id] not reflect the totality of damage that either Party suffered in violation of international law" *(ibid.)*. It also recognized that, in the context of proceedings aimed at providing compensation for injuries affecting large numbers of victims, the relevant institutions have adopted less rigorous standards of proof. They have accordingly reduced the levels of compensation awarded in order to account for the uncertainties that flow from applying a lower standard of proof (*ibid.*, pp. 528-529, para. 38).

108. The Court is convinced that it should proceed in this manner in the present case. It will take due account of the above-mentioned conclusions regarding the nature, form and amount of reparation when considering the different forms of damage claimed by the DRC.

109. Uganda submits that the relevant principles of international law concerning compensation preclude requiring a responsible State to pay compensation that exceeds its financial capacity. The DRC, however, considers that "the amounts awarded should not be influenced by . . . the situation of the perpetrator of the wrongful act" and that they should depend on the injury alone.

110. The Court recalls in this regard that the EECC raised the question whether, in determining the amount of compensation, account should be taken of the financial burden imposed on the responsible State, given its economic condition, in particular if there is any doubt about the State's capacity to pay without compromising its ability to meet its people's basic needs (EECC, *Final Award, Eritrea's Damages Claims, Decision of 17 August 2009, RIAA*, Vol. XXVI, pp. 522-524, paras. 19-22). The Court will further address the question of the respondent State's financial capacity below (see paragraph 407).

C. Questions of Proof

111. Having established the principles and rules applicable to the assessment of reparations in the present case, the Court will examine questions of proof in order to determine who bears the burden of proving a fact, the standard of proof, and the weight to be given to certain kinds of evidence.

* *

112. The DRC maintains that it is not required, as Uganda claims, to prove each injury sustained in the armed conflict. According to the Applicant, Uganda is seeking to impose a more exacting standard of proof than is required at the reparations stage. It adds that, at this stage, the circumstances of the case and the difficulties encountered by the Parties in gathering evidence in a situation of armed conflict should also be taken into account. The DRC recalls the Court's jurisprudence, according to which, in some situations, the respondent is in a better position to establish certain facts. It therefore asks the Court to adopt an approach to the valuation of harm that is neither mechanical nor rigid.

113. Uganda, for its part, draws the attention of the Court to the DRC's obligation to prove the loss, damage or injury suffered by specific persons or property, in specific places and at specific times. According to the Respondent, it follows from the 2005 Judgment, in particular paragraph 260 thereof (see paragraph 71 above), that the DRC must demonstrate that the injury suffered was the consequence of the internationally wrongful acts for which Uganda was found responsible, by providing evidence that the injury was a result of specific actions attributable to Uganda. According to the Respondent, it falls to the DRC to provide proof of the exact injury, the causal nexus, and that each specific action that gave rise to injury is attributable to Uganda.

* *

114. The Court does not accept Uganda's contention that the DRC must prove the exact injury suffered by a specific person or property in a given location and at a given time for it to award reparation. In cases of

mass injuries like the present one, the Court may form an appreciation of the extent of damage on which compensation should be based without necessarily having to identify the names of all victims or specific information about each building or other property destroyed in the conflict.

1. The burden of proof

115. The Court will begin by recalling the rules governing the burden of proof. In accordance with its well-established jurisprudence on the matter, "as a general rule, it is for the party which alleges a fact in support of its claims to prove the existence of that fact" (*Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua), Compensation, Judgment, I.C.J. Reports 2018 (I)*, p. 26, para. 33; *Ahmadou Sadio Diallo (Republic of Guinea* v. *Democratic Republic of the Congo), Merits, Judgment, I.C.J. Reports 2010 (II)*, p. 660, para. 54). In principle, therefore, it falls to the party alleging a fact to "submit the relevant evidence to substantiate its claims" (*Pulp Mills on the River Uruguay (Argentina* v. *Uruguay), Judgment, I.C.J. Reports 2010 (I)*, p. 71, para. 163).

116. However, the Court considers that this is not an absolute rule applicable in all circumstances. There are situations where "this general rule would have to be applied flexibly . . . and, in particular, [where] the Respondent may be in a better position to establish certain facts" (*Ahmadou Sadio Diallo (Republic of Guinea* v. *Democratic Republic of the Congo), Compensation, Judgment, I.C.J. Reports 2012 (I)*, p. 332, para. 15). The Court "cannot however apply a presumption that evidence which is unavailable would, if produced, have supported a particular party's case; still less a presumption of the existence of evidence which has not been produced" (*Land, Island and Maritime Frontier Dispute (El Salvador/Honduras: Nicaragua intervening), Judgment, I.C.J. Reports 1992*, p. 399, para. 63).

117. The Court has thus underlined that "[t]he determination of the burden of proof is in reality dependent on the subject-matter and the nature of each dispute brought before the Court; it varies according to the type of facts which it is necessary to establish for the purposes of the decision of the case" (*Ahmadou Sadio Diallo (Republic of Guinea* v. *Democratic Republic of the Congo), Merits, Judgment, I.C.J. Reports 2010 (II)*, p. 660, para. 54). It is for the Court to evaluate all the evidence produced by the parties and which has been duly subjected to their scrutiny, with a view to forming its conclusions. Depending on the circumstances of the case, it may be that "neither party is alone in bearing the burden of proof" (*ibid.*, p. 661, para. 56).

118. As regards the damage that occurred in the district of Ituri, which was under Ugandan occupation, the Court recalls the conclusion it reached in paragraph 78 above. In this phase of the proceedings, it is for Uganda to establish that a particular injury suffered by the DRC in Ituri was not caused by its failure to meet its obligations as an occupying Power.

119. However, as regards damage that occurred on Congolese territory outside Ituri, and although the existence of armed conflict may make it more difficult to establish the facts, the Court is of the view that "[u]ltimately . . . it is the litigant seeking to establish a fact who bears the burden of proving it; and in cases where evidence may not be forthcoming, a submission may in the judgment be rejected as unproved" (*Land and Maritime Boundary between Cameroon and Nigeria (Cameroon* v. *Nigeria), Preliminary Objections, Judgment, I.C.J. Reports 1998*, p. 319, para. 101; see also *Military and Paramilitary Activities in and against Nicaragua (Nicaragua* v. *United States of America), Jurisdiction and Admissibility, Judgment, I.C.J. Reports 1984*, p. 437, para. 101).

2. The standard of proof and degree of certainty

120. In practice, the Court has applied various criteria to assess evidence (see *Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina* v. *Serbia and Montenegro), Judgment, I.C.J. Reports 2007 (I)*, pp. 129-130, paras. 209-210; *Corfu Channel (United Kingdom* v. *Albania), Merits, Judgment, I.C.J. Reports 1949*, p. 17). The Court considers that the standard of proof may vary from case to case and may depend on the gravity of the acts alleged (*I.C.J. Reports 2007 (I)*, p. 130, para. 210). The Court has also recognized that a State that is not in a position to provide direct proof of certain facts "should be allowed a more liberal recourse to inferences of fact and circumstantial evidence" (*Corfu Channel (United Kingdom* v. *Albania), Merits, Judgment, I.C.J. Reports 1949*, p. 18).

121. The Court has previously addressed the question of the weight to be given to certain kinds of evidence. The Court recalls, as noted in its 2005 Judgment, that it

> "will treat with caution evidentiary materials specially prepared for this case and also materials emanating from a single source. It will prefer contemporaneous evidence from persons with direct knowledge. It will give particular attention to reliable evidence acknowledging facts or conduct unfavourable to the State represented by the person making them (*Military and Paramilitary Activities in and against Nicaragua (Nicaragua* v. *United States of America), Merits, Judgment, I.C.J. Reports 1986*, p. 41. para. 64). The Court will also give weight to evidence that has not, even before this litigation, been challenged by impartial persons for the correctness of what it contains." (2005 Judgment, *I.C.J. Reports 2005*, p. 201, para. 61; see also *Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina* v. *Serbia and Montenegro), Judgment, I.C.J. Reports 2007 (I)*, pp. 130-131, para. 213.)

122. The Court stated that the value of reports from official or independent bodies

> "depends, among other things, on (1) the source of the item of evidence (for instance partisan, or neutral), (2) the process by which it has been generated (for instance an anonymous press report or the product of a careful court or court-like process), and (3) the quality or character of the item (such as statements against interest, and agreed or uncontested facts)" (*Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Croatia* v. *Serbia), Judgment, I.C.J. Reports 2015 (I)*, p. 76, para. 190).

123. The Court considers it helpful to refer to the practice of other international bodies that have addressed the determination of reparation concerning mass violations in the context of armed conflict. The EECC recognized the difficulties associated with questions of proof in its examination of compensation claims for violations of obligations under the *jus in bello* and *jus ad bellum* committed in the context of an international armed conflict. While it required "clear and convincing evidence to establish that damage occurred", the EECC noted that if the same high standard were required for quantification of the damage, it would thwart any reparation. It therefore required "less rigorous proof" for the purposes of quantification (EECC, *Final Award, Eritrea's Damages Claims, Decision of 17 August 2009, RIAA*, Vol. XXVI, p. 528, para. 36). Moreover, in its Order for Reparations in the *Katanga* case, which concerns acts that took place in the course of the same armed conflict as in the present case, the ICC was mindful of the fact that "the Applicants were not always in a position to furnish documentary evidence in support of all of the harm alleged, given the circumstances in the DRC" (*The Prosecutor* v. *Germain Katanga*, ICC-01/04-01/07, Trial Chamber II, Order for Reparations pursuant to Article 75 of the Statute, 24 March 2017, p. 38, para. 84).

124. In light of the foregoing and given that a large amount of evidence has been destroyed or rendered inaccessible over the years since the armed conflict, the Court is of the view that the standard of proof required to establish responsibility is higher than in the present phase on reparation, which calls for some flexibility.

125. The Court notes that the evidence included in the case file by the DRC is, for the most part, insufficient to reach a precise determination of the amount of compensation due. However, given the context of armed conflict in this case, the Court must take account of other evidence, such as the various investigative reports in the case file, in particular those from United Nations organs. The Court already examined much of this evidence in its 2005 Judgment and took the view that some of the United Nations reports, as well as the final report of the Judicial Com-

mission of Inquiry into Allegations into Illegal Exploitation of Natural Resources and Other Forms of Wealth in the DRC established in 2001 (hereinafter the "Porter Commission Report"), had probative value when corroborated by other reliable sources (*I.C.J. Reports 2005*, p. 249, para. 237). Although the Court noted in 2005 that it was not necessary for it to make findings of fact for each individual incident, these documents nevertheless record a considerable number of incidents on which the Court can now rely in evaluating the damage and the amount of compensation due. The Court will also take more recent evidence into account, notably the "Report of the Mapping Exercise documenting the most serious violations of human rights and international humanitarian law committed within the territory of the Democratic Republic of the Congo between March 1993 and June 2003", which was published in 2010 by the Office of the United Nations High Commissioner for Human Rights (hereinafter the "Mapping Report"). The Court will also take account of the reports by the Court-appointed experts, where it considers them to be relevant.

126. In the circumstances of the case and given the context and the time that has elapsed since the facts in question occurred, the Court considers that it must assess the existence and extent of the damage within the range of possibilities indicated by the evidence. This may be evidence included in the case file by the Parties, in the reports submitted by the Court-appointed experts or in reports of the United Nations and other national or international bodies. Finally, the Court considers that, in such circumstances, an assessment of the existence and extent of the damage must be based on reasonable estimates, taking into account whether a particular finding of fact is supported by more than one source of evidence ("a number of concordant indications") (see *Military and Paramilitary Activities in and against Nicaragua (Nicaragua* v. *United States of America), Merits, Judgment, I.C.J. Reports 1986*, p. 83, para. 152).

D. The Forms of Damage Subject to Reparation

127. The Parties disagree about which forms of damage fall within the scope of the 2005 Judgment and thus must be taken into account by the Court during this phase of the proceedings.

* *

128. The DRC argues that the internationally wrongful acts attributable to Uganda and the existence of the resulting injuries have already been established by the Court in its 2005 Judgment and that the present

phase of the proceedings concerns only the extent of those injuries, with a view to evaluating the amount of the reparation.

129. The DRC asserts that it is not reasonable to interpret the 2005 Judgment as excluding from this reparation phase the forms of damage not expressly mentioned therein. Thus, in the Applicant's view, incidents of rape and sexual violence, which are not referred to as such in the 2005 Judgment, fall within the framework of that Judgment, as do other forms of damage, such as macroeconomic damage and the plundering of certain minerals not expressly mentioned therein.

130. While Uganda admits its responsibility for the internationally wrongful acts established by the Court, it contends that the 2005 Judgment contains certain temporal, geographic and subject-matter limitations. It considers that its obligation to make reparation concerns only the forms of damage expressly set out in the 2005 Judgment. In the Respondent's view, the DRC cannot, at this late stage, introduce into the general framework of the 2005 Judgment acts such as rape or sexual violence. Uganda thus asks the Court to limit the scope of the present Judgment to only those forms of damage expressly mentioned in the 2005 Judgment.

* *

131. The Court has already determined, in its 2005 Judgment, that Uganda is under an obligation to make reparation for the injury caused to the DRC by several actions and omissions attributable to it. The Court is of the opinion that its task, at this stage of the proceedings, is to rule on the nature and amount of reparation owed to the DRC by Uganda for the forms of damage established in 2005 that are attributable to it. Indeed, the Court's objective in its 2005 Judgment was not to determine the precise injuries suffered by the DRC. It is sufficient for an injury claimed by the Applicant to fall within the categories established in 2005 (*I.C.J. Reports 2005*, p. 241, para. 211, p. 245, para. 220, pp. 252-253, paras. 246-250, p. 257, para. 259, and pp. 280-281, para. 345, subparas. (3) and (4) of the operative part). As the Court has done in previous cases on reparation, it will determine whether each of the claims for reparation falls within the scope of its prior findings on liability (cf. *Ahmadou Sadio Diallo (Republic of Guinea* v. *Democratic Republic of the Congo), Compensation, Judgment, I.C.J. Reports 2012 (I)*, pp. 332-333, para. 17 and p. 343, para. 53).

III. Compensation Claimed by the DRC

132. The DRC claims compensation for damage to persons (Section A), damage to property (Section B), damage to natural resources (Section C) and for macroeconomic damage (Section D). The Court will

examine these claims on the basis of the general considerations described above.

A. Damage to Persons

133. In the operative part of its 2005 Judgment, the Court found that Uganda

> "by the conduct of its armed forces, which committed acts of killing, torture and other forms of inhumane treatment of the Congolese civilian population, destroyed villages and civilian buildings, failed to distinguish between civilian and military targets and to protect the civilian population in fighting with other combatants, trained child soldiers, incited ethnic conflict and failed to take measures to put an end to such conflict; as well as by its failure, as an occupying Power, to take measures to respect and ensure respect for human rights and international humanitarian law in Ituri district, violated its obligations under international human rights law and international humanitarian law" (*I.C.J. Reports 2005*, p. 280, para. 345, subpara. (3) of the operative part);

and

> "that the Republic of Uganda, by engaging in military activities against the Democratic Republic of the Congo on the latter's territory, by occupying Ituri and by actively extending military, logistic, economic and financial support to irregular forces having operated on the territory of the DRC, violated the principle of non-use of force in international relations and the principle of non-intervention" (*ibid.*, subpara. (1) of the operative part).

* *

134. The DRC claims a total of at least US$4,350,421,800 in compensation for damage to persons caused by the internationally wrongful acts of Uganda. The DRC divides this claim by reference to five forms of damage: loss of life (US$4,045,646,000), injuries and mutilations (US$54,464,000), rape and sexual violence (US$33,458,000), recruitment and deployment of child soldiers (US$30,000,000), as well as displacement of populations (US$186,853,800).

1. Loss of life

135. The DRC claims compensation for the loss of 180,000 civilian lives. To this, the DRC adds a claim for the loss of the lives of 2,000 mem-

bers of the Congolese armed forces who were allegedly killed in fighting with the Ugandan army or Ugandan-backed armed groups. To substantiate the number of 180,000 civilian lives lost, the DRC relies on mortality surveys and other estimates produced by non-governmental organizations, in particular a report by the International Rescue Committee (hereinafter the "IRC") and a study conducted by the Association pour le développement de la recherche appliquée en sciences sociales (hereinafter the "ADRASS"). These studies aim to quantify "excess mortality" by comparing the overall observed or calculated deaths during the conflict period with the mortality rate of previous years. While the IRC report estimates that 3.9 million "excess deaths" occurred during the relevant period, between 1998 and 2003, the ADRASS study arrives at a number of 200,000 "excess deaths".

136. The DRC proceeds from the estimate of the IRC, which it rounds up to 4 million lives lost. It then divides this number by ten, "[g]iven the caution which should be observed within judicial proceedings", to arrive at a "minimum estimate" of 400,000 civilian victims. Recognizing that Uganda should not be held responsible for every civilian death caused by the armed conflict, the DRC subsequently applies a multiplier of 0.45 to reflect the share of responsibility it attributes to Uganda. The DRC thereby arrives at a number of 180,000 civilian lives lost attributable to Uganda. The DRC considers that this approach finds support in the report of the Court-appointed expert Ms Guha-Sapir, who, based on data from 38 mortality surveys in the public domain, estimates the "excess civilian deaths" due to the conflict in the DRC between 1998 and 2003 to be 4,958,775. Dividing this number by ten and applying the 0.45 multiplier put forward by the DRC, Ms Guha-Sapir arrives at an estimate of 224,449 "excess civilian deaths".

137. The DRC submits that 60,000 of those deaths occurred in Ituri, that 920 resulted from the fighting in Kisangani, and that 119,080 occurred in other parts of the country. The DRC further divides the number of civilian lives lost into those resulting from violence that was deliberately targeted at the civilian population (40,000 in Ituri), and those which resulted from other breaches of Uganda's international obligations in the context of the invasion and occupation of parts of the DRC (20,000 collateral civilian deaths in Ituri; 920 in Kisangani; and 119,080 civilian deaths in other areas of the DRC).

138. In response to a question posed by the Court under Article 62 of the Rules of Court, the DRC submitted "victim identification form[s]", which had been collected by an expert commission established by the Government of the DRC (hereinafter the "Congolese Commission of Inquiry"). These forms record 5,440 individual lives allegedly lost due to Uganda's unlawful conduct.

139. The DRC proposes that the Court use fixed sums to determine the compensation for each life lost. With respect to lives lost as a result of

acts of violence deliberately targeted at the civilian population, the DRC requests US$34,000 in compensation per person. This figure allegedly corresponds to the average amount awarded by Congolese courts to the families of victims of war crimes. Regarding civilian deaths not resulting from direct violence against the civilian population and deaths among members of the Congolese armed forces, the DRC proposes that the Court use fixed amounts based on an estimation of the average age of the victims, average life expectancy and average anticipated yearly income, resulting in a figure of US$18,913 per person. With respect to the first category, the DRC notes that one of the Court-appointed experts, Mr. Senogles, did not analyse the prevailing practice of Congolese courts, as stipulated in the Court's terms of reference, and considers that his proposal to award US$30,000 per person is unsubstantiated and too low. The DRC is of the view that the expert failed to explain why the Court should have recourse to the practice of the United Nations Compensation Commission (hereinafter the "UNCC") instead of the case law of international courts and tribunals, especially those operating on the African continent.

140. In total, the DRC requests the Court to award US$4,045,646,000 in compensation for the loss of life which, it alleges, was caused by Uganda.

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141. Uganda submits that demographic studies estimating excess mortality do not prove "the exact injury that was suffered as a result of specific actions of Uganda", as required by the Court in its 2005 Judgment (*I.C.J. Reports 2005*, p. 257, para. 260). Uganda also maintains that the IRC study, as well as the report by the Court-appointed expert Ms Guha-Sapir, is unreliable and methodologically flawed. In particular, Uganda argues that both studies are based on outdated data. It asserts that if Ms Guha-Sapir's methodology were to be applied to the more recent data for the period 1998-2003 published by the United Nations Population Division, no significant "excess deaths" would have been detected. Uganda also notes that the authors of the ADRASS study considered that their figure of 200,000 lives lost is probably significantly overstated. Uganda further claims that the DRC's use of a multiplier of 0.45 to determine Uganda's share of responsibility is arbitrary and does not adequately take the role of other actors into account.

142. Uganda also refers to other independent sources, including the Uppsala Conflict Data Program (hereinafter the "UCDP") housed at Uppsala University and used by the Court-appointed expert Mr. Urdal, the Armed Conflict Location and Event Data Project (hereinafter the

"ACLED") housed at the University of Sussex, and the Mapping Report. Uganda points out that these "neutral sources" arrive at figures which are far lower than those put forward by the DRC. It also maintains that, under the Court's jurisprudence and for various reasons, the reports by third parties on which the DRC relies, including United Nations reports and reports by non-governmental organizations, must be treated with caution. Finally, Uganda argues that the practice of international courts and tribunals requires an applicant to provide evidence that proves the identity of persons who were allegedly killed, including the person's name and the date, location and cause of death. Uganda asserts that the DRC has thus failed to meet its burden of proof as to the exact injury that was suffered as a result of specific actions of Uganda. The DRC's request for compensation should therefore be rejected.

143. Regarding the claim concerning the deaths of Congolese soldiers, Uganda contends that the Court made no finding in the 2005 Judgment that Uganda was responsible for such deaths and that, even if the DRC were entitled to seek reparation for these alleged deaths, the claim is unsupported by evidence.

144. Concerning the valuation of lives lost as a result of deliberate violence against the civilian population, Uganda disputes that the appropriate average amount of compensation should be determined by reference to decisions of the DRC's domestic courts. It also asserts that the figure put forward by the DRC in this regard is not corroborated by the documents the DRC has submitted. Moreover, Uganda maintains that in recent reparation decisions relating to the same conflict, the ICC has awarded amounts that are substantially lower than those allegedly awarded by Congolese courts. Uganda also considers that the variables used by the DRC to determine the average amount of compensation for civilian deaths that were not the result of deliberate violence are not supported by evidence. In particular, Uganda notes that, in calculating the average annual income of the deceased victims, the actual average income in the DRC should be used instead of gross domestic product per capita. Concerning the report of the Court-appointed expert Mr. Senogles, Uganda argues that the valuation practice of the UNCC cannot be transposed to inter-State judicial proceedings. Moreover, Uganda maintains that Mr. Senogles applied the UNCC's methodology incorrectly by recommending fixed amounts based on the Commission's Category C claims, which required more detailed evidence of individual losses than is available in the present proceedings.

* *

145. The Court recalls that, in its 2005 Judgment, it found, *inter alia*, that Uganda had committed acts of killing among the civilian population, had failed to distinguish between civilian and military targets, had not

protected the civilian population in fighting with other combatants and, as an occupying Power, had failed to take measures to respect and ensure respect for human rights and international humanitarian law in Ituri (*I.C.J. Reports 2005*, p. 241, para. 211 and p. 280, para. 345, subpara. (3) of the operative part). Furthermore, the Court found that Uganda, through its unlawful military intervention in the DRC, had violated the prohibition of the use of force as expressed in Article 2, paragraph 4, of the United Nations Charter (*ibid.*, p. 227, para. 165). The Court reaffirms that, as a matter of principle, the loss of life caused by these internationally wrongful acts gives rise to the obligation of Uganda to make full reparation. To award compensation, the Court must determine the existence and extent of the injury suffered by the Applicant and satisfy itself that there exists a sufficiently direct and certain causal nexus between the Respondent's internationally wrongful act and the injury suffered.

146. The victim identification forms submitted by the DRC (see paragraph 138 above) are few in number in comparison to the number of lives lost claimed by the DRC, and thus do not support the claim that Uganda owes reparation for 180,000 civilian deaths.

147. Moreover, a large majority of the victim identification forms do not indicate the name of the deceased. Although, given the extraordinary circumstances of the present case, the Court is not persuaded by Uganda's contention that the identity of the persons allegedly killed must be established for these forms to have any evidentiary value (see paragraph 114 above), the victim identification forms also suffer from other defects, in particular the fact that they are not accompanied by corroborating documentation. Furthermore, many of the forms do not show a sufficient causal nexus between any internationally wrongful conduct by Uganda and the alleged harm, but rather refer to other actors as the presumed perpetrators of such harm, including Rwanda or armed groups operating outside Ituri, for whose actions Uganda was not responsible. The Court has observed in previous cases that witness statements which are collected many years after the relevant events, especially when not supported by corroborating documentation, must be treated with caution (*Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Croatia* v. *Serbia), Judgment, I.C.J. Reports 2015 (I)*, pp. 78-79, paras. 197 and 199; *Territorial and Maritime Dispute between Nicaragua and Honduras in the Caribbean Sea (Nicaragua* v. *Honduras), Judgment, I.C.J. Reports 2007 (II)*, p. 731, para. 244). Consequently, the victim identification forms submitted by the DRC can be accorded only very limited probative value in arriving at an appreciation of the number of deaths for which Uganda owes reparation.

148. The scientific studies relied on by the DRC to calculate the number of "excess deaths", namely the IRC report and the ADRASS study,

do not substantiate the existence of a sufficiently direct and certain causal nexus. The Court considers that, irrespective of the scientific and methodological quality of the surveys, they were not intended to, and do not, identify the number of deaths that have a sufficiently direct and certain causal nexus to the unlawful acts of Uganda. In her report, Ms Guha-Sapir estimates "with 95% confidence that a minimum of 3.2 million excess deaths may have resulted in this period due to armed conflict", but the Court was not convinced by her explanation for this estimate. During the hearing, Ms Guha-Sapir acknowledged that it was impossible to attribute the "excess deaths" identified in her report to a single cause. Even if the number of 3.2 million lives lost were accepted as an indication of the number of lives lost during the armed conflict, the Court would be left without any plausible basis to determine for which of these lives lost "there is a sufficiently direct and certain causal nexus between the wrongful act . . . and the injury suffered by the Applicant" (*Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua), Compensation, Judgment, I.C.J. Reports 2018 (I)*, p. 26, para. 32; *Ahmadou Sadio Diallo (Republic of Guinea* v. *Democratic Republic of the Congo), Compensation, Judgment, I.C.J. Reports 2012 (I)*, p. 332, para. 14, citing *Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina* v. *Serbia and Montenegro), Judgment, I.C.J. Reports 2007 (I)*, pp. 232-233, para. 462). Some of the lives lost during the conflict (the number of which cannot be determined) may be regarded as having a cause that is too remote from the internationally wrongful acts of Uganda to be a basis for a claim of reparation against it (see commentary to Article 31 of the ILC Articles on State Responsibility, *YILC*, 2001, Vol. II, Part Two, p. 93, para. 10). Consequently, the Court considers that the mortality surveys presented cannot contribute to the determination of the number of lives lost that are attributable to Uganda.

149. The Court also takes note of the report on "conflict deaths", that is "lives lost as a direct result of the armed conflict", prepared by the Court-appointed expert Mr. Urdal. Mr. Urdal's report is based on the UCDP database, an academic database which he uses to identify "direct conflict deaths" based on individual incidents. Using the UCDP database, Mr. Urdal arrives at an estimate of 14,663 direct civilian deaths that occurred in the entire DRC during the relevant period, between August 1998 and June 2003, including 5,769 in Ituri. This number includes civilians who "were killed as a result of deliberately targeted violence", as well as "civilian collateral victims". Mr. Urdal notes in his report that only 32 civilian deaths are coded in the UCDP database as having occurred in the DRC in clashes involving Ugandan troops. However, the Court recalls that, in its 2005 Judgment, it also held Uganda responsible for failing to comply with its obligations as an occupying Power in Ituri in

respect of violations of international human rights law and international humanitarian law in the occupied territory (*I.C.J. Reports 2005*, p. 245, para. 220). On this basis, and unless Uganda establishes that particular deaths alleged by the DRC in Ituri were not caused by Uganda's failure to meet its obligations as an occupying Power, Uganda owes reparation for the loss of life resulting from the conflict in Ituri, irrespective of whether those deaths resulted from clashes involving Ugandan troops (see paragraph 78 above). With respect to lives lost outside Ituri, the UCDP database is less helpful, since, according to the expert, it is "not designed to determine the legal attribution of deaths".

150. Moreover, the Court notes the inherent limitations of the UCDP database as evidence in a judicial proceeding. The UCDP database is based mainly on press reports and reports by non-governmental organizations. The Court accords to such documents, if they are submitted directly in its proceedings, only limited probative value when they are not corroborated by other forms of evidence (2005 Judgment, *I.C.J. Reports 2005*, p. 204, para. 68; *Oil Platforms (Islamic Republic of Iran* v. *United States of America), Judgment, I.C.J. Reports 2003*, p. 190, para. 60; *Military and Paramilitary Activities in and against Nicaragua (Nicaragua* v. *United States of America), Merits, Judgment, I.C.J. Reports 1986*, pp. 40-41, paras. 62-63; *United States Diplomatic and Consular Staff in Tehran (United States of America* v. *Iran), Judgment, I.C.J. Reports 1980*, pp. 9-10, paras. 12-13). Moreover, the numbers resulting from the UCDP database represent very conservative estimates and, in all likelihood, undercount the overall number of direct civilian deaths. This was confirmed by Mr. Urdal at the hearing, when he stated that the figure of 14,663 civilian deaths (that occurred in the entire DRC from August 1998 until June 2003 based on the UCDP database, including 5,769 in Ituri) was "almost certainly an underestimate" and that it would be impossible to determine the "margin of error". His assessment regarding an undercount is to a certain extent substantiated by indications on the ACLED database for an overall number of 23,791 (civilian and military) deaths resulting from the conflict.

151. Although the information supplied by Mr. Urdal may provide an indication of an approximate number of direct civilian victims, the Court cannot base its assessment of the number of lives lost solely on the report of Mr. Urdal and the UCDP database. It is thus necessary to consider additional forms of evidence.

152. The Court has considered reports produced under the auspices of the United Nations and other documents prepared by independent third parties. In its 2005 Judgment, the Court relied on United Nations reports as "sufficient evidence of a reliable quality", but only "to the extent that

they [were] of probative value and [were] corroborated, if necessary, by other credible sources" (*I.C.J. Reports 2005*, pp. 239-240, paras. 205-208 and p. 249, para. 237). The precise evidentiary value accorded to any report, including those produced by United Nations entities, also depends on the methodology and amount of research underlying its preparation (*Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Croatia* v. *Serbia), Judgment, I.C.J. Reports 2015 (I)*, p. 76, paras. 189-190; *Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina* v. *Serbia and Montenegro), Judgment, I.C.J. Reports 2007 (I)*, pp. 135-137, paras. 227-230). For that reason, the Court attaches particular credibility to the Mapping Report (see paragraph 125 above). Notably, all the information contained in the Mapping Report is corroborated by at least two independent sources, including witness interviews, and thus constitutes reliable evidence (Mapping Report, para. 10). However, even the Mapping Report

> "did not provide for in-depth investigations or gathering of evidence admissible in court, but rather [aims at giving] 'the basis for the formulation of initial hypotheses of investigation by giving a sense of the scale of violations, detecting patterns and identifying potential leads or sources of evidence'" (*ibid.*, para. 5).

153. The Court has also taken into account other United Nations documents, such as the Secretary-General's reports on the United Nations Organization Mission in the Democratic Republic of the Congo (hereinafter "MONUC"), bearing in mind that those reports do not always provide sufficient information as to the methodology adopted and are for the most part less rigorously verified than the Mapping Report.

154. The Court is of the view that the various reports of United Nations bodies, including the Mapping Report, provide a certain amount of information about specific incidents during the conflict, but do not provide a sufficient basis for the Court to arrive at an overall estimate of the number of deaths attributable to Uganda. The individual instances of persons killed that are listed in the Mapping Report are often described in imprecise terms (e.g. "several" or "numerous"). In other cases, the Mapping Report at least provides a range of the number of possible casualties. This is exemplified by the situation in Kisangani, which is documented comparatively well. The Mapping Report states that the fighting between Ugandan and Rwandan troops in Kisangani resulted in the death of "over 30" civilians in August 1999, "over 24 civilians" in May 2000, and "between 244 and 760" civilians in June 2000 (Mapping Report, paras. 361-363). While these numbers may suffice to cast doubt on the number of 920 civilian casualties claimed by the DRC in relation to these events, they provide the Court with certain ranges that inform its overall appreciation of the scale of loss of life. Moreover, since the Mapping

Report was not designed to assign responsibility to particular actors, the numbers provided therein do not necessarily enable the Court to conclude that there was a sufficiently direct and certain causal nexus between the internationally wrongful acts of Uganda and the instances of loss of life reported (see paragraphs 93 and 148 above).

155. The Court takes note of Uganda's estimate that the Mapping Report identifies a total number of 2,291 lives lost with respect to which there can be a "reasonable suspicion" that they resulted from conduct that is attributable to Uganda. However, this assessment does not take into account the number of lives that were lost as a result of Uganda's failure to comply with its obligations as an occupying Power in Ituri, nor does it recognize that Uganda may owe reparation for certain deaths outside Ituri, even if the Mapping Report does not make specific reference to Uganda's role in a particular incident.

156. The Court further considers that, even when adding together the civilian lives lost that were recorded by the Mapping Report as having occurred in Ituri and the lives lost in other parts of the DRC in which Uganda is implicated, the total number will probably not reflect the full extent of loss of life for which Uganda is responsible. The Mapping Report aims solely to document serious violations of international humanitarian and human rights law. The United Nations Secretary-General's Second special report on MONUC dated 27 May 2003, for example, estimates that "more than 60,000" deaths occurred between 1999 and 2003 in Ituri alone (UN doc. S/2003/566 of 27 May 2003, para. 10). While the Court cannot simply adopt a figure that appears, without supporting analysis, in a single report, the MONUC report nevertheless suggests that reliance solely on the Mapping Report would lead to an undercount of the number of lives lost.

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157. In considering the deficiencies in the evidence presented by the DRC, the Court takes into account the extraordinary circumstances of the present case, which have restricted the ability of the DRC to produce evidence with greater probative value (see paragraphs 125-126 above). The Court recalls that from 1998 to 2003, the DRC did not exercise effective control over Ituri, due to belligerent occupation by Uganda. In the *Corfu Channel* case, the Court found that the exclusive territorial control that is normally exercised by a State within its frontiers has a bearing upon the methods of proof available to other States, which may be allowed to have a more liberal recourse to inferences of fact and circumstantial evidence (*Corfu Channel (United Kingdom* v. *Albania), Merits, Judgment, I.C.J. Reports 1949*, p. 18) (see paragraph 120 above). This

general principle also applies to situations in which a State that would normally bear the burden of proof has lost effective control over the territory where crucial evidence is located on account of the belligerent occupation of its territory by another State.

158. Moreover, the DRC rightly emphasizes that the kind of evidence that is usually provided in cases concerning damage to persons, such as death certificates and hospital records, is often not available in remote areas lacking basic civilian infrastructure, and that this reality has also been recognized by the ICC. The Court recalls the finding of the ICC according to which victims of the same conflict were not always in a position to furnish documentary evidence (see paragraph 123 above). In those proceedings, however, many such victims did in fact provide death certificates and medical reports (*The Prosecutor* v. *Germain Katanga*, ICC-01/04-01/07, Trial Chamber II, Order for Reparations pursuant to Article 75 of the Statute, 24 March 2017, paras. 111-112). While it would not have been impossible for the DRC to produce such documentation for a certain number of persons in the present case, the Court recognizes the difficulties in obtaining such documentation for tens of thousands of alleged victims.

159. The Court is aware that detailed proof of specific events that have occurred in a devastating war, in remote areas, and almost two decades ago, is often not available. At the same time, the Court considers that notwithstanding the difficult situation in which the DRC found itself, more evidence relating to loss of life could be expected to have been collected since the Court delivered its 2005 Judgment (see paragraph 66 above).

160. The Court observes that the evidence before it, notably the Mapping Report, demonstrates that a large number of civilian casualties occurred in the DRC between 1998 and 2003 and that a significant part of these casualties can be linked to internationally wrongful acts of Uganda. However, there is insufficient evidence to support the DRC's claim of 180,000 civilian deaths for which Uganda owes reparation. Nor can the Court base its conclusions on reparation on the 32 deaths that are coded in the UCDP database as having occurred in clashes involving Ugandan forces, if only because that figure does not cover deaths caused by armed groups in Ituri (see paragraph 78 above).

161. The Court considers that the analysis by Mr. Urdal, taken together with reports of various United Nations bodies, provides a more substantiated basis for assessing the number of lives lost for which Uganda owes reparation. According to Mr. Urdal, the UCDP database arrives at an estimate of 14,663 direct civilian deaths in the entire DRC, of which 5,769 occurred in Ituri and 8,894 occurred in areas outside of

Ituri. In respect of deaths in Ituri, the Court has not been presented with evidence suggesting that those civilian deaths were due to a cause other than Uganda's failure to meet its obligations as an occupying Power. Moreover, Mr. Urdal has indicated that the UCDP database likely undercounted the total number of civilian deaths in Ituri. It follows that the number of civilian deaths in Ituri for which Uganda owes reparation likely exceeds the figure of 5,769 that Mr. Urdal derived from the UCDP database. Outside Ituri, the Court may not simply assume that the number of civilian deaths for which Uganda owes reparation corresponds to the 8,894 conflict-related deaths calculated by Mr. Urdal as having occurred in that area. On the one hand, given the involvement of many actors in the armed conflict outside Ituri, it cannot be presumed that all such deaths were caused by Uganda's wrongful conduct. On the other hand, Mr. Urdal has observed that the UCDP database likely also undercounted civilian deaths outside Ituri.

162. Neither the materials presented by the DRC, nor the reports provided by the Court-appointed experts or prepared by United Nations bodies contain sufficient evidence to determine a precise or even an approximate number of civilian deaths for which Uganda owes reparation. Bearing these limitations in mind, the Court considers that the evidence presented to it suggests that the number of deaths for which Uganda owes reparation falls in the range of 10,000 to 15,000 persons.

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163. Turning to valuation, the Court considers that the DRC has not presented convincing evidence for its claim that the average amount awarded by Congolese courts to the families of victims of war crimes amounts to US$34,000. Expert reports submitted in the context of cases before the ICC that are related to the situation in the DRC suggest that this figure is too high (*The Prosecutor* v. *Bosco Ntaganda*, ICC-01/04-02/06, Trial Chamber VI, Reparations Order, 8 March 2021, para. 237; *The Prosecutor* v. *Germain Katanga*, ICC-01/04-01/07, Trial Chamber II, Order for Reparations pursuant to Article 75 of the Statute, 24 March 2017, para. 230). Therefore, the Court will not rely on the average amount proposed by the DRC for the loss of a life as a result of deliberate acts of violence against the civilian population, irrespective of whether judgments of domestic courts may generally serve as an appropriate guide in a case such as the present one. The Court also does not consider that the alternative fixed-sum rates suggested by the Court-appointed expert Mr. Senogles are suitable for the present proceedings. The expert derives these rates from the practice of the UNCC but does not provide a satis-

factory rationale for applying those rates in the present case. The rate he suggests for loss of life is based on the UNCC's Category C claims, which allowed individuals to claim actual losses up to US$100,000 on condition that they were documented by appropriate evidence of the circumstances and of the valuation of the claimed loss. The Court notes that, under the UNCC's Category B claims, claimants could seek fixed amounts, ranging from US$2,500 per individual who suffered serious personal injury or whose spouse, child or parent died, to US$10,000 per family of a victim, in an expedited process where the standard of proof was lower.

164. The methodology that the DRC proposes for the valuation of deaths that did not result from direct attacks on the civilian population is similar to that based on expected future life-time earnings. The Court notes that claims in respect of loss of life are usually based on an evaluation of the losses of the surviving heirs or successors, in addition to administrative expenses such as medical and burial costs (see *Corfu Channel (United Kingdom* v. *Albania), Assessment of Amount of Compensation, Judgment, I.C.J. Reports 1949*, pp. 249-250; *Opinion in the* Lusitania *Cases, 1 November 1923, RIAA*, Vol. VII, p. 35). This approach was considered by the EECC to be "a useful reference for assessing compensation in inter-State claims, if properly applied in appropriate cases", which "may provide a rough measure of a State's injury where a group of its nationals of known size has suffered similar injuries" (EECC, *Final Award, Ethiopia's Damages Claims, Decision of 17 August 2009, RIAA*, Vol. XXVI, p. 669, para. 83). In addition to this material element of injury, the Court may award compensation for non-material ("moral" or "non-pecuniary") elements of the injury caused to individuals and their surviving relatives as a result of the psychological harm they have suffered (*Ahmadou Sadio Diallo (Republic of Guinea* v. *Democratic Republic of the Congo), Compensation, Judgment, I.C.J. Reports 2012 (I)*, p. 333, para. 18). In the *Diallo* case, the Court found that non-material injury can be established without specific evidence and that any quantification of compensation for such injury necessarily rests on equitable considerations (*ibid.*, pp. 334-335, paras. 21 and 24). However, for the purposes of the present proceedings, the Court does not consider that it would be appropriate to assign a higher value to lives lost in a deliberate attack on civilians, as the DRC proposes. It notes in this regard that the EECC considered that, in the situation before it, large per capita awards for non-material damage, which may be justified in individual cases, would be inappropriate in a situation involving significant numbers of unidentified and hypothetical victims (EECC, *Final Award, Ethiopia's*

Damages Claims, Decision of 17 August 2009, RIAA, Vol. XXVI, pp. 664-665, paras. 61 and 64).

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165. Concerning the DRC's request for compensation for 2,000 lives allegedly lost among members of its armed forces, the Court notes that the DRC has provided very little evidence in support of this claim. The Mapping Report gives a very limited indication in this regard, referring generally to losses suffered by the Congolese armed forces in 1999 and noting one incident in August 2000 (Mapping Report, paras. 385 and 392). The Court does not consider that other material submitted by the DRC, including the memoir of MLC leader Jean-Pierre Bemba, constitutes reliable evidence. The Court emphasizes that the more lenient evidentiary standard employed in view of the difficulty of obtaining documentary evidence in the DRC (see paragraphs 123-126 above) does not apply with equal force to the loss of life of military personnel, since a State can be expected to possess at least minimal records regarding its own armed forces, including those killed in action. The Court dismisses this claim of the DRC for lack of evidence, and therefore does not address any other question in relation to it.

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166. The Court recalls that it may, under the exceptional circumstances of the present case, award compensation in the form of a global sum, within the range of possibilities indicated by the evidence and taking into account equitable considerations (see paragraph 106 above). The Court notes that, while the available evidence is not sufficient to determine a reasonably precise or even an approximate number of civilian lives lost that are attributable to Uganda, it is nevertheless possible to identify a range of possibilities with respect to the number of such civilian lives lost (see paragraph 162 above). Taking into account all the available evidence (see paragraphs 135-156 above), the various methodologies proposed to determine the amount of compensation for a human life lost (see paragraphs 163-164 above), as well as its jurisprudence and the pronouncements of other international bodies (see paragraphs 69-126, 157-158 and 163-164 above), the Court will award compensation for the loss of civilian lives as part of a global sum for all damage to persons (see paragraph 226 below).

2. *Injuries to persons*

167. The DRC also requests the Court to award US$54,464,000 in compensation for injuries and mutilations among the civilian population.

168. This claim includes injuries due to deliberate attacks on the civilian population, such as direct targeting, mutilation or torture, as well as injuries suffered as collateral damage resulting from military operations. The DRC submits that Uganda is responsible for 30,000 injured or mutilated civilians in Ituri. The DRC arrives at this number by dividing the 60,000 deaths which it claims to have occurred in Ituri by two. It claims that, of the 30,000 individuals injured in Ituri, 20,000 were harmed as a result of deliberate violence against civilians, while the remaining 10,000 were injured as a result of "other circumstances related to the conflicts". The DRC further states that the alleged 20,000 individuals injured as a result of deliberate violence against civilians include 15,000 who were seriously injured or mutilated and 5,000 who suffered minor injuries. In other areas, the DRC maintains that 1,937 civilians were injured as a consequence of the fighting between Uganda and Rwanda in Kisangani, in addition to 203 civilians injured as a result of Uganda's internationally wrongful acts in Beni, Butembo and Gemena. Thus, the overall number of injured victims put forward by the DRC is 32,140. To support this claim, the DRC invokes United Nations reports, particularly the Mapping Report, the Secretary-General's Second special report on MONUC, the MONUC special report on the events in Ituri, as well as the victim identification forms submitted by the DRC. However, the DRC also notes the "absence of more precise data on this point".

169. In terms of valuation, the DRC submits that a distinction must be made between injuries resulting from deliberate attacks on civilians and those suffered "as collateral damage" resulting from military operations. The DRC requests the Court to award compensation to victims in the first category on the basis of the average sums allegedly awarded by Congolese courts to victims injured or mutilated in the context of the perpetration of serious international crimes, namely US$3,500 for serious injuries or mutilations and US$150 for minor injuries. With regard to "collateral" injuries, the DRC argues that the Court should award a minimum of US$100 per person.

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170. Uganda asserts that the DRC has not produced adequate evidence to sustain its claim for compensation for injuries and mutilations among the civilian population.

171. Uganda argues that the DRC has derived the number of 30,000 injured persons in Ituri by arbitrarily dividing by two an uncor-

roborated mortality estimate included in a single United Nations report. Moreover, Uganda notes that the DRC has not established the identity of the persons alleged to have been injured and has failed to provide details such as the location, date or nature of the injury. In addition, Uganda maintains that the DRC has not demonstrated a sufficiently direct causal nexus between the personal injuries claimed and Uganda's unlawful acts. In this regard, Uganda reiterates its criticism of the victim identification forms submitted by the DRC and notes that, in proceedings before the ICC, victims of the same conflict submitted corroborative documentation such as hospital records and forensic reports.

172. Uganda further submits that the DRC's proposed valuation of damage for personal injuries is unsupported by evidence. Uganda argues that the DRC has provided only a handful of domestic judgments, mostly relating to rape and sexual violence, which do not corroborate the figures allegedly awarded by Congolese courts in relation to other injuries or mutilations.

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173. In its 2005 Judgment, the Court found Uganda responsible for torture and other forms of inhuman treatment of the civilian population, as well as for failing to distinguish between civilian and military targets and to protect the civilian population in fighting with other combatants, as well as for failing, as an occupying Power, to take measures to respect and ensure respect for human rights and international humanitarian law in Ituri district (*I.C.J. Reports 2005*, p. 280, para. 345, subpara. (3) of the operative part). Therefore, injuries among the civilian population which arise from these acts, as well as from the violation of the prohibition of the use of force and the principle of non-intervention (*ibid.*, para. 345, subpara. (1) of the operative part), fall within the scope of the 2005 Judgment and are, as a matter of principle, subject to the obligation to make reparation.

174. With regard to Ituri, the DRC puts forward a figure of 30,000 injured civilians. Taking its claim of 60,000 civilian lives lost in Ituri as a point of departure, the DRC estimates that the number of persons injured must amount to at least half that number. The Court notes that, during an armed conflict, the number of persons injured normally surpasses the number of lives lost and, on that basis, it is not excessive to estimate the number of injured persons as half of the number of deaths. However, the DRC has not presented sufficient evidence to establish that the number of lives lost in Ituri does in fact amount to 60,000 (see paragraphs 156 and 160 above). Therefore, the Court has no basis for using the number of 60,000 lives allegedly lost in Ituri as a reference even for an approximation of the number of civilians injured. The DRC acknowledges that its approach is due to "the absence of more precise data on this point".

175. The Court has already noted that the victim identification forms submitted by the DRC cannot be considered reliable evidence and do not demonstrate the full extent of injuries claimed (see paragraphs 146-147 above). By the DRC's own count, no more than 1,353 of those forms record alleged injuries, including sexual violence. Apart from their minimal evidentiary value, the forms thus represent only a fraction of the injuries claimed by the DRC.

176. Furthermore, the Court observes that none of the relevant United Nations reports includes an overall estimate of the number of injured civilians. The United Nations Secretary-General's Second special report on MONUC gives a broad estimate of lives lost and persons displaced in Ituri but notes in relation to other personal injuries only that "countless others have been left maimed or severely mutilated" (UN doc. S/2003/566 of 27 May 2003, para. 10). Similarly, the MONUC special report on the events in Ituri contains some examples of instances where civilians were left injured, but does not provide a basis for the Court to reach an overall estimate (UN doc. S/2004/573 of 16 July 2004, paras. 74-75 and 93). The Mapping Report also contains examples of incidents involving injuries resulting from deliberate attacks on the civilian population, including through torture and mutilation (Mapping Report, paras. 369, 407-408, 413-414 and 422). However, the Mapping Report acknowledges that "most effort had to be focused on incidents involving the deaths of a large number of victims" (*ibid.*, para. 535). The sum of the instances identified in the Mapping Report amounts to hundreds of injured civilians, a number which the Court finds implausibly low, particularly given the protracted and pervasive violence in Ituri.

177. More reliable estimates exist with regard to the magnitude of injuries resulting from the fighting between Ugandan and Rwandan troops in Kisangani. The Mapping Report states that the fighting between UPDF and Rwandan troops in Kisangani in August 1999 resulted in over 100 wounded civilians (*ibid.*, para. 361). The report of the United Nations inter-agency assessment mission to Kisangani (hereinafter the "Inter-Agency Report") notes that an estimated 1,700 people were injured in clashes between Ugandan and Rwandan troops in the period from 5 to 10 June 2000 (UN doc. S/2000/1153 of 4 December 2000, para. 57). This figure is broadly corroborated by the Mapping Report, which states that "over 1,000" civilians were wounded in Kisangani during this encounter (Mapping Report, para. 363). The Court can therefore conclude that the number of 1,937 injured civilians put forward by the DRC in relation to Kisangani falls within a plausible range. The Court is not in a position to apportion to Uganda a specific share of the total damage related to persons injured in Kisangani.

178. The Mapping Report also refers to relevant events in other areas of the DRC. For example, the Mapping Report indicates that Ugandan

troops in Beni were "arbitrarily detain[ing] large numbers of people and subject[ing] them to torture and various other cruel, inhuman or degrading treatments" (Mapping Report, para. 349). In addition, the Report mentions the torture of civilians and a human rights activist in the town of Buta (*ibid.*, para. 402). However, while these examples indicate that deliberate attacks against and mistreatment of civilians by Ugandan forces, sometimes amounting to torture, were not confined to Ituri or Kisangani, the Mapping Report cannot serve as a reliable basis to determine the extent of such acts in other locations for the purpose of awarding compensation.

179. On the basis of the evidence reviewed, the Court is unable to determine, with a sufficient level of certainty, even an approximate estimate of the number of civilians injured by internationally wrongful acts of Uganda. The Court notes that the DRC has failed to produce appropriate evidence to corroborate its claim that 30,000 civilians were injured in Ituri. However, the Court reiterates its conclusions with regard to the difficult circumstances prevailing in the DRC and their effect on the ability of the Applicant to furnish the kind of evidence normally expected in claims relating to personal injuries (see paragraphs 120-126 above). The Court considers that the available evidence at least confirms the occurrence of a significant number of injuries in many localities.

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180. Regarding valuation, the Court notes that the DRC claims fixed amounts of US$3,500 per person for injuries resulting from deliberate attacks on civilians, and US$150 for minor deliberate injuries. With regard to "collateral" injuries, the DRC seeks a minimum of US$100 per person. The DRC does not provide convincing evidence that these figures are derived from the average amounts awarded by Congolese courts in the context of the perpetration of serious international crimes. The Court is mindful of the fact that the proposed sum for "collateral" injuries is intended to cover medical costs and loss of income and only to a lesser extent compensation for non-material harm, whereas injuries and mutilation from direct attacks on civilians would justify higher awards because of the associated trauma and psychological harm. However, large awards for non-material harm may be inappropriate in situations involving significant numbers of unidentified and hypothetical victims (see paragraph 164 above). Furthermore, the Court notes that it is difficult to draw any distinction between serious and minor injuries since there is no basis to determine their respective proportions.

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181. The Court recalls that it may, under the exceptional circumstances of the present case, award compensation in the form of a global sum, within the range of possibilities indicated by the evidence and taking into account equitable considerations (see paragraph 106 above). The Court notes that the available evidence for personal injuries is less substantial than that for loss of life, and that it is impossible to determine, even approximately, the number of persons injured as to whom Uganda owes reparation. The Court can only find that a significant number of such injuries occurred and that local patterns can be detected (see paragraph 179 above). Taking into account all the available evidence (see paragraphs 168-178 above), the methodologies proposed to assign a value to personal injuries (see paragraph 180 above), as well as its jurisprudence and the pronouncements of other international bodies (see paragraphs 69-126 above), the Court will award compensation for personal injuries as part of a global sum for all damage to persons (see paragraph 226 below).

3. Rape and sexual violence

182. The DRC seeks US$33,458,000 in compensation for 1,710 victims of rape and sexual violence in Ituri and for 30 victims of such acts in other parts of the DRC, including Kisangani.

183. The DRC acknowledges that the Congolese Commission of Inquiry was able to identify no more than 342 cases of rape in Ituri, as recorded by the victim identification forms. The DRC categorizes these cases into 122 cases of rape (which the DRC refers to as *"viol simple"*) and 220 cases of "aggravated rape". The DRC then multiplies the number of 342 by five and arrives at 1,710 victims (610 cases of rape and 1,100 cases of "aggravated rape"). The DRC justifies this method of calculation by arguing that sexual violence was a widespread weapon of war in Ituri and that it is commonly underreported because of the social stigma attached to it. To this figure, the DRC adds 18 cases of rape in Kisangani, 10 in Butembo, and two in Beni, as reported by the Congolese Commission of Inquiry.

184. With respect to valuation, the DRC claims that, in the context of serious international crimes, Congolese courts have on average awarded sums of US$12,600 in cases of rape and US$23,200 in cases of "aggravated rape". The DRC further submits that the non-material injury suffered by the victims of sexual violence is particularly significant and that it is aggravated by the frequent ostracization of the victims by their family members or society in general.

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185. Uganda argues that instances of rape and sexual violence are not mentioned in the 2005 Judgment, and that, therefore, the DRC should be precluded from claiming compensation for such acts.

186. Uganda also maintains that the DRC has failed to produce evidence to support the number of rapes alleged to have occurred in Ituri or elsewhere. In this regard, Uganda reiterates its criticism of the victim identification forms and the use of multipliers.

187. Uganda states that the DRC provides no authority for the proposition that compensation for sexual violence should be determined by reference to decisions rendered by Congolese courts. Moreover, Uganda is of the view that the decisions of those courts do not support the average figures put forward by the DRC.

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188. The Court notes that, in its 2005 Judgment, Uganda was found to be responsible for violations of its obligations under international humanitarian law and international human rights law, including by acts of torture and other forms of inhuman treatment (*I.C.J. Reports 2005*, p. 241, para. 211). International criminal tribunals as well as human rights courts and bodies have recognized that rape and other acts of sexual violence committed in the context of armed conflict may amount to grave breaches of the Geneva Conventions or violations of the laws and customs of war, and that they may also constitute a form of torture and inhuman treatment (*The Prosecutor* v. *Kunarac et al.*, IT-96-23 and IT-96-23/1-A, International Criminal Tribunal for the former Yugoslavia, Appeals Chamber, Judgement of 12 June 2002, pp. 46-47, paras. 149-151; *Mrs. A.* v. *Bosnia and Herzegovina* (United Nations, Committee against Torture, Communication No. 854/2017, decision of 2 August 2019, UN doc. CAT/C/67/D/854/2017), para. 7.3; as to regional practice, see e.g. African Commission on Human and Peoples' Rights, General Comment No. 4 on the African Charter on Human and Peoples' Rights: The Right to Redress for Victims of Torture and Other Cruel, Inhuman or Degrading Punishment or Treatment (Art. 5), pp. 17-18, paras. 57-58). The Court therefore considers that Uganda can be required to pay compensation for acts of rape and sexual violence, to the extent substantiated by the relevant evidence, even though such acts were not mentioned specifically in the 2005 Judgment (see paragraph 131 above).

189. Concerning the evidentiary basis of the DRC's claim, the Court reiterates that the victim identification forms provided by the DRC are of little probative value (see paragraphs 146-147 above). The Court is mindful that victims of sexual violence often experience psychological trauma

and social stigma, and that, therefore, such violence is frequently under-reported and notoriously difficult to document (see EECC, *Final Award, Ethiopia's Damages Claims, Decision of 17 August 2009, RIAA*, Vol. XXVI, pp. 675-676, paras. 104-105). However, the Court does not find it appropriate to overcome such evidentiary challenges by using unsubstantiated multipliers. Therefore, even if the 342 cases of sexual violence which are, according to the DRC, supported by the victim identification forms were deemed to be adequately substantiated, the Court could not accept the number of 1,740 such cases claimed by the DRC as being sufficiently proven.

190. The Court considers that it is impossible to derive even a broad estimate of the number of victims of rape and other forms of sexual violence from the reports and other data available to it. This absence of adequate documentation has also been recognized by various United Nations reports. The MONUC special report on the events in Ituri, for example, notes that "[t]he exact number of female victims of rape or sexual slavery is impossible to estimate at this time" (UN doc. S/2004/573 of 16 July 2004, para. 1). Similarly, the Mapping Report acknowledges its own shortcomings with regard to sexual violence:

> "Aware that such a methodology prevents full justice from being done to the numerous victims of sexual violence and fails to reflect appropriately the widespread use of this form of violence by all armed groups involved in the different conflicts in the DRC, it was decided from the outset to seek information and documents supporting the perpetration of sexual violence in certain contexts rather than seeking to confirm each individual case, the victims being unfortunately too numerous and dispersed across the whole country." (Mapping Report, para. 535.)

191. However, the Court finds that it is beyond doubt that rape and other forms of sexual violence were committed in the DRC on a large and widespread scale. The Mapping Report notes "the widespread use of this form of violence by all armed groups" and reiterates that the victims were "numerous" (*ibid.*, see also paras. 35 and 530). It provides various examples of rape in Ituri during the period of occupation involving members of the UPDF and other armed groups (*ibid.*, paras. 405, 408-409, 416 and 419) and outside Ituri by members of the UPDF (*ibid.*, paras. 330 and 443). The MONUC special report on the events in Ituri observes that in that area "[c]ountless women were abducted and became 'war wives', while others were raped or sexually abused before being released" (UN doc. S/2004/573 of 16 July 2004, para. 1). The ICC has found that rape and sexual violence occurred in Ituri during the period in which the district was occupied by Uganda, and that they amounted to a "common

practice" (*The Prosecutor* v. *Bosco Ntaganda*, ICC-01/04-02/06, Trial Chamber VI, Judgment of 8 July 2019, paras. 293, 940-948, 1196 and 1199).

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192. Regarding the valuation of the harm suffered by victims of rape and sexual violence, the Court finds that the DRC has not provided sufficient evidence that would corroborate the alleged average amounts awarded by Congolese courts of US$23,200 per victim for "aggravated rape" and US$12,600 for rape. The Court takes note of an expert report submitted to the ICC relating to the situation in the DRC, which indicates that there is an emerging standard in Congolese courts of US$5,000 per victim being awarded in cases of rape (*ibid.*, Reparations Order, 8 March 2021, para. 238).

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193. The Court recalls that it may, under the exceptional circumstances of the present case, award compensation in the form of a global sum, within the range of possibilities indicated by the evidence and taking into account equitable considerations (see paragraph 106 above). The Court notes that the available evidence for rape and sexual violence is less substantial than that for loss of life, and that it is not possible to determine even an approximate number of cases of rape and sexual violence attributable to Uganda. The Court can only find that a significant number of such injuries occurred (see paragraphs 190-191 above). Taking into account all the available evidence (see paragraphs 183-189 above), the methodologies proposed to assign a value to rape and sexual violence (see paragraph 192 above), as well as its jurisprudence and the pronouncements of other international bodies (see paragraphs 69-126 above), the Court will award compensation for rape and sexual violence as part of a global sum for all damage to persons (see paragraph 226 below).

4. Recruitment and deployment of child soldiers

194. The DRC claims US$30,000,000 as compensation for the recruitment of 2,500 child soldiers by Uganda and by armed groups supported by Uganda.

195. The DRC's claim is based on two specific instances of alleged recruitment of child soldiers, which it supports with three distinct pieces of evidence. First, the DRC refers to the United Nations Secretary-General's Sixth report on MONUC which indicates that, in 2000, "a considerable number" of children had been taken for military training to Uganda, about 600 of whom were about to be transferred to the custody of UNICEF or non-governmental organizations (UN doc. S/2001/128 of 12 February 2001, para. 66). Second, the DRC relies on witness testimony before the ICC in the *Lubanga* case, allegedly referring to the same incident and putting the number of transferred children at 700. Third, the DRC invokes the Mapping Report, which notes that the MLC was engaged in the recruitment of child soldiers with "the backing of the Ugandan army", that the MLC "admitted to having 1,800 [child soldiers] within its ranks" (Mapping Report, para. 697) and that "all the armed groups in Ituri (UPC, FNI, FRPI, FAPC and PUSIC) are alleged to have recruited thousands of children along ethnic lines" (*ibid.*, para. 429).

196. The DRC requests a fixed sum of US$12,000 per child soldier, deriving this figure from the alleged practice of Congolese courts.

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197. Uganda asserts that the number of 600 children indicated in the Secretary-General's Sixth report on MONUC is contradicted by the Mapping Report. Moreover, Uganda argues that the same witness in the *Lubanga* case on whom the DRC relies indicated that a significant percentage of the children involved in this incident were over the age of 15 and could therefore not be classified as child soldiers.

198. Uganda also submits that the Mapping Report refers only to the recruitment of child soldiers by the MLC and that there is no evidence either in the Mapping Report or otherwise presented by the DRC demonstrating that the child soldiers in question were recruited by Uganda or trained in UPDF training camps. According to Uganda, the DRC claims compensation for the recruitment of child soldiers only with respect to Ituri. Uganda points out that the MLC had almost no presence in Ituri. In addition, Uganda maintains that it cannot be held responsible for acts of the MLC outside occupied Ituri and that the Court, in its 2005 Judgment, held that the MLC was neither created nor controlled by Uganda. Moreover, Uganda highlights that the DRC did not list the MLC among the armed groups for whose acts it claims reparation. With regard to valuation, Uganda objects to the DRC's method of assessing the injury suffered by child soldiers by reference to the amount awarded by Congolese courts for acts that the DRC considers have caused similar harm.

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199. In its 2005 Judgment, the Court found that "there [was] convincing evidence of the training in UPDF training camps of child soldiers and of the UPDF's failure to prevent the recruitment of child soldiers in areas under its control" (*I.C.J. Reports 2005*, p. 241, para. 210). The DRC's claim is thus encompassed by the 2005 Judgment.

200. The Court finds that there is limited evidence supporting the DRC's claims regarding the number of child soldiers recruited or deployed. The Court notes that the Secretary-General's Sixth report on MONUC found that, in the year 2000, 600 children who had apparently been transferred for military training to Uganda were soon to be repatriated by humanitarian organizations. In particular, the report recalls:

> "As indicated in my 6 December 2000 report, a considerable number of Congolese children were taken from the Bunia, Beni and Butembo region, apparently for military training in Uganda (para. 75). Concern has been expressed at the possibility that these children will be deployed back to the Democratic Republic of the Congo as soldiers. As the present report was being finalized, information was received that 600 children would be transferred to the custody of humanitarian organizations next week." (UN doc. S/2001/128 of 12 February 2001, para. 66).

Furthermore, the Court takes note of the MONUC special report on the events in Ituri, according to which "[t]housands of children aged from 7 to 17 were drawn forcibly or voluntarily into armed groups" (UN doc. S/2004/573 of 16 July 2004, para. 1). This report contains various indications which confirm that a significant number of children were recruited or deployed as child soldiers in Ituri (*ibid.*, paras. 39, 147 and 148). The Mapping Report also indicates that "[a]ccording to child protection agencies working in the disarmament, demobilisation and reintegration (DDR) of children, at least 30,000 children were recruited or used by the armed forces or groups during the conflict" (Mapping Report, para. 673).

201. The Court takes note of Uganda's reliance on the Mapping Report, according to which, ultimately, only 163 children were repatriated (*ibid.*, para. 429). However, the relevant section of the Mapping Report notes that in 2000 "at least 163 of these children were sent to Uganda to undergo military training at a UPDF camp in Kyankwanzi before finally being repatriated to Ituri by UNICEF in February 2001" *(ibid.)*. The Court reads the Mapping Report to mean that 163 out of a larger number of children were ultimately repatriated by UNICEF to Ituri in 2001.

202. This reading of the Mapping Report is supported by witness testimony concerning the same events in the *Lubanga* trial at the ICC. In

this case, witness P-0116 recalled that, in 2000, the accused had sent children to Uganda:

> "P-0116, who was based in Bunia during the period shortly before the time frame of the charges, testified he was told that the accused had sent children to Uganda during the summer of 2000, and that Mr. Lubanga was with them at the camp . . . Some of those who witnessed this transfer of about 700 youths to Uganda told P-0116 they had been taken on Ugandan cargo planes, and it appeared that the accused was in contact with the Ugandan military authorities who gave him the necessary military support." (*The Prosecutor* v. *Thomas Lubanga Dyilo*, ICC-01/04-01/06, Trial Chamber I, Judgment pursuant to Article 74 of the Statute, 14 March 2012, paras. 1031 and 1033.)

203. The Court notes Uganda's point that P-0116 was not an eyewitness and recalls that it affords limited evidentiary weight to hearsay testimony (*Military and Paramilitary Activities in and against Nicaragua (Nicaragua* v. *United States of America), Merits, Judgment, I.C.J. Reports 1986*, p. 42, para. 68; *Corfu Channel (United Kingdom* v. *Albania), Merits, Judgment, I.C.J. Reports 1949*, pp. 16-17). However, the Court is also mindful of the fact that the witness was assessed as credible by an ICC Trial Chamber and that his or her description of the events matches the one set out in the Mapping Report.

204. Regarding the alleged support provided by Uganda for the recruitment and deployment of child soldiers by the MLC, the Mapping Report notes that "[t]he MLC's army, the ALC, with the backing of the Ugandan Army, the UPDF, allegedly also recruited children, primarily in Mbandaka, Equateur Province" (Mapping Report, para. 697). This report also mentions that, in 2001, the MLC admitted to having 1,800 child soldiers within its ranks *(ibid.)*. The Court is not convinced by Uganda's argument that the DRC has limited its claim geographically to Ituri. While it is true that some parts of the DRC's Memorial give the impression that all 2,500 instances of the recruitment of child soldiers are claimed to have occurred in Ituri, other sections note that "such practices were also reported in other regions, including the province of Equateur".

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205. Concerning the valuation of the harm caused with respect to child soldiers, the Court observes that the DRC did not provide evidence for the sums allegedly awarded by Congolese courts. The Court further notes that the Court-appointed expert suggested basing the valuation of the injury suffered by child soldiers on an analogy with the UNCC Category E claims. However, this category pertained to individuals who had

been taken as hostages or were illegally detained, and did not, therefore, reflect the material injury and psychological trauma sustained by child soldiers in the DRC. The Court further observes that, in the *Lubanga* case, the ICC Trial Chamber set the amount of compensation for such a victim *ex aequo et bono* at US$8,000, taking into account, *inter alia*, decisions of Congolese courts (*The Prosecutor* v. *Thomas Lubanga Dyilo*, ICC-01/04-01/06, Trial Chamber II, Decision Setting the Size of the Reparations Award for which Thomas Lubanga Dyilo Is Liable, 21 December 2017, para. 259). In the framework of the present reparation proceedings, these methodologies do not provide a sufficient basis for assigning a specific valuation of damage in respect of a child soldier.

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206. The Court recalls that it may, under the exceptional circumstances of the present case, award compensation in the form of a global sum, within the range of possibilities indicated by the evidence and taking into account equitable considerations (see paragraph 106 above). The Court notes that the available evidence for the recruitment and deployment of child soldiers provides a range of the possible number of victims in relation to whom Uganda owes reparation (see paragraphs 200-204 above). Taking into account all the available evidence (see paragraphs 195-204 above), the methodologies proposed to assign a value to the damage caused by the recruitment and deployment of child soldiers (see paragraph 205 above), as well as its jurisprudence and the pronouncements of other international bodies (see paragraphs 69-126 above), the Court will award compensation for the recruitment and deployment of child soldiers as part of a global sum for all damage to persons (see paragraph 226 below).

5. Displacement of populations

207. The DRC claims US$186,853,800 in compensation for the flight and displacement of parts of the population in Ituri and elsewhere in the DRC.

208. The DRC estimates that 600,000 persons were forced to flee their town or village as a consequence of Uganda's failure to comply with its obligations as an occupying Power in Ituri between 1998 and 2003. To substantiate its claim, the DRC refers, in particular, to the Secretary-General's Second special report on MONUC, the MONUC special report on the events in Ituri, and the Mapping Report.

209. The DRC further submits that many people were forced to flee in order to escape the impact of the war in other parts of the DRC. How-

ever, the DRC also asserts that since it would "not [be] possible to derive any exact figures from" the records, it has limited its claim to 433 cases of displacement in Beni, 93 in Butembo and 12 in Gemena. These instances are allegedly identified and recorded in the victim identification forms collected by the Congolese Commission of Inquiry. In addition, relying on the Inter-Agency Report, the DRC asserts that 68,000 persons were internally displaced as a result of the confrontations between Ugandan and Rwandan troops in Kisangani. The DRC thus claims compensation for a total of 668,538 displaced persons.

210. Regarding the valuation of these cases of flight and displacement, the DRC submits that a distinction must be made between the situation of persons who fled their homes in order to escape deliberate acts of violence against civilian populations and the situation of those who were driven from their homes by the fighting. According to the DRC, the first of these scenarios mainly occurred in Ituri and should be compensated by a sum of US$300 per person, amounting to a total of US$180,000,000. The second scenario allegedly applies to those who fled their homes for shorter periods in areas outside Ituri, mainly in Kisangani, and the ensuing damage should be valued at US$100 per person, amounting to a total of US$6,853,800. The DRC explains that these sums are meant to reflect the material harm ([days of displacement] × [daily cost of living]) combined with a lump sum for moral injury suffered.

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211. Uganda criticizes the DRC's claim for being based on broad estimates and not on a case-by-case analysis relating to specific groups of persons displaced in identifiable locations on specific dates. Uganda asserts that the DRC derives the number of allegedly displaced persons in Ituri from an unsubstantiated estimate in a single United Nations report. Furthermore, Uganda submits that there is no evidence indicating that such displacements occurred as a result of deliberate efforts by Uganda to make civilians flee or were a direct result of Uganda's violation of the *jus ad bellum*. According to Uganda, with respect to Ituri, the DRC has also failed to show that Uganda's exercise of due diligence obligations would have sufficed to prevent the alleged displacement.

212. Regarding the situation in Kisangani, Uganda highlights that the Mapping Report did not adopt the estimate of 68,000 displaced persons contained in the Inter-Agency Report, stating merely that "thousands of people" had been displaced. With respect to displacement in other parts of the DRC, Uganda reiterates that the victim identification forms are not credible evidence.

213. With regard to the valuation of the injury resulting from the displacement of persons, Uganda submits that the DRC has not explained,

other than by asserting that they are reasonable, why the amounts of US$300 and US$100 should, respectively, be the measure of damage for persons displaced as a result of deliberate violence and for other displaced persons.

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214. The Court reiterates that, in its 2005 Judgment, it held Uganda responsible for indiscriminate and deliberate attacks on the civilian population and for its failure to protect the civilian population in the course of fighting against other troops (*I.C.J. Reports 2005*, p. 241, para. 211). In addition, the Court found that Uganda did not comply with its obligations as an occupying Power and incited ethnic conflict in Ituri *(ibid.)*. Uganda is under an obligation to make reparation for any displacement of civilians that was caused in a sufficiently direct and certain way by these acts (see paragraphs 78 and 93 above). This includes cases of displacement that have a sufficiently direct and certain causal nexus to Uganda's violation of the *jus ad bellum*, even if they were not accompanied by violations of international humanitarian law or human rights obligations (EECC, *Final Award, Ethiopia's Damages Claims, Decision of 17 August 2009, RIAA*, Vol. XXVI, p. 731, para. 322).

215. The Court recognizes that a large majority of cases of displacement for which the DRC seeks compensation occurred in Ituri. In this regard, the Court takes note of the Secretary-General's Second special report on MONUC which states that, "[a]ccording to the Office for the Coordination of Humanitarian Affairs, between 500,000 and 600,000 internally displaced persons" were dispersed throughout Ituri as at May 2003 (UN doc. S/2003/566 of 27 May 2003, para. 10). While this number appears plausible given the magnitude of the conflict and its impact on Ituri, the Court recalls that, in its 2005 Judgment, it decided not to take into account elements of United Nations reports which rely only on second-hand sources (*I.C.J. Reports 2005*, p. 225, para. 159). Moreover, the Court cannot confirm such a large number based on an estimate from a single report. The Court reiterates that, in the present context, it considers United Nations reports as reliable evidence only "to the extent that they are of probative value and are corroborated, if necessary, by other credible sources" (*ibid.*, p. 239, para. 205).

216. The Court observes that the number of displaced persons claimed by the DRC finds support in the MONUC special report on the events in Ituri, which notes that "[m]ore than 600,000 [were] forced to flee from their homes" between January 2002 and December 2003 (UN doc. S/2004/573 of 16 July 2004, para. 40). However, the MONUC special report does not indicate the source for its estimate. In addition,

the Court points out that the period covered by the report extends to December 2003 and thus a few months beyond the temporal scope of Uganda's occupation of Ituri and the 2005 Judgment. An earlier report prepared by the Special Rapporteur on the human rights situation in the DRC, to which the Court also referred in its 2005 Judgment (*I.C.J. Reports 2005*, p. 240, para. 209), notes that ethnic tensions fuelled by Uganda had displaced 50,000 persons by August 2000 (UN docs. A/55/403 of 20 September 2000, para. 26, and E/CN.4/2001/40 of 1 February 2001, para. 31). While this report gives a useful indication of how the situation in Ituri evolved during the early stages of the conflict, it does not provide data for subsequent years and can, as such, neither corroborate nor disprove the figure claimed by the DRC.

217. A report prepared in July 2003 by the non-governmental organization Human Rights Watch (hereinafter "HRW"), which the Court referred to in its 2005 Judgment, also adopts the figure of 500,000 displaced civilians (HRW, "Ituri: Covered in Blood. Ethnically Targeted Violence in Northeastern DR Congo", p. 50). However, the Court notes that the source used for this figure is cited as "Estimates of the UN Office for the Co-ordination of Humanitarian Affairs (OCHA), January 2003" and is thus likely the same as the one relied on by the Secretary-General's Second special report on MONUC. Consequently, the Court cannot rule out the possibility that all three reports indicating a number of more than 500,000 displaced persons were based on the same source, whose methodology, accuracy and probative value the Court is unable to ascertain.

218. The Court acknowledges, however, that additional evidence has been presented with regard to specific instances of large-scale displacement in Ituri. The MONUC special report on the events in Ituri describes, in detail, large-scale operations against Lendu villages by UPDF soldiers and allied militias from February to April 2002 in the Irumu region, resulting in 40,000 displaced persons (UN doc. S/2004/573 of 16 July 2004, para. 42). Moreover, the special report recalls how 2,000 individuals were displaced as a result of UPDF troops failing to stop an attack on the town of Mabanga by local Hema and Gegere militias in August 2002 (*ibid.*, para. 45). According to the same report, the subsequent fighting in Bunia, in which the UPDF was involved, and particularly the massacres conducted by the Union des patriotes congolais (hereinafter the "UPC"), resulted in the displacement of 10,000 families (*ibid.*, para. 49). Finally, the special report describes the large-scale "Chikana Namukono" military operation that was conducted by the UPC between January and May 2003 in the Lipri, Bambu and Kobu area, and which forced 60,000 civilians to flee into the surrounding bush (*ibid.*, para. 70). The Court notes that the description of these events is not based on third-party estimates but on eyewitness testimony collected by MONUC human rights investigators. In addition, the Court observes that the Mapping Report mentions a fur-

ther instance in the Irumu region in September 2002, where the killing of Hema by troops of the Force de résistance patriotique en Ituri (hereinafter the "FRPI") resulted in "several thousand" displaced persons (Mapping Report, para. 413).

219. More specific evidence is also available concerning the displacement of persons in locations outside Ituri, particularly from the city of Kisangani. In its 2005 Judgment, the Court recognized that

> "[a]ccording to the report of the inter-agency assessment mission to Kisangani (established pursuant to paragraph 14 of Security Council resolution 1304 (2000) (doc. S/2000/1153 of 4 December 2000, paras. 15-16)), the armed conflict between Ugandan and Rwandan forces in Kisangani led to 'fighting spreading into residential areas and indiscriminate shelling occurring for 6 days . . . 65,000 residents were forced to flee the fighting and seek refuge in nearby forests'" (*I.C.J. Reports 2005*, p. 240, para. 208).

220. The Court referred to this section of the Inter-Agency Report to establish that Uganda had breached various obligations under international law, and not to establish the precise extent of the damage caused by these violations. In this regard, notwithstanding the Court's earlier observations regarding the Inter-Agency Report, it cannot ignore new evidence that has since emerged. The Mapping Report adopts a more rigorous methodology than the Inter-Agency Report (see paragraph 152 above). In particular, the Mapping Report did not adopt the number of 68,000 displaced persons in relation to the "Six-Day War" of June 2000 in Kisangani but more cautiously noted that the encounter caused "thousands of people to be displaced" (Mapping Report, para. 363). In the absence of further evidence, the Court cannot therefore adopt the number of 68,000 persons displaced in Kisangani, as claimed by the DRC.

221. The Court recalls that the displacements in Kisangani were the result of the fighting between Ugandan and Rwandan troops. Having considered the available evidence, the Court attaches particular weight to the conclusion in the Mapping Report that "thousands" of persons were displaced from Kisangani as a result of these confrontations. In the view of the DRC, Uganda owes reparation for all the damage in Kisangani, because that damage had both cumulative and complementary causes. Uganda, on the other hand, maintains that the two States separately committed internationally wrongful acts and that each is responsible only for the damage caused by its own action. The Court considers that each State is responsible for damage in Kisangani that was caused by its own armed forces acting independently. However, based on the very limited evidence available to it, the Court can form only a general appreciation of

the total number of persons displaced by the conflict in Kisangani. Under these circumstances, the Court is not in a position to apportion to Uganda a specific share of the total number of displaced persons. It has taken into account the available evidence on the displacement of persons from Kisangani in arriving at the global sum awarded for all injuries to persons (see paragraph 106 above and paragraph 226 below).

222. Regarding displacements that have allegedly occurred in other parts of the DRC, the Court notes that the only evidence submitted by the DRC consists of the victim identification forms. These forms can be accorded only very limited probative value (see paragraphs 146-147 above).

223. In conclusion, the Court finds that the evidence presented by the DRC does not establish a sufficiently certain number of displaced persons for whom compensation could be awarded separately. The evidence does, however, indicate a range of possibilities resulting from substantiated estimates. The Court is convinced that Uganda owes reparation in relation to a significant number of displaced persons, taking into account that displacements in Ituri alone appear to have been in the range of 100,000 to 500,000 persons (see paragraphs 215-218 above).

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224. Regarding the valuation of loss resulting from displacement, the Court sees no basis to draw a distinction between two types of displacement, as suggested by the DRC, based on whether the victims fled their homes in order to escape deliberate acts of violence against civilian populations or were driven from their homes by the fighting. Considerations more relevant to the valuation of damage caused by displacement would include the length of time that an individual was displaced and the difficulty of the circumstances endured during displacement. These are matters as to which the DRC did not offer evidence. The Court also notes that the DRC does not sufficiently explain the basis for the figures of US$300 and US$100 sought for the two types of displacement that it identifies.

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225. The Court recalls that it may, under the exceptional circumstances of the present case, award compensation in the form of a global sum, within the range of possibilities indicated by the evidence and taking into account equitable considerations (see paragraph 106 above). The Court notes that the available evidence for the displacement of persons provides a range of the possible number of victims attributable to Uganda (see

paragraph 223 above). Taking into account all the available evidence (see paragraphs 208-222 above), possible methodologies to assign a value to the displacement of a person (see paragraph 224 above), as well as its jurisprudence and the pronouncements of other international bodies (see paragraphs 69-126 above), the Court will award compensation for the displacement of persons as part of a global sum for all damage to persons (see paragraph 226 below).

6. *Conclusion*

226. On the basis of all the preceding considerations (see paragraphs 133-225 above, specifically 166, 181, 193, 206 and 225), and given that Uganda has not established that particular injuries alleged by the DRC in Ituri were not caused by its failure to meet its obligations as an occupying Power, the Court finds it appropriate to award a single global sum of US$225,000,000 for the loss of life and other damage to persons.

B. Damage to Property

227. The DRC also maintains that Uganda must make reparation in the form of compensation for damage to property.

228. In the operative part of its 2005 Judgment, the Court found that

> "the Republic of Uganda, by the conduct of its armed forces, which . . . destroyed villages and civilian buildings, failed to distinguish between civilian and military targets and to protect the civilian population in fighting with other combatants . . . incited ethnic conflict and failed to take measures to put an end to such conflict; as well as by its failure, as an occupying Power, to take measures to respect and ensure respect for human rights and international humanitarian law in Ituri district, violated its obligations under international human rights law and international humanitarian law" (*I.C.J. Reports 2005*, p. 280, para. 345, subpara. (3) of the operative part);

and

> "that the Republic of Uganda, by engaging in military activities against the Democratic Republic of the Congo on the latter's territory, by occupying Ituri and by actively extending military, logistic, economic and financial support to irregular forces having operated

on the territory of the DRC, violated the principle of non-use of force in international relations and the principle of non-intervention" (*I.C.J. Reports 2005*, p. 280, para. 345, subpara. (1) of the operative part).

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229. The DRC asks that Uganda pay US$239,971,970 for damage to property. This claim consists of several elements, which are detailed below.

230. With respect to damage in Ituri, the DRC claims US$12,956,200 for damage to private dwellings, US$21,250,000 for damage to civilian infrastructure, in particular schools, health facilities and administrative buildings, and US$7,318,413 for damage due to looting. Together these elements of the claim amount to US$41,524,613.

231. The DRC alleges that 8,693 private dwellings, 200 schools, 50 health facilities and 50 administrative buildings were destroyed in Ituri.

232. Regarding damage to property outside Ituri, the DRC claims US$25,628,075 for damage to private dwellings and civilian infrastructure in places where the UPDF operated (Kisangani, Beni, Butembo and Gemena). After initially revising this figure downward in response to questions asked by the Court, in its final submissions the DRC ultimately reverted to claiming the original amount. In addition, the DRC claims US$97,412,090 for damage to its electric company, Société nationale d'électricité (hereinafter "SNEL"), and US$69,417,192 for damage to certain property of its armed forces. Together, these elements of the claim amount, according to the DRC, to US$198,447,357.

233. To particularize its claims concerning private dwellings and looting, the DRC relies on aggregate tables allegedly prepared on the basis of data contained in its victim identification forms. The DRC's claims for damage to infrastructure are based on United Nations reports, while those concerning SNEL and the property of the Congolese armed forces rely on summary reports prepared by these entities. The DRC also proposes that the Court, in determining its claim regarding damage to property, use an "approach based on approximate number and cost".

234. The DRC estimates the value of a "basic" private dwelling at US$300, dwellings of "medium" quality at US$5,000, and "luxury" dwellings at US$10,000. It considers that 80 per cent of the private houses destroyed were "basic". The DRC submits that the value of each school and health facility should be set at US$75,000 and the value of each administrative building at US$50,000. Regarding looting, the DRC bases both its claim for the extent of the damage suffered and its valuation on

records of its investigators, as reflected in the above-mentioned aggregate tables.

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235. Uganda submits that the DRC has failed "to sustain its burden of proving these property claims with convincing evidence that shows, with a high degree of certainty, the exact injury suffered as a result of specific internationally wrongful acts of Uganda, or the valuation of the alleged injury". Uganda stresses that this standard also pertains to damage to property in Ituri, where its status as an occupying Power

> "does not relieve the DRC of its burden . . . to prove specific harms inflicted by other actors in Ituri, prove specific measures that Uganda failed to take as an occupying Power, and prove the causal nexus between such omissions and the harms".

Uganda alleges that the DRC has not provided sufficient documentation or information as evidence to prove its claims or to show a causal nexus with Uganda's internationally wrongful acts. It also argues that the credibility of the numbers in the summary tables submitted by the DRC is undermined by arithmetic errors and contradictory information.

236. Uganda considers that the DRC's claim relating to the property of the Congolese armed forces was not raised at any time during the merits phase and therefore cannot serve as a basis for an award of damages in this phase, adding that the claim would, in any case, fail for lack of proof.

237. Responding to the DRC's argument that the Court would need to take the "specific circumstances and characteristics" of the case into account, Uganda points out that victims at the ICC produced residence certificates, habitation certificates and other documents of a similar kind. Uganda also emphasizes that the EECC "was furnished with engineering studies, building-by-building assessment of damaged structures, aerial and ground-level photography and affidavits by public works officials and residents" and that the DRC has not produced similar evidence.

238. Concerning the valuation of dwellings in Ituri, Uganda notes that the Court-appointed expert Mr. Senogles confirmed that the values asserted by the DRC are "not evidenced and not explained". Uganda maintains that the DRC would have been in a position to submit at least some supporting materials in the form of bills, receipts or other documents that might corroborate the alleged costs. It voices similar concerns with regard to the alleged value of administrative buildings, as well as

property damage outside Ituri. Moreover, Uganda asserts that the "evidentiary discount factors" applied by Mr. Senogles (see paragraph 239 below) cannot be used to remedy this alleged lack of evidence. Finally, Uganda submits that values asserted for allegedly looted individual property are too high and not based on corroborating information.

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239. The Court-appointed expert Mr. Senogles was asked under the terms of reference to respond to the following question:

> "Based on the evidence available in the case file and documents publicly available, particularly the United Nations Reports mentioned in the 2005 Judgment, what is the approximate number and type of properties damaged or destroyed by Ugandan armed forces in the relevant period in the district of Ituri and in June 2000 in Kisangani?"

The expert bases his factual assessments exclusively on the claims and allegations made in the Memorial of the DRC, without considering additional sources of information, such as United Nations reports. For private dwellings in Ituri, the expert simply adopts the number of luxury, medium-quality and basic dwellings set out in one of the aggregate tables presented by the DRC (26, 199 and 13,384 respectively), and multiplies those figures by the unitary values put forward by the DRC itself. For other claims, the expert applies "evidentiary discount factors" to certain aspects of the claim in order "to take account of the inherent uncertainty in the way [the] claim has been put forward". As a general matter, the expert notes "the absence of granular detail or evidence in respect of each individual property" but also finds it "understandable . . . for the damages claim in respect of thousands of individual properties to have been formulated in such a way".

1. General aspects

240. The Court recalls that, in its 2005 Judgment, it found that Uganda was responsible for damage to property, both inside and outside Ituri. The Court concluded that UPDF troops "destroyed villages and civilian buildings" and "failed to distinguish between civilian and military targets" (*I.C.J. Reports 2005*, p. 241, para. 211).

241. In the same Judgment, the Court also determined that Uganda "fail[ed], as an occupying Power, to take measures to respect and ensure respect for human rights and international humanitarian law in Ituri dis-

trict" (*I.C.J. Reports 2005*, p. 280, para. 345, subpara. (3) of the operative part). The Court recalls that, in this phase of the proceedings, it is for Uganda to establish that the damage to particular property in Ituri alleged by the DRC was not caused by its failure to meet its obligations as an occupying Power. In the absence of evidence to that effect, it may be concluded that Uganda owes reparation in relation to such damage (see paragraph 78 above).

242. The Court emphasizes that, given the extraordinary character of the conflict and the ensuing difficulty of gathering detailed evidence for most forms of property damage, the DRC cannot be expected to provide specific documentation for each individual building destroyed or seriously damaged during the five years of Uganda's unlawful military involvement in the DRC (see paragraph 114 above). At the same time, the Court considers that, notwithstanding the difficult situation in which the DRC found itself, more evidence could be expected to have been collected by the DRC since the Court delivered its 2005 Judgment, particularly in relation to assets and infrastructure owned by the DRC itself and of which it was in possession and control. The Court will bear these considerations in mind when assessing the evidence tendered by the DRC.

2. Ituri

243. In the Court's view, the DRC offers no convincing evidence for the number of 8,693 private dwellings that it claims have been destroyed in Ituri. Some of the victim identification forms provide a certain impression of the different types of property lost by individuals. These forms do not, however, contain information to substantiate the alleged extent of the damage and the nature and value of the property affected (see paragraphs 146-147 above). Therefore, the victim identification forms submitted — and the aggregate tables allegedly prepared on the basis of such forms — do not contribute to identifying the scale of damage even within a possible range. There are also substantial inconsistencies with respect to the claim for damage to private dwellings in Ituri. For instance, in its Memorial, the DRC states that 80 per cent of the private dwellings destroyed were "basic" *(habitations légères)*. However, the aggregate table presented by the DRC for Ituri indicates that 98 per cent of them were "basic".

244. The DRC has based its claim that 200 schools were destroyed in Ituri on an unsubstantiated estimate in the Secretary-General's Second special report on MONUC which is not corroborated by the Mapping Report. Uganda has pointed out that the document in which the DRC lists lost properties only refers to 18 schools and 12 kindergartens.

245. Nor does the DRC substantiate the number of 50 administrative buildings and 50 health facilities that it alleges have been destroyed in Ituri. The DRC merely considers it "reasonable to assume" that 50 clinics

and hospitals and 50 administrative buildings were destroyed as a consequence of Uganda's failure to comply with its obligations as an occupying Power in Ituri, without providing any further evidence. The DRC's claim with respect to looting of property in Ituri is based on general references in international reports and on victim identification forms whose probative value is limited and which often do not identify the specific property that was looted. Finally, the DRC does not substantiate its assessment regarding the average valuations of the buildings and other forms of property destroyed or looted in Ituri.

246. The evidence presented by the DRC does not permit the Court to even approximate the extent of the damage, and the report of the Court-appointed expert does not provide any relevant additional information. The Court must therefore base its own assessment on United Nations reports, particularly on the Mapping Report. The Court considers that this report contains several credible findings on the destruction of "dwellings", "buildings", "villages", "hospitals" and "schools" in Ituri. For example, it states with respect to Ituri that, on 31 August 2002, elements of the UPC, which had received logistical support from the UPDF, set "over 1,000 houses" on fire in Walendu Bindi in the Irumu region (Mapping Report, para. 413). The Mapping Report also states that, on 15 October 2002, UPC militiamen destroyed "more than 500 buildings" in Zumbe in the Walendu Tatsi community (*ibid.*, para. 414) and that, on 6 March 2003, elements of the UPDF, the Front national intégrationiste and the FRPI, in the course of a joint military operation, "destroyed numerous buildings, private homes and premises used by local and international NGOs" (*ibid.*, para. 421). Furthermore, the Mapping Report identifies at least ten occasions where entire villages were set on fire by the UPDF or armed groups operating in Ituri (*ibid.*, paras. 366, 370, 414 and 422), and other incidents where hundreds of buildings were burned or destroyed during attacks (*ibid.*, paras. 409 and 413-414). The Court also takes into consideration that the MONUC special report on the events in Ituri contains various descriptions of entire villages and buildings that were burned down or otherwise destroyed by armed groups in Ituri (UN doc. S/2004/573 of 16 July 2004, paras. 47 and 63).

247. The Court further notes that the Mapping Report and other United Nations reports establish a convincing record of large-scale pillaging in Ituri, both by Uganda's armed forces and by other actors (Mapping Report, paras. 366, 369-370, 405, 407-408, 413-414, 416, 419-421 and 428; MONUC special report on the events in Ituri, UN doc. S/2004/573 of 16 July 2004, paras. 42, 49, 51, 73-74, 100 and 114).

248. With regard to the valuation of the property lost, the Court considers that the DRC has not provided convincing evidence supporting the alleged average value of private dwellings, public buildings and property looted. This is acknowledged in the report of the Court-appointed expert

Mr. Senogles. The expert nevertheless recommends that the Court adopt the figures proposed by the DRC with regard to private dwellings, based on their "reasonableness". With regard to different forms of property damage, the expert applies unexplained "evidentiary discount factor[s]", i.e. 25 per cent for public buildings and 50 per cent for looting in Ituri. The Court does not consider that the expert has sufficiently substantiated the variable "evidentiary discount factors" he proposes to apply.

249. The Court considers that proceedings before the ICC relating to the same conflict are relevant for the purposes of valuation. In the *Katanga* case, Trial Chamber II assessed the harm connected to the destruction of each house in the village of Bogoro (Ituri) in February 2003, at US$600 (*The Prosecutor* v. *Germain Katanga*, No. ICC-01/04-01/07, Trial Chamber II, Order for Reparations pursuant to Article 75 of the Statute, 24 March 2017, para. 195). As to the valuation of schools and health care centres, the ICC's Trust Fund for Victims has provided an estimate, not addressed by the Trial Chamber, that it would cost US$50,000 to rebuild a school or health care centre in Ituri as at February 2020 (*The Prosecutor* v. *Bosco Ntaganda*, No. ICC-01/04-02/06, Trial Chamber VI, Reparations Order, 8 March 2021, para. 236 (iv); *The Prosecutor* v. *Bosco Ntaganda*, No. ICC-01/04-02/06, Trial Chamber VI, Trust Fund for Victims' observations relevant to reparations, 28 February 2020, para. 130 *(d)*).

3. Outside Ituri

250. As to damage outside Ituri (see in general paragraphs 82-84 above), the DRC relies primarily on aggregate tables allegedly prepared on the basis of victim identification forms and on the Inter-Agency Report, which provides a list of incidents that resulted in damage to private dwellings, schools and administrative buildings in Kisangani during June 2000. The DRC has not satisfactorily responded to the Court's request to explain its methodology for the calculation of property damage claimed in Kisangani, Beni and Butembo, locations where the UPDF is known to have operated. The Court also notes that, by extending the claim to all damage to property that would not have occurred "but for" the unlawful use of force by Uganda, the DRC disregards the fact that the Court decided, in its 2005 Judgment, that armed groups operating outside Ituri were not under the control of Uganda (*I.C.J. Reports 2005*, p. 226, para. 160, pp. 230-231, para. 177 and p. 253, para. 247). Therefore, even if the Court were able to determine the extent of damage to property outside Ituri, it has not been provided with sufficient evidence regarding the question of which property damage was caused by Uganda. Concerning the operations of the UPDF in Beni and Butembo, the Mapping Report confirms several incidents that resulted in substantial

destruction of property without, however, indicating the extent of such destruction (Mapping Report, paras. 330, 347-349, 361 and 443).

251. The evidence presented by the DRC does not permit the Court to assess the extent of the damage even approximately, and the report of the Court-appointed expert does not provide any relevant additional information. Mr. Senogles simply applies unexplained "discount factors" of 25 per cent to the DRC's claims with respect to Beni, Butembo and Gemena, and 40 per cent to the claim relating to Kisangani.

252. The Court notes that, with respect to Kisangani, the Mapping Report refers to the destruction of "over 400 private homes and . . . serious damage to public and commercial properties, places of worship . . . educational institutions and healthcare facilities, including hospitals" during indiscriminate attacks with heavy weapons between the Ugandan and Rwandan armed forces from 5 to 10 June 2000 (Mapping Report, para. 363). The Mapping Report thus corroborates the findings of the Inter-Agency Report (UN doc. S/2000/1153 of 4 December 2000, paras. 15-16 and 57, and tables 1 and 2), which the Court considered to be a reliable source in its 2005 Judgment (*I.C.J. Reports 2005*, p. 240, para. 208).

253. The Court considers that the Mapping Report and the Inter-Agency Report contain sufficient evidence to conclude that Uganda caused extensive property damage in Kisangani. In the view of the DRC, Uganda owes reparation for all the damage in Kisangani, because that damage had both cumulative and complementary causes. Uganda, on the other hand, maintains that the two States, Uganda and Rwanda, separately committed internationally wrongful acts and that each is responsible only for the damage caused by its own wrongful actions. The Court considers that each State is responsible for damage in Kisangani that was caused by its own armed forces acting independently. However, based on the very limited evidence available to it, the Court is not in a position to apportion a specific share of the damage to Uganda. It has taken into account the available evidence on damage to property in Kisangani in arriving at the global sum awarded for all damage to property (see paragraph 258 below).

4. Société nationale d'électricité (SNEL)

254. The claim of the DRC for damage caused to SNEL forms a large part (US$97,412,090) of the overall claim for damage to property (US$239,971,970). It is possible that, given the character of the conflict and the scale of the hostilities, the company suffered at least some dam-

age (Inter-Agency Report, para. 57). However, the brief and rudimentary report on which the DRC relies was prepared by SNEL in 2016, shortly before the filing of the Memorial on the question of reparation. In this connection, the Court recalls that it "will treat with caution evidentiary materials specially prepared for this case" (2005 Judgment, *I.C.J. Reports 2005*, p. 201, para. 61). The report by SNEL does not contain evidence that would substantiate the extent and valuation of damage claimed, or the responsibility of Uganda for any damage, nor is it corroborated by other evidence before the Court. The report of the Court-appointed expert is unhelpful in this respect, as his recommendation is based on the amounts claimed by the DRC and merely applies an unexplained 40 per cent "discount factor".

255. The Court notes that SNEL is a public entity which, as a national service provider, is subject to specific supervision by the Government of the DRC. Given the Government's close relationship with SNEL, in particular the fact that it likely has relevant documents in its possession, the DRC could have been expected to provide some evidence substantiating its claim to the Court. Under these circumstances, the Court considers that the DRC has not discharged its burden of proof regarding its claim for damage to SNEL.

5. Military property

256. Similar considerations apply to the DRC's claim for damage to certain property of its armed forces (US$69,417,192). The DRC substantiates this claim only by way of a brief and rudimentary report that was prepared by DRC officials shortly before the filing of its Memorial on the question of reparation. This report does not provide a sufficient basis for the Court to determine the existence of the damage claimed, the responsibility of Uganda for such damage or its valuation. Given the direct authority of the Government over its armed forces, the DRC could have been expected to substantiate its claims more fully, which it has not done. The Court dismisses this claim of the DRC for lack of evidence, and therefore does not address any other question in relation to this claim.

6. Conclusion

257. The Court finds that the evidence presented by the DRC regarding damage to property is particularly limited. The Court is nevertheless persuaded that a significant amount of damage to property was caused by Uganda's unlawful conduct, as the Court found in its 2005 Judgment

(*I.C.J. Reports 2005*, p. 241, para. 211). The Mapping Report, in particular, provides reliable and corroborated information about many instances of damage to property caused by Uganda, and also by other actors in Ituri (see paragraphs 246, 247, 252 and 253 above). The Court also concludes that Uganda has not established that the particular damage to property alleged by the DRC in Ituri was not caused by Uganda's failure to meet its obligations as an occupying Power.

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258. The Court recalls that it may, under the exceptional circumstances of the present case, award compensation in the form of a global sum, within the range of possibilities indicated by the evidence and taking into account equitable considerations (see paragraph 106 above). The Court notes that the available evidence in relation to damage to property caused by Uganda is limited, but the Mapping Report at least substantiates many instances of damage to property caused by Uganda. Taking into account all the available evidence (see paragraphs 230-253 above), the proposals regarding the assignment of value to damage to property (see paragraphs 234-235 and 239 above), as well as its jurisprudence and the pronouncements of other international bodies (see paragraphs 69-126 above), the Court will award compensation for damage to property as a global sum of US$40,000,000 (see paragraph 106 above).

C. Damage related to Natural Resources

259. In its 2005 Judgment, the Court found that

> "the Republic of Uganda, by acts of looting, plundering and exploitation of Congolese natural resources committed by members of the Ugandan armed forces in the territory of the Democratic Republic of the Congo and by its failure to comply with its obligations as an occupying Power in Ituri district to prevent acts of looting, plundering and exploitation of Congolese natural resources, violated obligations owed to the Democratic Republic of the Congo under international law" (*I.C.J. Reports 2005*, pp. 280-281, para. 345, subpara. (4) of the operative part).

The Court recalls that both the DRC and Uganda are parties to the African Charter on Human and Peoples' Rights of 27 June 1981, Article 21, paragraph 2, of which states that "[i]n case of spoliation the dispossessed people shall have the right to the lawful recovery of its property as well as to an adequate compensation".

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260. In its final submissions presented at the oral proceedings, the DRC asked the Court to adjudge and declare that Uganda is required to pay US$1,043,563,809 as compensation for damage to Congolese natural resources caused by acts of looting, plundering and exploitation. This sum comprises claims for the loss of minerals, including gold, diamonds, coltan, tin and tungsten, for the loss of coffee and timber, for damage to flora through deforestation, and damage to fauna.

261. The DRC relies on the 2005 Judgment, in which the Court found that there was persuasive and credible evidence to establish that Uganda had violated its international obligations by exploiting natural resources, notably as an occupying Power. In this regard, the DRC invokes the principle of *res judicata*. It argues that, in order to demonstrate the "exact injury", it is not necessary to prove that the injury in question is linked to a specific internationally wrongful act with absolute certainty. It further argues that a lower evidentiary standard applies to natural resources, as laid down by the Court in the case concerning *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua)* (*Compensation, Judgment, I.C.J. Reports 2018 (I)*, pp. 26-27, paras. 33-35). The DRC considers this standard to be adequate in light of the special circumstances which "stem from five years of looting, plundering and exploitation of natural resources across a territory and by persons not under the DRC's control".

262. To substantiate the extent and amount of its claim, the DRC uses different methodologies depending on the type of natural resource in question. It applies a surplus methodology for its claims regarding gold, diamonds and coltan (see paragraph 283 below). According to this approach, the difference between the production of minerals in Uganda and the export of those minerals from Uganda between 1998 and 2003 is used as a proxy for assessing the injury allegedly suffered by the DRC as a result of the illegal exploitation. With respect to timber, the DRC calculates the damage based on the commercial value of exports and taxes of a specific timber company, DARA-Forest, from 1998 to 2003. The DRC's claims relating to damage to fauna are mainly based on an assessment prepared by the Congolese Institute for Nature Conservation (hereinafter the "ICCN"), the public body in the DRC responsible for managing national parks. The DRC further refers to the reports of the United Nations Panel of Experts on the Illegal Exploitation of Natural Resources and Other Forms of Wealth of the Democratic Republic of the Congo (hereinafter "UNPE"), the Porter Commission Report, the Mapping Report and reports by non-governmental organizations to establish the causal nexus between the damage and internationally wrongful acts attributable to Uganda and to prove the alleged extent of the damage.

263. Regarding its claims for exploitation of coffee, tin and tungsten, the DRC adopts the figures set out in the report by the Court-appointed expert Mr. Nest. With respect to the methodology adopted by the expert to determine the extent of exploitation, notably of gold, diamonds and coltan, however, the DRC expresses doubts about the "proxy tax rate" approach adopted by the expert to calculate the damage in question. As for the valuation of the exploited resources, the DRC considers it inappropriate for the expert to apply a discount of 35 per cent (see paragraph 271 below) systematically without any regard for the specific value of each resource. The DRC also contends that the expert relied on the market conditions in the DRC as a "spoliation economy" caused by Uganda's breach of international obligations, and concludes that the Court should not adopt these very low base prices. In addition, the DRC maintains that the expert excluded the exploitation of natural resources by civilians in Ituri and thus inappropriately limited the scope of his analysis. Finally, the DRC argues that the expert should have included damage to fauna and flora through deforestation in the scope of his analysis.

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264. Uganda submits that the Court should reject the DRC's claims for compensation for the looting, plundering and exploitation of its natural resources. Uganda argues that certain kinds of natural resources for which the DRC claims compensation, notably timber and fauna, fall outside the scope of the 2005 Judgment. Uganda further maintains that the DRC's claims regarding tin, tungsten and coffee are *ultra petita*, since the DRC only raised them during the first round of the oral proceedings.

265. Uganda further argues that the evidence that the DRC presents is insufficient, and that the DRC has not discharged its burden of proof. In response to the DRC's reliance on the standard set out in the *Certain Activities Carried Out by Nicaragua in the Border Area* case (see paragraph 261 above), Uganda maintains that in that case the Court was not "approximating from zero [since] Costa Rica presented evidence linking specific injury to specific wrongful acts occurring in a specific area and at a specific point in time". Uganda claims that the DRC must provide "evidence regarding the locations, ownership, average production, and concessions or licenses for each mine and forest for which the DRC claims compensation for illegal exploitation by Uganda".

266. According to Uganda, the methodologies applied by the DRC suffer from considerable flaws. With regard to the DRC's contention that the difference between the purported production of minerals in Uganda and export of those minerals from Uganda between 1998 and 2003 can be

used as a proxy for assessing the injury allegedly suffered by the DRC as a result of the illegal exploitation of those minerals, Uganda argues that this effectively contradicts the Court's finding in 2005 that there was no "governmental policy of Uganda directed at the exploitation of natural resources of the DRC [n]or that Uganda's military intervention was carried out in order to obtain access to Congolese resources" (2005 Judgment, *I.C.J. Reports 2005*, p. 251, para. 242). Regarding the exploitation of timber, Uganda observes that the DRC's claim is founded entirely on a "case study" concerning DARA-Forest, which the Porter Commission refuted as wholly unfounded and which the UNPE itself retracted. Uganda thus argues that the evidence adduced by the DRC fails to prove the exact extent of damage to the different kinds of natural resources and does not demonstrate that such damage can be attributed to Uganda.

267. In response to the findings of the Court-appointed expert Mr. Nest, Uganda argues that under the terms of reference the expert was not instructed to assess the exploitation of tin, tungsten and coffee and that his findings in this regard were therefore beyond the scope of his mandate. With respect to the methodology applied to assess the quantity of resources exploited, Uganda contends that the expert relies on an "exports — domestic production" model that is methodologically flawed. Furthermore, Uganda maintains that the expert's methodology contradicts what it describes as the express findings in the 2005 Judgment that Uganda had no governmental policy directed at the exploitation of the DRC's natural resources and that Uganda's military intervention in the DRC was not carried out in order to obtain access to these resources. Regarding valuation, Uganda argues that the expert's determination of the base prices by reference to the market price was inapposite and that their adjustment was based on arbitrary factors.

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268. The Court-appointed expert Mr. Nest estimates that the total value of exploitation activities by personnel in what he refers to as the "Ugandan area of influence" amounts to US$58,855,466.40 (US$41,332,950.80 for resources extracted in Ituri; US$17,522,515.60 for resources extracted outside Ituri). The expert uses the term "Ugandan area of influence" to describe non-government-held areas in the northern part of the DRC where UPDF personnel were present, covering approximately one-third of the territory of the DRC, both inside and outside of Ituri.

269. In the terms of reference, the Court asked the expert to evaluate the "approximate quantity" and value of unlawfully exploited "natural

resources, such as gold, diamond, coltan and timber" within Ituri during the occupation by Ugandan armed forces of that district and of "natural resources, such as gold, diamond, coltan and timber" plundered and exploited by Ugandan armed forces in the DRC, except for Ituri, "[b]ased on the evidence available in the case file and documents publicly available, particularly the United Nations Reports mentioned in the 2005 Judgment" (see paragraph 25 above).

270. Concerning the scope of his report, the expert understands the formulation "natural resources, such as gold, diamond, coltan and timber" to be a non-exhaustive list. On this basis, he also examined the exploitation of tin, tungsten and coffee. Regarding the methodology adopted, the expert report notes that complete evidence for the purposes of a precise valuation was missing "in virtually all cases". Therefore,

> "other sources of information had to be relied on to inform estimates about resource distribution and quantities, including maps of deposits, anecdotal descriptions of resource distribution from field observations in the DRC, or production data had to be combined from several sources".

Furthermore, the expert report points to the effect of "tumultuous conditions" on the availability, reliability, and commensurability of data, to the interruptive impact of the conflict on industrial production during the period from 1998 to 2003, and to significant but often unrecorded artisanal production and smuggling of all seven resources addressed in the expert report.

271. The expert proceeded in "eight basic steps". He first assessed the quantity of resources produced in what he called the Ugandan area of influence, based on national production data combined with information about the location of resources (for gold and diamonds). Alternatively, "[w]here national data for resources were not available or appeared too unreliable", the expert used "export and/or import data for countries trading in the DRC resources" as a "proxy" for DRC production (as for coltan, coffee, timber, tin and tungsten). He then estimated the distribution of the pertinent resources within the Ugandan area of influence, notably between Ituri and non-Ituri. The expert next calculated the average price for each resource and for each year of the conflict by taking the base annual average prices for 1998-2003 and applying a discount of 35 per cent to reflect the approximate prices in the relevant areas based on information obtained from a wide range of sources, including databases, reports by the United Nations and other international organizations, and academic publications. He then adjusted the resulting price into 2020 United States dollars by "inflating" them by reference to a standard rate. The expert then obtained the base value of each resource by multiplying the estimated amount of each resource produced in the Ugandan area of

influence, Ituri and outside Ituri, by its price during the relevant period. Finally, on the basis of a variety of sources, the expert indicated, for each resource, "proxy taxes", i.e. estimated rates reflecting the value extracted by personnel through each method of exploitation (theft, payments of fees and licences, and taxation) as a percentage of the estimated total value of production for each resource in the relevant period. The expert set such specific "proxy taxes" for Ituri, where he took into account the value extracted by "any and all armed forces and any affiliated administrative personnel, including both UPDF and Congolese", and for the remainder of the Ugandan area of influence, where he only took into account exploitation undertaken by UPDF personnel. He then calculated the value exploited by the above-referenced personnel from each resource in Ituri and outside Ituri by multiplying the base value of each natural resource by the "proxy taxes" previously estimated.

272. In its observations on the expert's report, the DRC pointed out that Mr. Nest had not taken account of the unlawful exploitation of natural resources in Ituri by civilians which, it alleges, was brought about by Uganda's violation of its international obligations as the occupying Power. In response, Mr. Nest explained that, for Ituri, he had estimated the value extracted by military and administrative personnel only, excluding the value retained by civilians. This exclusion was based on his assumption that "civilians were voluntarily involved in the production, trade and export of the seven resources from 1998 to 2003, and that profits retained by them, after theft and taxes, remained in their control". The expert then supplemented his original report by estimating the additional value extracted by civilians from those resources in Ituri. He also indicated that the question whether the civilian-retained portion of this value should be regarded as part of the damage suffered by the DRC is a matter for the Court to determine.

1. General aspects

273. In its 2005 Judgment, the Court stated that "[i]n reaching its decision on the DRC's claim [regarding natural resources], it [was] not necessary for the Court to make findings of fact with regard to each individual incident alleged" (*I.C.J. Reports 2005*, p. 249, para. 237). The Court then found that

> "it d[id] not have at its disposal credible evidence to prove that there [had been] a governmental policy of Uganda directed at the exploitation of natural resources of the DRC or that Uganda's military intervention [had been] carried out in order to obtain access to Congolese resources" (*ibid.*, p. 251, para. 242).

However, it

> "consider[ed] that it ha[d] ample credible and persuasive evidence to conclude that officers and soldiers of the UPDF, including the most high-ranking officers, [had been] involved in the looting, plundering and exploitation of the DRC's natural resources and that the military authorities [had] not take[n] any measures to put an end to these acts" (*I.C.J. Reports 2005*, p. 251, para. 242).

274. With respect to the natural resources located outside Ituri, the Court established that Uganda bears responsibility for looting, plundering and exploitation of natural resources "whenever" members of the UPDF were involved (*ibid.*, p. 252, para. 245), but not for any such acts committed by members of "rebel groups" that were not under Uganda's control (*ibid.*, p. 253, para. 247). The 2005 Judgment did not specify which acts of looting, plundering and exploitation of natural resources the Court considered to be attributable to Uganda. That decision was left to the reparations phase, in which the DRC would have to provide evidence regarding the extent of damage to natural resources outside Ituri, as well as its attribution to Uganda.

275. With respect to natural resources located in Ituri, the Court found "sufficient credible evidence" to establish that Uganda had violated "its obligations under Article 43 of the Hague Regulations of 1907 as an occupying Power in Ituri in respect of all acts of looting, plundering and exploitation of natural resources in the occupied territory" (*ibid.*, para. 250). This means Uganda is liable to make reparation for all acts of looting, plundering or exploitation of natural resources in Ituri, even if the persons who engaged in such acts were members of armed groups or other third parties (*ibid.*, para. 248). It remains for the Court in the reparations phase to satisfy itself that the available evidence establishes the existence of the alleged injury from looting, plundering and exploitation of natural resources and, in the exceptional circumstances of this case, to identify at least a range of possibilities regarding its extent.

276. The Court recalls that it is limited to deciding on the amount of compensation due for the injuries resulting from the internationally wrongful acts that the Court identified in its 2005 Judgment (*ibid.*, p. 257, para. 260), in which it specifically addressed reports regarding the exploitation of gold (*ibid.*, pp. 249-250, para. 238 and pp. 250-251, paras. 240-242), diamonds (*ibid.*, p. 250, para. 240, p. 251, para. 242 and p. 253, para. 248), and coffee (*ibid.*, p. 250, para. 240). The Court did not mention coltan, tin, tungsten, timber or damage to fauna and flora. Coltan, tin, tungsten and timber are nonetheless raw materials which are encompassed by the generic term "natural resources". Furthermore, the Court is of the view that claims relating to fauna are covered by the scope of the 2005 Judgment, in which the "hunting and plundering of

protected species" was referred to as part of the DRC's allegations regarding natural resources (*I.C.J. Reports 2005*, p. 246, para. 223). To the extent that damage to flora represents a direct consequence of the plundering of timber through deforestation, the Court considers that such damage falls within the scope of the 2005 Judgment. The Court must nevertheless satisfy itself in the present reparations phase that the alleged exploitation of resources which were not mentioned explicitly in the 2005 Judgment actually occurred and that Uganda is liable to make reparation for the ensuing damage.

277. The Court is of the view that the methodological approach taken by the expert report is convincing overall. The Court notes that the methodology adopted by the expert appropriately differs slightly depending on the resource in question and on the respective degree of reliability of the data on which he bases his estimates. The expert report is also transparent about its own limitations, acknowledging that

> "[t]he incompleteness of data meant other sources of information had to be relied on to inform estimates about resource distribution and quantities, including maps of deposits, anecdotal descriptions of resource distribution from field observations in the DRC, or production data had to be combined from several sources".

Despite these limitations, Mr. Nest's methodology informs the Court's conclusions on the extent of damage for which Uganda owes reparation. Given the nature of the unlawful exploitation of natural resources, including the conflict situation and the lack of documentation in the relevant sector of the economy that is predominantly informal, the Court is of the view that the "proxy tax" (see paragraph 271 above) methodology used by Mr. Nest is appropriate, in the circumstances of the present case, to estimate the loss with a suitable degree of approximation. The Court is not convinced by the standard suggested by Uganda, according to which the DRC has to prove the specific time, place, and damage relating to each incident of exploitation (see paragraph 114 above). Given the pattern of widespread exploitation and the evidentiary challenges in this case, the approach suggested by Uganda does not appear appropriate. Instead, the Court considers that the approach taken in the expert's report, which is based on estimates derived from reliable economic data, scientific publications and the case file, produces a more persuasive assessment and valuation of the damage. The expert has also taken into account other explanations for the respective surpluses of Congolese production and Ugandan exports. As to valuation, the expert report applies a plausible discount to the international market price.

278. As previously noted (see paragraph 272 above), the expert did not include the value extracted by civilians from natural resources in Ituri in

the amount of compensation estimated in his original report, based on his assumption that, during the period of occupation, civilians were voluntarily involved in the production, trade and export of those resources and that profits retained by them remained in their control (see paragraph 272 above). In the circumstances assumed by the expert, it can be concluded that an operator's continued retention of its own profits does not amount to an act of "looting, plundering and exploitation" in respect of which the Court found that Uganda had failed to comply with its obligations as an occupying Power under Article 43 of the Regulations Respecting the Laws and Customs of War on Land annexed to the Fourth Hague Convention of 18 October 1907 (2005 Judgment, *I.C.J. Reports 2005*, p. 253, para. 250) and thus, would not call for any reparation by Uganda. However, the 2005 Judgment also refers to instances in which UPDF members facilitated illegal trafficking in natural resources by commercial entities (*ibid.*, para. 248). The evidence available to the Court does not permit an appreciation of the extent to which the scenario assumed by Mr. Nest prevailed in Ituri, as compared to situations in which other private persons deprived the operator of profits through acts of looting, plundering or exploitation of natural resources. In considering the compensation owed with respect to all acts of looting, plundering and exploitation of natural resources, the Court therefore places emphasis on the calculations made by Mr. Nest using the "proxy tax" methodology.

279. The Court notes that the terms of reference provided to the expert by the Court did not include damage to fauna and damage to flora through deforestation and that the expert therefore made no findings with respect to those forms of damage to natural resources (beyond commercial trade in timber).

280. The Court observes that the DRC refers, in support of its claim for damage related to natural resources, to the UNPE reports, the Porter Commission Report, the Mapping Report, reports by non-governmental organizations and reports prepared by domestic institutions. In its 2005 Judgment, the Court expressed its general view that the Porter Commission Report and the United Nations reports furnished sufficient and convincing evidence to determine whether Uganda engaged in acts of looting, plundering and exploitation of the DRC's natural resources (*ibid.*, p. 201, para. 61, and p. 249, para. 237). The Court attributes probative value to the findings of these reports, particularly if they are corroborated by the Mapping Report and the expert report by Mr. Nest.

281. Taking these general considerations into account, the Court will draw its conclusions on the basis of the evidence that it finds reliable in order to determine the damage caused by Uganda to Congolese natural resources and the compensation to be awarded.

2. Minerals

(a) *Gold*

282. In its Memorial the DRC claimed US$675,541,972 for the loss of gold. At the end of the oral proceedings the DRC stated that its claim for gold was "at least US$249,881,000".

283. To calculate the extent of damage, the DRC uses a surplus exports methodology to ascertain the amount of gold that was exploited. This methodology is based on the assumption that domestic production by Uganda was virtually non-existent between 1998 and 2003, that Uganda nonetheless exported large amounts of gold during the relevant period, and that the surplus of exports corresponds to the amount of gold Uganda exploited in the DRC.

284. The DRC bases its calculations on data for the years 1998 to 2000 from the Ugandan Ministry of Energy and Mineral Development, taken from the first UNPE report (UN doc. S/2001/357 of 12 April 2001, pp. 19-20), and from the annual reports of Uganda's Ministry of Energy and Mineral Development for the period from 2001 to 2003. The DRC claims that the surplus of gold exports from Uganda amounts to 45,143 tonnes for the period between 1998 and 2003. Responding to the contention by Uganda that only statistics from the Ugandan Bureau of Statistics (hereinafter the "UBOS") were accurate, the DRC stated that the export surplus would still amount to 28,923 tonnes even if it were calculated using the UBOS figures.

285. The DRC refers to various reports to illustrate the extent of Uganda's role in the exploitation of gold, in terms of geography, the quantity of resources involved, and the range of practices employed. To substantiate its claim, the DRC refers to the presence of Uganda as an occupying Power in the Adidi and Mabanga gold mines in the Ituri district. It also refers to the presence of Uganda in the Watsa (Haut-Uélé district) and Bondo gold mines (Bas-Uélé district). Depending on the location, the DRC argues that UPDF soldiers requisitioned or exploited gold, or levied "taxes" on the exploitation of gold. The DRC recognizes that the various incidents it refers to are not, in themselves, sufficient to quantify its injury, but argues that they do establish the extent of Uganda's role in the looting, plundering and illegal exploitation of gold.

286. With respect to valuation, the DRC stated during the oral proceedings that it agrees with the approach taken by Mr. Nest which consisted in using the World Gold Council's data, and that the resulting price should therefore be discounted to reflect the part of the value chain that remains, if any, in the DRC. The DRC suggests applying a discount percentage of 95 per cent.

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287. Uganda maintains that the Court, in its 2005 Judgment, made no finding that Uganda was responsible for gold smuggling or that Uganda derived any benefit from illegally exploited gold. It is of the view that the DRC has offered no legal basis for an award of monetary compensation for the exploitation of gold.

288. Uganda submits that the DRC's methodology to assess the extent of the injury the DRC allegedly suffered contradicts the Court's finding in its 2005 Judgment that there was no "governmental policy of Uganda directed at the exploitation of natural resources of the DRC [n]or that Uganda's military intervention was carried out in order to obtain access to Congolese resources" (*I.C.J. Reports 2005*, p. 251, para. 242). Uganda also argues that the surplus methodology adopted by the DRC is flawed because the DRC does not demonstrate any link between the export of natural resources from Uganda and their illegal exploitation. Uganda emphasizes that the Porter Commission did not make any finding concerning the illegal character of gold exports by Uganda. Uganda further argues that the DRC's approach disregards statistical and regulatory factors that explain the apparent gap between Uganda's purported production and export of gold. According to Uganda, the "economic data" on which the DRC relied came from the first UNPE report, which was widely criticized. Furthermore, these data merely indicate the amount of gold for which permit-seekers sought authorization for export from Uganda, and not what they actually exported.

289. Uganda further maintains that virtually none of the examples of injury alleged by the DRC contains proof of specific acts of exploitation of gold attributable to Uganda. While Uganda recognizes that the DRC provides evidence, primarily from the Porter Commission Report, "of specific acts attributable to Uganda resulting in unlawful exploitation of mineral resources", it argues that the DRC fails to prove the existence and the extent of injury with respect to these acts. Regarding its responsibility as an occupying Power in Ituri, Uganda claims that the DRC did not offer any evidence to prove that the injury would have been averted if Uganda had acted in compliance with its legal obligations. Uganda also argues that, even if it had taken all measures in its power and discharged its obligations as an occupying Power, it could not possibly have prevented all exploitative acts by private persons in Ituri.

290. Uganda also contests the method of valuation adopted by the DRC during the oral proceedings according to which the valuation price of gold should correspond to 95 per cent of the world price. Uganda points out that this discount is based on field studies that had nothing to do with Uganda or the UPDF, since they concern transactions of Congolese local dealers from 2007 to 2011.

291. Uganda argues that the Court should not rely on the expert report by Mr. Nest. According to Uganda, Mr. Nest conceded when questions were put to him at the hearing that the methodology he had adopted did not prove that the surplus of Ugandan exports had originated in unlawful exploitation of gold in the DRC that was attributable to Uganda. It further claims that Mr. Nest relied on uncorroborated estimates and applied "proxy taxes" based on inflationary figures and inadequate data.

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292. The Court-appointed expert Mr. Nest combines two methods to assess the amount of illegally exploited gold. First, he compares the data relating to the DRC's total national production data with DRC exports ("DRC production surplus"). To the extent that this gold production exceeded formal exports in what he refers to as the Ugandan area of influence, he assumed that this surplus reflected the total quantity of gold smuggled from that area. Secondly, the expert compares the data from the UBOS regarding gold exports with Ugandan production data as a basis for estimating the quantities of gold illegally exploited in the Ugandan area of influence ("Ugandan export surplus"). The expert then takes the higher figure between the DRC production surplus and the Ugandan export surplus as the estimated quantity of gold exploited in the Ugandan area of influence for each year. Based on eight documents that contain eyewitness reports and statements by gold producers, he estimates that around 45 per cent of the gold production in the Ugandan area of influence came from Ituri, and around 55 per cent from outside Ituri. The expert then estimates the value exploited by relevant personnel from gold by reference to "proxy taxes" (see paragraph 271 above). According to Mr. Nest, "[w]ithin Ituri all armed forces are likely to have stolen limited quantities of gold from producers and traders" and, "[o]utside Ituri, it is probable [that] some UPDF personnel engaged in limited theft of gold". With respect to fees and licences, the applicable "proxy taxes" were calculated by reference to United Nations reports and other reports. As to "taxes" levied on gold, he indicates that, for various reasons, outside Ituri "the funds extracted through a tax on value imposed by UPDF personnel is estimated to be low". Mr. Nest estimates the value of gold exploited by relevant personnel in the Ugandan area of influence at US$45,892,790.20 (US$35,359,097.30 for gold exploitation in Ituri and US$10,533,692.90 for gold exploitation outside Ituri).

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293. In its 2005 Judgment, the Court referred to the Porter Commission's findings on the exploitation of gold when establishing Uganda's responsibility for the looting, plundering and exploitation of natural resources (*I.C.J. Reports 2005*, pp. 249-251, paras. 238 and 240-242). Yet the Court did not attribute specific acts of exploitation of gold outside Ituri to Uganda.

294. The Court is not convinced by the methodology and the figures on which the DRC bases its assessment of the amount and value of gold looted, plundered and exploited for which Uganda owes reparation. In particular, the DRC's methodology does not exclude the value of gold production and trade that commercial entities continued to receive during the period of Ugandan occupation and control, nor does it take into account informal gold production in Uganda.

295. However, the Court considers that there is sufficient evidence of the involvement of Ugandan forces in gold exploitation throughout the DRC (see e.g. Porter Commission Report, pp. 19-20, 64-72, 81-82, 177, 197; see also 2005 Judgment, *I.C.J. Reports 2005*, pp. 249-250, para. 238, and pp. 250-251, paras. 240-241). Referring to widespread individual incidents of exploitation over a period of five years, the evidence establishes a pattern of plundering, looting and exploitation of gold in the DRC which involved Ugandan forces. The Court considers Mr. Nest's methodology and assessment to be a helpful basis for its appreciation of the damage attributable to Uganda's unlawful conduct (see paragraph 292 above).

296. Specifically with respect to Ituri, the evidence before the Court establishes a pattern of exploitation of gold (see e.g. Porter Commission Report, p. 69; Mapping Report, paras. 753-757 and 761; First UNPE report, UN doc. S/2001/357 of 12 April 2001, para. 59; see also 2005 Judgment, *I.C.J. Reports 2005*, p. 250, para. 240, and p. 253, para. 248) also reflected by the expert in his report. According to the findings made in paragraphs 249 and 250 of the 2005 Judgment, Uganda failed to comply with its obligations as an occupying Power and is responsible for "all acts" of exploitation in Ituri. As the Court has noted, this implies that Uganda is liable to make reparation for all acts of looting, plundering or exploitation of natural resources in Ituri, even if the persons who engaged in such acts were members of armed groups or other third parties (see paragraphs 79, 275 and 278 above).

297. The Court further considers that the evidence before it shows a pattern of exploitation of gold outside Ituri (First UNPE report, UN doc. S/2001/357 of 12 April 2001, paras. 56-57 as confirmed by the Porter Commission Report, pp. 21-23 and 64-72). In calculating "proxy taxes" (see paragraph 271 above) outside Ituri, Mr. Nest uses information regarding the locations of gold and of Ugandan forces to estimate exploitation by Ugandan troops as opposed to other forces, so that the Court

does not need to reduce this figure to take account of the fact that the conduct of other forces outside Ituri is not attributable to Uganda.

298. The Court is of the view that there is sufficient evidence to conclude that Uganda is responsible for a substantial amount of damage resulting from looting, plundering and exploitation of gold within the range of the assessment of the expert report. On this basis, the Court will award compensation for this form of damage as part of a global sum for all damage to natural resources (see paragraph 366 below).

(b) *Diamonds*

299. The DRC claims US$7,055,885 for the looting, plundering and illegal exploitation of diamonds.

300. The DRC argues that the extent of Uganda's role in the illegal exploitation and exportation of the DRC's diamond resources is clear from various perspectives: first, from Uganda's occupation of the DRC's diamond mining areas; secondly, from the involvement of certain members of the Ugandan army in the provision of security services to companies exploiting diamonds and the collection of "taxes" by rebel groups allied to Uganda; thirdly, from the involvement of the most senior Ugandan military officials in the exploitation of the DRC's diamond reserves; and fourthly, from the role that Ugandan military transport played in the exporting of diamonds.

301. The DRC submits that the exponential increase that was seen in Ugandan diamond exports from 1998, despite Uganda not producing diamonds, provides further confirmation of Uganda's role in the illegal exploitation and exportation of the DRC's diamond resources, and enables it to assess the extent of the injury suffered. On the basis of export statistics stemming from a 2002 report by the British All-Party Parliamentary Group on the Great Lakes and Genocide Prevention, based largely on data from the Diamond High Council (now the Antwerp World Diamond Centre), the DRC estimates that the injury it suffered in the period from 1998 to 2001 amounted to US$7,055,885, i.e. the total value of Ugandan diamond exports during the period in question. The DRC adds that that amount needs to be supplemented by Ugandan diamond exports in 2002 and 2003. Although the DRC made enquiries to the Diamond High Council to that effect, it has not provided a figure to the Court.

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302. Uganda maintains that the DRC's claim that Uganda illegally exploited Congolese diamonds in the amount of US$7,055,885 lacks foundation. Accordingly, in Uganda's view, the DRC has offered no legal basis upon which compensation can be awarded for this claim.

303. Uganda observes that the methodology used by the DRC to assess the extent of damage based on Uganda's purported export of minerals effectively contradicts the Court's finding in 2005 that there was no "governmental policy of Uganda directed at the exploitation of natural resources of the DRC [n]or that Uganda's military intervention was carried out in order to obtain access to Congolese resources" (2005 Judgment, *I.C.J. Reports 2005*, p. 251, para. 242). Uganda further highlights that the DRC bases its claim entirely on the widely criticized first report of the UNPE.

304. Uganda contests the DRC's valuation of its injury, noting that the export statistics provided by the DRC emanate from a single source, the Diamond High Council, and are uncorroborated. Uganda emphasizes that neither the British All-Party Parliamentary Group nor the UNPE independently verified the data from the Diamond High Council before relying on them. Uganda refers to the Porter Commission, which concluded that the first UNPE report based on these statistics was unreliable since the data did not reflect the legal export of diamonds from Uganda but rather the declared origin of imports after arriving in Belgium. Uganda has submitted its own statistical data from the UBOS which indicate that Uganda exported only miniscule quantities of diamonds between 1998 and 2003 (worth approximately US$4,393 in total).

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305. In his report, the Court-appointed expert Mr. Nest applies to diamonds a methodology comparable to the one he uses for gold. He states, however, that the dataset on which he relies makes the resulting estimates less complete than those for gold. To compensate for this, Mr. Nest extrapolates in certain respects from the data on gold. On the basis of his findings, Mr. Nest estimates that the value extracted by relevant personnel through the exploitation of diamonds is US$6,039,299, of which US$1,013,897 is in Ituri and US$5,025,402 outside Ituri.

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306. In its 2005 Judgment, the Court referred to the Porter Commission's findings on the exploitation of diamonds when establishing Ugan-

da's liability for the looting, plundering and exploitation of natural resources (*I.C.J. Reports 2005*, pp. 250-251, paras. 240 and 242, and p. 253, para. 248). Notably, the Court found with respect to Ituri that "[i]t is apparent from various findings of the Porter Commission that rather than preventing the illegal traffic in natural resources, including diamonds, high-ranking members of the UPDF facilitated such activities by commercial entities" (*ibid.*, p. 253, para. 248). However, the Court did not identify specific acts regarding the exploitation of diamonds for which Uganda is responsible, nor did it specify the quantity or value of the exploited diamonds.

307. The Court considers that the figures put forward by the DRC with respect to the quantity and value of exploited diamonds for which Uganda owes reparation are not based on a convincing methodological approach, in particular because the DRC relies on insufficient and uncorroborated data.

308. However, the Court is of the view that there is sufficient evidence of involvement by Ugandan forces in a pattern of plundering, looting and exploitation of diamonds throughout the DRC. The Court notes that the Porter Commission Report contains descriptions of multiple incidents involving the exploitation of diamonds attributable to Uganda (Porter Commission Report, pp. 51, 82, 88-89, 117, 121-123 and 162). Furthermore, United Nations reports published after the Porter Commission Report substantiated the existence of such patterns of diamond exploitation in Ituri (see e.g. the MONUC special report on the events in Ituri, UN doc. S/2004/573 of 16 July 2004, para. 133; Mapping Report, para. 768) and outside Ituri (see e.g. Mapping Report, para. 748).

309. In these circumstances, the Court considers Mr. Nest's methodology, which, in essence, corresponds to the one he adopted for gold, and his assessment to be a persuasive reference for the Court's determination of the extent and valuation of damage for which Uganda owes reparation.

310. The Court considers that there is sufficient evidence to conclude that Uganda is responsible for damage resulting from the looting, plundering and exploitation of diamonds within the range of the assessment of the expert report. On this basis, the Court will award compensation for this form of damage as part of a global sum for all damage to natural resources (see paragraph 366 below).

(c) *Coltan*

311. The DRC claims US$2,915,880 for damage resulting from the plundering, looting, and illegal exploitation of coltan and niobium, one of the minerals extracted from coltan.

312. The DRC refers to various reports indicating that Uganda controlled coltan mines in Bafwasende and Mambasa in order to substantiate its claim that coltan was one of the natural resources unlawfully exploited

either in Ituri or by Ugandan forces outside Ituri. The DRC also relies on the final UNPE report, according to which UPDF soldiers operated coltan mines, charged diggers a daily fee to exploit an area, and had connections with a company called La Conmet that transported coltan from Orientale Province in the DRC to Uganda and then to Kazakhstan.

313. In order to substantiate the extent of coltan exploitation by Uganda, the DRC relies on a 2002 report by the British All-Party Parliamentary Group on the Great Lakes and Genocide Prevention, which is based, *inter alia*, on statistics provided by the Ugandan Government. The report contains Ugandan export statistics of coltan and niobium in the relevant period. The DRC submits that Uganda, while not producing coltan itself, exported a total of 90,640 kg of coltan between 1998 and 2000.

314. Relying on information from La Conmet, the DRC submits that the market price of coltan during the relevant period was US$17 per kilogram. The 90,640 kg allegedly exploited by Uganda thus had a value of US$1,540,880. The DRC asserts that the evidence also shows that Ugandan exports of niobium had a total value of US$1,375,000 during the relevant period. Combining the figures for coltan and niobium, the DRC argues that the damage it suffered amounts to at least US$2,915,880.

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315. Uganda maintains that the DRC has offered no legal basis for an award of monetary compensation for the exploitation of coltan/niobium.

316. Uganda contends that the "economic data" on the basis of which the DRC attempts to demonstrate the extent of unlawful coltan/niobium exploitation by Uganda do not support the DRC's claim. According to Uganda, the data taken from the 2002 report by the British All-Party Parliamentary Group on the Great Lakes and Genocide Prevention reproduce the data originally presented in the first UNPE report, which in turn is based on export statistics apparently received from Uganda's Ministry of Energy and Mineral Development. Uganda claims that these statistics do not even refer to coltan, but only to niobium and tantalum. Uganda further maintains that these statistics show that the value of niobium exports during the period of the conflict was nearly five times less than that claimed by the DRC and, even with the addition of the export value of tantalum, still nearly three times lower than the DRC's assessment.

317. Uganda further considers that, to the extent that coltan from the DRC may have transited through Uganda, it did so in the normal course of trade. It argues that the DRC had to present convincing evidence that specific amounts of coltan transited through Uganda as a result of specific internationally wrongful acts attributable to Uganda, which it has failed to do. Uganda maintains that the Porter Commission refuted the claim that Uganda's exports of niobium were connected to the illegal exploitation of Congolese resources.

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318. Mr. Nest notes that the "overwhelming majority" of informal coltan production in the DRC was in what he called the "Rwandan area of influence". However, he finds that, outside Ituri, "it is reasonable to assume some UPDF personnel stole minor quantities of [coltan]". Mr. Nest estimates that the value of coltan unlawfully exploited by Uganda amounts to US$375,487 of which US$63,038 in Ituri and US$312,449 outside Ituri.

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319. The evidence furnished by the DRC does not provide a convincing basis for its claim of US$2,915,880 for coltan. The Porter Commission found that the allegations contained in the La Conmet "case study" and in the UNPE reports, on which the DRC relies, were not supported by credible evidence. The Court further notes that various incidents involving Rwandan exploitation of coltan can be identified from the available evidence, thus giving credence to Mr. Nest's observation that most of the informal coltan production was in what Mr. Nest calls the "Rwandan area of influence".

320. At the same time, there are certain indications of coltan exploitation by UPDF personnel in Ituri, as well as outside Ituri. In its final report, the UNPE observed that various armed groups exploited coltan in Ituri under the protection of the UPDF (Final UNPE report, UN doc. S/2002/1146 of 16 October 2002, p. 21, para. 108). The United Nations experts also described several clashes between the UPDF and other forces, and even within the UPDF itself, for control of coltan-rich areas outside Ituri (*ibid.*, p. 20, para. 101). The cross-border transportation of coltan in vehicles belonging to the Chief of Staff of the UPDF is also documented. For example, the Mapping Report details measures taken by the UPDF in retaliation for an attack on one of their coltan convoys on the road to Butembo (Mapping Report, para. 743). A 2001 HRW report describes how Mai-Mai fighters ambushed UPDF

soldiers in order to intercept a truck transporting a supply of coltan with a value of around US$70,000 (HRW, "Uganda in Eastern DRC. Fueling Political and Ethnic Strife", p. 5).

321. In light of these circumstances, the Court considers Mr. Nest's methodology and assessment to be a persuasive basis for the Court's determination of the extent and valuation of damage attributable to Uganda's internationally wrongful conduct.

322. The Court considers that there is sufficient evidence to conclude that Uganda is responsible for damage resulting from the looting, plundering and exploitation of coltan within the range of the assessment of the expert report. On this basis, the Court will award compensation for this form of damage as part of a global sum for all damage to natural resources (see paragraph 366 below).

(d) *Tin and tungsten*

323. The DRC claims US$257,667 for the exploitation of tin and US$82,147 for the exploitation of tungsten. These claims were not contained in the DRC's written submissions but were introduced after the submission of the expert report, which included both minerals in its study. Accordingly, the amounts claimed by the DRC and the underlying methodology are based on the expert report by Mr. Nest.

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324. Uganda submits that the DRC has not proven any damage or provided any valuation with respect to tin and tungsten. According to Uganda, Mr. Nest's estimates must be disregarded because they are contrary to the *non ultra petita* rule, which precludes the Court from awarding a party more than it requested.

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325. According to the report by Mr. Nest, tin ore extracted in the DRC is often found in the same ore body as coltan. Referring to the "3Ts" — tin, tantalite and tungsten — the expert notes in his report that, "[e]xcluding tin and tungsten given the attention paid to these resources would be an error [because of] intense interest in these minerals and their connection to conflict in [the] DRC". At the same time, Mr. Nest notes that probably only limited value was exploited from tin and tungsten by UPDF personnel or by other actors in Ituri. When explaining the inclusion of the two minerals in the expert report, he clarifies that "[t]his report estimates that limited value was exploited from tin and tungsten. However, given public interest in these resources they have been included to

flag their relative insignificance as sources of value exploited by personnel in either Ituri or non-Ituri."

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326. The Court considers that the inclusion of tin and tungsten in the scope of the expert report was permissible under the terms of reference (see paragraph 276 above). The Court notes that Mr. Nest's expert report refers only to evidence of the transit of small quantities of tin and tungsten through Ituri, which in itself does not constitute looting, plundering or exploitation. In particular, he underlines that he included those two minerals only "in order to flag their relative insignificance as sources of value exploited by personnel in either Ituri or non-Ituri" (see paragraph 325 above).

327. Given that there is limited evidence relating to tin and tungsten and that the expert noted the relative insignificance of these resources, in terms of the quantities exploited and the corresponding value, the Court decides that it will not take these two minerals into account in determining the compensation due for damage to natural resources.

3. Flora

(a) *Coffee*

328. The DRC includes in its claim for reparation the damage resulting from the unlawful exploitation of coffee, and adopts the amounts given in Mr. Nest's expert report, namely US$2,046,568 (Ituri) and US$722,804 (outside Ituri), amounting to US$2,769,372 in total.

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329. Uganda submits that the DRC has not proven any damage or provided any valuation with respect to its claim for coffee. Uganda contends that Mr. Nest's estimates should be disregarded by the Court since they were made contrary to the *non ultra petita* rule.

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330. The Court-appointed expert explains that he understood the terms of reference to be non-exhaustive. He maintains that, since he was explicitly asked to base his report on the UNPE reports, "[n]eglecting coffee, in [his] view, would be an error" as "UNPE (2001a; 2001b; 2002a;

2002b) and MONUC (2004) specifically include coffee in their reports". He estimates the damage resulting from the exploitation of coffee at US$2,046,568 (Ituri) and US$722,804 (outside Ituri), amounting to a total of US$2,769,372. According to Mr. Nest, "[w]ithin Ituri all armed forces probably stole limited quantities of coffee", and "[o]utside Ituri, any theft of coffee by UPDF personnel was probably minor".

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331. The Court considers that the inclusion of coffee in the scope of the expert report was permissible under the terms of reference (see paragraph 276 above). Mr. Nest's findings with respect to coffee are corroborated to a certain extent by other evidence. For instance, the Porter Commission confirmed allegations indicating the looting, plundering and exploitation of coffee attributable to Uganda outside Ituri (e.g. Porter Commission Report, pp. 18, 82-83 and 89) where, according to the expert, 70 per cent of the exploited coffee was produced. The findings of the Porter Commission regarding coffee were also cited by the Court in 2005 (*I.C.J. Reports 2005*, pp. 250-251, paras. 240 and 242, with reference to paragraph 13.1 of the Porter Commission Report). The exploitation of coffee in Ituri is further mentioned in a 2001 HRW report (HRW, "Uganda in Eastern DRC. Fueling Political and Ethnic Strife", p. 39). The Court therefore considers that there is sufficient evidence to conclude that Uganda is responsible for damage resulting from the looting, plundering and exploitation of coffee.

332. However, since these reports only contain anecdotal evidence, and since the expert could otherwise only rely on an uncorroborated report by a Congolese non-governmental organization, the Court considers that it is appropriate to award compensation at a level lower than that calculated by the Court-appointed expert. On this basis, the Court will award compensation for this form of damage as part of a global sum for all damage to natural resources (see paragraph 366 below).

(b) *Timber*

333. The DRC claims US$100 million for the unlawful exploitation of timber. During the oral proceedings, the DRC stated that it was claiming, "in respect of flora, primarily, US$100 million, and, in the alternative, the . . . minimum amount of US$85,483,758 [for damage within Ituri]". The DRC contends that the invasion and occupation of Congolese terri-

tory by Ugandan armed forces damaged the DRC's flora, particularly through deforestation for the purposes of timber exploitation, in the provinces of Orientale and North Kivu.

334. To substantiate the extent of the damage and its attribution to Uganda, the DRC mainly relies on the case study concerning the DARA-Forest company taken from the first UNPE report (UN doc. S/2001/357 of 12 April 2001, paras. 47-54). The DRC states that the scale of the commercial damage is illustrated by the market value of the 48,000 cubic metres of timber that DARA-Forest exported annually and exclusively to Uganda between September 1998 and 2003 from the territory where the Ugandan army was operating. The DRC admits that the UNPE amended its analysis in relation to the DARA-Forest company and noted that it appeared that the Government of the DRC still recognized the companies operating in rebel-held areas. The DRC also acknowledges that the Porter Commission Report disputed many of the assertions made by the UNPE in its initial report, including the claim linking Ugandan authorities to the DARA-Forest company. The DRC maintains that the Commission's detailed analysis indicates various instances of exploitation for which Uganda was responsible, including timber smuggling in the provinces of Orientale and North Kivu, the UPDF's involvement in that trafficking, and the scale and volume of the activity of DARA-Forest. The DRC also highlights that the UNPE and the Porter Commission confirm that the harvested forests, except the one in Beni, are located in Ituri, where Uganda was the occupying Power (Porter Commission Report, pp. 54-55 and 61-62).

335. The DRC mainly bases its claim on the alleged commercial value of exports by the DARA-Forest company. The DRC uses data on export prices from the International Tropical Timber Organization to calculate the total commercial value of the timber exported by DARA-Forest between 1998 and 2003. Based on these data for the relevant years, the DRC puts forward an average export price of US$439.30 per cubic metre for tropical sawn timber. It submits that DARA-Forest's illegal exports spanned a period of four and a half years. On that basis, the DRC calculates that those exports have a total commercial value of US$94,888,800.

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336. In Uganda's view, the DRC has submitted no evidence to justify the compensation claimed for deforestation.

337. As to the extent of the alleged damage, Uganda observes that the DRC's claim is founded entirely on the case study of DARA-Forest, which the Porter Commission refuted as "fundamentally flawed" and

which the UNPE itself retracted. Uganda points to the findings of the Porter Commission according to which "Dara's operation . . . was not illegal exploitation" and "therefore should not have been . . . used as a basis for criticism" of Uganda. Moreover, Uganda highlights the Commission's conclusion that "[t]here is no evidence . . . that Uganda as a country or as a [g]overnment harvests timber in the Democratic Republic of Congo". Uganda maintains that with regard to the few instances in which the Porter Commission described the involvement of Ugandan soldiers in the exploitation of timber, the DRC offers no evidence specifying and proving the exact injury resulting from such exploitation.

338. Uganda also criticizes the DRC's method of valuation, in particular its use of market value to calculate the damage, arguing that any injury to the DRC would have been limited to lost concession payments and taxes. However, according to Uganda, in the present case no compensation is due since the DRC's own evidence showed that DARA-Forest adhered to all the regulations in force and paid its taxes. Uganda adds that, even if the price of timber exports were relevant to this analysis, the average price claimed by the DRC is unsupported by reliable evidence.

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339. Mr. Nest uses a "proxy tax" (see paragraph 271 above) to arrive at the conclusion that the DRC is owed compensation for the timber exploitation in the amount of US$3,438,704 (US$2,793,301 in Ituri; US$645,402 outside Ituri).

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340. The Court is of the view that the evidence submitted by the DRC does not support the amount claimed as compensation for the unlawful exploitation of timber. The methodology applied by the DRC to substantiate its claim is not convincing. The Porter Commission concluded that the DARA-Forest case study "was fundamentally flawed" and that it was "unable to find support for any single allegation made in this so-called Case Study" (Porter Commission Report, p. 64). Furthermore, as to areas outside Ituri, the evidence on which the DRC relies does not prove Uganda's involvement in the exploitation of timber by the DARA-Forest company. According to the addendum to the report of the UNPE, the exploitation licence held by DARA-Forest was granted by the Congolese Government which continued to approve the company's operations in rebel-held areas. Moreover, according to the Porter Commission Report,

during the occupation of Ituri DARA-Forest continued to pay taxes at the same bank as it had done before the area came under rebel control (Porter Commission Report, pp. 62-63).

341. In its questions put to the Parties under Article 62, paragraph 1, of the Rules of Court, the Court invited the DRC to provide it with evidence regarding "the locations, ownership, average production, and concessions or licenses for each . . . forest". However, the DRC failed to do so. Instead, the DRC continued to rely on the DARA-Forest case study during the oral proceedings.

342. The Court further considers that the report by Mr. Nest provides little support for the amount claimed by the DRC. Notably, he gives lower average prices for timber than those put forward by the DRC.

343. However, the Court recognizes that the Porter Commission Report contains indications that Uganda was involved in timber exploitation (*ibid.*, p. 153). The Court also notes that there is additional evidence of exploitation of timber in Ituri (see e.g. Final UNPE report, UN doc. S/2002/1146 of 16 October 2002, p. 22, para. 116; Mapping Report, para. 751). Furthermore, the report by the Court-appointed expert estimates that a considerable amount of exploited timber stems from what he terms the "Ugandan area of influence".

344. The Court considers that there is sufficient evidence to conclude that Uganda owes reparation for damage resulting from the looting, plundering and exploitation of timber. The Court nevertheless notes that Mr. Nest's calculations in relation to timber are based on less precise information and rougher estimates than were available to him, for example, in relation to gold. The amount of compensation should therefore be considerably lower than his estimate. On this basis, the Court will award compensation for this form of damage as part of a global sum for all damage to natural resources (see paragraph 366 below).

(c) *Environmental damage resulting from deforestation*

345. In its written pleadings, the DRC did not raise a separate claim with respect to environmental damage and referred only once to "damage done to biodiversity and the habitats of animal species" as part of its claims for compensation for deforestation. However, the DRC reserved its right to supplement its claim concerning damage to flora, noting that "a scientific study ha[d] shown that the massive deforestation in the east of the country [was] most pronounced in those areas where the Ugandan armed forces [had been] operating". In its oral pleadings, the DRC stated that its claim of US$100,000,000 for damage to flora comprised damage

caused by the commercial exploitation of timber and damage caused by deforestation, and thus environmental damage. Given that the DRC values the unlawful exploitation of timber in Ituri at between approximately US$85,500,000 and US$95,000,000, the remainder (between US$5 million and US$14.5 million) may be understood as covering environmental damage resulting from deforestation, in particular, a loss of biodiversity. However, the DRC offers no evidence for the extent of this damage, nor does it offer a methodology for its valuation.

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346. Uganda did not address the claim for compensation for environmental damage separately from that for the exploitation of timber.

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347. Mr. Nest clarified that he understood the DRC's claim for damage due to "deforestation" as referring to "timber production". Therefore, he did not address the assessment of environmental damage separately from the exploitation of timber.

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348. The Court has held that "it is consistent with the principles of international law governing the consequences of internationally wrongful acts, including the principle of full reparation, to hold that compensation is due for damage caused to the environment, in and of itself" (*Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua), Compensation, Judgment, I.C.J. Reports 2018 (I)*, p. 28, para. 41) and that "damage to the environment, and the consequent impairment or loss of the ability of the environment to provide goods and services, is compensable under international law" (*ibid.*, para. 42).

349. The Court also recalls that in *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua)*, it found with respect to environmental damage that

> "[t]he damage may be due to several concurrent causes, or the state of science regarding the causal link between the wrongful act and the damage may be uncertain. These are difficulties that must be addressed as and when they arise in light of the facts of the case at hand and the evidence presented to the Court. Ultimately, it is for the Court to

> decide whether there is a sufficient causal nexus between the wrongful act and the injury suffered." (*Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua), Compensation, Judgment, I.C.J. Reports 2018 (I)*, p. 26, para. 34.)

350. However, in the present case the DRC did not provide the Court with any basis for assessing damage to the environment, in particular to biodiversity, through deforestation. The Court is thus unable to determine the extent of the DRC's injury, even on an approximate basis, and therefore dismisses the claim for environmental damage resulting from deforestation.

4. Fauna

351. In its Memorial, the DRC claimed US$2,692,980,468 for alleged direct and indirect loss of wildlife in four national parks (Virunga National Park, Garamba National Park, the Okapi Wildlife Reserve and Maiko National Park). During the oral proceedings, the DRC stated that it was claiming "a minimum amount of US$680,902,068" for direct losses in two of its national parks, the Okapi Wildlife Reserve and Virunga National Park.

352. The DRC submits that it was difficult to assess the injury related to fauna given "the sheer scale of the damage inflicted, its duration, the diversity of forms it took [and] the difficulty of collecting data in areas which had been under Uganda's control for a long period". The DRC emphasizes that the Okapi Wildlife Reserve is largely located in Ituri, which was under Ugandan occupation during the relevant period. It also specifies that "a small part of Virunga Park lies within Ituri".

353. To substantiate its claim, the DRC mainly relies on a 2016 study titled "Evaluation of the damage caused to Congolese fauna by Uganda between 1998 and 2003", which was prepared by a team of experts from the University of Kinshasa using the estimates of the ICCN, the body responsible for managing national parks in the DRC. According to this study, 54,892 animals were killed as a result of Uganda's conduct. The DRC also makes reference to reports by UNESCO, to the UNPE reports and to a study by the ICCN based on aerial counts in 2003 with respect to Virunga National Park. In response to Uganda's criticism of this last ICCN study, the DRC submits that the ICCN "carried out aerial counts in 2003, in conjunction with the Zoological Societies of London and Frankfurt, the US Fish and Wildlife Service and the International Rhino Foundation" and "compared [its estimates] to those of UNESCO".

354. With respect to its method of valuation, the DRC contends that "the price fixed for each animal has been set on the basis of prices habitu-

ally applied in international markets, or in unlawful markets in the case of species listed in Appendix I to [the Convention on International Trade in Endangered Species of Wild Fauna and Flora]", and that these prices were adjusted to reflect only the share of the damage caused by Uganda.

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355. Uganda argues that the DRC's claim for loss of wildlife falls outside the scope of the 2005 Judgment. Further, even if the Court's findings on the merits permitted a claim for compensation relating to wildlife, the DRC's claims in this regard clearly exceed the scope of those findings, given that the DRC only presented to the Court certain limited acts concerning harm to wildlife at the merits phase.

356. Uganda maintains that the DRC must present convincing evidence with a high level of certainty of specific internationally wrongful acts attributable to Uganda that resulted in specific wildlife loss to the DRC, as well as the valuation of that loss. According to Uganda, the DRC does not satisfy this requirement. Uganda emphasizes that the DRC bases its claim for direct losses on a single source, the study by the ICCN, a Congolese governmental agency. According to Uganda, the DRC does not explain how and on what basis the ICCN collected and compiled that information. Uganda asserts that the DRC appears to have fabricated the numbers claimed for the purposes of this litigation. It points out that the UNESCO report cited by the DRC in fact contradicts the findings set out in the study by the ICCN and that the findings of the UNPE on which the DRC relies were refuted by the Porter Commission.

357. Uganda argues that the DRC assigns monetary values to killed and unborn animals based on "unreliable, inappropriate and arbitrary prices", including "black market" prices. Uganda also asserts that claiming compensation for unborn offspring leads to double counting because ordinarily the value of an animal captures its ability to produce offspring. Finally, Uganda points to flaws in the DRC's methodology for calculating the number of offspring that would have been born.

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358. The Court recalls that it found that the DRC's claims relating to damage to fauna are encompassed by the scope of its 2005 Judgment (see paragraph 276 above). However, the Court is of the view that the evi-

dence submitted by the DRC does not support the amount of its claim. The 2016 study prepared by a team of experts of the University of Kinshasa (see paragraph 353 above) needs to be treated with caution, bearing in mind that the Court stated in its 2005 Judgment that it "w[ould] treat with caution evidentiary materials specially prepared for [a case before it] and also materials emanating from a single source" (2005 Judgment, *I.C.J. Reports 2005*, p. 201, para. 61). Furthermore, the Court notes that neither the studies that are based on information from the ICCN (see paragraph 353 above) nor the UNESCO report cited by the DRC sufficiently explains the way in which the respective estimates were reached. Furthermore, these reports are insufficient to establish a causal nexus between any damage in park areas outside Ituri and the wrongful acts of Uganda. The Court therefore limits its further examination to the claims of the DRC relating to the parts of the Okapi Wildlife Reserve and Virunga National Park which are located in Ituri.

359. The Court observes that some of the damage claimed by the DRC is alleged to have occurred in the Okapi Wildlife Reserve, 90 per cent of which is located in Ituri, and in the northern part of Virunga National Park, a small part of which is located in Ituri. The Court recalls that Uganda is internationally responsible for failing to comply with its obligations as an occupying Power in Ituri in respect of all acts of looting, plundering or exploitation of natural resources in the occupied territory, which includes damage to wildlife, and that it owes reparation for such damage (see paragraphs 79, 275 and 278 above).

360. The Court further recalls that "the absence of adequate evidence as to the extent of material damage will not, in all situations, preclude an award of compensation for that damage" (*Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua), Compensation, Judgment, I.C.J. Reports 2018 (I)*, pp. 26-27, para. 35). It notes that wildlife is often subject to less social and technical monitoring than human beings or commercial goods. In this context, the Court ascribes particular weight to reports by international organizations specifically mandated to monitor the sites in question, to the extent that these reports are of probative value and are corroborated, if necessary, by other credible sources.

361. The Court notes that various reports from international organizations contain substantial indications that significant damage was inflicted upon wildlife in Ituri during the period of Ugandan occupation (UNESCO, *World Heritage in the Congo Basin*, 2004, p. 25; Mapping Report, para. 745; UNPE Interim report, UN doc. S/2002/565 of 22 May 2002, para. 52). The Court also observes that Uganda itself has confirmed the existence of severe poaching in the occupied territory, when it pointed out that it had started an anti-poaching initiative ("Operation Tango") in the Okapi Wildlife Reserve and Virunga National Park as from late October 2000. In this context, Uganda cites an article, only parts of which

Uganda included in an annex to its written pleadings, stating in particular that "[a]lthough poaching began in earnest in 1996, the heaviest slaughter of wildlife occurred between 1998 and 2000", and that "[a]ccording to reliable trade sources, much of the tooled ivory on the Ugandan market is being smuggled from Ituri". Since 90 per cent of the Okapi Wildlife Reserve is located in Ituri, Uganda had an obligation at the relevant time to fulfil its duties as an occupying Power (see paragraph 79 above).

362. Under these circumstances, the Court considers that the information given in the reports by international organizations is sufficient for it to conclude that significant damage to fauna occurred in the areas in which Uganda was an occupying Power. The Court therefore concludes that Uganda is liable to make reparation for damage occurring in those parts of the Okapi Wildlife Reserve and Virunga National Park located in Ituri, where Uganda was the occupying Power.

363. While the available evidence is not sufficient to determine a reasonably precise or even an approximate number of animal deaths for which Uganda owes reparation, the Court is nevertheless satisfied, on the basis of the reports cited above (see paragraph 361), that Uganda is responsible for a significant amount of damage to fauna in the Okapi Wildlife Reserve and in the northern part of Virunga National Park, to the extent that these parks are located in Ituri. On this basis the Court will award compensation for this form of damage as part of a global sum for all damage to natural resources.

5. Conclusion

364. The Court observes that the evidence presented to it and the expert report by Mr. Nest demonstrate that a large quantity of natural resources was looted, plundered and exploited in the DRC between 1998 and 2003. In respect of Ituri, Uganda is liable to make reparation for all such acts. As to areas outside of Ituri, a significant amount of natural resources looted, plundered and exploited is attributable to Uganda. However, neither the report by the Court-appointed expert nor the evidence presented by the DRC or set out in reports by the Porter Commission, United Nations bodies and non-governmental organizations is sufficient to prove the precise extent of the looting, plundering and exploitation for which Uganda is liable. The expert report by Mr. Nest provides a methodologically solid and persuasive estimate on the basis of the available evidence. This expert report is particularly helpful regarding the valuation of the different natural resources it covers (minerals, coffee and timber). However, while the expert report by Mr. Nest, and, with respect to fauna, the reports by specialized United Nations bodies, may offer the

best possible estimate of the scale of the exploitation of natural resources under the circumstances, they do not permit the Court to reach a sufficiently precise determination of the extent or the valuation of the damage.

365. As it did with respect to damage to persons and to property, the Court must take account of the extraordinary circumstances of the present case, which have restricted the ability of the DRC and of the expert to present evidence with greater probative value (see paragraphs 120-126 above). The Court recalls that it may, under the exceptional circumstances of the present case, award compensation in the form of a global sum, within the range of possibilities indicated by the evidence and taking into account equitable considerations (see paragraph 106 above).

366. Taking into account all the available evidence (see paragraphs 260-363 above, specifically 298, 310, 322, 332, 344 and 363), in particular the findings and estimates contained in the report by the Court-appointed expert Mr. Nest, as well as its jurisprudence and the pronouncements of other international bodies (see paragraphs 69-126 above), the Court will award compensation for the looting, plundering and exploitation of natural resources in the form of global sum of US$60,000,000.

D. Macroeconomic Damage

367. Finally, the DRC claims US$5,714,000,775 for macroeconomic damage.

368. In the operative part of its 2005 Judgment, the Court found that "Uganda, by engaging in military activities against the Democratic Republic of the Congo . . . violated the principle of non-use of force in international relations and the principle of non-intervention" and held "that the Republic of Uganda is under obligation to make reparation to the Democratic Republic of the Congo for the injury caused" (*I.C.J. Reports 2005*, pp. 280-282, para. 345, subparas. (1) and (5)). The Court did not, however, specifically mention macroeconomic damage.

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369. The DRC submits that the unlawful use of large-scale force by Uganda caused a considerable slowdown in the economic activity of the DRC, constituting a loss of revenue for which full compensation must be paid. The DRC invokes the principle that reparation must, as far as possible, wipe out all the consequences of the illegal act and re-establish the situation which would, in all probability, have existed if that act had not been committed (*Factory at Chorzów, Merits, Judgment No. 13, 1928, P.C.I.J., Series A, No. 17*, p. 47). The DRC also claims, referring to Articles 31 and 36 of the ILC Articles on State Responsibility, that compensa-

tion should cover any financially assessable damage including loss of profits in so far as it is established. Therefore, in the DRC's view, general economic consequences are not excluded from the compensable damage.

370. The DRC submits that any past State practice or jurisprudence that rejected reparation for macroeconomic damage resulting from war or armed conflict was based on special provisions peculiar to each case in point and that all these cases were exceptions to the general rule of full reparation.

371. According to the DRC, Uganda caused compensable general economic injury, in addition to more specific harm. The DRC maintains that there is no risk of double recovery if compensation for macroeconomic damage is awarded together with compensation for loss suffered by individuals. In this regard, the DRC argues that, if a country suffers on both the macroeconomic and the microeconomic level, the former represents a loss of profits, whereas the latter represents damage to the existing assets of businesses or production units.

372. To substantiate its claim, the DRC commissioned two experts from the University of Kinshasa to estimate the macroeconomic damage caused by the 1998-2003 war. This 2016 study (hereinafter the "Kinshasa study") is based on a model that was developed by two economists who specialize in modelling the impact of war on the economic performance of affected countries. The DRC maintains that there is nothing speculative about macroeconomic damage, since the effects of war on the macroeconomic balance of affected States, the progress of the economy and its performance in terms of growth, are measurable and have indeed been measured by the DRC using proven methods and reliable data. The DRC further submits that the data it provided show that although the Congolese economy was already declining in 1998, the downturn was precipitated by the war and the economy began to recover when the war ended, demonstrating that the war had caused specific and identifiable macroeconomic harm.

373. According to the Kinshasa study, the macroeconomic damage suffered by the DRC as a result of the 1998-2003 war amounts to US$12,697,779,493.27. Since, in the DRC's submission, the harm resulting from the war was not caused solely by Uganda's internationally wrongful conduct but was also the consequence of acts of other States, Uganda's share amounts to 45 per cent of the total. The sum claimed by the DRC under this head of damage is thus US$5,714,000,775.

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374. Uganda disputes the DRC's claim for macroeconomic damage on several grounds.

375. Uganda submits that the DRC's claim is not covered by the 2005 Judgment. In Uganda's view, the DRC must show an "exact injury" resulting from "specific actions" that constitute violations of international law for which the Court has established Uganda's responsibility, which the DRC has not done with respect to macroeconomic damage.

376. Uganda also maintains that macroeconomic damage resulting from armed conflict is not compensable under international law. Uganda argues that this is confirmed by the uniform rejection of such claims in State practice and in jurisprudence. Regarding State practice, Uganda refers to the Treaty of Versailles and the unilateral or conventional reparation schemes after the Second World War, none of which included an obligation to pay reparation for the macroeconomic impact of the war. With regard to jurisprudence, Uganda cites the EECC final awards on Ethiopia's damage and on Eritrea's damage, respectively, for the propositions that international law imposes no responsibility to compensate for the "generalized economic and social consequences of war", and that past tribunals have not "found generalized conditions of war-related economic disruption and decline to constitute compensable elements of damage, even in the case of some types of injury bearing a relatively close connection to illegal conduct".

377. Uganda further considers that macroeconomic damage is not subject to compensation under international law because it is inherently speculative. More specifically, Uganda claims that the causal nexus between its violation of the prohibition of the use of force and any possible macroeconomic loss is not sufficiently direct and is too remote. Uganda asserts that the DRC's claim itself illustrates the speculative nature of this head of damage, as "no claim for compensation can be justified by recourse to probabilities, variables, statistical methods and cryptic formulas".

378. In addition, Uganda submits that the concept of lost profits does not encompass macroeconomic damage as claimed by the DRC. In this regard, Uganda argues that lost profits relate to income-producing assets. Uganda contends that the economy of a nation does not constitute an income-producing asset. According to Uganda, the DRC fails to identify any assets that were specifically designed to produce profits and were affected by Uganda's internationally wrongful acts.

379. Uganda also argues that the macroeconomic damage for which the DRC seeks compensation includes damage that is also claimed elsewhere in its written pleadings and that the DRC thus effectively seeks double recovery under the guise of macroeconomic damage.

380. Finally, Uganda asserts that, from an economic science perspective, the methodology by which the DRC substantiates its claim is flawed. Noting that the Kinshasa study mainly relies on a model developed by two economists, Uganda commissioned the same two experts, Mr. Paul Collier and Ms Anke Hoeffler of the University of Oxford, to prepare an assessment (hereinafter the "Collier and Hoeffler assessment") in which they set out their critical views of the Kinshasa study. Apart from alleging several technical errors and raising issues with the data used in the Kinshasa study, the Collier and Hoeffler assessment points to an "overall flaw [that] is more fundamental" and consists in an implausible assumption of positive growth in gross domestic product in the DRC after 1998 and in disregarding the rise of global commodity prices from 2001 onwards.

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381. The Court does not need to decide, in the present proceedings, whether a claim for macroeconomic damage resulting from a violation of the prohibition of the use of force, or a claim for such damage more generally, is compensable under international law. It is enough for the Court to note that the DRC has not shown a sufficiently direct and certain causal nexus between the internationally wrongful act of Uganda and any alleged macroeconomic damage. In any event, the DRC has not provided a basis for arriving at even a rough estimate of any possible macroeconomic damage.

382. The Court considers that it is not sufficient, as the DRC claims, to show "an uninterrupted chain of events linking the damage to Uganda's wrongful conduct". Rather, the Court is required to determine "whether there is a sufficiently direct and certain causal nexus between the wrongful act . . . and the injury suffered by the Applicant" (see paragraph 93 above; *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua), Compensation, Judgment, I.C.J. Reports 2018 (I)*, p. 26, para. 32; *Ahmadou Sadio Diallo (Republic of Guinea* v. *Democratic Republic of the Congo), Compensation, Judgment, I.C.J. Reports 2012 (I)*, p. 332, para. 14; *Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina* v. *Serbia and Montenegro), Judgment, I.C.J. Reports 2007 (I)*, pp. 233-234, para. 462). Compensation can thus only be awarded for losses that are not too remote from the unlawful use of force (commentary to Article 31 of the ILC Articles on State Responsibility, *YILC*, 2001, Vol. II, Part Two, p. 93, para. 10). A violation of the prohibition of the use of force does not give rise to an obligation to make reparation for all that comes afterwards, and Uganda's conduct is not the only relevant cause of all that happened during the conflict (see EECC, *Final Award, Ethiopia's Damages Claims, Decision of 17 August 2009, RIAA*, Vol. XXVI, p. 719, para. 282).

383. Uganda's unlawful use of force may well have had a negative effect on the economy of the DRC. In these proceedings, however, the Court must determine whether any macroeconomic damage allegedly suffered by the DRC is supported by the evidence, and whether the DRC has established a sufficiently direct and certain causal nexus between the internationally wrongful conduct of Uganda identified by the Court in its 2005 Judgment and this head of damage. The Kinshasa study on which the DRC relies does not provide any certainty regarding the existence or extent of the negative effect on the economy alleged by the DRC. The countervailing Collier and Hoeffler assessment casts serious doubts on the Kinshasa study, at least regarding the extent of any possible damage and the potential effects of any independent causal factors. The Court also notes that the methodology used in the Kinshasa study is based on an econometric model that is designed to show general trends or verify certain hypotheses that may suffice for abstract scientific purposes or policy recommendations. The Court is not convinced that the methodology used in the study is sufficiently reliable for an award of reparation in a judicial proceeding.

384. The Court concludes that the DRC has not demonstrated that a sufficiently direct and certain causal nexus exists between the internationally wrongful acts of Uganda and any possible macroeconomic damage. The Court therefore cannot award compensation to the DRC for losses allegedly arising from the general disruption to the economy as a result of the conflict (see EECC, *Final Award, Ethiopia's Damages Claims, Decision of 17 August 2009, RIAA*, Vol. XXVI, p. 747, para. 395). The Court thus rejects the claim of the DRC for macroeconomic damage.

IV. Satisfaction

385. The DRC argues that, regardless of the amount awarded by the Court, compensation as a form of reparation is not sufficient to remedy fully the damage caused to the DRC and its population. It therefore asks that Uganda be required to give satisfaction through: (i) the criminal investigation and prosecution of officers and soldiers of the UPDF; (ii) the payment of US$25 million for the creation of a fund to promote reconciliation between the Hema and the Lendu in Ituri; and (iii) the payment of US$100 million for the non-material harm suffered by the DRC as a result of the war.

386. Uganda, for its part, is of the view that the DRC's request for criminal investigations and prosecutions is a new liability claim which was not brought at the merits phase. Furthermore, it asserts that the

claim for a payment of US$125 million concerns the same injury already covered by the DRC's other claims, and that, in any event, satisfaction should take the form of a purely symbolic payment.

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387. Before examining the three forms of satisfaction sought by the DRC, the Court recalls that, in general, a declaration of violation is, in itself, appropriate satisfaction in most cases (*Pulp Mills on the River Uruguay (Argentina* v. *Uruguay), Judgment, I.C.J. Reports 2010 (I)*, p. 106, para. 282 (1); *Certain Questions of Mutual Assistance in Criminal Matters (Djibouti* v. *France), Judgment, I.C.J. Reports 2008*, p. 245, para. 204; *Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina* v. *Serbia and Montenegro), Judgment, I.C.J. Reports 2007 (I)*, p. 234, para. 463, and p. 239, para. 471 (9); *Corfu Channel (United Kingdom* v. *Albania), Merits, Judgment, I.C.J. Reports 1949*, p. 35). However, satisfaction can take an entirely different form depending on the circumstances of the case, and in so far as compensation does not wipe out all the consequences of an internationally wrongful act.

388. As regards the first measure sought by the DRC, namely the conduct of criminal investigations and prosecutions, the Court recalls that under Article 37 of the ILC Articles on State Responsibility:

"1. The State responsible for an internationally wrongful act is under an obligation to give satisfaction for the injury caused by that act insofar as it cannot be made good by restitution or compensation.
2. Satisfaction may consist in an acknowledgement of the breach, an expression of regret, a formal apology or another appropriate modality."

389. The Court observes that the forms of satisfaction listed in the second paragraph of this provision are not exhaustive. In principle, satisfaction can include measures such as "disciplinary or penal action against the individuals whose conduct caused the internationally wrongful act" (commentary to Article 37 of the ILC Articles on State Responsibility, *YILC*, 2001, Vol. II, Part Two, p. 106, para. 5).

390. The Court recalls that, in its 2005 Judgment, it found that Ugandan troops had committed grave breaches of the Geneva Conventions. The Court observes that, pursuant to Article 146 of the Fourth Geneva Convention relative to the Protection of Civilian Persons in Time of War of 12 August 1949 and to Article 85 of the Protocol Additional to the Geneva Conventions of 12 August 1949 and relating to the Protection of

Victims of International Armed Conflicts (Protocol I), Uganda has a duty to investigate, prosecute and punish those responsible for the commission of such violations. There is no need for the Court to order any additional specific measure of satisfaction relating to the conduct of criminal investigations or prosecutions. The Respondent is required to investigate and prosecute by virtue of the obligations incumbent on it.

391. As regards the second measure of satisfaction sought by the DRC, namely the payment of US$25 million for the creation of a fund to promote reconciliation between the Hema and the Lendu in Ituri, the Court recalls that in its 2005 Judgment it considered that the UPDF had "incited ethnic conflicts and t[aken] no action to prevent such conflicts in Ituri district" (*I.C.J. Reports 2005*, p. 240, para. 209). In this case, however, the material damage caused by the ethnic conflicts in Ituri is already covered by the compensation awarded for damage to persons and to property. The Court nevertheless invites the Parties to co-operate in good faith to establish different methods and means of promoting reconciliation between the Hema and Lendu ethnic groups in Ituri and ensure lasting peace between them.

392. Lastly, the Court cannot uphold the third measure of satisfaction sought by the DRC, namely the payment of US$100 million for non-material harm. There is no basis for granting satisfaction for non-material harm to the DRC in such circumstances, given the subject-matter of reparation in international law and international practice in this regard. The EECC rejected Ethiopia's claim for moral damage suffered by Ethiopians and by the State itself on account of Eritrea's illegal use of force (EECC, *Final Award, Ethiopia's Damages Claims, Decision of 17 August 2009, RIAA*, Vol. XXVI, p. 662, paras. 54-55, and p. 664, para. 61). In the circumstances of the case, the Court considers that the non-material harm for which the DRC seeks satisfaction is included in the global sums awarded by the Court for various heads of damage.

V. Other Requests

393. The Court now turns to the other requests made by the DRC in its final submissions, namely that the Court order Uganda to reimburse the DRC's costs incurred during the proceedings, that the Court grant pre-judgment and post-judgment interest, and that the Court remain seised of the case until Uganda has fully made the reparations and paid compensation as ordered by it.

A. Costs

394. The DRC in its final submissions requests the Court to order that the costs it incurred in the present case be reimbursed by Uganda. It

argues that there are special circumstances for doing so, referring in particular to the gravity of the violations of international law from which the DRC and its people suffered, as well as the catastrophic scale of the damage that resulted. The DRC submits that it has faced an enormous task in identifying and assessing that damage, which has placed an additional burden on already impoverished public finances, a burden that the DRC would not have had to bear if large areas of its territory had not been invaded and occupied by the Ugandan armed forces for a number of years. In the DRC's view, those circumstances fully justify making an exception, in the present case, to the general rule set forth in Article 64 of the Statute of the Court that each party bear its own costs.

395. Uganda, for its part, argues that granting the DRC's request for costs would run counter to the presumption set forth in Article 64 of the Court's Statute, and that it would be contrary to the practice of the Court and its predecessor, neither having ever ordered one party to pay the costs of the other. Uganda contends that only if the Court were faced with a serious abuse of process by a party might there be a possibility of departing from the principle; in its view, such circumstances are not met in the present case. Uganda submits that it was fully justified in resisting the DRC's claims and that there is therefore no basis for ordering it to pay the DRC's costs. In its final submissions, Uganda requests that the Court declare that each Party should bear its own costs.

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396. Article 64 of the Statute provides that "[u]nless otherwise decided by the Court, each party shall bear its own costs". Taking into account the circumstances of this case, including the fact that Uganda prevailed on one of its counter-claims against the DRC and subsequently waived its own claim for compensation, the Court sees no sufficient reason that would justify departing, in the present case, from the general rule set forth in Article 64 of the Statute. Accordingly, each Party shall bear its own costs.

B. Pre-Judgment and Post-Judgment Interest

397. The DRC in its final submissions requests the Court to order Uganda to pay pre-judgment interest and post-judgment interest. With respect to pre-judgment interest, the DRC observes that, according to Article 38, paragraph 1, of the ILC Articles on State Responsibility, "[i]nterest on any principal sum due . . . shall be payable when necessary in order to ensure full reparation". The DRC contends that, in light of

the principle of full reparation and taking into account the passage of time, pre-judgment interest is appropriate in the present case. The DRC in its written pleadings requested the Court to fix the rate of the pre-judgment interest at 6 per cent. At the hearings, it proposed a rate of 4 per cent, payable from the filing of the Memorial on Reparation, due on heads of claim other than those for which the amount of compensation awarded by the Court, based on an overall assessment, already takes into account the passage of time.

398. The DRC also requests that post-judgment interest, at a rate of 6 per cent, accrue on the principal sum awarded by the Court, should Uganda fail to pay it "on the date of the judgment".

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399. Uganda argues that ordering pre-judgment interest in the circumstances of the case would not be consistent with the practice of the Court or the rules applicable to inter-State compensation under international law. In this regard, it submits that pre-judgment interest would apply only in circumstances where the Court determines that a fixed sum was due to the applicant as of a specified date in the past, and to the extent that is necessary to ensure full reparation. Uganda argues, however, that no such circumstances exist in the present case. Rather, it asserts that the DRC generally seeks compensation based on a present-day valuation and that there is no basis for supplementing that valuation with compensatory interest.

400. Uganda considers that in the circumstances of the case, the DRC is only entitled to post-judgment interest. In this regard, it accepts that, should the Court order Uganda to pay compensation to the DRC, it could order that, if such compensation is not paid within a reasonable period of time, interest would accrue on the amount owed until the date of payment. However, Uganda argues that what constitutes a "reasonable period of time" for such payment must be assessed in light of the amount established by the Court. Given contemporary market conditions, it urges the Court to set such interest at an annual rate no higher than 3 per cent.

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401. With respect to the DRC's claim for pre-judgment interest, the Court observes that, in the practice of international courts and tribunals, while pre-judgment interest may be awarded if full reparation for injury caused by an internationally wrongful act so requires, interest is not an autonomous form of reparation, nor is it a necessary part of compensation in every case (see *Certain Activities Carried Out by Nicaragua in the*

Border Area (Costa Rica v. *Nicaragua), Compensation, Judgment, I.C.J. Reports 2018 (I)*, p. 58, para. 151). The Court notes that in determining the amount to be awarded for each head of damage, it has taken into account the passage of time (cf. *ibid.*, para. 152). In this regard, the Court observes that the DRC itself has stated in its final submissions that it is not requesting pre-judgment interest in respect of damage for which "the amount of compensation awarded by the Court, based on an overall assessment, already takes account of the passage of time". The Court considers that there is thus no need to award pre-judgment interest in the circumstances of the case.

402. With regard to the DRC's claim for post-judgment interest, the Court recalls that it has granted such interest in past cases in which it has awarded compensation, having observed that "the award of post-judgment interest is consistent with the practice of other international courts and tribunals" (*Ahmadou Sadio Diallo (Republic of Guinea* v. *Democratic Republic of the Congo), Compensation, Judgment, I.C.J. Reports 2012 (I)*, p. 343, para. 56; see also *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua), Compensation, Judgment, I.C.J. Reports 2018 (I)*, p. 58, paras. 154-155). The Court expects timely payment and has no reason to assume that Uganda will not act accordingly. Nevertheless, consistent with its practice, the Court decides that, should payment be delayed, post-judgment interest shall be paid. It will accrue at an annual rate of 6 per cent on any overdue amount (see paragraph 406 below).

C. Request that the Court Remain Seised of the Case

403. In its final submissions, the DRC also requests that the Court "declare that the present dispute will not be fully and finally resolved until Uganda has actually paid the reparations and compensation ordered by the Court" and that "[u]ntil that time, the Court will remain seised of the present case".

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404. The Court observes that the DRC, by its request, is essentially asking the Court to supervise the implementation of its Judgment. In this regard, the Court notes that in none of its previous judgments on compensation has it considered it necessary to remain seised of the case until a final payment was received. The Court moreover considers that the award of post-judgment interest addresses the DRC's concerns regarding timely compliance by the Respondent with the payment obligations set out in the present Judgment. In light of the above, there is no reason for the Court to remain seised of the case and the request of the DRC must therefore be rejected.

VI. Total Sum Awarded

405. The total amount of compensation awarded to the DRC is US$325,000,000. This global sum includes US$225,000,000 for damage to persons, US$40,000,000 for damage to property, and US$60,000,000 for damage related to natural resources.

406. The total sum is to be paid in annual instalments of US$65,000,000, due on 1 September of each year, from 2022 to 2026. The Court decides that, should payment be delayed, post-judgment interest at an annual rate of 6 per cent on each instalment will accrue on any overdue amount from the day which follows the day on which the instalment was due.

407. The Court is satisfied that the total sum awarded, and the terms of payment, remain within the capacity of Uganda to pay. Therefore, the Court does not need to consider the question whether, in determining the amount of compensation, account should be taken of the financial burden imposed on the responsible State, given its economic condition (see paragraph 110 above).

408. The Court notes that the reparation awarded to the DRC for damage to persons and to property reflects the harm suffered by individuals and communities as a result of Uganda's breach of its international obligations. In this regard, the Court takes full cognizance of, and welcomes, the undertaking given by the Agent of the DRC during the oral proceedings regarding the fund that has been established by the Government of the DRC, according to which the compensation to be paid by Uganda will be fairly and effectively distributed to victims of the harm, under the supervision of organs whose members include representatives of victims and civil society and whose operation is supported by international experts. In distributing the sums awarded, the fund is encouraged to consider also the possibility of adopting measures for the benefit of the affected communities as a whole.

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409. For these reasons,

The Court,

(1) *Fixes* the following amounts for the compensation due from the Republic of Uganda to the Democratic Republic of the Congo for the damage caused by the violations of international obligations by the Republic of Uganda, as found by the Court in its Judgment of 19 December 2005:

(a) By twelve votes to two,

US$225,000,000 for damage to persons;

IN FAVOUR: *President* Donoghue; *Vice-President* Gevorgian; *Judges* Tomka, Abraham, Bennouna, Yusuf, Xue, Sebutinde, Bhandari, Robinson, Iwasawa, Nolte;

AGAINST: *Judge* Salam; *Judge* ad hoc Daudet;

(b) By twelve votes to two,

US$40,000,000 for damage to property;

IN FAVOUR: *President* Donoghue; *Vice-President* Gevorgian; *Judges* Tomka, Abraham, Bennouna, Yusuf, Xue, Sebutinde, Bhandari, Robinson, Iwasawa, Nolte;

AGAINST: *Judge* Salam; *Judge* ad hoc Daudet;

(c) Unanimously,

US$60,000,000 for damage related to natural resources;

(2) By twelve votes to two,

Decides that the total amount due under point 1 above shall be paid in five annual instalments of US$65,000,000 starting on 1 September 2022;

IN FAVOUR: *President* Donoghue; *Vice-President* Gevorgian; *Judges* Abraham, Bennouna, Yusuf, Xue, Sebutinde, Bhandari, Robinson, Salam, Iwasawa, Nolte;

AGAINST: *Judge* Tomka; *Judge* ad hoc Daudet;

(3) Unanimously,

Decides that, should payment be delayed, post-judgment interest of 6 per cent will accrue on any overdue amount as from the day which follows the day on which the instalment was due;

(4) By twelve votes to two,

Rejects the request of the Democratic Republic of the Congo that the costs it incurred in the present case be borne by the Republic of Uganda;

IN FAVOUR: *President* Donoghue; *Vice-President* Gevorgian; *Judges* Abraham, Bennouna, Yusuf, Xue, Sebutinde, Bhandari, Robinson, Salam, Iwasawa, Nolte;

AGAINST: *Judge* Tomka; *Judge* ad hoc Daudet;

(5) Unanimously,

Rejects all other submissions made by the Democratic Republic of the Congo.

Done in French and in English, the French text being authoritative, at the Peace Palace, The Hague, this ninth day of February, two thousand and twenty-two, in three copies, one of which will be placed in the archives

of the Court and the others transmitted to the Government of the Democratic Republic of the Congo and the Government of the Republic of Uganda, respectively.

(Signed) Joan E. Donoghue,
President.

(Signed) Philippe Gautier,
Registrar.

Judge Tomka appends a declaration to the Judgment of the Court; Judge Yusuf appends a separate opinion to the Judgment of the Court; Judge Robinson appends a separate opinion to the Judgment of the Court; Judge Salam appends a declaration to the Judgment of the Court; Judge Iwasawa appends a separate opinion to the Judgment of the Court; Judge *ad hoc* Daudet appends a dissenting opinion to the Judgment of the Court.

(Initialled) J.E.D.
(Initialled) Ph.G.

Annex 22

Appendix A to the Principles Governing IPCC Work

PROCEDURES FOR THE PREPARATION, REVIEW, ACCEPTANCE, ADOPTION, APPROVAL AND PUBLICATION OF IPCC REPORTS

Adopted at the Fifteenth Session (San Jose, 15-18 April 1999) amended at the Twentieth Session (Paris, 19-21 February 2003), Twenty-First Session (Vienna, 3 and 6-7 November 2003), Twenty-Ninth Session (Geneva, 31 August-4 September 2008), Thirty-Third Session (Abu Dhabi, 10-13 May 2011), Thirty-Fourth Session (Kampala, 18-19 November 2011),Thirty-Fifth Session (Geneva, 6-9 June 2012) and the Thirty-Seventh Session (Batumi, 14-18 October 2013)

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1. INTRODUCTION

This revised Appendix to the Principles Governing IPCC Work contains the procedures for the preparation, review, acceptance, adoption, approval and publication of IPCC reports and other materials relevant to methodologies. These Procedures for the Preparation, Review, Acceptance, Adoption, Approval and Publication of IPCC Reports were adopted at the Fifteenth Session of the IPCC (San Jose, 15-18 April 1999) and amended at the Twentieth Session (Paris, 19-21 February 2003), Twenty-First Session (Vienna, 3 and 6-7 November 2003), Twenty-Ninth Session (Geneva, 31 August-4 September 2008), Thirty-Third Session (Abu Dhabi, 10-13 May 2011), Thirty-Fourth Session (Kampala, 18-19 November 2011) and Thirty-Fifth Session (Geneva, 6-9 June 2012).

2. DEFINITIONS

The definitions of terms used in this document are as follows:

"Acceptance" of IPCC Reports at a Session of the Working Group or Panel signifies that the material has not been subject to line by line discussion and agreement, but nevertheless presents a comprehensive, objective and balanced view of the subject matter.

"Adoption" of IPCC Reports is a process of endorsement section by section (and not line by line) used for the longer report of the Synthesis Report as described in section 4.4 and for Overview Chapters of Methodology Reports.

"Approval" of IPCC Summaries for Policymakers signifies that the material has been subject to detailed, line by line discussion and agreement.

"Assessment Reports" are published materials composed of the full scientific and technical assessment of climate change, generally in three volumes, one for each of the Working Groups of the IPCC. Each of the volumes may be composed of two or more sections including: (a) a Summary for Policymakers (b) an optional technical summary and (c) individual chapters and their executive summaries.

"Members of the IPCC" are countries who are Members of WMO and/or the United Nations.

"Methodology Reports" are published materials, which provide practical guidelines for the preparation of greenhouse gas inventories. Such reports may be composed of two or more sections including: (a) an Overview Chapter, which broadly describes the background, structure and major features of the report, (b) individual chapters and (c) technical Annexes.

"***Observer Organisation***" refers to a body or an agency, whether national or international, governmental, intergovernmental or non-governmental which is qualified in matters covered by the IPCC and which has been admitted by the Panel in accordance with the IPCC Policy and Process for Admitting Observer Organisations to be represented at Sessions of the Panel and any of its Working Groups.[1]

[1] The IPCC has a "Policy and Process for Admitting Observer Organizations". See: http://www.ipcc.ch/pdf/ipcc-principles/ipcc-principles-observer-org.pdf

"Reports" refer to the main IPCC materials (including Assessment, Synthesis, Methodology and Special Reports and their Summaries for Policymakers and Overview Chapters).

"Session of a Working Group" refers to a series of meetings at the plenary level of the governmental representatives to a Working Group of the IPCC.

"Session of the Bureau" refers to a series of meetings of the elected members of the IPCC Bureau who may be accompanied by a representative of their government.

"Session of the Panel" refers to a series of meetings at the plenary level of the governmental representatives to the IPCC.

"Special Report" is an assessment of a specific issue and generally follows the same structure as a volume of an Assessment Report.

"Summary for Policymakers" ("SPM") is a component of a Report, such as an Assessment, Special or Synthesis Report, which provides a policy-relevant but policy-neutral summary of that Report.

"Supporting Material" consists of three categories: (1) Workshop proceedings and material from Expert Meetings which are either commissioned or supported by the IPCC, (2) software or databases to facilitate the use of the IPCC Methodology Reports, and (3) guidance material (guidance notes and guidance documents) to guide and assist in the preparation of comprehensive and scientifically sound IPCC Reports and Technical Papers.

"Synthesis Reports" synthesise and integrate materials contained within the Assessment Reports and Special Reports and are written in a non-technical style suitable for policymakers and address a broad-range of policy-relevant but policy-neutral questions. They are composed of two sections as follows: (a) a Summary for Policymakers and (b) a longer report.

"***Task Force Bureau"*** refers to the elected members of the Bureau of the Task Force on National Greenhouse Gas Inventories. It is chaired by two Co-chairs, referred to in the following as Task Force Bureau Co-chairs.

"Technical Papers" are based on the material already in the Assessment Reports and Special Reports and are prepared on topics for which an objective international scientific/technical perspective is deemed essential.

"Working Group Bureau" refers to the elected members of the Bureau of a Working Group. It is chaired by Co-chairs, referred to as "Working Group Co-chairs".

3. IPCC MATERIAL

There are three main classes of IPCC material, each of which is defined in Section 2.

A. IPCC Reports (which include Assessment, Synthesis and Special Reports and their Summaries for Policymakers and Methodology Reports)
B. Technical Papers
C. Supporting Material

The different classes of material are subject as appropriate to different levels of formal endorsement. These levels are described in terms of acceptance, adoption and approval as defined in Section 2.

The different levels of endorsement for the different classes of IPCC material are as follows:

A. In general, IPCC Reports are accepted by the appropriate Working Group. Reports prepared by the Task Force on National Greenhouse Gas Inventories are accepted by the Panel. Summaries for Policymakers are approved by the appropriate Working Groups (Section 4.2) and subsequently accepted by the Panel (Section 4.4). Overview chapters of Methodology Reports are adopted, section by section, by the appropriate Working Group or in case of reports prepared by the Task Force on National Greenhouse Gas Inventories by the Panel (Section 4.4). In the case of the Synthesis Report the Panel adopts the underlying Report, section by section, and approves the Summary for Policymakers. The definition of the terms "acceptance", "adoption" and "approval" will be included in the IPCC published Reports (Section 4.6).

B. Technical Papers are not accepted, approved or adopted by the Working Groups or the Panel but are finalised in consultation with the Bureau, which will function in the role of an Editorial Board (Section 5).

C. Supporting Materials are not accepted, approved or adopted (Section 6).

4. ASSESSMENT REPORTS, SYNTHESIS REPORTS, SPECIAL REPORTS AND METHODOLOGY REPORTS

4.1 Convening a Scoping Meeting to Prepare Report Outline

Each IPCC Assessment Report, Special Report, Methodology Report and Synthesis Report, as defined in Section 2 of Appendix A to the Principles Governing IPCC work, should be preceded by a scoping meeting that develops its draft outline (and explanatory notes as appropriate). Nominations for participation will be solicited from Government Focal Points, observer organisations, and Bureau members. Participants should be selected by the relevant respective Working Group Bureau/Task Force Bureau and, in case of the Synthesis Report, by the IPCC Chair in consultation with the Working Group Co-Chairs. In selecting scoping meeting participants, consideration should be given to the following criteria: scientific, technical and socio-economic expertise, including the range of views; geographical representation; a mixture of experts with and without previous experience in IPCC; gender balance; experts with a background from relevant stakeholder and user groups, including governments. The Working Group/Task Force Bureau and, in the case of the Synthesis Report, the IPCC Chair will report to the Panel on the selection process including a description of how the selection criteria for participation and any other considerations have been applied, and including a list of participants.

Based on the report of the scoping meeting the Panel will decide whether to prepare a report and agree on its scope, outline, and the work plan including schedule and budget.

4.2 General Procedures for Preparing IPCC Reports

In Assessment Reports, Synthesis Reports, and Special Reports, Coordinating Lead Authors (CLAs), Lead Authors (LAs), and Review Editors (REs) of chapter teams are required to consider the range of scientific, technical and socio-economic views, expressed in balanced assessments. Authors should use calibrated uncertainty language that expresses the diversity of the scientifically and technically valid evidence, based mainly on the strength of the evidence and the level of agreement in the scientific, technical, and socio-economic literature. The IPCC guidance notes on addressing uncertainties are available on the IPCC website[2].

The review process generally takes place in three stages: expert review of IPCC Reports, government/expert review of IPCC Reports, and government review of the Summaries for Policymakers and Overview Chapters and/or the Synthesis Report.

Working Group/Task Force Bureau Co-Chairs should aim to avoid (or at least minimise) the overlap of government review periods for different IPCC Reports and with Sessions of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) and its Subsidiary Bodies.

Expert review should normally be eight weeks, but not less than six weeks, except to the extent decided by the Panel. Government and government/expert reviews should not be less than eight weeks, except to the extent decided by the Panel.

All written expert and government review comments will be made available to reviewers on request during the review process.

[2] See: http://www.ipcc.ch/pdf/supporting-material/uncertainty-guidance-note.pdf

The drafts of IPCC Reports and Technical Papers which have been submitted for formal expert and/or government review, the expert and government review comments, and the author responses to those comments will be made available on the IPCC website as soon as possible after the acceptance by the Panel and the finalisation of the Report or Technical Paper. The IPCC considers its draft reports, prior to acceptance, to be pre-decisional, provided in confidence to reviewers, and not for public distribution, quotation or citation.

4.3 Preparation of Reports by the Working Groups and the Task Force on National Greenhouse Gas Inventories

It is essential that the Working Group and Task Force on National Greenhouse Gas Inventories work programmes allow enough time in their schedules, according to procedures, for a full review by experts and governments and for the acceptance of the report. The Working Group/Task Force Bureau Co-Chairs are responsible for implementing the work programme and ensuring that proper review of the material occurs in a timely manner.

To ensure proper preparation and review, the following steps should be undertaken:

1. Compilation of lists of potential Coordinating Lead Authors, Lead Authors, Contributing Authors, Review Editors and of Government Focal Points.
2. Selection of Coordinating Lead Authors, Lead Authors and Review Editors.
3. Preparation of draft Report.
4. Review
    a. First Review (by experts).
    b. Second Review (by governments and experts).
5. Preparation of final draft Report.
6. Acceptance of Report at a Session of the Working Group(s) or the Panel respectively.

4.3.1 Compilation of Lists of Potential Coordinating Lead Authors, Lead Authors, Contributing Authors, Review Editors and of Government Focal Points

At the request of Working Group/Task Force Bureau Co-Chairs, through their respective Working Group/Task Force Bureau, and the IPCC Secretariat, governments, observer organisations and the Working Group/Task Force Bureaux should identify appropriate experts for each area in the Report who can act as potential Coordinating Lead Authors, Lead Authors, Contributing Authors or Review Editors. To facilitate the identification of experts and later review by governments, governments should also designate their respective Focal Points. IPCC Bureau Members and Members of the Task Force Bureau should contribute where necessary to identifying appropriate Coordinating Lead Authors, Lead Authors, Contributing Authors, and Review Editors in cooperation with the Government Focal Points within their region to ensure an appropriate representation of experts from developing and developed countries and countries with economies in transition.
These should be assembled into lists available to all IPCC Members and maintained by the IPCC Secretariat. The tasks and responsibilities of Coordinating Lead Authors, Lead Authors, Contributing Authors, Review Editors and Government Focal Points are outlined in Annex 1.

4.3.2 Selection of Coordinating Lead Authors, Lead Authors and Review Editors

Coordinating Lead Authors, Lead Authors and Review Editors are selected by the relevant Working Group/Task Force Bureau, under general guidance and review provided by the Session of the Working Group or, in case of reports prepared by the Task Force on National Greenhouse Gas Inventories, the Panel, from those experts cited in the lists provided by governments and observer organisations, and other experts as appropriate, known through their publications and works. The composition of the group of Coordinating Lead Authors and Lead Authors for a chapter, a report or its summary shall aim to reflect:

- the range of scientific, technical and socio-economic views and expertise;
- geographical representation (ensuring appropriate representation of experts from developing and developed countries and countries with economies in transition); there should be at least one and normally two or more from developing countries;

- a mixture of experts with and without previous experience in IPCC;
- gender balance.

The Working Group/Task Force Bureau will report to the Panel on the selection process and the extent to which the aims were achieved. The IPCC should make every effort to engage experts from the region on the author teams of chapters addressing specific regions, but should also engage experts from countries outside of the region when they can provide an essential contribution to the assessment.

The Coordinating Lead Authors and Lead Authors selected by the Working Group/Task Force Bureau may enlist other experts as Contributing Authors to assist with the work.

At the earliest opportunity, the IPCC Secretariat should inform all governments and observer organisations who the Coordinating Lead Authors, Lead Authors and Review Editors are for different chapters and indicate the general content area that the person will contribute to the chapter.

4.3.3 Preparation of Draft Report

Preparation of the first draft of a Report should be undertaken by Coordinating Lead Authors and Lead Authors. Experts who wish to contribute material for consideration in the first draft should submit it directly to the Lead Authors. Contributions should be supported as far as possible with references from the peer-reviewed and internationally available literature, and with copies of any unpublished material cited. Clear indications of how to access the latter should be included in the contributions. For material available in electronic format only, a hard copy should be archived and the location where such material may be accessed should be cited.

Lead Authors will work on the basis of these contributions, the peer-reviewed and internationally-available literature, including manuscripts that can be made available for IPCC review and selected non-peer review literature according to Annex 2 and IPCC Supporting Material (see Section 6). Material which is not published but which is available to experts and reviewers may be included provided that its inclusion is fully justified in the context of the IPCC assessment process (see Annex 2).

In preparing the first draft, and at subsequent stages of revision after review, Lead Authors should clearly identify disparate views for which there is significant scientific or technical support, together with the relevant arguments. Technical summaries provided will be prepared under the leadership of the Working Group/Task Force Bureaux.

4.3.4 Review

Three principles governing the review should be borne in mind. First, the best possible scientific and technical advice should be included so that the IPCC Reports represent the latest scientific, technical and socio-economic findings and are as comprehensive as possible. Secondly, a wide circulation process, ensuring representation of independent experts (i.e. experts not involved in the preparation of that particular chapter) from developing and developed countries and countries with economies in transition should aim to involve as many experts as possible in the IPCC process. Thirdly, the review process should be objective, open and transparent.

Working Group/TFI Co-chairs should arrange a comprehensive review of reports in each review phase, seeking to ensure complete coverage of all content. Those parts of a Working Group report that are cross-cutting with other Working Group reports should be cross-checked through the relevant Authors and Co-chairs of that other Working Group.

To help ensure that Reports provide a balanced and complete assessment of current information, each Working Group/Task Force Bureau should normally select two to four Review Editors per chapter (including the executive summaries) and per technical summary of each Report.

Review Editors should normally consist of a member of the Working Group/Task Force Bureau, and an independent expert based on the lists provided by governments and observer organisations. Review Editors should not be involved as authors or reviewers for material for which they are a Review Editor. In selecting Review Editors, the Bureaux should select from developed and developing countries and from countries with economies in transition, and should aim for a balanced representation of scientific, technical, and socio-economic views.

4.3.4.1 First Review (by Experts)

First order draft Reports should be circulated by Working Group/Task Force Bureau Co-Chairs for review. The Working Group/Task Force Bureaux shall seek the participation of reviewers encompassing the range of scientific, technical and socio-economic views, expertise, and geographical representation and shall actively undertake to promote and invite as wide a group of experts as possible. This includes experts nominated as Coordinating Lead Authors, Lead Authors, Review Editors or Contributing Authors as included in lists maintained by the IPCC. Government Focal Points should be notified of the commencement of this process.

The first draft Reports should be sent to Government Focal Points, for information, along with a list of those to whom the Report has been sent for review in that country.

The Working Group/Task Force Bureau Co-Chairs should make available to reviewers on request during the review process specific material referenced in the document being reviewed, which is not available in the international published literature.

Expert reviewers should provide the comments to the appropriate Lead Authors through the relevant Working Group/Task Force Bureau Co-Chairs with a copy, if required, to their Government Focal Point.

Coordinating Lead Authors, in consultation with the Review Editors and in coordination with the respective Working Group/Task Force Bureau Co-Chairs and the IPCC Secretariat, are encouraged to supplement the draft revision process by organising a wider meeting with principal Contributing Authors and expert reviewers, if time and funding permit, in order to pay special attention to particular points of assessment or areas of major differences.

4.3.4.2 Second Review (by Governments and Experts)

A revised draft should be distributed by the appropriate Working Group/Task Force Bureau Co-chairs or through the IPCC Secretariat to governments through the designated Government Focal Points, and to all the Coordinating Lead Authors, Lead Authors and Contributing Authors and Expert Reviewers. The Working Group/Task Force Bureaux shall seek the participation of reviewers encompassing the range of scientific, technical and socio-economic views, expertise, and geographical representation and shall actively undertake to promote and invite as wide a group of experts as possible. This includes experts nominated as Coordinating Lead Authors, Lead Authors, Review Editors or Contributing Authors as included in lists maintained by the IPCC. Government Focal Points should be notified of the commencement of this process.

Governments should send one integrated set of comments for each Report to the appropriate Working Group/Task Force Bureau Co-chairs through their Government Focal Points.

Non-government reviewers should send their further comments to the appropriate Working Group/Task Force Bureau Co-Chairs with a copy to their appropriate Government Focal Point.

4.3.5 Preparation of Final Draft Report

Preparation of a final draft Report taking into account government and expert comments for submission to a Session of a Working Group or, in case of a report prepared by the Task Force on National Greenhouse Gas Inventories, to the Panel for acceptance should be undertaken by Coordinating Lead Authors and Lead Authors in consultation with the Review Editors. If necessary,

and timing and funding permitting, a wider meeting with principal Contributing Authors and expert and government reviewers is encouraged in order to pay special attention to particular points of assessment or areas of major differences. It is important that Reports describe different (possibly controversial) scientific, technical, and socio-economic views on a subject, particularly if they are relevant to the policy debate. The final draft should credit all Coordinating Lead Authors, Lead Authors, Contributing Authors, reviewers and Review Editors by name and affiliation (at the end of the Report).

4.4 Preparation, Approval and Acceptance of Summaries for Policymakers and Adoption of Overview Chapters of Methodology Reports Related to National Greenhouse Gas Inventories

Summary sections of Reports approved by the Working Groups and accepted by the Panel will principally be the Summaries for Policymakers, prepared by the respective Working Groups of their full scientific, technical and socio-economic Assessments, and Summaries for Policymakers of Special Reports prepared by the Working Groups. The Summaries for Policymakers should be subject to simultaneous review by both experts and governments, a government round of written comments of the revised draft before the approval Session and to a final line by line approval by a Session of the Working Group.

Responsibility for preparing first drafts and revised drafts of Summaries for Policymakers, lies with the respective Working Group Co-Chairs. The Summaries for Policymakers should be prepared concurrently with the preparation of the main Reports.

The first review of the Summaries for Policymakers will take place during the same time period as the Expert Government Review of the Second Order Draft of the full report. The final draft of the Summaries for Policymakers prepared by the respective Working Groups and Overview Chapters of Methodology Report related to National Greenhouse Gas Inventories will be circulated for a final government round of written comments in preparation of the Session of the Working Group(s) that approves it or Session of the Panel that adopts it.

Approval of the Summary for Policymakers at the Session of the Working Group, signifies that it is consistent with the factual material contained in the full scientific, technical and socio-economic Assessment or Special Report accepted by the Working Group. Coordinating Lead Authors should be consulted in order to ensure that the Summary for Policymakers is fully consistent with the findings in the main report. These Summaries for Policymakers should be formally and prominently described as:

> "A Report of (Working Group X of) the Intergovernmental Panel on Climate Change."

For a Summary for Policymakers approved by a Working Group to be endorsed as an IPCC Report, it must be accepted at a Session of the Panel. Because the Working Group approval process is open to all governments, Working Group approval of a Summary for Policymakers means that the Panel cannot change it. However, it is necessary for the Panel to review the Report at a Session, note any substantial disagreements, (in accordance with Principle 10 of the Principles Governing IPCC Work) and formally accept it.

Overview Chapters of Methodology Reports related to National Greenhouse Gas Inventories will be adopted section by section by the Panel. The Overview Chapters should be subject to simultaneous review by both experts and governments. Responsibility for preparing first drafts and revised drafts lies with the respective Task Force Bureau Co-Chairs. The Overview Chapters should be prepared concurrently with the preparation of the main Reports.

4.5 Acceptance of Reports

Reports presented for acceptance at Sessions of the Working Groups, or in case of reports prepared by the Task Force on National Greenhouse Gas Inventories reports presented for acceptance by the Panel, are the full scientific, technical and socio-economic Assessment Reports

of the Working Groups, Special Reports and Methodology Reports, that is, the IPCC Guidelines for National Greenhouse Gas Inventories or the IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptations.
The subject matter of these Reports shall conform to the terms of reference of the relevant Working Groups, or the Task Force on National Greenhouse Gas Inventories and to the work plan approved by the Panel.

Reports to be accepted by the Working Groups, and reports prepared by the Task Force on National Greenhouse Gas Inventories will undergo expert and government/expert reviews. The purpose of these reviews is to ensure that the Reports present a comprehensive, objective, and balanced view of the areas they cover. While the large volume and technical detail of this material places practical limitations upon the extent to which changes to these Reports will normally be made at Sessions of Working Groups or the Panel, "acceptance" signifies the view of the Working Group or the Panel that this purpose has been achieved. The content of the authored chapters is the responsibility of the Lead Authors, subject to Working Group or Panel acceptance. Changes (other than grammatical or minor editorial changes) made after acceptance by the Working Group or the Panel shall be those necessary to ensure consistency with the Summary for Policymakers or the Overview Chapter. These changes shall be identified by the Lead Authors in writing and made available to the Panel at the time it is asked to accept the Summary for Policymakers, in case of reports prepared by the Task Force on National Greenhouse Gas Inventories by the end of the Session of the Panel which adopts/accepts the report.

Reports accepted by Working Groups, or prepared by the Task Force on National Greenhouse Gas Inventories should be formally and prominently described on the front and other introductory covers as:

> "A report accepted by Working Group X of the IPCC (or, a report prepared by the Task Force on National Greenhouse Gas Inventories of the IPCC and accepted by the Panel) but not approved in detail."

4.6 Reports Approved and Adopted by the Panel

Reports approved and adopted by the Panel will be the Synthesis Report of the Assessment Reports and other Reports as decided by the Panel whereby Section 4.4 applies *mutatis mutandis*.

4.6.1 The Synthesis Report

The Synthesis Report will synthesise and integrate materials contained within the Assessment Reports and Special Reports and should be written in a non-technical style suitable for policymakers and address a broad range of policy-relevant but policy-neutral questions approved by the Panel. The Synthesis Report is composed of two sections as follows: (a) a Summary for Policymakers and (b) a longer report. The IPCC Chair will lead a writing team whose composition is agreed by the Bureau after nominations by the IPCC Chair in consultation with the Working Group Co-Chairs. In selecting the writing team for the Synthesis report, consideration should be given to the following criteria: scientific, technical and socio-economic expertise, including the range of views; geographical representation; a mixture of experts with and without previous experience in IPCC; gender balance. The IPCC Chair will report to the Panel on the selection process including a description of how the selection criteria for participation and any other considerations have been applied. An approval and adoption procedure will allow Sessions of the Panel to approve the SPM line by line and to ensure that the SPM and the longer report of the Synthesis Report are consistent, and the Synthesis Report is consistent with the underlying Assessment Reports and Special Reports from which the information has been synthesised and integrated. This approach will take 5-7 working days of a Session of the Panel.

Step 1: The longer report (30-50 pages) and the SPM (5-10 pages) of the Synthesis Report are prepared by the writing team.

Step 2: The longer report and the SPM of the Synthesis Report undergo simultaneous expert/government review.

Step 3: The longer report and the SPM of the Synthesis Report are then revised by Lead Authors, with the assistance of the Review Editors.

Step 4: The revised drafts of the longer report and the SPM of the Synthesis Report are submitted to Governments, and observer organisations eight weeks before the Session of the Panel.

Step 5: The longer report and the SPM of the Synthesis Report are both tabled for discussion in the Session of the Panel:

- The Session of the Panel will first provisionally approve the SPM line by line.

- The Session of the Panel will review and adopt the longer report of the Synthesis Report, section by section, i.e. roughly one page or less at a time. The review and adoption process for the longer report of the Synthesis Report should be accomplished in the following manner:

    - When changes in the longer report of the Synthesis Report are required either to conform it to the SPM or to ensure consistency with the underlying Assessment Reports, the Panel and authors will note where changes are required in the longer report of the Synthesis Report to ensure consistency in tone and content. The authors of the longer report of the Synthesis Report will then make changes in the longer report of the Synthesis Report. Those Bureau members who are not authors will act as Review Editors to ensure that these documents are consistent and follow the directions of the Session of the Panel.

    - The longer report of the Synthesis Report is then brought back to the Session of the Panel for the review and adoption of the revised sections, section by section. If inconsistencies are still identified by the Panel, the longer report of the Synthesis Report is further refined by the Authors with the assistance of the Review Editors for review and adoption by the Panel. This process is conducted section by section, not line by line.

- The final text of the longer report of the Synthesis Report will be adopted and the SPM approved by the Session of the Panel.

The Report consisting of the longer report and the SPM of the Synthesis Report is an IPCC Report and should be formally and prominently described as:

> "A Report of the Intergovernmental Panel on Climate Change."

4.7 Addressing Possible Errors in Assessments Reports, Synthesis Reports, Special Reports and Methodology Reports

The procedures to be followed for investigating possible errors in an Assessment Report, Synthesis Report, Special Report or Methodology Report and, if appropriate, implementing its correction are defined in the IPCC Protocol for Addressing Possible Errors in IPCC Assessment Reports, Synthesis Reports, Special Reports or Methodology Reports (see Annex 3).

5. TECHNICAL PAPERS

IPCC Technical Papers are prepared on topics for which an objective, international scientific/technical perspective is deemed essential. They:

a. are based on the material already in the IPCC Assessment Reports, Special Reports or Methodology Reports;

b. are initiated: (i) in response to a formal request from the Conference of the Parties to the UN Framework Convention on Climate Change (UNFCCC) or its Subsidiary Bodies and agreed by the IPCC Bureau; or (ii) as decided by the Panel;

c. are prepared by a team of Lead Authors, including a Coordinating Lead Author, selected by the Working Group/Task Force Bureaux in accordance with the provisions of Sections 4.3.1 and 4.3.2 for the selection of Lead Authors and Coordinating Lead Authors;

d. are submitted in draft form for simultaneous expert and government review with circulation to expert reviewers and Government Focal Points in accordance with Section 4.3.4.1 at least four weeks before the comments are due;

e. are revised by the Lead Authors based upon the comments received in the paragraph above, and with assistance from at least two Review Editors per entire Technical Paper who are selected as per the procedures for selecting Review Editors for Assessment Reports, Synthesis Reports, Special Reports and Methodology Reports in Section 4.3.2 of this Appendix and carry out the roles as listed in Section 5 of Annex 1;

f. are submitted for final government review at least four weeks before the comments are due;

g. are finalised by the Lead Authors, in consultation with the IPCC Bureau which functions in the role of an Editorial Board, based on the comments received; and,

h. if necessary, as determined by the IPCC Bureau, would include in a footnote differing views, based on comments made during final government review, not otherwise adequately reflected in the paper.

The following Guidelines should be used in interpreting requirement (a) above: The scientific, technical and socio-economic information in Technical Papers must be derived from:

(a) The text of IPCC Assessment Reports and Special Reports and the portions of material in cited studies that were relied upon in these Reports.

(b) Relevant models with their assumptions, and scenarios based on socio-economic assumptions, as they were used to provide information in those IPCC Reports, as well as emission profiles for sensitivity studies, if the basis of their construction and use is fully explained in the Technical Paper.

The Technical Papers must reflect the balance and objectivity of those Reports and support and/or explain the conclusions contained in those Reports.

Information in the Technical Papers should be referenced as far as possible to the subsection of the relevant IPCC Reports and related material.

Such Technical Papers are then made available to the UNFCCC Conference of the Parties or its Subsidiary Bodies, in response to its request, and thereafter publicly. If initiated by the Panel, Technical Papers are made available publicly. In either case, IPCC Technical Papers prominently should state in the beginning:

"This is a Technical Paper of the Intergovernmental Panel on Climate Change prepared in response to a request from (the Conference of the Parties to) / (a Subsidiary Body of) the United Nations Framework Convention on Climate Change / (decision of the Panel). The material herein has undergone expert and government review but has not been considered by the Panel for formal acceptance or approval."

6. IPCC SUPPORTING MATERIAL

Supporting material consists of three categories:

(i) published reports and proceedings from Workshops and Expert Meetings within the scope of the IPCC work programme that have IPCC recognition,
(ii) material, including databases and software, commissioned by Working Groups, or by the Bureau of the Task Force on National Greenhouse Gas Inventories in support of the assessment or methodology development process which IPCC decides should have wide dissemination, and
(iii) guidance material (guidance notes and guidance documents) that guides and assists in the preparation of comprehensive and scientifically sound IPCC Reports and Technical Papers.

Procedures for the recognition of Workshops and Expert Meetings are given in Sections 7.1 and 7.2. Arrangements for publication of supporting material should be agreed as part of the process of IPCC recognition or commissioned by Working Groups/the Task Force Bureau to prepare specific supporting material. All supporting material of categories (i) and (ii) should be formally and prominently described on the front and other introductory covers as:

> "Supporting material prepared for consideration by the Intergovernmental Panel on Climate Change. This supporting material has not been subject to formal IPCC review processes."

Guidance material (guidance notes and guidance documents) is material to guide and assist authors in the preparation of comprehensive and scientifically sound IPCC Reports and Technical Papers. Guidance notes and documents are usually the responsibility of Working Group Bureaux, the Task Force Bureau or IPCC Chair as appropriate, but may also be commissioned by the Panel, the IPCC Executive Committee or the IPCC Bureau. Guidance notes and documents are developed and finalised by the relevant Working Group Bureaux, the Task Force Bureau or the IPCC Chair. The Executive Committee will oversee the consistency of these materials. Guidance notes and documents should be accessible together with the IPCC Principles and Procedures and published.

7. WORKSHOPS AND EXPERT MEETINGS

7. 1 IPCC Workshops and Expert Meetings

IPCC Workshops and Expert Meetings are those that have been agreed upon in advance by an IPCC Working Group, or by the Panel as useful or necessary for the completion of the work plan of a Working Group, the Task Force on National Greenhouse Gas Inventories or a task of the IPCC. Only such activities may be designated as "IPCC" Workshops or Expert Meetings. Their funding should include full and complete provision for participation of experts from developing countries and countries with economies in transition.

An *IPCC Expert Meeting* focuses on a specific topic bringing together a limited number of relevant experts. The relevant Working Group/Task Force Bureaux, or the IPCC Chair, will identify and select participants to Expert Meetings.

An *IPCC Workshop* considers cross-cutting or complex topics requiring input from a broad community of experts. It requires nominations by Government Focal Points and, as appropriate, observer organisations. The relevant Working Group/Task Force Bureaux, or the IPCC Chair, may also nominate experts and will select the participants to the Workshop.

Proposals for IPCC Workshops or Expert Meetings will be submitted to the Panel for its decision through the relevant Working Group/Task Force Bureaux, or the IPCC Chair. The proposals will include descriptions of the topic(s), and clarify the choice for an Expert Meeting or a Workshop.

The composition of participants to Expert Meetings and Workshops shall aim to reflect:
- The relevant range of scientific, technical and socio-economic views and expertise,
- Geographical representation as appropriate,
- A mixture of experts with and without previous experience in IPCC,
- Gender balance.

The relevant Working Group/Task Force Bureaux, or the IPCC Chair, may install a Scientific Steering Committee to assist in organizing these meetings, taking into account the criteria mentioned above.

Government Focal Points should be notified of the list of invited participants to an Expert Meeting or Workshop at the earliest opportunity after the selection has taken place.

The relevant Working Group/Task Force Bureaux, or the IPCC Chair, will convene the Expert Meeting or Workshop and report to the IPCC Bureau and Panel on the selection process, including a description of how the selection criteria and any other considerations for participation have been applied.

The proceedings of IPCC Workshops and Expert Meetings should normally be published summarising the range of views presented at the meeting. Such proceedings should:

- include a full list of participants;
- indicate when and by whom they were prepared;
- indicate whether and by whom they were reviewed prior to publication;
- acknowledge all sources of funding and other support;
- indicate prominently at the beginning of the document that the activity was held pursuant to a decision of the relevant Working Group or the Panel but that such decision does not imply Working Group or Panel endorsement or approval of the proceedings or any recommendations or conclusions contained therein.

7.2 Co-sponsored Workshops and Expert Meetings

IPCC co-sponsorship may be extended to other Workshops or Expert Meetings if the IPCC Chair, as well as the Co-Chairs of the relevant Working Group/Task Force Bureau determine in advance that the activity will be useful to the work of the IPCC. IPCC co-sponsorship of such an activity does not convey any obligation by the IPCC to provide financial or other support. In considering whether to extend IPCC co-sponsorship, the following factors should be taken into account:

- whether full funding for the activity will be available from sources other than the IPCC;
- whether the activity will be open to government experts as well as experts from non-governmental organisations participating in the work of the IPCC;
- whether provision will be made for participation of experts from developing countries and countries with economies in transition;
- whether the proceedings will be published and made available to the IPCC in a time frame relevant to its work;
- whether the proceedings will:
    - include a full list of participants;
    - indicate when and by whom they were prepared;
    - indicate whether and by whom they were reviewed prior to publication;
    - specify all sources of funding and other support;
    - prominently display the following disclaimer at the beginning of the document:

      "IPCC co-sponsorship does not imply IPCC endorsement or approval of these proceedings or any recommendations or conclusions contained herein. Neither the papers presented at the Workshop/Expert Meeting nor the report of its proceedings have been subjected to IPCC review."

ANNEX 1

TASKS AND RESPONSIBILITIES FOR LEAD AUTHORS, COORDINATING LEAD AUTHORS, CONTRIBUTING AUTHORS, EXPERT REVIEWERS AND REVIEW EDITORS OF IPCC REPORTS AND GOVERNMENT FOCAL POINTS

1. LEAD AUTHORS

Function:

To be responsible for the production of designated sections addressing items of the work programme on the basis of the best scientific, technical and socio-economic information available.

Comment:

Lead Authors will typically work as small groups which have responsibility for ensuring that the various components of their sections are brought together on time, are of uniformly high quality and conform to any overall standards of style set for the document as a whole.

The task of Lead Authors is a demanding one and in recognition of this the names of Lead Authors will appear prominently in the final Report. During the final stages of Report preparation, when the workload is often particularly heavy and when Lead Authors are heavily dependent upon each other to read and edit material, and to agree to changes promptly, it is essential that the work should be accorded the highest priority.

The essence of the Lead Authors' task is synthesis of material drawn from available literature as defined in Section 4.2. Lead Authors, in conjunction with Review Editors, are also required to take account of expert and government review comments when revising text. Lead Authors may not necessarily write original text themselves, but they must have the proven ability to develop text that is scientifically, technically and socio-economically sound and that faithfully represents, to the extent that this is possible, contributions by a wide variety of experts. The ability to work to deadlines is also a necessary practical requirement. Lead Authors are required to record in the Report views which cannot be reconciled with a consensus view but which are nonetheless scientifically or technically valid.

Lead Authors may convene meetings with Contributing Authors, as appropriate, in the preparations of their sections or to discuss expert or government review comments and to suggest any Workshops or Expert Meetings in their relevant areas to the Working Group/Task Force Bureau Co-Chairs. The names of all Lead Authors will be acknowledged in the Reports.

2. COORDINATING LEAD AUTHORS

Function:

To take overall responsibility for coordinating major sections of a Report.

Comment:

Coordinating Lead Authors will be Lead Authors with the added responsibility of ensuring that major sections of the Report are completed to a high standard, are collated and delivered to the Working Group/Task Force Bureau Co-Chairs in a timely manner and conform to any overall standards of style set for the document.

Coordinating Lead Authors will play a leading role in ensuring that any crosscutting scientific or technical issues which may involve several sections of a Report are addressed in a complete and coherent manner and reflect the latest information available.

The skills and resources required of Coordinating Lead Authors are those required of Lead Authors with the additional organisational skills needed to coordinate a section of a Report. The names of all Coordinating Lead Authors will be acknowledged in the Reports.

3. CONTRIBUTING AUTHORS

Function:

To prepare technical information in the form of text, graphs or data for assimilation by the Lead Authors into the draft section.

Comment:

Input from a wide range of contributors is a key element in the success of IPCC assessments, and the names of all contributors will be acknowledged in the Reports. Contributions are sometimes solicited by Lead Authors but unprompted contributions are encouraged.

Contributions should be supported as far as possible with references from the peer reviewed and internationally available literature, and with copies of any unpublished material cited; clear indications of how to access the latter should be included in the contributions. For material available in electronic format only, the location where such material may be accessed should be cited.

Contributed material may be edited, merged and if necessary, amended, in the course of developing the overall draft text.

4. EXPERT REVIEWERS

Function:

To comment on the accuracy and completeness of the scientific/technical/socio-economic content and the overall scientific/technical/socio-economic balance of the drafts.

Comment:

Expert reviewers will comment on the text according to their own knowledge and experience.

5. REVIEW EDITORS

Function:

Review Editors will assist the Working Group/Task Force Bureaux in identifying reviewers for the expert review process, ensure that all substantive expert and government review comments are afforded appropriate consideration, advise lead authors on how to handle contentious/controversial issues and ensure genuine controversies are reflected adequately in the text of the Report.

Comment:

There will be two to four Review Editors per chapter (including their executive summaries) and per technical summary. In order to carry out these tasks, Review Editors will need to have a broad understanding of the wider scientific and technical issues being addressed. The workload will be particularly heavy during the final stages of the Report preparation. This includes attending those meetings where writing teams are considering the results of the two review rounds. Review Editors are not actively engaged in drafting Reports and cannot serve as reviewers of those chapters of which they are Authors. Review Editors can be members of a Working Group/Task Force Bureau or outside experts agreed by the Working Group/Task Force Bureau.

Although responsibility for the final text remains with the Lead Authors, Review Editors will need to ensure that where significant differences of opinion on scientific issues remain, such differences are described in an annex to the Report. Review Editors must submit a written report to the Working Group Sessions or the Panel and where appropriate, will be requested

to attend Sessions of the Working Group and of the IPCC to communicate their findings from the review process and to assist in finalising the Summary for Policymakers, Overview Chapters of Methodology Reports and Synthesis Reports. The names of all Review Editors will be acknowledged in the Reports.

6. GOVERNMENT FOCAL POINTS

Function:

To prepare and update the list of national experts as required to help implement the IPCC work programme, and to arrange the provision of integrated comments on the accuracy and completeness of the scientific and/or technical content and the overall scientific and/or technical balance of the drafts.

Comment:

Government review will typically be carried out within and between a number of Departments and Ministries. For administrative convenience, each government and observer organisation should designate one Focal Point for all IPCC activities, provide full information on this Focal Point to the IPCC Secretariat and notify the Secretariat of any changes in this information. The Focal Point should liaise with the IPCC Secretariat regarding the logistics of the review process(es). The full exchange of information is of particular importance.

ANNEX 2

PROCEDURE ON THE USE OF LITERATURE IN IPCC REPORTS

This annex is provided to ensure that the IPCC process for the use of literature is open and transparent. In the assessment process, emphasis is to be placed on the assurance of the quality of all cited literature. Priority should be given to peer-reviewed scientific, technical and socio-economic literature if available.

It is recognized that other sources provide crucial information for IPCC Reports. These sources may include reports from governments, industry, and research institutions, international and other organizations, or conference proceedings. Use of this literature brings with it an extra responsibility for the author teams to ensure the quality and validity of cited sources and information[3]. In general, newspapers and magazines are not valid sources of scientific information. Blogs, social networking sites, and broadcast media are not acceptable sources of information for IPCC Reports. Personal communications of scientific results are also not acceptable sources.

The following additional procedures are specified:

1. Responsibilities of Coordinating, Lead and Contributing Authors
The Coordinating Lead Authors will ensure that all sources are selected and used in accordance with the procedures in this Annex.

The author team is required to critically assess information they would like to include from any source. Each chapter team should review the quality and validity of each source before incorporating information into an IPCC Report. Authors who wish to include information that is not publicly or commercially available are required to send the full reference and a copy, preferably electronically, to the relevant Technical Support Unit. For any source written in a language other than English, an executive summary or abstract in English is required.

These procedures also apply to papers undergoing the publication process in peer-reviewed journals at the time of the government or expert review.

All sources will be integrated into the reference section of the IPCC Report.

2. Responsibilities of the Review Editors
The Review Editors will support and provide guidance to the author team in ensuring the consistent application of the procedures in this Annex.

3. Responsibilities of the Working Group /Task Force Bureau Co-Chairs
For sources that are not publicly or commercially available, the Working Group/Task Force Bureau Co-Chairs coordinating the Report will make these sources available to reviewers who request them during the review process.

4. Responsibilities of the IPCC Secretariat
For sources that are not publicly or commercially available, the IPCC Secretariat will store these sources after publication of an IPCC report, in order to support the "IPCC Protocol for Addressing Possible Errors in IPCC Assessment Reports, Synthesis Reports, Special Reports or Methodology Reports".

[3] see IPCC-XXXII/INF.4, Notes on the Informal Task Group on Procedures, containing general guidance on the use of literature in IPCC, page 7, section 2.
http://www.ipcc.ch/meetings/session32/inf04_p32_review_ipcc_proc_proced_notes_informal_task_group.pdf

ANNEX 3

IPCC PROTOCOL FOR ADDRESSING POSSIBLE ERRORS IN IPCC ASSESSMENT REPORTS, SYNTHESIS REPORTS, SPECIAL REPORTS AND METHODOLOGY REPORTS

Adopted by the Panel at the Thirty-Third Session (Abu Dhabi, 10-13 May 2011) and amended at the Thirty-Seventh Session (Batumi 14-18 October 2013)

Preamble

At its 32nd Session (October 2010), the IPCC Panel noted the proposed protocol for addressing errors in previous assessment reports (IPCC-XXXII/INF.8). The Panel tasked the IPCC Chairman, the IPCC Vice-Chairs, the Co-Chairs of Working Groups I, II and III and the Task Force on Inventories to take any necessary steps to ensure that this protocol is finalised and then used for evaluation of potential errors and developing errata as appropriate. The protocol is presented below.

This protocol is intended to be used only to correct errors that could have been avoided in the context of the information available at the time the report was written. Its use should be reserved for errors of fact or accuracy. The protocol cannot be used to make changes that reflect new knowledge or scientific information that became available only after the literature cut-off date for the report in question. It cannot be used to propose the consideration of additional sources not cited in the existing assessment, unless directly relevant to an error of fact or accuracy. It must also not be invoked to reflect a difference in opinion compared with an author team or a new interpretation of knowledge or scientific information.

This protocol is intended to address the full range of possible errors from typographical errors through complicated issues of sourcing, interpretation, analysis, or assessment, arising from the previously mentioned errors of fact or accuracy.

Responsibility for implementing the error correction protocol rests with the current Co-Chairs of the relevant Working Group or Task Force product containing the alleged error. If the error is in a Synthesis Report, responsibility rests with the current IPCC Chairman. In all cases, the relevant Coordinating Lead Authors and Co-Chairs of the report containing the alleged error or, in the case of the Synthesis Report, the IPCC Chairman and relevant Working Group Co-Chairs at the time of that assessment, will be kept informed of the evaluation and participate as appropriate.

The protocol is presented as a decision tree, which is based on a set of underlying principles. The procedure to be followed for investigating the claimed error and, if appropriate, implementing its correction depends on the location of the claimed error, i.e., whether it resides in a Chapter or the Technical Summary of a Working Group Contribution to an Assessment Report or of a Special Report, or in a Methodology Report, in the Summary for Policymakers of a Working Group Contribution or of a Special Report, or in the Overview Chapter of a Methodology Report, or in a Synthesis Report.

IPCC Protocol for Addressing Errors
in IPCC Assessment Reports, Synthesis Reports, Special Reports or Methodology Reports

Principles underlying this protocol for handling errors:

1. This protocol is intended to be used only to correct errors that could have been avoided in the context of the information available at the time the report was written.

2. The IPCC Secretariat is the entry point for all error reporting.

3. The IPCC Secretariat maintains an internal error tracking system. Entries are made in consultation with the current Co-Chairs of the relevant Working Group (WG) or Task Force (TF) or in case of an error in a Synthesis Report in consultation with the current IPCC Chairman. This system informs the leadership of IPCC and the Technical Support Units (TSUs), via a protected website, about the current status of all active error handling processes.

4. To the extent possible, corrections should be based on consensus, consistent with the IPCC principles that form the foundation for the underlying reports.

5. Responsibility for decisions at steps during the process is with the current WG or TF Bureau of the WG or TF product in which the alleged error resides. If the error is in a Synthesis Report, responsibility rests with the current IPCC Bureau.

6. Responsibility for implementation is with the current Co-Chairs of the WG or TF product in which the alleged error resides. If the error is in a Synthesis Report, responsibility rests with the current IPCC Chairman.

7. Original authors (Coordinating Lead Authors (CLAs), and Lead Authors (LAs) if necessary) must be involved as appropriate. Communication with them is via the current Co-Chairs of the relevant WG or TF (the IPCC Chairman in the case of the Synthesis Report). If any of the individuals identified as playing leading roles on behalf of author teams of previous reports are not available, then the current Co-Chairs of the WG or TF (the IPCC Chairman in the case of the Synthesis Report) will identify an individual or individuals best qualified to take over those roles.

8. For alleged errors regarding the previous assessment cycles, the previous Co-Chairs of the relevant WG or TF and the previous IPCC Chairman need to be kept informed and may be consulted as appropriate.

9. Handling of alleged errors must be coordinated across Chapters, Executive Summaries of Chapters, Technical Summaries of WG Contributions, Summaries for Policymakers for Working Groups, Synthesis Reports, Summaries for Policymakers for Synthesis Reports, and Overview Chapters of Methodology Reports.

10. At the start of the process, the claimant is informed by the IPCC Secretariat about the next steps in a general way, and referred to this "IPCC Protocol for Addressing Possible Errors in IPCC Assessment Reports, Synthesis Reports, Special Reports or Methodology Reports". The claimant will again be informed at the conclusion of the process.

11. Errata are posted on the IPCC and WG or TF websites after the conclusion of the process. A short explanatory statement about the error may also be posted.

Section 1: If the alleged error is in a Working Group Contribution or Special Report (Chapter or Technical Summary) or in a Methodology Report, start here. Otherwise, go to Section 2.

For all alleged errors, it is essential to evaluate the possibility of consequences for the Summary for Policymakers of a WG Contribution to an Assessment Report, for the Summary for Policymakers of a Special Report, for the Overview Chapter of a Methodology Report*, or for a Synthesis Report.*

Note: This section describes the procedure that is followed to address errors in a Working Group Contribution or a Special Report (Chapter or Technical Summary) or in a Methodology Report*. Figure 1 provides an overview of the protocol for section 1.*

Step 1:
An alleged error is reported to the IPCC Secretariat. If received elsewhere, it is passed to the IPCC Secretariat. A new entry is made in the internal error tracking system.

Step 2:
The IPCC Secretariat forwards the claim to the current Co-Chairs of the relevant WG (or TF). The IPCC Secretariat acknowledges receipt to the claimant, providing information about the next steps in a general way, and refers the claimant to the "IPCC Protocol for Addressing Possible Errors in IPCC Assessment Reports, Synthesis Reports, Special Reports or Methodology Reports".

Step 3:
The current WG or TF Co-Chairs and relevant Bureau decide whether action on the claim is warranted. They may consult previous Co-Chairs or CLAs of the relevant chapter. The condition for further processing is that one or more of the relevant current WG or TF Co-Chairs and relevant Bureau find that action is warranted.

If consensus is reached that action is not warranted, the IPCC Secretariat informs the claimant and closes the case.

If no consensus is reached or if the consensus is reached that action is warranted, the current WG or TF Co-Chairs consult the CLAs (or LAs if necessary) of the chapter.

If the CLAs of the chapter with the alleged error agree that there is an error, continue with step 4A.

If the CLAs of the chapter with the alleged error do not agree that there is an error, continue with step 4B.

Step 4A: *(for cases where the authors agree that there is an error)*
For typographical errors, decisions on and posting of errata are handled by the current Technical Support Unit of the relevant WG or TF under the supervision of its Co-Chairs. The CLAs of the relevant chapters and WG or TF Bureau are informed. The IPCC Secretariat is informed, posts the errata, and closes the case.

Otherwise, go to step 5A.

Step 5A: *(for cases where the authors agree that there is an error)*
The current WG or TF Co-chairs and CLAs (and LAs if necessary) of the chapter with the alleged error evaluate the error and decide whether the correction requires expertise beyond the author team.

If the author team has the appropriate expertise to construct an erratum, then one is constructed by the CLAs and submitted to the current WG or TF Bureau for approval. Following approval, the Secretariat informs the claimant and the erratum is posted on the IPCC and WG or TF websites. The case is then closed.

If further expertise is required, then the relevant Co-Chairs and WG or TF Bureau appoint a Review Team containing, as a minimum, two experts who were not involved in drafting the chapter, plus at least one CLA or LA from the chapter with the error, and charges that Review Team with proposing, within two months' time, an erratum statement. The Co-Chairs then submit this to the relevant WG or TF Bureau for approval. Following approval, the Secretariat informs the claimant and the erratum is posted on the IPCC and WG or TF websites. The case is then closed.

If the authors, Review Team, and WG or TF Bureau fail to reach consensus on an erratum statement, then the WG or TF Co-Chairs inform the Executive Committee of the disagreement, and they ask the IPCC Chairman to appoint, within two months, an Independent Review Committee. This committee should consist of at least three experts not involved in drafting the chapter with the alleged error and not involved as a Bureau Member, CLA, or LA on the assessment with the alleged error or the current assessment. The Independent Review Committee, after consultation with the authors, the Review Team, the Co-Chairs, and the WG or TF Bureau, is tasked to propose a revised erratum. If consensus is now reached with the authors, the Co-Chairs then submit this to the relevant WG or TF Bureau for approval. Following approval, the Secretariat informs the claimant, and the erratum is posted on the IPCC and WG or TF websites. The case is then closed.

If the current WG or TF Co-Chairs, the WG or TF Bureau and the relevant CLAs still cannot come to consensus, the current WG or TF Co-Chairs and the IPCC Chairman draft a "Contested Erratum" statement, signed by the IPCC Chairman. This is posted on the IPCC and WG or TF erratum websites. This statement reports the claimed error, and explains that issues have been raised but these cannot be resolved before this matter is reassessed in the present or next cycle. The IPCC Chairman and relevant WG or TF Co-Chairs decide on a communications strategy if needed. The case is then closed.

Step 4B: *(for cases where the authors do not agree that there is an error)*
The WG or TF Co-Chairs inform the Executive Committee of the disagreement. The CLAs of the chapter with the alleged error provide the WG or TF Co-Chairs with a brief document explaining why the text in question does not contain an error. The WG or TF Co-Chairs then appoint, within two months, an Initial Review Group of two Bureau members and at least one CLA or LA from the current assessment if available, otherwise at least one expert who was not involved in drafting the chapter. The Initial Review Group is tasked to analyze the text in question and decide if they agree with the CLAs of the chapter with the alleged error. The response from the Initial Review Group is due in two months.

If the Initial Review Group agrees that there was no error, then the WG or TF Co-Chairs inform the relevant CLAs and task them with preparing, within two months, a brief document explaining why the text in question was in fact not an error. The current WG or TF Co-Chairs submit the document to the current WG or TF Bureau for approval. After approval by the WG or TF Bureau, the IPCC Secretariat informs the claimant, and the case is closed.

If the Initial Review Group finds there is an error, the WG or TF Bureau considers the report from the Initial Review Group, as well as from the authors, and aims to find consensus with the authors and the Initial Review Group on the development of an erratum.

If consensus is reached, the CLAs, in consultation with the Initial Review Group, develop an erratum statement, which is submitted to the WG or TF Bureau for approval. Following approval, the IPCC Secretariat informs the Executive Committee and the claimant, and the erratum is posted on the IPCC and WG or TF websites. The case is then closed.

If consensus is not reached continue with step 5B.

Step 5B: *(for cases where the authors do not agree that there is an error)*
The WG or TF Co-Chairs inform the Executive Committee of the disagreement, and they ask the current IPCC Chairman to appoint, within two months, an Independent Review Committee. This committee should consist of at least three experts not involved in drafting the chapter with the

alleged error and not involved as a Bureau Member, CLA, or LA on the assessment with the alleged error or the current assessment. The Independent Review Committee is tasked to evaluate the alleged error.

If the Independent Review Committee agrees there is no error, they prepare, within two months, a brief document explaining why the text in question was in fact not an error. The current WG or TF Co-Chairs submit the document to the current WG or TF Bureau for approval. After approval by the current WG or TF Bureau, the IPCC Secretariat informs the claimant, and the case is closed.

If the Independent Review Committee finds there is an error, they are tasked with providing, within two months, a proposed course of action. The WG or TF Bureau informs the relevant CLAs about the proposed action and, if agreement is found with them that there is an error and how to handle it, the authors develop an erratum statement, which is submitted to the WG or TF Bureau for approval. Following approval, the IPCC Secretariat informs the Executive Committee and the claimant, and the erratum is posted on the IPCC and WG or TF websites. The case is then closed.

If the current WG or TF Co-Chairs, the WG or TF Bureau and the relevant CLAs still cannot come to consensus, the current WG or TF Co-Chairs and the IPCC Chairman draft a "Contested Erratum" statement, signed by the IPCC Chairman. This is posted on the IPCC and WG or TF erratum websites. This statement reports the claimed error, and explains that issues have been raised but these cannot be resolved before this matter is reassessed in the present or next cycle. The IPCC Chairman and relevant WG or TF Co-Chairs decide on a communications strategy if needed. The case is then closed.

Note: before posting any erratum, the WG or TF Co-Chairs should evaluate possible consequences of the erratum for the Summary for Policymakers, Overview Chapter or Synthesis Report. If there are consequences, the relevant process in Sections 2 and/or 3 of this protocol needs to occur after the process in Section 1.

Section 2:

If the alleged error is in the Summary for Policymakers of a Working Group Contribution or of a Special Report, or in the Overview Chapter of a Methodology Report, start here. If it is in a Synthesis Report, go to Section 3.

Note: For errors in the Summary for Policymakers or Overview Chapter that arise from an underlying Chapter or the Technical Summary of a WG Contribution or of a Special Report or in a Methodology Report*, the error evaluation and correction process described in Section 1 of this protocol must be completed first to address the error in the underlying Chapter and/or Technical Summary or in* a Methodology Report*.*

Step 1:
An alleged error is reported to the IPCC Secretariat. If received elsewhere, it is passed to the IPCC Secretariat. A new entry is made in the internal error tracking system.

Step 2:
The IPCC Secretariat forwards the claim to the current Co-Chairs of the relevant WG or TF. The IPCC Secretariat acknowledges receipt to the claimant, providing information about the next steps in a general way, and refers the claimant to the "IPCC Protocol for Addressing Possible Errors in IPCC Assessment Reports, Synthesis Reports, Special Reports or Methodology Reports".

Step 3:
The current WG or TF Co-Chairs and relevant Bureau decide whether action on the claim is warranted. They may consult previous Co-Chairs or CLAs of the relevant chapter. The condition for further processing is that one or more of the relevant current WG or TF Co-Chairs and relevant Bureau find that action is warranted.

If consensus is reached that action is not warranted, the IPCC Secretariat informs the claimant and closes the case.

If no consensus is reached or if the consensus is reached that action is warranted, the current WG or TF Co-Chairs consult the past WG or TF Co-Chairs who were authors of the Summary for Policymakers or Overview Chapter, as well as the CLAs of the relevant chapter of the underlying report.

If the past WG or TF Co-Chairs and relevant CLAs agree that there is an error, continue with step 4A.

If the past WG or TF Co-Chairs and relevant CLAs do not agree that there is an error, continue with step 4B.

Step 4A: *(for cases where the past WG or TF Co-Chairs and relevant CLAs agree that there is an error)*
For typographical errors, decisions on and posting of errata are handled by the current Technical Support Unit of the relevant WG or TF under the supervision of its Co-Chairs. The WG or TF Bureau and the past WG or TF Co-Chairs who were authors of the Summary for Policymakers or Overview Chapter are informed. The IPCC Secretariat is informed. It then informs the Executive Committee, posts the errata, and closes the case.

Otherwise, go to step 5A.

Step 5A: *(for cases where the past WG or TF Co-Chairs and relevant CLAs agree that there is an error)*
The current WG or TF Co-chairs and the past WG or TF Co-Chairs who were authors of the Summary for Policymakers or Overview Chapter with the alleged error, as well as the CLAs of the relevant chapter of the underlying report, evaluate the error.

The past WG or TF Co-Chairs and relevant CLAs construct an erratum statement for the Summary for Policymakers or Overview Chapter and submit it to the current WG or TF Bureau for approval. Following WG or TF Bureau approval, the proposed erratum is submitted to the Panel for approval. To allow for rapid response, the Panel may delegate this approval step to the Executive Committee, which can decide that the erratum be posted on the IPCC and WG or TF websites and that the claimant be informed, or can decide to defer to the next session of the IPCC Bureau or of the Panel. Following approval, the Secretariat informs the claimant and the erratum is posted on the IPCC and WG or TF websites. The case is then closed.

If the past WG or TF Co-Chairs and relevant CLAs fail to reach consensus on an erratum statement with the WG or TF Bureau, the Panel, or the Executive Committee, then the WG or TF Co-Chairs inform the Executive Committee of the disagreement, and they ask the IPCC Chairman to appoint, within two months, an Independent Review Committee. This committee should consist of at least three experts not involved in drafting the Summary for Policymakers or Overview Chapter with the alleged error and not involved as a Bureau Member, CLA, or LA on the assessment with the alleged error or the current assessment. The Independent Review Committee, after consultation with the past WG or TF Co-Chairs and relevant CLAs, the current WG or TF Co-Chairs, and the WG or TF Bureau, is tasked to propose a revised erratum. The current WG or TF Co-Chairs then submit this to the relevant WG or TF Bureau for approval. Following WG or TF Bureau approval, the proposed erratum statement is submitted to the Panel for approval. To allow for rapid response, the Panel may delegate this approval step to the Executive Committee, which can decide that the erratum be posted on the IPCC and WG or TF websites and that the claimant be informed, or can decide to defer to the next session of the IPCC Bureau or of the Panel. Following approval, the Secretariat informs the claimant, and the erratum is posted on the IPCC and WG or TF websites. The case is then closed.

If the past WG or TF Co-Chairs and relevant CLAs, the current WG or TF Co-Chairs, the WG or TF Bureau, and the Panel or the Executive Committee still cannot come to consensus, the current WG or TF Co-Chairs and the IPCC Chairman draft a “Contested Erratum” statement, signed by the IPCC Chairman. This is posted on the IPCC and WG or TF erratum websites. This statement reports the claimed error, and explains that issues have been raised but these cannot be resolved before this matter is reassessed in the present or next cycle. The IPCC Chairman and relevant WG or TF Co-Chairs decide on a communications strategy if needed. The case is then closed.

Step 4B: *(for cases where the past WG or TF Co-Chairs and relevant CLAs do not agree that there is an error)*
The current WG or TF Co-Chairs inform the Executive Committee of the disagreement. The past WG or TF Co-Chairs who were authors of the Summary for Policymakers or Overview Chapter with the alleged error, as well as the CLAs of the relevant chapter of the underlying report, provide the current WG or TF Co-Chairs with a brief document explaining why the text in question does not contain an error. The current WG or TF Co-Chairs then appoint, within two months, an Initial Review Group of two Bureau members and at least one CLA or LA from the current assessment if available, otherwise at least one expert who was not involved in drafting the Summary for Policymakers or Overview Chapter with the alleged error or relevant chapter of the underlying report. The Initial Review Group is tasked to analyze the text in question and decide if they agree with the past WG or TF Co-Chairs and relevant CLAs. The response from the Initial Review Group is due in two months.

If the Initial Review Group agrees that there was no error, then the current WG or TF Co-Chairs inform the past WG or TF Co-Chairs and relevant CLAs and task them with preparing, within two months, a brief document explaining why the text in question was in fact not an error. The current WG or TF Co-Chairs submit the document to the current WG or TF Bureau for approval. After approval by the WG or TF Bureau, the IPCC Secretariat informs the claimant, and the case is closed.

If the Initial Review Group finds there is an error, the WG or TF Bureau considers the report from the Initial Review Group, as well as from the authors, and aims to find consensus with the past WG or TF Co-Chairs and relevant CLAs and the Initial Review Group on the development of an erratum.

If consensus is reached, the current WG or TF Co-Chairs, in consultation with the Initial Review Group, develop an erratum statement, which is submitted to the WG or TF Bureau for approval. Following WG or TF Bureau approval, the proposed erratum statement is submitted to the Panel for approval. To allow for rapid response, the Panel may delegate this approval step to the Executive Committee, which can decide that the erratum be posted on the IPCC and WG or TF websites and that the claimant be informed, or can decide to defer to the next session of the IPCC Bureau or of the Panel. Following approval, the IPCC Secretariat informs the claimant and the erratum is posted on the IPCC and WG or TF websites. The case is then closed.

If consensus is not reached continue with step 5B.

Step 5B: *(for cases where the past WG or TF Co-Chairs and relevant CLAs do not agree that there is an error)*
The current WG or TF Co-Chairs inform the Executive Committee of the disagreement, and they ask the current IPCC Chairman to appoint, within two months, an Independent Review Committee. This committee should consist of at least three experts not involved in drafting the Summary for Policymakers or Overview Chapter with the alleged error and not involved as a Bureau Member, CLA, or LA on the assessment with the alleged error or the current assessment. The Independent Review Committee is tasked to evaluate the alleged error.

If the Independent Review Committee agrees there is no error, they prepare, within two months, a brief document explaining why the text in question was in fact not an error. The current WG or TF Co-Chairs submit the document to the current WG or TF Bureau for approval. After approval by the current WG or TF Bureau, the IPCC Secretariat informs the claimant, and the case is closed.

If the Independent Review Committee finds there is an error, they are tasked with providing, within two months, a proposed course of action. The WG or TF Bureau informs the past WG or TF Co-Chairs and relevant CLAs about the proposed action and, if agreement is found with them that there is an error and how to handle it, the past WG or TF Co-Chairs and relevant CLAs develop an erratum statement, which is submitted to the WG or TF Bureau for approval. Following WG or TF Bureau approval, the proposed erratum statement is submitted to the Panel for approval. To allow for rapid response, the Panel may delegate this approval step to the Executive Committee, which can decide that the erratum be posted on the IPCC and WG or TF websites and that the claimant be informed, or can decide to defer to the next session of the IPCC Bureau or of the Panel. Following approval, the IPCC Secretariat informs the claimant and the erratum is posted on the IPCC and WG or TF websites. The case is then closed.

If the current WG or TF Co-Chairs, the WG or TF Bureau and the past WG or TF Co-Chairs and relevant CLAs still cannot come to consensus, the current WG or TF Co-Chairs and the IPCC Chairman draft a “Contested Erratum” statement, signed by the IPCC Chairman. This is posted on the IPCC and WG or TF erratum websites. This statement reports the claimed error, and explains that issues have been raised but these cannot be resolved before this matter is reassessed in the present or next cycle. The IPCC Chairman and relevant WG or TF Co-Chairs decide on a communications strategy if needed. The case is then closed.

Section 3:

If the alleged error is in a Synthesis Report.

Note: For errors in the Synthesis Report that arise from an underlying Chapter or the Technical Summary or the Summary for Policymakers of a WG Contribution, the error evaluation and correction process described in Sections 1 and/or 2 of this protocol must be completed first to address the error in the underlying Chapter, Technical Summary and/or Summary for Policymakers.

Step 1:
An alleged error is reported to the IPCC Secretariat. If received elsewhere, it is passed to the IPCC Secretariat. A new entry is made in the internal error tracking system.

Step 2:
The IPCC Secretariat forwards the claim to the current IPCC Chairman, all WG Co-Chairs, and the Executive Committee. The IPCC Secretariat acknowledges receipt to the claimant, providing information about the next steps in a general way, and refers the claimant to the "IPCC Protocol for Addressing Possible Errors in IPCC Assessment Reports, Synthesis Reports, Special Reports or Methodology Reports".

Step 3:
The current IPCC Chairman, WG Co-Chairs, and IPCC Bureau decide whether action on the claim is warranted. They may consult previous Chairs, relevant WG Co-Chairs, or CLAs of the relevant chapter. The condition for further processing is that the current IPCC Chairman or one or more of the relevant current WG Co-Chairs and Bureau find that action is warranted.

If consensus is reached that action is not warranted, the IPCC Secretariat informs the claimant and closes the case.

If no consensus is reached or if the consensus is reached that action is warranted, the current IPCC Chairman consults the Chairman and the relevant WG Co-Chairs of the assessment with the alleged error.

If the Chairman and the relevant WG Co-Chairs of the assessment with the alleged error agree that there is an error, continue with step 4A.

If the Chairman and the relevant WG Co-Chairs of the assessment with the alleged error do not agree that there is an error, continue with step 4B.

Step 4A: *(for cases where the Chairman and the relevant WG Co-Chairs of the assessment with the alleged error agree that there is an error)*
For typographical errors, decisions on and posting of errata are handled by the current Technical Support Unit of the Synthesis Report or of the relevant WG under the supervision of the IPCC Chairman and WG Co-Chairs as appropriate. The past Chairman as leader of the writing team for the Synthesis Report is informed. The IPCC Secretariat is informed, posts the errata, and closes the case.

Otherwise, go to step 5A.

Step 5A: *(for cases where the Chairman and the relevant WG Co-Chairs of the assessment with the alleged error agree that there is an error)*
The current IPCC Chairman and WG Co-chairs, in collaboration with the Chairman and the relevant WG Co-Chairs of the assessment with the alleged error, evaluate the error.

The past Chairman and relevant WG Co-Chairs of the assessment with the alleged error (with relevant CLAs if appropriate) construct an erratum statement for the Synthesis Report and submit it to the current IPCC Bureau for approval. Following IPCC Bureau approval, the proposed erratum is

submitted to the Panel for approval. To allow for rapid response, the Panel may delegate this approval step to the Executive Committee, which can decide that the erratum be posted on the IPCC and WG or TF websites and that the claimant be informed, or can decide to defer to the next session of the IPCC Bureau or of the Panel. Following approval, the Secretariat informs the claimant and the erratum is posted on the IPCC website. The case is then closed.

If the past Chairman and relevant WG Co-Chairs of the assessment with the alleged error (with relevant CLAs if appropriate) fail to reach consensus on an erratum statement with the IPCC Bureau, the Panel, or the Executive Committee, then the current IPCC Chairman informs the Executive Committee of the disagreement, and appoints, within two months, an Independent Review Committee. This committee should consist of at least three experts not involved in drafting the Synthesis Report with the alleged error and not involved as a Bureau Member, CLA, or LA on the assessment with the alleged error or the current assessment. The Independent Review Committee, after consultation with the past Chairman and relevant WG Co-Chairs of the assessment with the alleged error (with relevant CLAs if appropriate), the current IPCC Chairman and WG Co-Chairs, and the IPCC Bureau, is tasked to propose a revised erratum. The current IPCC Chairman then submits this to the IPCC Bureau for approval. Following IPCC Bureau approval, the proposed erratum statement is submitted to the Panel for approval. To allow for rapid response, the Panel may delegate this approval step to the Executive Committee, which can decide that the erratum be posted on the IPCC and WG or TF websites and that the claimant be informed, or can decide to defer to the next session of the IPCC Bureau or of the Panel. Following approval, the Secretariat informs the claimant, and the erratum is posted on the IPCC website. The case is then closed.

If the past Chairman and relevant WG Co-Chairs of the assessment with the alleged error (with relevant CLAs if appropriate), the current WG Co-Chairs, the IPCC Bureau, and the Panel or the Executive Committee still cannot come to consensus, the IPCC Chairman and the relevant WG Co-Chairs draft a "Contested Erratum" statement, signed by the IPCC Chairman. This is posted on the IPCC and WG erratum websites. This statement reports the claimed error, and explains that issues have been raised but these cannot be resolved before this matter is reassessed in the present or next cycle. The current IPCC Chairman and WG Co-Chairs decide on a communications strategy if needed. The case is then closed.

Step 4B: *(for cases where the Chairman and the relevant WG Co-Chairs of the assessment with the alleged error do not agree that there is an error)*
The current IPCC Chairman informs the Executive Committee of the disagreement. The past Chairman and relevant WG Co-Chairs of the assessment with the alleged error (with relevant CLAs if appropriate) provide the current IPCC Chairman with a brief document explaining why the text in question does not contain an error. The current IPCC Chairman then appoints, within two months, an Initial Review Group of two Bureau members and at least one CLA or LA from the current assessment if available, otherwise at least one expert who was not involved in drafting the Synthesis Report with the alleged error or relevant chapter of an underlying WG report. The Initial Review Group is tasked to analyze the text in question and decide if they agree with the past Chairman, relevant WG Co-Chairs, and relevant CLAs. The response from the Initial Review Group is due in two months.

If the Initial Review Group agrees that there was no error, then the current IPCC Chairman informs the past Chairman and relevant WG Co-Chairs of the assessment with the alleged error (with relevant CLAs if appropriate) and tasks them with preparing, within two months, a brief document explaining why the text in question was in fact not an error. The current IPCC Chairman submits the document to the current IPCC Bureau for approval. After approval by the IPCC Bureau, the IPCC Secretariat informs the claimant, and the case is closed.

If the Initial Review Group finds there is an error, the IPCC Bureau considers the report from the Initial Review Group, as well as from the past Chairman, relevant WG Co-Chairs, and relevant CLAs, and aims to find consensus with the past Chairman, relevant WG Co-Chairs, relevant CLAs, and the Initial Review Group on the development of an erratum.

If consensus is reached, the current IPCC Chairman, in consultation with the Initial Review Group, develops an erratum statement, which is submitted to the IPCC Bureau for approval. Following IPCC Bureau approval, the proposed erratum statement is submitted to the Panel for approval. To allow for rapid response, the Panel may delegate this approval step to the Executive Committee, which can decide that the erratum be posted on the IPCC and WG or TF websites and that the claimant be informed, or can decide to defer to the next session of the IPCC Bureau or of the Panel. Following approval, the IPCC Secretariat informs the claimant and the erratum is posted on the IPCC website. The case is then closed.

If consensus is not reached continue with step 5B.

Step 5B: *(for cases where the Chairman and the relevant WG Co-Chairs of the assessment with the alleged error do not agree that there is an error)*
The current IPCC Chairman informs the Executive Committee of the disagreement, and appoints, within two months, an Independent Review Committee. This committee should consist of at least three experts not involved in drafting the Synthesis Report with the alleged error and not involved as a Bureau Member, CLA, or LA on the assessment with the alleged error or the current assessment. The Independent Review Committee is tasked to evaluate the alleged error.

If the Independent Review Committee agrees there is no error, they prepare, within two months, a brief document explaining why the text in question was in fact not an error. The current IPCC Chairman submits the document to the current IPCC Bureau for approval. After approval by the IPCC Bureau, the IPCC Secretariat informs the claimant, and the case is closed.

If the Independent Review Committee finds there is an error, they are tasked with providing, within two months, a proposed course of action. The IPCC Bureau informs the past Chairman and relevant WG Co-Chairs of the assessment with the alleged error (and relevant CLAs if appropriate) about the proposed action and, if agreement is found with them that there is an error and how to handle it, the past Chairman, relevant WG Co-Chairs, and relevant CLAs develop an erratum statement, which is submitted to the IPCC Bureau for approval. Following IPCC Bureau approval, the proposed erratum statement is submitted to the Panel for approval. To allow for rapid response, the Panel may delegate this approval step to the Executive Committee, which can decide that the erratum be posted on the IPCC and WG or TF websites and that the claimant be informed, or can decide to defer to the next session of the IPCC Bureau or of the Panel. Following approval, the IPCC Secretariat informs the claimant and the erratum is posted on the IPCC website. The case is then closed.

If the current IPCC Chairman, the IPCC Bureau, and the past Chairman, relevant WG Co-Chairs, and relevant CLAs still cannot come to consensus, the IPCC Chairman and the relevant Co-Chairs draft a “Contested Erratum” statement, signed by the IPCC Chairman. This is posted on the IPCC erratum website. This statement reports the claimed error, and explains that issues have been raised but these cannot be resolved before this matter is reassessed in the present or next cycle. The IPCC Chairman and WG Co-Chairs decide on a communications strategy if needed. The case is then closed.

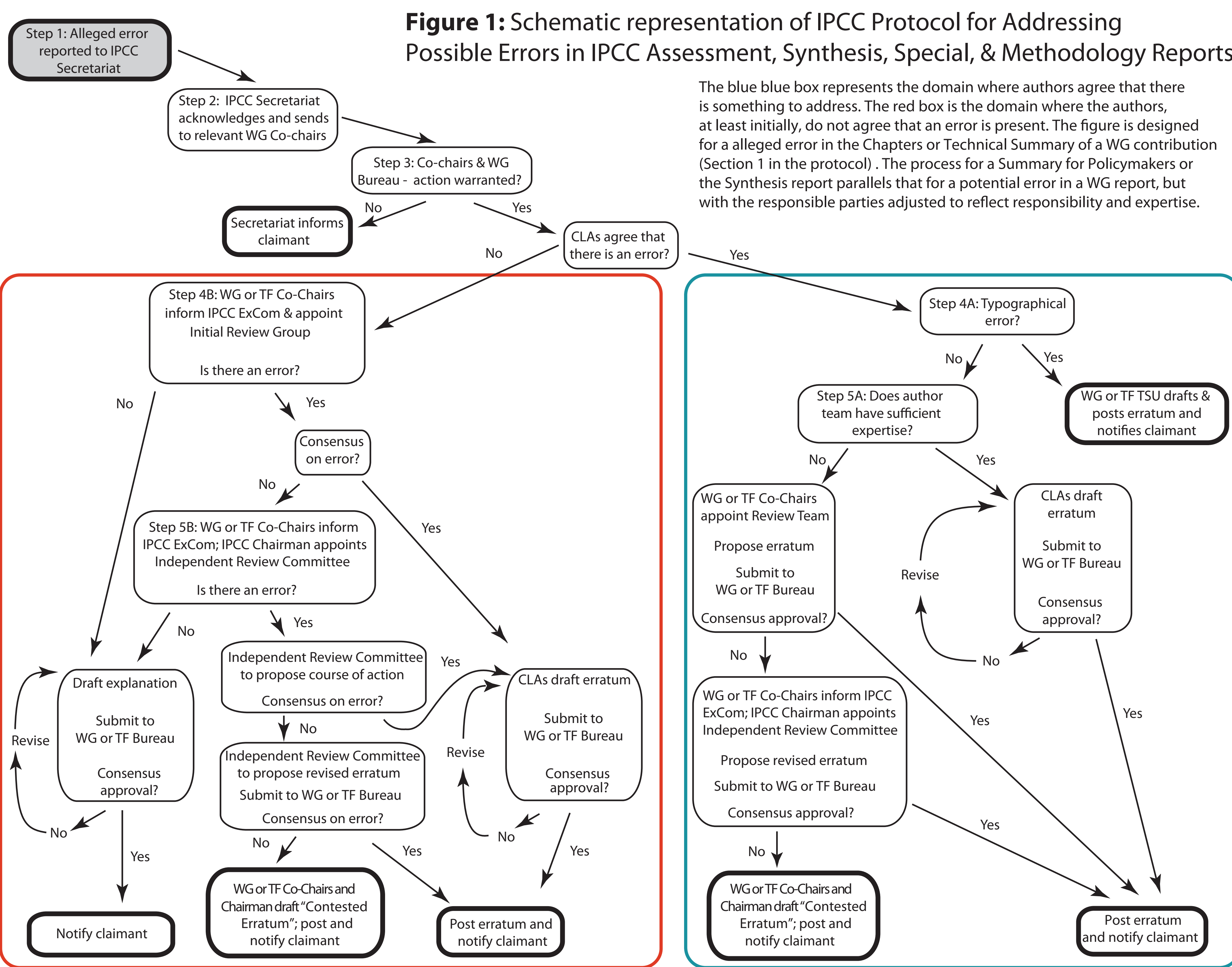


Figure 1: Schematic representation of IPCC Protocol for Addressing Possible Errors in IPCC Assessment, Synthesis, Special, & Methodology Reports
The blue blue box represents the domain where authors agree that there is something to address. The red box is the domain where the authors, at least initially, do not agree that an error is present. The figure is designed for a alleged error in the Chapters or Technical Summary of a WG contribution (Section 1 in the protocol) . The process for a Summary for Policymakers or the Synthesis report parallels that for a potential error in a WG report, but with the responsible parties adjusted to reflect responsibility and expertise.
Step 1: Alleged error reported to IPCC Secretariat
Step 2: IPCC Secretariat acknowledges and sends to relevant WG Co-chairs
Step 3: Co-chairs & WG Bureau - action warranted?
No
Secretariat informs claimant
Yes
CLAs agree that there is an error?
No
Yes
Step 4B: WG or TF Co-Chairs inform IPCC ExCom & appoint Initial Review Group
Is there an error?
No
Yes
Consensus on error?
No
Yes
Step 5B: WG or TF Co-Chairs inform IPCC ExCom; IPCC Chairman appoints Independent Review Committee
Is there an error?
No
Yes
Draft explanation
Submit to WG or TF Bureau
Consensus approval?
Revise
No
Yes
Notify claimant
Independent Review Committee to propose course of action
Consensus on error?
Yes
No
Independent Review Committee to propose revised erratum
Submit to WG or TF Bureau
Consensus on error?
No
Yes
WG or TF Co-Chairs and Chairman draft "Contested Erratum"; post and notify claimant
CLAs draft erratum
Submit to WG or TF Bureau
Consensus approval?
Revise
No
Yes
Post erratum and notify claimant
Step 4A: Typographical error?
No
Yes
WG or TF TSU drafts & posts erratum and notifies claimant
Step 5A: Does author team have sufficient expertise?
No
Yes
WG or TF Co-Chairs appoint Review Team
Propose erratum
Submit to WG or TF Bureau
Consensus approval?
CLAs draft erratum
Submit to WG or TF Bureau
Consensus approval?
Revise
No
No
WG or TF Co-Chairs inform IPCC ExCom; IPCC Chairman appoints Independent Review Committee
Propose revised erratum
Submit to WG or TF Bureau
Consensus approval?
Yes
Yes
Yes
No
WG or TF Co-Chairs and Chairman draft "Contested Erratum"; post and notify claimant
Post erratum and notify claimant

Annex 23

Historical responsibility for climate change is radically shifted when colonial rule is taken into account, Carbon Brief analysis reveals.

The first-of-its-kind analysis offers a thought-provoking fresh perspective on questions of climate justice (https://www.carbonbrief.org/in-depth-qa-what-is-climate-justice) and historical responsibility, which lie at the heart of the global climate debate.

In total, humans have collectively pumped 2,558bn tonnes of CO2 (GtCO2) into the atmosphere since 1850, enough to warm the planet by 1.15C above pre-industrial temperatures.

This means that, by the end of 2023, more than 92% of the carbon budget (https://www.carbonbrief.org/guest-post-what-the-tiny-remaining-1-5c-carbon-budget-means-for-climate-policy/) for 1.5C will have been used up (https://www.nature.com/articles/s41558-023-01848-5) – leaving less than five years remaining if current annual emissions continue.

However, responsibility for using up this global budget is highly unequal. The wealthiest (https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/) countries – and within each nation the wealthiest (https://www.unep.org/resources/emissions-gap-report-2023?gclid=CjwKCAiAjfyqBhAsEiwA-UdzJKmWA1mFqCG4gTErISd9-t2hBFYIY-oLISMa8AmO9uhL67SJ-571LBoCXRkQAvD_BwE) individuals – have taken a disproportionate share.

Previous Carbon Brief analysis (https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/) already showed the US (20%) to be the world's largest contributor to warming. Yet it implicitly allocated none of the responsibility for emissions under colonial rule to the colonial rulers, even though they held ultimate decision-making authority at the time.

Privacy - Terms

The new analysis tests the implications of reversing this assumption. It finds the US (21%) and China (12%) still top – but the share of former colonial powers growing significantly.

The French share of historical emissions rises by half, the UK nearly doubles, the Netherlands nearly triples and Portugal more than triples. Together, the EU+UK's responsibility for warming rises by nearly a third, to 19%.

India is among the former colonies seeing its share of historical responsibility fall (by 15%, to below the UK), with Indonesia down by 24% and Africa's already small contribution also dropping 24%.

How cumulative national CO_2 emissions from fossil fuels, land use, land use change and forestry change over time during 1850-2023, million tonnes, when accounting for emissions under colonial rule. The remaining carbon budget for a 50/50 chance of staying below 1.5C is shown by the doughnut chart in the bottom right. Source: Carbon Brief analysis of figures from Jones et al (https://www.nature.com/articles/s41597-023-02041-1) (2023), Lamboll et al (https://www.nature.com/articles/s41558-023-01848-5) (2023), the Global Carbon Project (https://www.globalcarbonproject.org/), CDIAC (https://cdiac.ess-dive.lbl.gov/), Our World in Data (https://github.com/owid/co2-data), the International (https://www.iea.org/data-and-statistics/charts/co2-emissions-from-international-shipping-in-the-net-zero-scenario-2000-2030) Energy Agency (https://www.iea.org/data-and-statistics/charts/direct-co2-emissions-from-aviation-in-the-net-zero-scenario-2000-2030) and Carbon Monitor (https://carbonmonitor.org/). Animation by Carbon Brief.

Notably, former colonial powers such as the UK and the Netherlands are much more prominent in the history of cumulative global CO_2 emissions shown in the animation above.

While former colonies such as India and Indonesia are less prominent as a result, they still have significant emissions in the post-colonial era, pushing them into the top 10 as of 2023.

As before, the new analysis is based on CO_2 emissions from the burning of fossil fuels and cement production, along with land use, land use change and forestry (LULUCF).

It covers the period from 1850 – often taken as the baseline for current warming – through to 2023, drawing primarily on a recent compilation (https://www.nature.com/articles/s41597-023-02041-1) of emissions estimates.

The assignment of colonial responsibility for emissions is largely based on research (https://journals.sagepub.com/doi/10.1177/0003122410382639) into the emergence of independent nation states since the early 19th century.

Other key findings of the analysis include:

> - As a group, the EU+UK collectively ranks second for emissions within its own borders (375GtCO2, 14.7% of the global total). This climbs by nearly a third after adding colonial emissions, to 478GtCO2 and 18.7% of the global total – just behind the US.
> - The UK ranks fourth in the world when accounting for colonial emissions – jumping ahead of its former colony India. Including emissions under British rule in 46 former colonies, the UK is responsible for nearly twice as much global warming as previously thought (130GtCO2 and 5.1% of the total, instead of 76GtCO2 and 3.0%).
> - The largest contributions to the UK's colonial emissions are from India (13GtCO2, cutting its own total by 15%), Myanmar (7GtCO2, -49%) and Nigeria (5GtCO2, -33%).
> - The Netherlands accounts for nearly three times as much warming when accounting for colonial emissions (35GtCO2 and 1.4% of the total, rather than 13GtCO2 and 0.5%). This is largely due to LULUCF emissions in Indonesia, under Dutch rule, of 22GtCO2.
> - Africa – the vast majority of which was under colonial rule – sees its share of historical emissions fall by nearly a quarter, from 6.9% to 5.2%. Despite a 21-times larger population, this 5.2% share is only fractionally higher than the UK's 5.1%.
> - When weighted by current populations, the Netherlands (2,014tCO2 per person) and the UK (1,922tCO2) become the world's top emitters on a cumulative per-capita

> basis. They are followed by Russia (1,655tCO_2), the US (1,560tCO_2) and Canada (1,524tCO_2).
>
> - On this per-capita measure, China (217tCO_2 per person), the continent of Africa (92tCO_2) and India (52tCO_2) are far behind developed nations' contributions to warming.
> - Many former colonial powers are also net CO_2 importers today. While data on CO_2 imports and exports is limited, available figures further raise their shares of historical emissions.

These findings reinforce the significant historical responsibility of developed countries for current warming, particularly the former colonial powers in Europe.

While they account for less than 11% of the world's population today, together, the US, EU and UK are responsible for 39% of cumulative historical emissions and current CO_2-related warming.

Many of these countries now have small (https://ourworldindata.org/co2-emissions) and declining emissions (https://www.nature.com/articles/s43247-023-00687-8). Yet their relative wealth today – and their historical contributions to current warming – are recognised within the international (https://unfccc.int/sites/default/files/convention_text_with_annexes_english_for_posting.pdf) climate regime (https://www.carbonbrief.org/interactive-the-paris-agreement-on-climate-change/) as being tied to a responsibility to lead, not only in terms of cutting their own emissions, but also in supporting (https://www.carbonbrief.org/explainer-how-can-climate-finance-be-increased-from-billions-to-trillions/) the climate (https://www.carbonbrief.org/qa-the-fight-over-the-loss-and-damage-fund-for-climate-change/) response (https://www.carbonbrief.org/guest-post-three-major-gaps-in-climate-adaptation-finance-for-developing-countries/) in less developed countries.

The article below sets out why cumulative CO_2 matters, how colonial rule changes responsibility for warming and where colonial emissions come from. It then looks at the impact of weighting emissions on a per-capita basis and accounting for emissions embedded in traded goods.

The article also includes a sortable, searchable table showing these key metrics for each country, as well as further details on the methodology used to produce this analysis.

> - Why cumulative CO2 matters
> - How colonial rule changes responsibility for warming
> - Where colonial emissions come from
> - How population size affects responsibility for warming
> - How emissions imports and exports affect responsibility for warming
> - Table: Historical emissions and colonial responsibility
> - Methodology: Historical emissions and colonial responsibility
> - Methodology: Why this analysis starts in 1850

Why cumulative CO2 matters

There is "unequivocal" evidence that humans have warmed the planet, causing "widespread and rapid" changes to Earth's oceans, ice and land surface, according to the latest Intergovernmental Panel on Climate Change (https://www.ipcc.ch/) (IPCC) sixth assessment report (https://www.carbonbrief.org/qa-ipcc-wraps-up-its-most-in-depth-assessment-of-climate-change/).

The summary for policymakers (https://www.carbonbrief.org/qa-ipcc-wraps-up-its-most-in-depth-assessment-of-climate-change/) states that current warming has been caused by "more than a century of net GHG [greenhouse gas] emissions from energy use, land-use and land use change, lifestyle and patterns of consumption, and production".

Global warming is virtually certain (https://www.carbonbrief.org/analysis-greater-than-99-chance-2023-will-be-hottest-year-on-record/) to reach a new record high in 2023. Yet global greenhouse gas emissions have also climbed to record levels (https://www.carbonbrief.org/unep-humanity-is-still-breaking-all-the-wrong-records-in-fast-warming-world/).

Meanwhile, climate change to date is already causing widespread impacts (https://www.carbonbrief.org/mapped-how-climate-change-affects-extreme-weather-around-the-world/) that disproportionately (https://www.carbonbrief.org/in-depth-qa-what-is-climate-justice/) affect low-income countries, from deadly (https://www.carbonbrief.org/western-mediterranean-heatwave-almost-impossible-without-climate-change/) heatwaves (https://www.carbonbrief.org/record-breaking-2023-heat-events-are-not-rare-anymore-due-to-climate-change/) and droughts (https://www.carbonbrief.org/climate-change-intensity-of-ongoing-drought-in-syria-iraq-and-iran-not-rare-anymore/) to "catastrophic" ice loss (https://www.carbonbrief.org/qa-warming-of-2c-would-trigger-catastrophic-loss-of-worlds-ice-new-report-says/).

Human-caused CO2 emissions are the largest contributor (https://www.carbonbrief.org/striking-new-nasa-videos-show-co2-emissions-rapidly-building-up-in-atmosphere/) to warming and there is a direct, linear relationship (https://www.nature.com/articles/nature08019) between the amount of CO2 released and the warming of the Earth's surface.

Moreover, the timing of a tonne of CO2 being emitted has only a limited impact (https://iopscience.iop.org/article/10.1088/1748-9326/10/3/031001) on the amount of warming it will ultimately cause. Once emitted, the resulting increase in atmospheric CO2 levels is essentially permanent (https://www.nature.com/articles/climate.2008.122) on human timescales. This is despite the fact that individual CO2 molecules have a limited lifetime (https://www.annualreviews.org/doi/abs/10.1146/annurev.earth.031208.100206) in the atmosphere, as they circulate around the carbon cycle (https://www.carbonbrief.org/analysis-how-carbon-cycle-feedbacks-could-make-global-warming-worse/).

As a result, CO2 emissions from previous centuries continue to contribute to the heating of the planet – and current warming is determined by the cumulative total of CO2 emissions over time.

This is the scientific basis for the carbon budget (https://www.carbonbrief.org/guest-post-what-the-tiny-remaining-1-5c-carbon-budget-means-for-climate-policy/), namely, the total amount of CO2 that can be emitted to stay below any given limit on global temperatures.

This analysis uses the latest estimates (https://www.nature.com/articles/s41558-023-01848-5) of the remaining carbon budget (https://www.carbonbrief.org/guest-post-what-the-tiny-remaining-1-5c-carbon-budget-means-for-climate-policy/) for a 50/50 chance of limiting warming to less than 1.5C above pre-industrial temperatures.

The carbon budget is now smaller than the figure used in Carbon Brief's 2021 analysis (https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/), due to updated understanding (https://www.carbonbrief.org/guest-post-what-the-tiny-remaining-1-5c-carbon-budget-means-for-climate-policy/) of the warming impact of non-CO2 greenhouse gases.

Adding up all of the human-caused CO2 emissions tracked in this analysis, during 1850-2023, amounts to 2,558GtCO2. (See: Methodology: Why this analysis starts in 1850.)

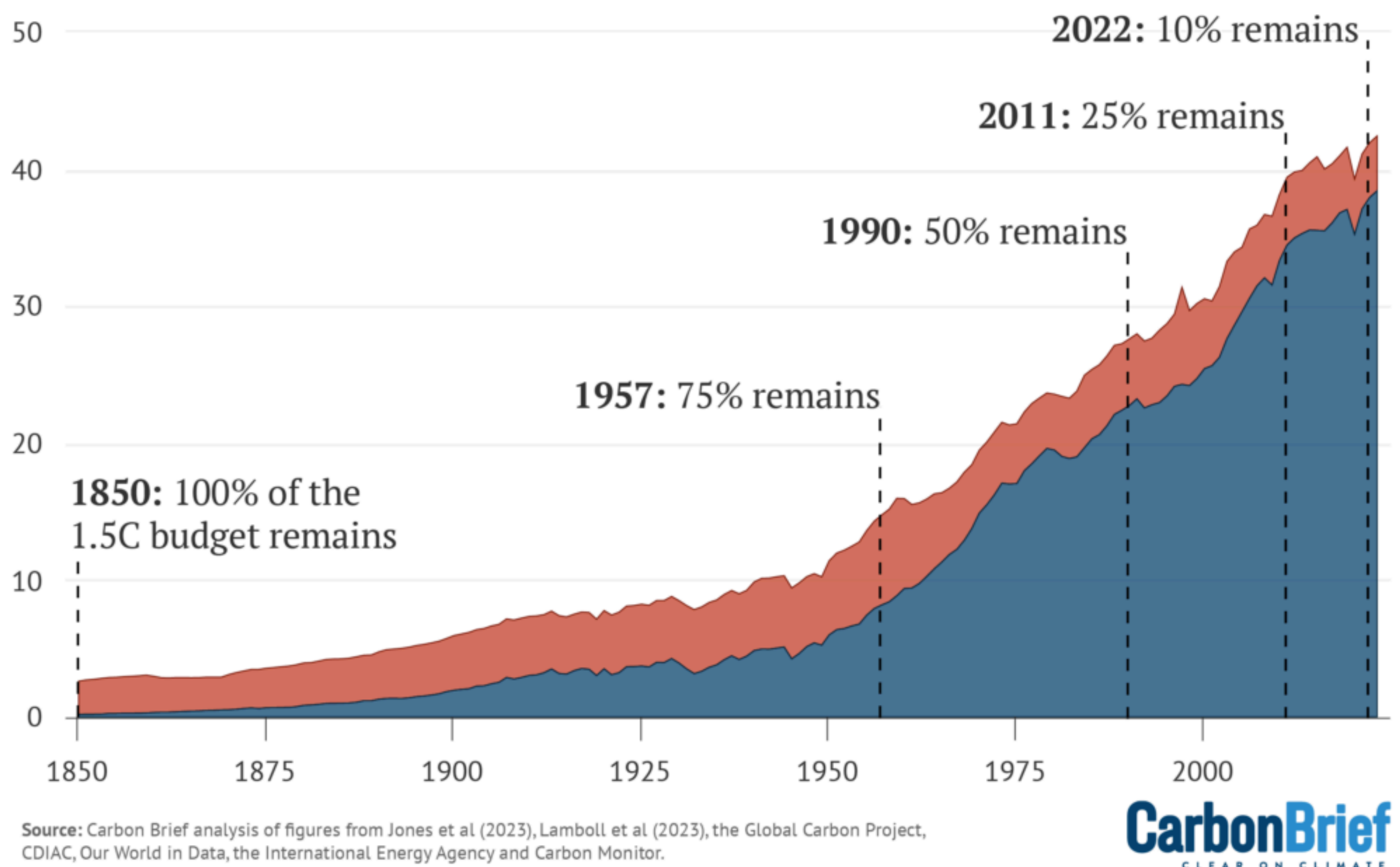
This means the remaining carbon budget for 1.5C will be just 208GtCO2 by the end of 2023. Less than 8% of the budget will be left – and the entire budget would be used up within less than five years, if global CO2 emissions were to continue at current levels.

In the first decade covered by Carbon Brief's analysis, land-related emissions including deforestation account for more than 90% of the CO2 being released each year.

This pattern is reversed in the present day, with fossil fuels and cement production accounting for an estimated 91% of global CO2 emissions in 2023, as shown in the figure below.

Annual global CO2 emissions from fossil fuels and cement overtook land-related emissions for the first time in 1947 – coincidentally, the year that India and Pakistan gained independence.

Overall, fossil fuels and cement account for more than two-thirds of cumulative CO2, some 71% of the total emissions released during 1850-2023. Land use and forestry account for the other 29%.



Annual global CO2 emissions from fossil fuels and cement (dark blue) as well as from land use, land-use change and forestry (red), 1850-2023, billions of tonnes. Source: Carbon Brief analysis of figures from Jones et al (https://www.nature.com/articles/s41597-023-02041-1) (2023), Lamboll et al (https://www.nature.com/articles/s41558-023-01848-5) (2023), the Global Carbon Project (https://www.globalcarbonproject.org/), CDIAC (https://cdiac.ess-dive.lbl.gov/), Our World in Data (https://github.com/owid/co2-data), the International Energy Agency (https://www.iea.org/data-and-statistics/charts/co2-emissions-from-international-shipping-in-the-net-zero-scenario-2000-2030) and Carbon Monitor (https://carbonmonitor.org/). Chart by Carbon Brief.

Carbon Brief’s estimates of cumulative emissions since 1850 – and the remaining carbon budget as of the present day – are fully aligned with the latest (https://www.nature.com/articles/s41558-023-01848-5) updates (https://essd.copernicus.org/articles/15/2295/2023/essd-15-2295-2023.pdf) since the IPCC report in 2021.

The accelerating depletion of the carbon budget for 1.5C is illustrated by markers in the figure above, showing the years when 25%, 50% and 75% of the budget had been used up.

This shows that it took 107 years to use up the first quarter of the carbon budget, then just 33 years to use up the next quarter and only a further 22 years for the third quarter.

At the current rate, the final quarter of the 1.5C budget will have been used up in 16 years.

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How colonial rule changes responsibility for warming

Historical responsibility is ethically complex (https://www.degruyter.com/document/doi/10.1515/mopp-2013-0009/html?lang=en), but it is clear that colonial powers had a significant influence (https://global.oup.com/academic/product/environment-and-empire-9780199260317) on landscapes, natural resource use (https://researchdirect.westernsydney.edu.au/islandora/object/uws:12680) and development patterns (https://news.mit.edu/2020/sugar-factories-colonial-indonesia-olken-dell-0206) taking place under their rule. It would be hard to justify ignoring this completely.

Indeed, it is well known (https://theconversation.com/earth-day-colonialisms-role-in-the-overexploitation-of-natural-resources-113995) that colonial powers extracted natural resources from colonised lands to support their economic (https://ejournal2.undip.ac.id/index.php/ihis/article/download/16037/8516), military (https://legionmagazine.com/the-royal-navys-war-on-trees/) and political (https://global.oup.com/academic/product/environment-and-empire-9780199260317?cc=gb&lang=en&) power.

Yet the link to historical emissions has never been quantified, until now.

This analysis assigns full responsibility for past emissions to those with ultimate decision-making authority at the time, namely, the colonial rulers. This reverses the implicit assumption of previous analyses (https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/), where none of the responsibility was given to colonial powers.

Arguably, the true share of responsibility for current warming lies somewhere between these two extremes, where emissions are fully assigned to either the colonial powers or their former colonies.

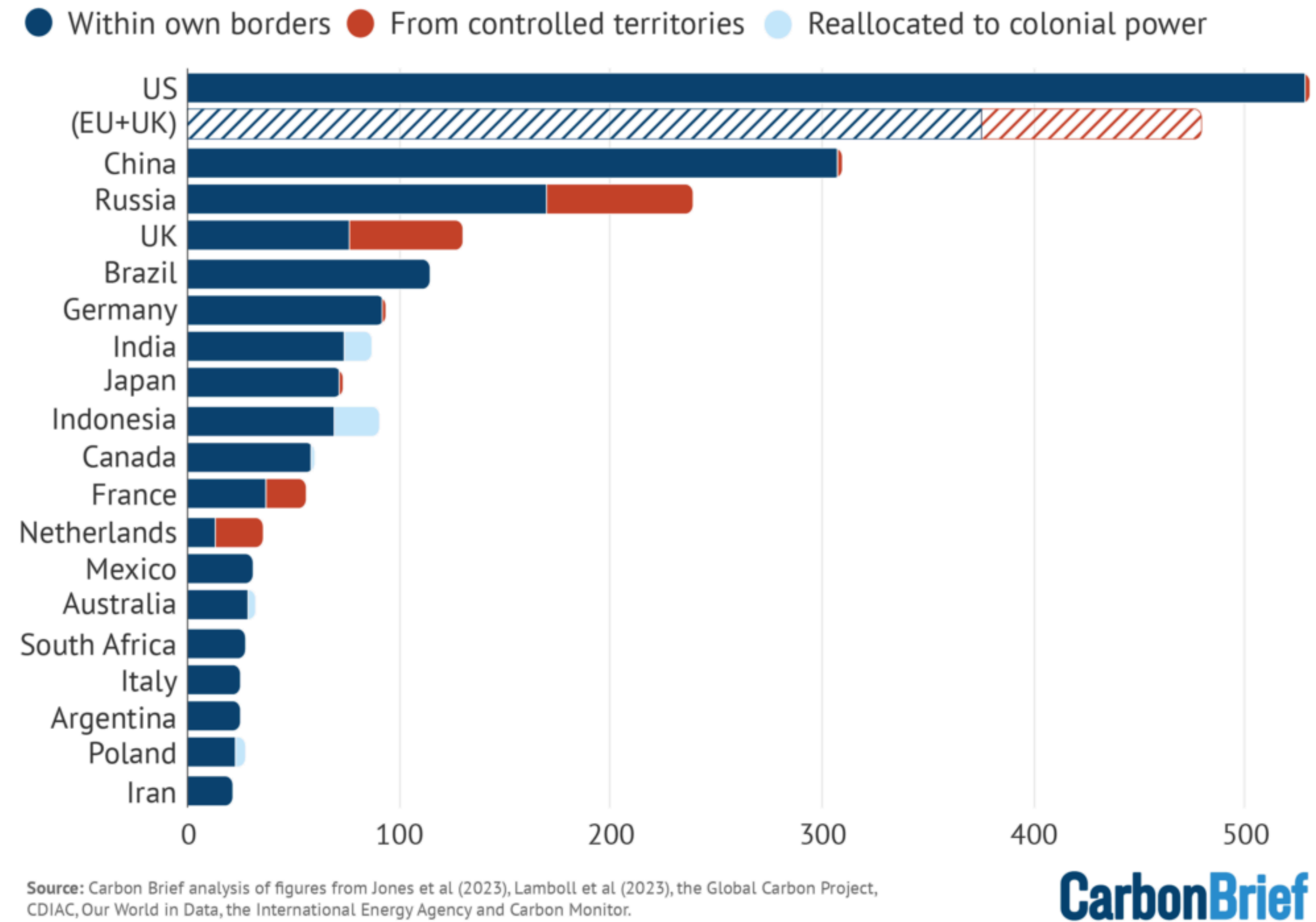
In line with this approach, the analysis assigns responsibility for emissions within the former Soviet republics to Russia, because decision-making authority was heavily centralised (https://www.britannica.com/place/Soviet-Union) in Moscow.

The figure below shows the top 20 countries in the world in terms of their cumulative historical CO2 emissions. The blue columns show emissions taking place within each country's current borders, while the red chunks show emissions that took place under its rule, in controlled territories. The light blue chunks show emissions reallocated from former colonies to the former colonial power.

Notably, the major post-colonial European powers, including the UK (+70%), France (+51%) and the Netherlands (+181%), all see significant increases in their share of historical emissions.

While they do not appear in the top 20, there are similar effects for Belgium (+33%), Portugal (+234%) and Spain (+12%). Collectively, the EU+UK take on much larger responsibility (+28%).

On the flip side, India (-15%) and Indonesia (-24%) are particularly notable for their reduced share of cumulative emissions, under this new approach to historical responsibility for warming.



The top 20 countries for cumulative CO2 emissions from fossil fuels, cement, land use, land use change and forestry, 1850-2023, billion tonnes. CO2 emissions that occurred within each country's national borders are shown in dark blue, while those that took place overseas during periods of imperial rule are coloured red. Emissions reallocated to former imperial powers are shaded light blue. EU+UK is shown in addition to the relevant individual countries. Source: Carbon Brief analysis of figures from Jones et al (https://www.nature.com/articles/s41597-023-02041-1) (2023), Lamboll et al (https://www.nature.com/articles/s41558-023-01848-5) (2023), the Global Carbon Project (https://www.globalcarbonproject.org/), CDIAC (https://cdiac.ess-dive.lbl.gov/), Our World in Data (https://github.com/owid/co2-data), the International Energy Agency (https://www.iea.org/data-and-statistics/charts/direct-co2-emissions-from-aviation-in-the-net-zero-scenario-2000-2030) and Carbon Monitor (https://carbonmonitor.org/). Chart by Carbon Brief.

Russia also sees a significant increase in its historical responsibility for current warming, which rises by two-fifths to 9.3% of the global total, under the approach taken in this analysis.

Nevertheless, some argue (https://www.jstor.org/stable/259797) that the nature of the power dynamics within the former Soviet Union was different to those between European colonialists and the peoples they colonised overseas.

While also not appearing in the top 20, there are big shifts, too, for Austria (+72%) and Hungary (+70%), as a result of the former Austro-Hungarian empire. This, too, was of a different nature to the overseas colonisations (https://www.britannica.com/topic/Western-colonialism) of other European powers.

Accounting for colonial rule alters the relative ranking of a number of countries.

The UK is the most prominent example, climbing from eighth-largest contributor to climate change to fourth. This means it leapfrogs its former colony, India, in terms of past responsibility.

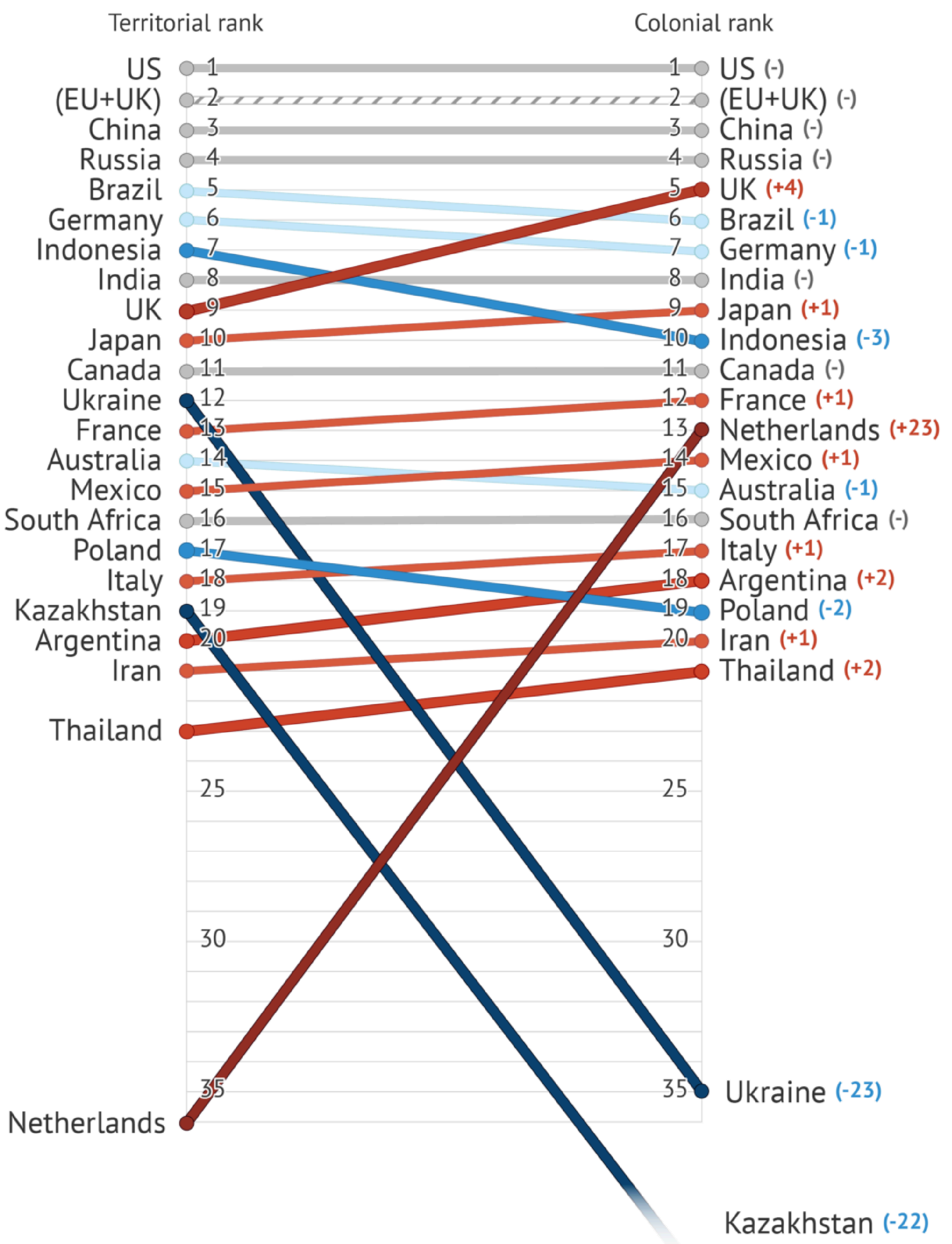
Similarly, while the Netherlands does not quite overtake Indonesia, their relative rankings are significantly different after accounting for colonial responsibility for past emissions.

These shifts are illustrated in the figure below, which shows the top 20 countries in the world ranked according to their share of cumulative emissions. On the left, only emissions within present-day borders are considered, while on the right, emissions under colonial rule are added.

(Note that the EU+UK is shown as a bloc, in addition to the top 20 countries.)

The UK is more responsible for global warming than its former colony India, when colonial-era emissions are considered

Global ranking for share of cumulative historical CO2, 1850-2023, under territorial vs colonial responsibility



Source: Carbon Brief analysis of figures from Jones et al (2023), Lamboll et al (2023), the Global Carbon Project, CDIAC, Our World in Data, the International Energy Agency and Carbon Monitor.

The top 20 countries in the world, ranked in terms of their share of cumulative historical emissions 1850-2023 within current national borders (left) and after accounting for periods of foreign rule (right). Source: Carbon Brief analysis of figures from Jones et al (https://www.nature.com/articles/s41597-023-02041-1) (2023), Lamboll et al (https://www.nature.com/articles/s41558-023-01848-5) (2023), the Global Carbon Project (https://www.globalcarbonproject.org/), CDIAC (https://cdiac.ess-dive.lbl.gov/), Our World in Data (https://github.com/owid/co2-data), the International Energy Agency (https://www.iea.org/data-and-statistics/charts/direct-co2-emissions-from-aviation-in-the-net-zero-scenario-2000-2030) and Carbon Monitor (https://carbonmonitor.org/). Chart by Carbon Brief.

The other obvious shifts in the ranking chart, above, are for Ukraine and Kazakhstan, both former Soviet republics that were under centralised rule from Moscow for much of the 20th century.

Unlike other emissions reassignments under Carbon Brief's new analysis, these and other former Soviet republics have large amounts of fossil fuel-based CO2 emissions shifted off their books.

Referring back to the chart of fossil- versus land-based emissions over time, above, illustrates the major reason why this is the case. Annual CO2 emissions were dominated by contributions from LULUCF until the middle of the 20th century, when fossil fuel use started to explode.

Many former European colonies in Asia, Africa, Oceania and the Americas had gained independence well before the point when fossil fuel use accelerated. In contrast, former Soviet republics were part of the Soviet Union administered from Moscow until its collapse in 1991 (https://www.britannica.com/event/the-collapse-of-the-Soviet-Union).

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Where colonial emissions come from

The history of European imperialism is "inseparable from the history of global environmental change", say Prof William Beinert (https://www.sant.ox.ac.uk/people/william-beinart-0) and Lotte Hughes (https://open.academia.edu/LotteHughes/CurriculumVitae) in their 2007 book *Environment and Empire* (https://academic.oup.com/book/40609).

For the UK, one driver was what they describe as the "gradual domestic deforestation" of the country, which "hastened dependence on coal for energy" and drove demand for timber imports.

In turn, the shift to machine power based on fossil fuels "enormously expanded the possibilities of metropolitan production and consumption [and] facilitated a new surge in imperial expansion, carried by steamships, railways, and motor vehicles". They write:

> "Metropolitan countries sought raw materials of all kinds, from timber and furs to rubber and oil. They established plantations that transformed island ecologies. Settlers introduced new methods of farming; some displaced Indigenous peoples and their methods of managing the land."

This hunger for natural resources drove deforestation and environmental change in colonised lands, from the Americas and the Caribbean to Asia, Africa and Oceania.

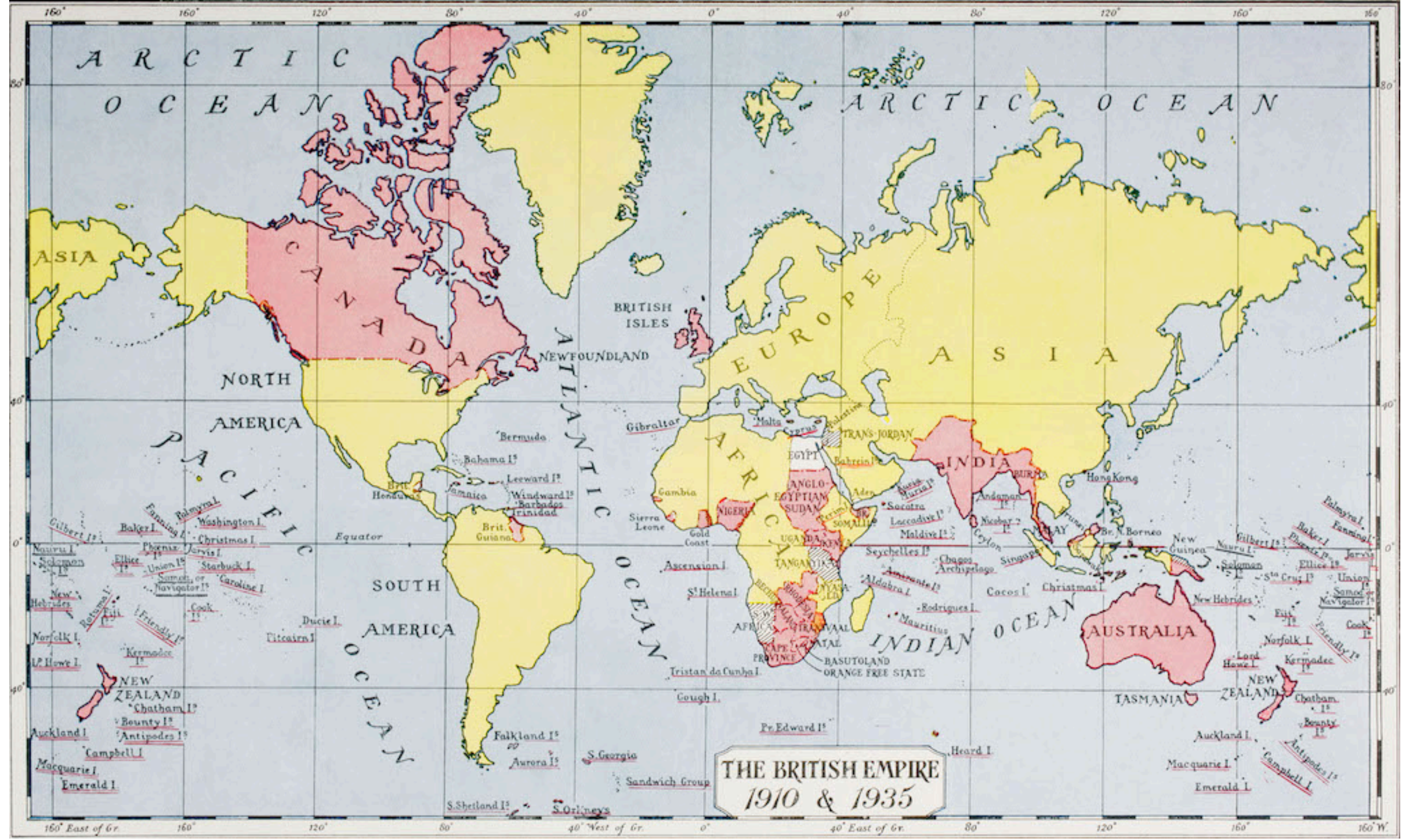
In Barbados, for example, the establishment of plantations "necessitated destroying the forests…with a combination of ring-barking and burning", according to the book.

Similarly, in Madeira, "one of the founding myths recalled by…colonists was a fire that burned for seven years – a powerful metaphor for deforestation".

Yet, as colonial forests were denuded of their ability to produce high-quality timber, colonisation also led to the beginnings of "conservationist practices and ideas", Beinart and Hughes write:

> "[W]hile natural resources have been intensely exploited, a related process, the rise of conservationist practices and ideas, was also deeply rooted in imperial history. Large tracts of land have been reserved for forests, national parks or wildlife."

The British empire was particularly far-reaching, controlling around a quarter (https://www.britannica.com/place/British-Empire) of the Earth's land surface at its peak by the end of the 19th century – and more than a quarter of its population.



Map showing the British empire, in red and hatched red, in 1910 and 1935. Credit: Hilary Morgan / Alamy Stock Photo (https://www.alamy.com/stock-photo-map-showing-the-king-george-vs-empire-in-red-in-1910-and-1935-33212184.html).

In Carbon Brief's new analysis, emissions under British rule in 46 former colonies are reassigned to the UK, almost doubling its share of the global historical total.

This is illustrated in the figure below, with notable contributions coming from India and Myanmar through to countries such as Australia, Canada, Tanzania, Zambia and COP28 hosts the United Arab Emirates.

The UK's contribution to climate change is nearly doubled when accounting for emissions under colonial rule

Cumulative CO2 emissions 1850-2023, billion tonnes

Within own borders: 58.7% (76.4 billion tonnes)

Former territories: 41.3% (53.7 billion tonnes)

UK

India

Myanmar

Nigeria

Australia

Malaysia

Zambia

Tanzania

Bangladesh

*

**

Other Africa

Other Asia

***

* New Zealand ** Canada *** Other

Source: Carbon Brief analysis of figures from Jones et al (2023), Lamboll et al (2023), the Global Carbon Project, CDIAC, Our World in Data, the International Energy Agency and Carbon Monitor.

Cumulative CO2 emissions from fossil fuels, cement, land use, land use change and forestry, 1850-2023, billion tonnes. Left: Emissions within the UK. Right: Emissions in other countries under British colonial rule. Source: Carbon Brief analysis of figures from Jones et al (https://www.nature.com/articles/s41597-023-02041-1) (2023), Lamboll et al (https://www.nature.com/articles/s41558-023-01848-5) (2023), the Global Carbon Project (https://www.globalcarbonproject.org/), CDIAC (https://cdiac.ess-dive.lbl.gov/), Our World in Data (https://github.com/owid/co2-data), the International Energy Agency (https://www.iea.org/data-and-statistics/charts/direct-co2-emissions-from-aviation-in-the-net-zero-scenario-2000-2030) and Carbon Monitor (https://carbonmonitor.org/). Chart by Carbon Brief.

The largest contribution to the UK's colonial emissions is from India, as shown in the figure above, with the second largest being from Myanmar.

In their book, Beinart and Hughes describe the intimate links between the colonisation of these countries and the exploitation of their natural resources, with the two interacting and reinforcing each other, as resources were used to further cement British control. They write:

> “Indigenous hardwoods were the prime riches…essential to the British army, navy and railways, they became cogs in the conquest of India. The new demands inevitably led to deforestation…Railways, [which were at the heart of domestic timber demand in India,] were critical for moving troops and thereby controlling territory. Rolling back the forests to make way for cultivation was also seen by the East India Company as a means of extending control.”

Beinart and Hughes also refer to the particular use of teak from Myanmar to make warships: “Burma or ‘Admiralty’ teak was known to be the strongest. Used for navy frigates, it was said to have saved Britain during the Napoleonic wars and aided her maritime expansion.”

Later, the depletion of Indigenous hardwood forests led to colonial conservation efforts, though the motives for doing this – and the means by which it was achieved – were decidedly mixed.

The book quotes Hugh Cleghorn, conservator of forests for the Madras presidency (https://www.britannica.com/place/Madras-Presidency), writing in 1861 of the “careless rapacity of the native population…who cut and cleared [forests]…without being in any way under the control or regulation of authority”. It continues:

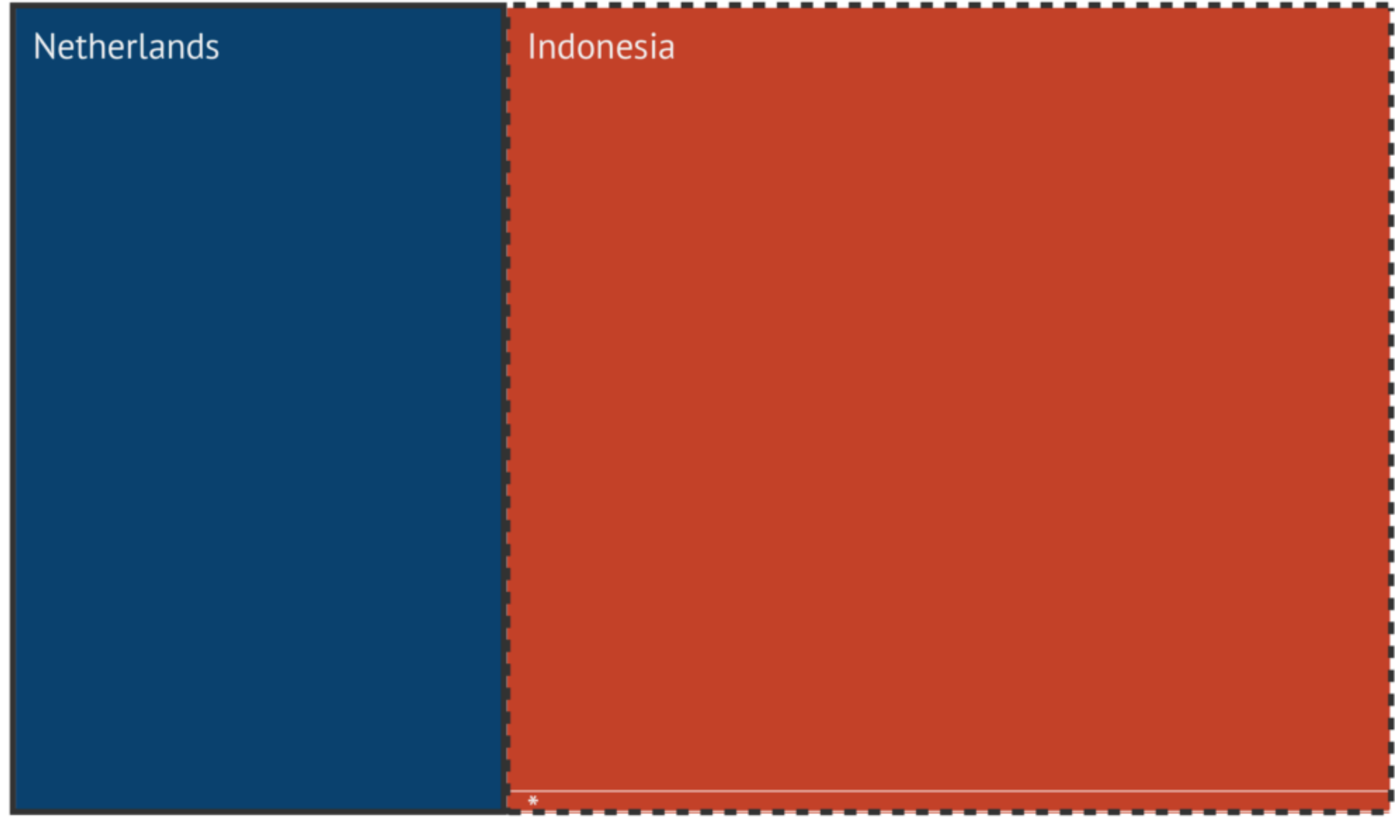
> “When a[n Indian] Forest Department was established in 1864, Britain had few experts of its own. [German forester Dietrich] Brandis (https://www.jstor.org/stable/4404184) had been brought in two years previously from Burma, where he was credited from with saving the Burmese teak forests from timber traders, for the benefit of British shipbuilders…The conservators were under pressure to manage the forests effectively, meet the needs of the admiralty and others for large quantities of timber, simultaneously turn a profit, and contain local peoples’ claims on the forests…The British laid claim to territory they considered unoccupied and unclaimed, and regarded princely property as theirs by right of conquest.”

Similar dynamics were at play in Indonesia, which had long been under Dutch rule. The late (https://www.jstor.org/stable/26281589) historian of Indonesia Prof Peter Boomgaard (https://www.carsoncenter.uni-muenchen.de/fellows/sof/former_fellows/peter_boomgaard/index.html) wrote in a 1999 book

chapter (https://www.environmentandsociety.org/mml/oriental-nature-its-friends-and-its-enemies-conservation-nature-late-colonial-indonesia-1889) that deforestation on the Indonesian island of Java “began to be perceived as a problem around 1850”.

Boomgaard adds that this led to the establishment of a colonial forest service and the creation of protected forests. This pattern (https://news.climate.columbia.edu/2022/09/21/how-colonialism-spawned-and-continues-to-exacerbate-the-climate-crisis/), which has included the confiscation of lands and the exclusion of Indigenous peoples in the name of conservation, has been repeated in many other former colonies.

The figure below show how cumulative emissions within the borders of the Netherlands (left), some 12.6GtCO2 between 1850-2023, are nearly tripled when taking into account emissions that took place under Dutch colonial rule – particularly in Indonesia (right).



Cumulative CO_2 emissions from fossil fuels, cement, land use, land use change and forestry, 1850-2023, billion tonnes. Left: Emissions within the Netherlands. Right: Emissions in other countries under Dutch colonial rule. Source: Carbon Brief analysis of figures from Jones et al (https://www.nature.com/articles/s41597-023-02041-1) (2023), Lamboll et al (https://www.nature.com/articles/s41558-023-01848-5) (2023), the Global Carbon Project (https://www.globalcarbonproject.org/), CDIAC (https://cdiac.ess-dive.lbl.gov/), Our World in Data (https://github.com/owid/co2-data), the International Energy Agency (https://www.iea.org/data-and-statistics/charts/co2-emissions-from-international-shipping-in-the-net-zero-scenario-2000-2030) and Carbon Monitor (https://carbonmonitor.org/). Chart by Carbon Brief.

Writing (https://budimanbm.medium.com/the-colonial-roots-of-deforestation-in-sumatra-4198ff76a08e) at his blog, Indonesian soil scientist Prof Budiman Minasny (https://www.sydney.edu.au/science/about/our-people/academic-staff/budiman-minasny.html) describes the impact of Dutch colonial rule on the island of Sumatra:

> "When we talk about deforestation, Indonesia always came up as the main culprit. Less talked about is [the] Dutch root of deforestation in Indonesia…The Dutch discovered the tobacco industry in Deli (https://en.wikipedia.org/wiki/Sultanate_of_Deli) in the 1860s and created an industrial-scale plantation system. The local sultans collaborated and gave concessions of 1,000–2,000 hectares of land to each company in a 75-year lease. The Dutch colonial planters assumed that tobacco could only grow well in the soil that had just been cleared from the virgin jungle. Thus, the industry drove large-scale virgin forests clearing to produce tobacco leaves exported to Europe and America."

The ongoing legacy of colonial rule is debated (https://news.climate.columbia.edu/2022/09/21/how-colonialism-spawned-and-continues-to-exacerbate-the-climate-crisis/), but many of its vestiges remain, whether in the structure of state administrative functions or in the presence of commercial interests owned by multinationals based in former colonial powers.

As a 2015 paper (https://www.scirp.org/journal/paperinformation.aspx?paperid=53443) explains, these colonial legacies continue to this day:

> "Though colonialism was dismantled in the first half of the twentieth century, its policies on forest nationalisation remain unchanged across many independent states in the tropics including Nigeria."

Concluding their chapter, Beinart and Hughes write of the British imperial legacy on India:

> "British imperial control of India had a major impact on its extraordinarily varied range of trees and forest products. It also restricted access to forests by poor people…That later exclusion of humans from wildlife parks was also partly rooted in the forest laws of the colonial people, which treated local people as wasteful and destructive…But pressures on the forest did not end with independence. The current rate of deforestation is said to be well over one million ha every year."

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How population size affects responsibility for warming

Overall cumulative emissions are what matters (https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/) for the atmosphere, given they relate directly to the level of warming being experienced today.

Still, from the perspectives of fairness, equity and climate justice – since national borders are arbitrary political constructs – it is also appropriate to consider responsibility at the individual level.

This involves weighting national cumulative emissions totals by their respective national populations, in order to calculate per-capita cumulative emissions.

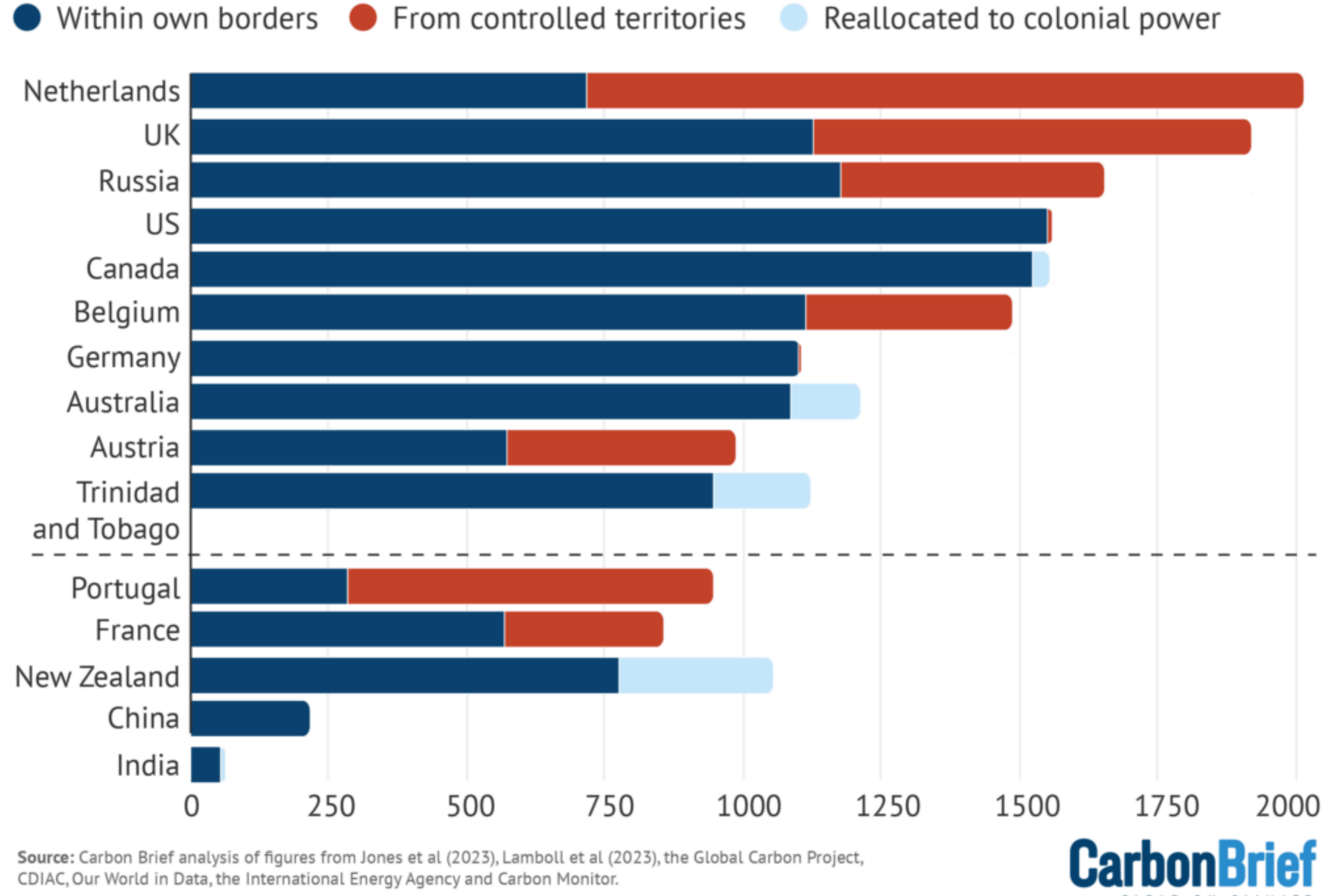
As in Carbon Brief's previous article (https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/), this analysis uses two alternative approaches to account for relative population sizes. Colonial responsibility alters both sets of figures dramatically.

The first approach takes a country's cumulative emissions to date and divides it by the population in 2023. The results are in the figure below, showing the top 10 emitters and five selected others.

Per-capita emissions within each country's borders are once again shown in blue, with per-capita emissions occurring in former territories under colonial rule shown in red. Per-capita emissions reallocated to a colonial power are shown in light blue.

Notably, former colonial powers the Netherlands (2,014tCO2 per person) and the UK (1,922tCO2) are the world's top emitters on this per-capita cumulative basis. They are followed by Russia (1,655tCO2), the US (1,560tCO2) and Canada (1,524tCO2).

The figure shows that colonial responsibility for emissions pushes the US and Canada down the rankings, from first and second (https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/), into fourth and third, respectively.



Top 10 countries with a population of at least 1 million and five selected others, in terms of their cumulative CO2 emissions 1850-2023 per head of current population, tonnes, from fossil fuels, cement, land use, land use change and forestry. Source: Carbon Brief analysis of figures from Jones et al (https://www.nature.com/articles/s41597-023-02041-1) (2023), Lamboll et al (https://www.nature.com/articles/s41558-023-01848-5) (2023), the Global Carbon Project (https://www.globalcarbonproject.org/), CDIAC (https://cdiac.ess-dive.lbl.gov/), Our World in Data (https://github.com/owid/co2-data), the International Energy Agency (https://www.iea.org/data-and-statistics/charts/direct-co2-emissions-from-aviation-in-the-net-zero-scenario-2000-2030) and Carbon Monitor (https://carbonmonitor.org/). Chart by Carbon Brief.

Other former imperial powers, including Belgium (1,487tCO2) and Austria (987tCO2) are also in the top 10, as are former colonies Australia (1,088tCO2, down 10% due to colonial emissions being reallocated) and Trinidad and Tobago (948tCO2, down 16%).

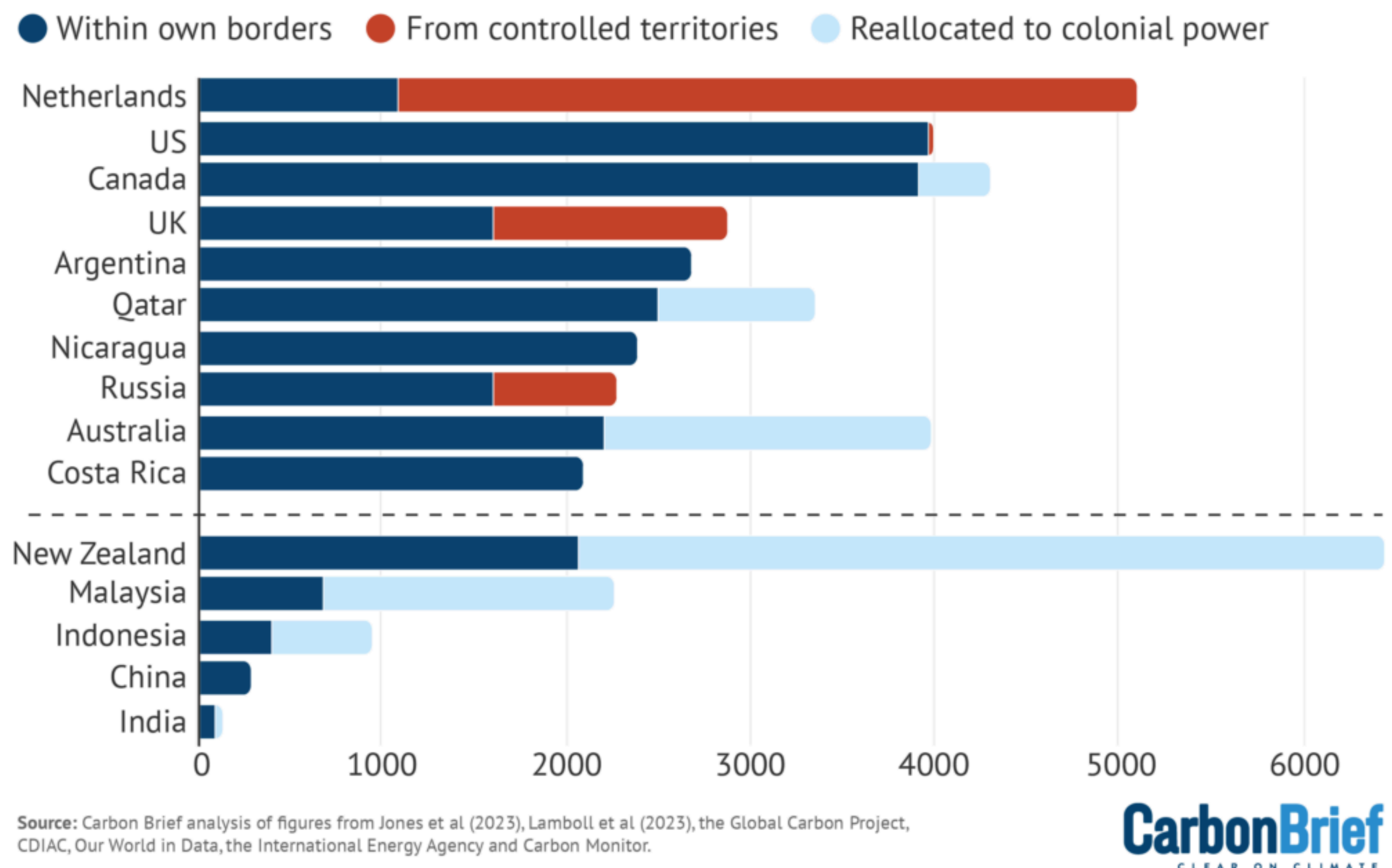
The figure also shows five other selected countries: Portugal (945tCO2) and France (857tCO2), with significant colonial footprints; as well as major emitters China (217tCO2) and India (52tCO2), which are far behind other nations on a per-capita basis.

Not shown on the chart is the average for the continent of Africa (92tCO2), which, like India's, is many times lower than the global average of 318tCO2.

The second approach to weighting historical emissions by population takes a country's per-capita emissions in each year and adds them up over time. This gives equal weight to the per-capita emissions of the populations of the past and the present day.

The results are shown in the figure below, again listing the top 10 emitters and five selected others.

Notably, the Netherlands is the top emitter on both per-capita metrics. Similarly, the UK, US and Canada all remain in the top five on this second per-capita basis.



Top ten countries with a population of at least 1 million and five selected others, in terms of their cumulative per capita CO2 emissions from fossil fuels, cement, land use, land use change and forestry, 1850-2023, tonnes per head per year. Colonial emissions in each year are weighted by the population of the colonial power. Source: Carbon Brief analysis of figures from Jones et al (2023), Lamboll et al (https://www.nature.com/articles/s41558-023-01848-5) (2023), the Global Carbon Project (https://www.globalcarbonproject.org/), CDIAC (https://cdiac.ess-dive.lbl.gov/), Our World in Data (https://github.com/owid/co2-data), the International Energy Agency (https://www.iea.org/data-and-statistics/charts/co2-emissions-from-international-shipping-in-the-net-zero-scenario-2000-2030) and Carbon Monitor (https://carbonmonitor.org/). Chart by Carbon Brief.

Other notable entries in the figure above include New Zealand and Australia, which ranked first and third, respectively, in Carbon Brief's previous analysis (https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/).

Once their significant early per-capita emissions, due to deforestation under colonial rule, are taken into account, both nations drop down the rankings on this second per-capita basis.

The chart includes five other selected countries, including Malaysia and Indonesia, which illustrate similar dynamics to New Zealand and Australia. Finally, the chart once again includes China and India, showing their cumulative per-capita emissions are far behind those of most others.

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How emissions imports and exports affect responsibility for warming

The search for overseas natural resources, to fuel the rise of industrialisation and globalisation, was one driver of colonial conquest.

In the post-colonial era, international trade continues to drive imports and exports of CO2, embedded in carbon-intensive goods and services.

Whereas standard emissions accounting is based on where CO2 is emitted, consumption-based emissions (https://www.carbonbrief.org/mapped-worlds-largest-co2-importers-exporters) accounting gives full responsibility to those that use the products and services rendered with fossil energy. This tends to reduce the total for major exporters, such as China.

However, there are challenges (https://www.carbonbrief.org/guest-post-the-uks-carbon-footprint-is-at-its-lowest-level-for-20-years) to calculating emissions on this basis, as it requires detailed trade tables. The consumption emissions data used for this analysis only begins in 1990 and only includes (https://www.pnas.org/content/108/21/8903) CO2 from fossil fuels and cement, meaning it excludes pre-1990 trade and LULUCF.

With these limitations in mind, the figure below shows how national responsibility for historical emissions is shifted further, when accounting for CO2 traded in goods and services.

Cumulative emissions in the period 1850-2023, including those that took place overseas under colonial rule, are shown in dark blue. The red chunks show additional CO2 associated with imported goods and services since 1990, while light blue shows CO2 embedded in exports.

Notably, former colonial powers, the UK and France have also been net CO2 importers since 1990, as the chart shows – although the impact on their overall totals is small.

When including these CO2 imports and exports, the UK’s share of historical emissions rises from 5.1% to 5.3%, while France goes from 2.2% to 2.3%.

On the flip side, China’s share of historical emissions and responsibility for current warming falls from 12.1% to 11.1%, when accounting for the trade in embedded CO2 since 1990. India’s share of the global total also falls, albeit fractionally, from 2.9% to 2.8%.

Former colonial powers also tend to be CO2 importers

The top 20 countries for cumulative CO2 emissions from fossil fuels, cement, land use, land use change and forestry, 1850-2023, billion tonnes. CO2 emissions that occurred within each country’s national borders and overseas during periods of imperial rule are shown in black, while those embedded in imported goods and services since 1990 are coloured red. Emissions embedded in exported goods and services are shaded light grey. Source: Carbon Brief analysis of figures from Jones et al (https://www.nature.com/articles/s41597-023-02041-1) (2023), Lamboll et al (https://www.nature.com/articles/s41558-023-01848-5) (2023), the Global Carbon Project (https://www.globalcarbonproject.org/), CDIAC (https://cdiac.ess-dive.lbl.gov/), Our World in Data (https://github.com/owid/co2-data), the International Energy Agency (https://www.iea.org/data-and-statistics/charts/direct-co2-emissions-from-aviation-in-the-net-zero-scenario-2000-2030) and Carbon Monitor (https://carbonmonitor.org/). Chart by Carbon Brief.

Exported goods accounted for as much as a quarter (https://www.climateworks.org/wp-content/uploads/2018/09/Carbon-Loophole-in-Climate-Policy-Final.pdf) of China's annual emissions in the mid-2000s. More recently, however, their share is down to around 10% (https://twitter.com/DrSimEvans/status/1453294026615148555) of China's yearly CO2 output.

Including carbon-intensive trade prior to 1990 would shift the picture shown in the figure above.

The UK, as the "workshop of the world (https://www.encyclopedia.com/humanities/dictionaries-thesauruses-pictures-and-press-releases/workshop-world)" in the 19th century, exported large volumes (https://histecon.fas.harvard.edu/energyhistory/British_energy_multipliers_Warde_Nov_2016.pdf) of energy- and carbon-intensive goods – often manufactured using resources gathered from its empire.

Other industrialising nations, such as the US and Germany, were also major exporters of manufactured goods, playing, as one 2017 paper (https://www.sciencedirect.com/science/article/pii/S0921800916307765) puts it, a similar role to that of China today.

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Table: Historical emissions and colonial responsibility

This article highlights the many alternative lenses through which historical responsibility can be viewed, with each showing a slightly different viewpoint on the world.

In order to foster discussion and debate over the figures – and in the spirit of transparency – the table below shows a range of metrics for all countries in 2023.

The table, which is sortable and searchable, lists countries according to their population, historical emissions within their own borders, emissions after accounting for colonial responsibility and the impact of CO2 embedded in trade since 1990 combined with colonial emissions.

Finally, the table shows the two alternative per-capita metrics. The first shows cumulative colonial emissions for each country, weighted by its population in 2023. The second shows per-capita colonial emissions in each year, cumulatively added up through to the present day.

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Country	2023 population, millions	Territorial GtCO2	Colonial GtCO2	Consumption GtCO2	tCO2 per population in 2023	Cumulative per capita tCO2
USA	340	528	530	540	1,560	3,999
EU+UK	517	375	478	506	926	1,252
China	1,426	307	309	284	217	281
Russia	144	170	239	226	1,655	2,272
United Kingdom	68	76	130	136	1,922	2,869
Brazil	216	115	115	116	533	1,421
Germany	83	92	92	97	1,105	1,288
India	1,429	87	74	71	52	81
Japan	123	72	73	80	593	685
Indonesia	278	91	69	68	248	386
Canada	39	60	59	59	1,524	3,914
France	65	37	56	59	857	1,209
International Transport	0	46	46	46	n/a	n/a
Netherlands	18	13	35	36	2,014	5,105
Mexico	128	31	31	32	245	727
Australia	26	32	29	28	1,088	2,196
South Africa	60	27	27	22	439	1,016
Italy	59	25	25	29	432	481
Argentina	46	25	25	25	543	2,678
Poland	41	27	23	22	557	659

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(Note that as for the figures above, this table excludes countries with a population of less than 1 million people.)

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A complete dataset covering all countries and all years, including the split between fossil fuel and LULUCF emissions, is available via GitHub (https://github.com/carbonbrief/colonial-emissions-data)*, under the same licence conditions.*

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Methodology: Historical emissions and colonial responsibility

This analysis is based on historical CO2 emissions from fossil fuel use, cement production, land use, land use change and forestry (LULUCF), during the period 1850-2023.

The approach taken for this article mirrors the methodology for Carbon Brief's 2021 analysis of historical responsibility (https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/) for climate change.

That earlier article explains how it is possible to make reliable estimates of historical emissions, even though they were not monitored or recorded at the time.

In broad terms, historical fossil fuel CO2 estimates rely on records of fossil fuel production and sale, with each unit of coal, oil and gas that is burned, releasing a predictable amount of CO2.

Estimates for LULUCF are based on records of changing patterns of land use, combined with models that translate these changes into related CO2 impacts.

The historical CO2 emissions figures used in this article are taken from research (https://www.nature.com/articles/s41597-023-02041-1) published in the journal *Scientific Data* in March 2023, covering the years 1850-2021.

This was authored by Dr Matthew Jones (https://mattwjones.co.uk/), research fellow at the Tyndall Centre for Climate Change Research at the University of East Anglia, with colleagues in Norway, Austria, Germany and the US.

In turn, this draws on data for fossil fuels and cement from the Global Carbon Budget (https://www.globalcarbonproject.org/carbonbudget/) (GCB), which adapts data from the Carbon Dioxide Information and Analysis Center (https://cdiac.ess-dive.lbl.gov/) (CDIAC)

prior to 1990.

The Jones et al paper uses estimated historical LULUCF emissions taken from three separate "bookkeeping models (https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/)" that contribute to the GCB.

Emissions from fossil fuels and cement are estimated for the years 2022 and 2023 based on the percentage changes reported by Carbon Monitor (https://carbonmonitor.org/), using country-specific figures where available.

Emissions from LULUCF for 2022 and 2023 are assumed to remain at 2021 levels.

Historical emissions estimates are combined with data on foreign rule, taken from a 2010 paper (https://journals.sagepub.com/doi/10.1177/0003122410382639) published in the *American Sociological Review* by Prof Andreas Wimmer and Yuval Feinstein, both then at the department of sociology at the University of California, Los Angeles (https://www.ucla.edu/).

Their paper tracks the rise of the independent nation state from 1816-2001. For each country and year, it lists whether a nation was independent and, if not, the foreign ruler.

Gaps in the Wimmer and Feinstein database were filled where necessary, using publicly available information. For example, the database combines some smaller colonial powers under a catch-all category of "other empires" and this was disaggregated where possible.

Notably, the database does not reflect changes in rule due to military occupation and Carbon Brief's analysis did not attempt to update this.

Similarly, a number of countries are not included in the Wimmer and Feinstein database.

For 10 missing countries with cumulative emissions of 0.5GtCO2 (0.02% of the global total) or more, Carbon Brief added publicly available information on periods of colonial rule, for use in the overall analysis. Missing countries with cumulative emissions below 0.5GtCO2 were not added into the database, except for two countries of the former Yugoslavia that were not originally included.

The code used for this analysis – and the resulting emissions figures – is available on GitHub (https://github.com/carbonbrief/colonial-emissions-data).

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A complete dataset covering all countries and all years, including the split between fossil fuel and LULUCF emissions, is available via the GitHub link, under the same licence conditions.

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Methodology: Why this analysis starts in 1850

The analysis for this article covers the period 1850-2023. There are a number of reasons for choosing this time period.

First and foremost, the data prior to 1850 is incomplete, posing a practical barrier to extending the analysis further back in time. While figures are available from 1750 onwards for national CO_2 emissions from fossil fuels and LULUCF, the fossil fuel figures in particular are relatively sparse.

More importantly, the Wimmer and Feinstein database on foreign rule only begins in 1816. Extending this data backwards would require manual checking for each country, as well as making judgements on the often-contested and cloudy question of when colonial rule began.

As for CO_2 emitted in the 1850s, pre-1850 emissions were predominantly from LULUCF.

This is because, as noted in Carbon Brief's 2021 analysis (https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/), CO_2 emissions from fossil fuels and cement were negligible in the period before 1850. Fossil CO_2 emissions during 1750-1850 amounted to less than 4GtCO_2, just over 0.1% of the cumulative total emitted subsequently.

The picture is a little different for LULUCF. Figures from OSCAR (https://zenodo.org/records/7313498), one of the three bookkeeping models used for post-1850 LULUCF estimates, extend back as far as 1701.

These figures show that some 93GtCO2 was released globally, during 1750-1850, equivalent to nearly 4% of the cumulative total from all sources during 1850-2023.

Nearly a quarter of this total originates in China and would not be reassigned on the basis of colonial rule. Another fifth is from the US and an eighth from Russia, but only just over 10% of the US figure occurred under British rule before 1776.

More notably, in the context of assigning colonial responsibility for historical emissions, are 4GtCO2 from LULUCF in India and the same again in Indonesia. Both countries were already under significant (https://www.britannica.com/place/India/Revolution-in-Bengal) colonial influence (https://www.britannica.com/place/Indonesia/Muslims-in-Java), even if not outright direct rule (https://www.britannica.com/event/British-raj).

Nevertheless, there is another reason to begin this analysis only in 1850. Specifically, 1850 is usually taken as the reference year (https://essd.copernicus.org/articles/14/4811/2022/) for historical simulations and marks the starting point for temperature changes, which are generally measured against an 1850-1900 baseline.

The IPCC's sixth assessment report calculates the "remaining carbon budget" for staying below 1.5C – or any other given temperature – starting from 1850.

This is because there is no good temperature baseline before then, says Prof Pierre Friedlingstein (http://emps.exeter.ac.uk/mathematics/staff/pf229), chair in mathematical modelling of climate systems at the University of Exeter (https://www.exeter.ac.uk/undergraduate/).

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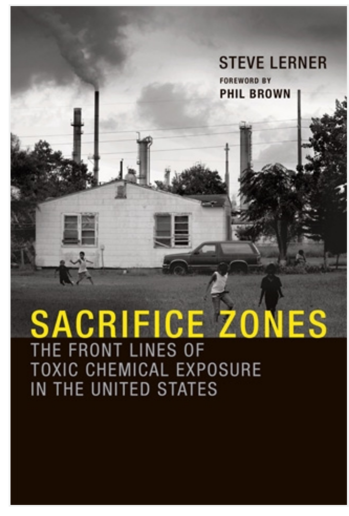

Sacrifice Zones: The Front Lines of Toxic Chemical Exposure in the United States

By Steve Lerner

The MIT Press

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The stories of residents of low-income communities across the country who took action when pollution from heavy industry contaminated their towns.

Across the United States, thousands of people, most of them in low-income or minority communities, live next to heavily polluting industrial sites. Many of them reach a point at which they say “Enough is enough.” After living for years with poisoned air and water, contaminated soil, and pollution-related health problems, they start to take action – organizing, speaking up, documenting the effects of pollution on their neighborhoods.

In *Sacrifice Zones*, Steve Lerner tells the stories of twelve communities, from Brooklyn to Pensacola, that rose up to fight the industries and military bases causing disproportionately high levels of chemical pollution. He calls these low-income neighborhoods “sacrifice zones.” And he argues that residents of these sacrifice zones, tainted with chemical pollutants, need additional regulatory protections.

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Sacrifice Zones goes beyond the disheartening statistics and gives us the voices of the residents themselves, offering compelling portraits of accidental activists who have become

grassroots leaders in the struggle for environmental justice and details the successful tactics they have used on the fenceline with heavy industry.

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TESTING THE BOMB: DISPARATE IMPACTS ON INDIGENOUS PEOPLES IN THE AMERICAN WEST, THE MARSHALL ISLANDS, AND IN KAZAKHSTAN

Jessica Barkas Threet*

The dawn of the nuclear age allowed the United States to dominate the world by means of a terrible and persistent force of nature. The full fury of nuclear weaponry was first visited upon Hiroshima and Nagasaki in 1945. Those events sparked the subsequent arms race between the United States and Soviet Union, resulting in hundreds of nuclear tests and thousands of doomsday weapons, many of which continue in existence today. Total disengagement of those weapons, however, would not mean we are safe from harm. Contamination of food and water supplies from nuclear testing, mining, and waste storage are issues with which future generations will be forced to contend. The Pandora's box cannot be closed, and we have assured a long and treacherous road ahead.

The immediate consequences of our nuclear activities can be seen in the indigenous populations living in the shadow of our nuclear weapons facilities.[1] These politically disempowered communities have been exploited by the superpowers in their rush to test more nuclear weapons and wreak more environmental havoc.[2] The governments of the United States and the former Soviet Union have been insensitive and indifferent to the heightened cultural vulnerabilities that have exacerbated contamination-related difficulties for affected populations.[3] They have largely refused to admit wrongdoing or to meaningfully compensate the victims.[4]

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* J.D. 2005, Seattle University School of Law; M.S. 2002, Western Washington University; B.S. 2000, University of Washington. Ms. Threet is presently a 2006 Knauss Marine Policy Fellow with the National Oceanographic and Atmospheric Administration. The author would like to thank the staff of the University of Baltimore Journal of Environmental Law, most notably Simone Kiersky and Missy McCurdy, for their suggestions and contributions in improving the quality of this article.

1. See discussion *infra* and *see generally* VALERIE L. KULETZ, THE TAINTED DESERT: ENVIRONMENTAL AND SOCIAL RUIN IN THE AMERICAN WEST 24-25 (1998), CHUGOKU NEWSPAPER, EXPOSURE: VICTIMS OF RADIATION SPEAK OUT 112-13 (1992) [hereinafter EXPOSURE]; YURI KUIDIN, KAZAKHSTAN NUCLEAR TRAGEDY 22 (1997) [hereinafter KAZAKH TRAGEDY].
2. *Id.*
3. Zohl de Ishtar, *Poisoned Lives, Contaminated Lands: Marshall Islanders Are Paying a High Price for the United States Nuclear Arsenal*, 2 SEATTLE J. SOC. JUST. 287, 299-300 (2003).
4. *Id.*

This article focuses on the impact of nuclear programs on the Native Americans of the American West; the native population of the Marshall Islands; and the ethnic Kazahks of Kazakhstan.[5] These groups, who appear to share few characteristics, have several things in common. For example, each has had little in the way of capital or political power; each is located far from major command and population centers; and each is of predominantly different race or ethnicity from decision-makers.[6]

Additionally, each community relies on the bounty of their ancestral lands for food and medicine.[7] They work the land and feed their families with the fruits of their labors.[8] This "living off the land" aspect is rarely taken into account in assessments of the health effects of environmental contamination, so what may be considered an "acceptable" level of contaminate for non-indigenous communities merely living in the contaminated zone will be multiplied substantially for an indigenous person gathering the majority of his or her food, water, and medicine from the contaminated area. This circumstance does not fit neatly into any particular category of environmental injustice, but may be described as a special case of distributive justice, or amplified disparate impact.[9] Themes of procedural due process are also implicated, as the impacted populations have been denied both notice of the potential contamination of their ancestral homelands and the opportunity to be heard after the fact.[10]

Neither the Western Native Americans, nor the Marshall Islanders, nor the Kazakhs have been offered any benefits designed to offset their sacrifices. Native Americans and Marshall Islanders from impacted areas do not make up a significant proportion of the holders of high-paying technical positions at the Department of Energy (DOE) or Department of Defense (DOD).[11] Local Kazakhs were not

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5. Britain, France, China, and other nations have also conducted nuclear tests. See, e.g the entry for "hydrogen bomb," in THE NEW AMERICAN DESK ENCYCLOPEDIA 611 (1989). Undoubtedly, indigenous and other politically disempowered populations were adversely affected, but for the purposes of this article, the author chosen to narrow the scope to the principle parties to the Cold War, the United States and Russia.
6. For Native Americans, see discussion *infra* pp. 4-12. For the Marshallese, see discussion *infra* pp. 12-20. ""For the Kazakhs, see discussion *infra* pp. 20-28.
7. *Id.*
8. *Id.*
9. Robert R. Kuehn, *A Taxonomy of Environmental Justice*, 30 ENVTL. L. REP., 10681, 10683 (2000) (describing distributive, procedural, corrective, and social justice). The phrase "amplified disparate impact" is the author's own.
10. *Id.* at 10688.
11. In the Marshall Islands, the population is employed in the fields of agriculture (21.4%), industry (20.9%), and services (57.7%), with the principle industries being copra, tuna processing, tourism, craft items from shell, wood, and pearls. CENT. INTELLIGENCE AGENCY, *World Factbook: Marshall Is-*

hired to manage the Soviet nuclear test site.[12] Instead, their homes were deemed "national sacrifice zones," as some have referred to highly contaminated sites.[13] It is implied in the term and supported by the documented use of humans as unknowing nuclear test subjects that those inhabitants of "national sacrifice zones" are, in fact, national human sacrifices.[14] The practice of compelling humans to serve as unwitting test subjects has been described by some as genocide.[15]

The governments of each of the indigenous populations described have engaged in different forms of disinformation campaigns to hide the truth about the nature of their activities and the hazards to the affected communities' health. The United States continues to deny wrongdoing, and the government of the current Russian Federation cannot be held responsible for the duplicitous actions of the defunct Soviet administration.[16] The two superpowers are nonetheless accountable for the wholesale poisoning of countless indigenous communities committed in the name of national security.

THE AMERICAN WEST: STAGES OF WEAPONS PRODUCTION AND THEIR IMPACTS ON INDIGENOUS POPULATIONS AND OTHER DOWNWINDERS

A. *Uranium mining*

In the 1950s and 1960s, uranium mines sprang up in the American West in response to the dawn of the nuclear age.[17] Hundreds, or even thousands, of mines were opened in Colorado, Utah, Arizona, Wyoming, New Mexico, and South Dakota, with lesser numbers in eleven other states.[18] Uranium mines were often constructed on tribal lands,

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lands, http://www.cia.gov/cia/publications/factbook/geos/rm.html#Econ (last modified Nov. 1, 2005). For the American West, *see e.g.*, KULETZ, *supra* note 1, at 43. "For the Native American inhabitants of these places, military/scientific occupation meant, at best, low-paid jobs to help build, maintain and clean the emerging [towns where DOD and DOE scientists and technicians live]"." *Id.*

12. *See generally* KAZAKH TRAGEDY, *supra* note 1.
13. A search of http://www.google.com reveals numerous references to "national sacrifice zones" or "national sacrifice areas" in writings discussing the use of Hanford, the Nevada Test Site, Niagara Falls area, and many other Department of Energy, Department of Defense, or private industrial areas.
14. Brenda Norrell, *Distribution Bill for Western Shoshone is Genocide*, INDIAN COUNTRY TODAY, Mar. 19, 2004, *available at* http://www.indiancountry.com/content.cfm?id=1079714945.
15. *Id.*
16. Robert Alvarez, A Brief History of Compensation for Radiation Injury and Disease in the United States 9-13 (Aug. 5, 2002) (unpublished manuscript, on file with the University of Baltimore Journal of Environmental Law); KAZAKH TRAGEDY, *supra* note 1, at 22.
17. *See generally* EXPOSURE, *supra* note 1, at 112-13; NUCLEAR WASTELANDS (Arjun Makhijani et al. eds., 1995) [hereinafter NUCLEAR WASTELANDS].
18. *Id.*

with the Navajo, Hopi, Laguna Pueblo, Zia Pueblo, Spokane, Northern Arapaho, Lakota, Acoma, and Jemez nations hosting significant numbers.[19] Driven by poverty, and ignorant of the risks to their health, tribal members made up the majority of the miner population.[20] They have been stricken with lung cancer and other ailments from working in the midst of uranium dust and radon gas, often with little or no filtration systems.[21]

B. *Weapons Fabrication and Fuel Refinement*

Fabrication and refinement facilities have been primary contributors to the most egregious radioactive pollution.[22] One of these facilities is located on the Hanford Nuclear Site in Washington State, partly within and adjacent to the Yakama nation's community and sacred sites.[23] Formerly home to a community of about twelve hundred, it is high steppe, semi-arid grassland and sagebrush country.[24] It is also thought by many to be the most contaminated site in the Western hemisphere.[25]

The Hanford fuel refinement facility discharged contaminated cooling water into the Columbia River, which ran radioactive for some years.[26] High-level waste tanks, housing a toxic stew of radioactive materials, are thought to have leaked one million gallons of fluid into the ground and to some extent, the Columbia River.[27] Low-level liquid wastes were simply discharged into open, unlined trenches, where they also seeped into the water table.[28] Because of discharges from Hanford and other industrial sites, the fish now found in the Columbia River basin are so contaminated that they pose a 1 in 60 cancer risk to those who eat them in quantities traditional to a Yakama nation diet.[29]

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19. *Id.* at 113-14; *see also* KULETZ, *supra* note 1, at 24-25.
20. NUCLEAR WASTELANDS, *supra* note 17, at 113-14, KULETZ, *supra* note 1, at 24-25.
21. EXPOSURE, *supra* note 1, at 46-48.
22. ROY E. GEPHART, HANFORD: A CONVERSATION ABOUT NUCLEAR WASTE AND CLEANUP 1.10 n. 11 (2003).
23. *Id.* at 5.1.
24. *Id.* at 1.10 n. 11.
25. *Id.* at 4.1.
26. *Id.* at 5.41. "An average of 10,000-12,000 curies a day was discharged" to the Columbia River from 1956 to 1965. *Id.* at 5.43. Sodium-24, Phosphorus-32, Neptunium-239, Zinc-65, and Arsenic-76 made up ninety-four percent of the radionuclides released from the reactors to the river. *Id.* at 5.43. Together, about 110 million curies were released to the Columbia between 1944 and 1971. *Id.* at 5.43.
27. *Id.* at 5.37-.38.
28. *Id.* at 5.39.
29. U.S. ENVTL. PROT. AGENCY, COLUMBIA RIVER BASIN FISH CONTAMINANT SURVEY 1996-1998 (2002), *available at* http://yosemite.epa.gov/r10/omp.nsf/d906d4ae3c3ddd1a88256f01007b607a/968c6816a0ef648488256f3b007b9499/$FILE/Fish%20Study.pdf.

The operators of the Hanford facility also intentionally exposed its neighbors, including the Yakama and white rural farmers, to releases of radioactive iodine, with the most appalling release occurring in the so-called "Green Run,"[30] which was apparently an experiment aimed at improving the United States' ability to track Soviet nuclear activities.[31] On December 3, 1949, between eight thousand and eleven thousand curies of radioactive I-131 was released into the atmosphere, with no warning or evacuation.[32] In contrast, the Three Mile Island incident in 1979 involved the release of only fifteen curies, and prompted the evacuation of all pregnant women and young children within five miles of the plant.[33]

Between 1944 and 1951, the Hanford facility was responsible for the release of hundreds of thousands of curies of I-131.[34] During that time, DOE contractors sent their employees to the area, posing as Department of Agriculture officials, in order to test the thyroids of local livestock for radioactive iodine.[35] In the years following the releases, children were sickened and farmers sometimes lost significant portion of their sheep flocks to stillbirths and bizarre deformities.[36] The human downwinders, many stricken with thyroid disease and other medical problems, are engaged in ongoing litigation with the DOE for compensation and medical monitoring.[37]

The situation was similar in Los Alamos, New Mexico, where Los Alamos National Laboratory also conducted experimental releases.[38] In this case, the radioactive substance was radiolanthanum, prompting scientists to dub them the "RaLa" tests.[39] In an effort to avoid the exposure of the Los Alamos community, the laboratory conducted its tests only when the prevailing winds blew away from Los Alamos – and towards the Pueblo Indian residences and food foraging areas.[40]

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30. MICHAEL D'ANTONIO, ATOMIC HARVEST: HANFORD AND THE LETHAL TOLL OF AMERICA'S NUCLEAR ARSENAL 119, 270 (1993).
31. *Id.* at 125.
32. *Id.* at 270.
33. *Id.*; U.S. NUCLEAR REGULATORY COMM'N, NUCLEAR REGULATORY COMMISSION FACTSHEET ON THREE MILE ISLAND, *available at* http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/3mile-isle.html (last modified Mar. 31, 2005).
34. D'ANTONIO, *supra* note 30, at 126. At least one source puts the figure at 727,900 curies. John Stang, *1944-1951: 727,900 Curies of Radioactive Iodine Released*, TRI-CITY HERALD, Jan. 29, 1999, *available at* http://archive.tri-cityherald.com/thyroid/history.html.
35. KULETZ, *supra* note 1, at 45.
36. D'ANTONIO, *supra* note 30, at 73.
37. *See, e.g.*, Hanford Downwinders Coal. v. Dowdle, 71 F.3d 1469 (9th Cir. 1995).
38. KULETZ, *supra* note 1, at 43.
39. *Id.*
40. *Id.* at 43-44.

C. *Nuclear Testing*

The area of nuclear testing is one in which the United States has been very reluctant to compensate victims or admit wrongdoing.[41] Causation is difficult to prove in court, and only limited Congressional action has allowed some victims to overcome sovereign immunity and receive compensation from the government.[42] Nuclear testing, particularly atmospheric testing, has some of the widest contamination patterns; exposure to harmful radiation need not occur as a result of living or working near the site.[43] Victims of fallout generally extract no benefit from nuclear test sites.[44]

In general, fallout stays on the land.[45] It does not wash away in a stream, except by flooding.[46] Nor is it practically possible to bulldoze, cap or seal it away.[47] Like liquid rain, it falls indiscriminately on crops, food-gathering areas, grazing land, livestock, and human populations, resulting in multiple exposures to those who depend primarily on the land for food, such as indigenous groups.[48]

Test sites are, therefore, chosen for their remote locations and few inhabitants. The American West hosts all of the continental United States' nuclear weapons test sites.[49] However, no consideration was given to the fact that those vast expanses include indigenous communities who inhabit, hunt, forage, and worship on the sites.[50] The Eastern and Midwestern United States, while home to appreciable numbers of laboratories and weapons fabrication facilities, do not

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41. *Id.* at 72-74.
42. *Id.* at 74.
43. *Cf. id.*
44. *Id.* at 15.
45. "Fallout" is the slowly descending particles of radioactive debris following a nuclear explosion. AMERICAN HERITAGE DICTIONARY 253 (2d ed. 1983); NEW AMERICAN DESK ENCYCLOPEDIA 439 (1989).Because it is essentially fine dust, it settles on land and is not any more readily removable than regular dust, which may be moved by flooding or duststorms.
46. *Id.*
47. KULETZ, *supra* note 1, at 15.
48. *See, e.g.* KULETZ, *supra* note 1, at 4.
49. American West sites include the Nevada Test Site in Nevada and the Trinity Site in New Mexico. "Peaceful" nuclear detonations have been carried out in sites outside of the NTS in Nevada, Colorado, Alaska, and Mississippi. KULETZ, *supra* note 1, at 44, 48, 60. The Department of Energy also admitted in 1993 that over 200 nuclear blasts took place in Nevada outside of the Nevada Test Site (NTS) between 1963 and 1990. *Id.* at 44. Three blasts also took place on Amchitka Island in the Alaskan Aleutian Island archipelago. NEVADA OPERATIONS OFFICE, UNITED STATES DEP'T OF ENERGY, UNITED STATES NUCLEAR TESTS, JULY 1945 THROUGH SEPTEMBER 1992 viii, xiii, xv (2000) [hereinafter NUCLEAR TESTS], *available at* http://www.nv.doe.gov/library/publications/historical/DOENV_209_REV15.pdf.
50. *See generally* KULETZ, *supra* note 1.

have the vast expanses of sparsely populated land available in the West.[51]

The Nevada Test Site

The Nevada Test Site (NTS) is the most bombed-out stretch of land on earth.[52] Over nine hundred nuclear tests were conducted on and below the site between 1952 and 1992, when a weapons testing moratorium was announced.[53] It is located on land just north of Las Vegas and claimed by the Shoshone under the Treaty of Ruby Valley, although the government continues to describe the area as nearly uninhabited.[54] On its western side is the land of the Western Shoshone; on its east lies the land of the Southern Paiute.[55] Surrounding the NTS are smaller bands, settlements, and reservations of both groups.[56] Also nearby are communities of Utes, Navajo, Hopi, Havasupai, and Hualapai.[57] The "nearly uninhabited" land, in reality, is home to over one hundred thousand to the south and east of the NTS.[58]

The circumstances under which NTS land was withdrawn from Shoshone control demonstrate the government's contempt for indigenous culture and claims to land. The 1863 Treaty of Ruby Valley allowed settlers to travel through Shoshone territory, including what is now the NTS, but did not authorize the removal of Shoshone control, and it did not cede territory to the government.[59] The United States offered the Shoshone $26 million for the territory in the 1970s, but the Shoshone have consistently refused the offer to sell.[60] The money was instead accepted by the United States Indian Claims Commission on "behalf" of the Shoshone.[61]

The Shoshone continue to assert their rights to the NTS land, even going so far as to issue visas that must be presented when entering the area.[62] Western Shoshone such as Carrie Dann continue to protest the theft of the NTS land and the desecration of sacred sites, such as

51. E.g. Fernald ,Ohio, Mound, Ohio, Oak Ridge, Tennessee, Savannah River, South Carolina, Brookhaven National Laboratory, New York.
52. KULETZ, *supra* note 1, at 70.
53. NUCLEAR TESTS, *supra* note 49.
54. KULETZ, *supra* note 1, at 148. For a DOE description of the area with respect to habitation by indigenous peoples, see TERRENCE R. FEHNER & F.G. GOSLING, ORIGINS OF NEVADA TEST SITE, 6-7 (2000), *available at* http://www.nv.doe.gov/library/publications/historical/DOE_MA0518.pdf.
55. KULETZ, *supra* note 1, at 134.
56. *Id.*
57. *Id.* at 72.
58. *Id.*
59. *Id.* at 148.
60. *Id.*
61. Id. at 148-49 (citing United States v. Dann, 470 U.S. 39, 40-41, 44 (1985)). The Supreme Court decided that appropriation of these funds to a Treasury account was "payment." *Id.*
62. *Id.* at 149.

Yucca Mountain, with nuclear waste repositories.[63] Meanwhile, the United States government has continued to further its military aims by consuming thousands of miles of Native American territory with firing ranges, conventional weapons testing sites, and proving grounds.[64]

Indigenous Exposure to Fallout and Damage Claims

Over 620 kilotons of fallout rained on Nevada, Arizona, and Utah, as compared with thirteen kilotons that fell on Hiroshima.[65] It is not surprising, therefore, that increased incidents of thyroid disease, cancer, and birth defects abound.[66] Many of the local inhabitants witnessed the tests firsthand, but were assured by the military that there was no danger.[67] A resident of the Moapa Southern Paiute Reservation described driving to the mountains between the NTS and the reservation to watch the spectacle of nuclear tests.[68] She now suffers thyroid problems.[69]

Medical science has known for some time that there is no "safe" dose of radiation, yet the military continued to assure local indigenous groups and other down-winders that no danger would ensue from the testing on the NTS site.[70] The 1984 ruling of the U.S. District Court for the District of Utah in *Allen v. United States*[71] attempted to provide locals with a remedy, holding that those who were not warned of the dangers of fallout were eligible to sue under the Federal Tort Claims Act (FTCA).[72] The broad exception to the FTCA, allowing federal agencies to avoid suit if their negligence was the result of "discretionary actions," was found not to apply.[73] The district court, regrettably, was reversed by the Tenth Circuit when it announced it would follow the Supreme Court's holding in United States v. S.A. Empreso de Viacao Aerea Rio Grandense (Varig Airlines):

> [T]he purpose of § 2680(a) [of the FTCA] was to avoid any judicial intervention that 'would require the courts to 'second guess' the political, social, and economic judgments of an agency.' Varig Airlines, 467 U.S. at 814. The bomb-testing decisions made by the President, the [Atomic Energy

63. Norrell, *supra* note 13.
64. *See generally* KULETZ, *supra* note 1, at 38-80.
65. KULETZ, *supra* note 1, at 72.
66. *Id.*
67. *Id.* at 3-4; Leonard W. Schroeter, *Human Experimentation, the Hanford Nuclear Site, and Judgment at Nuremberg*, 31 GONZ. L. REV. 147, 181 (1995) (discussing radiation injury litigation).
68. KULETZ, *supra* note 1, at 3.
69. *Id.*
70. *Id.* at 5.
71. Allen v. United States, 527 F. Supp. 476 (D. Utah 1981).
72. *Id.* at 486-88.
73. *Id.*

> Commission], and all those to whom they were authorized to delegate authority in the 1950s and 1960s, were among the most significant and controversial choices made during that period. The government deliberations prior to these decisions expressly balanced public safety against what was felt to be a national necessity, in light of national and international security. However erroneous or misguided these deliberations may seem today, it is not the place of the judicial branch to now question them.[74]

The Tenth Circuit's holding provided the government with immunity from suit by down-winders unless Congress passed legislation stripping that immunity. Congress responded to the challenge and passed the Radiation Exposure Compensation Act (RECA) in 1990, providing financial compensation to some miners, atomic veterans, and other downwinders.[75] RECA allows recovery for leukemia, multiple myeloma, non-Hodgkins lymphoma, and cancer of the thyroid, breast, stomach, pharynx, small intestine, pancreas, bile duct, gallbladder, and liver.[76] In order to be eligible, a claimant must have lived in certain areas downwind of the NTS for "a period of at least two years between January 21, 1951, to October 31, 1958, or for the period between June 30 and July 31, 1962."[77] Though some downwinders have successfully sued for damages, few have been from indigenous populations and none of the few epidemiological studies conducted in the area have included consideration of the diet and lifestyle of the indigenous populations.[78]

D. *Nuclear Waste Sites and Cleanup*

The DOE is presently engaged in the cleanup of nuclear weapons complexes at a cost of about seven to eight billion dollars per year.[79] More controversial, however, is the adequacy of the cleanup, as well as the DOE's choice to place nuclear waste disposal sites on or near in-

74. Allen v. United States, 816 F.2d 1417 (10th Cir. 1987) (citing United States v. S.A. Empresa de Viacao Aerea Rio Grandense (Varig Airlines), 467 U.S. 797 (1984)).
75. 42 U.S.C. § 2210 (2000).
76. Alvarez, *supra* note 16, at 21.
77. *Id.* at 24.
78. KULETZ, *supra* note 1, at 74-75.
79. Statement of Jesse H. Roberson, Assistant Secretary for Environmental Management U.S. Department of Energy before the Subcommittee on Energy and Water Development Committee on Appropriations U.S. Senate, April 7, 2003, *available at* http://www.em.doe.gov/doe/em/cda/content_detail_front_door/0,2119,14763_22306_23394,00.html.

digenous lands.[80] The most notorious of these sites is Yucca Mountain, sacred to the Shoshone.[81]

Some tribes or portions of tribes, such as the Shoshone, vigorously oppose the placement of any waste sites on their traditional lands, while other see hosting nuclear waste sites as a way to extract some benefits from the government, such as health care facilities and employment opportunities, in exchange for the inevitable degradation of their land.[82] It is a testament to some Native Americans' desperate need to survive that a culture for whom nature is central has come to embrace that which may destroy them.

NUCLEAR TESTING IN PARADISE: THE MARSHALL ISLANDERS

The United States' nuclear machine did not limit its exploitation of native lands to the continental United States. The first atomic tests after World War II took place in the remote South Pacific nation of the Marshall Islands.[83] The United States took the islands, populated chiefly by Micronesians working as subsistence farmers, from Japan after the war.[84] The Marshalls, the Northern Mariana Islands, and Micronesia became part of the United Nations Strategic Trust Territory to be administered by the United States until gaining its sovereignty in 1986.[85] The terms of the Trust required that the United States "promote the development of the inhabitants of the trust territory towards self-government or independence as may be appropriate . . . and to this end shall . . . promote the economic advancement of the inhabitants . . . encourage the development of fisheries, agriculture and industries; protect the inhabitants against the loss of their lands and resources."[86] The discussion below presents evidence gathered from the testimony of Marshall Islanders that the United States utterly failed at its fiduciary duties to the Marshall Islanders.

A. *"For the good of mankind": The Able, Baker, and Bravo Tests*

Before the Nevada Test Site ever came into being, Bikini Atoll exploded under the 1946 Able and Baker tests.[87] Earlier in 1946, the 167 residents of Bikini Atoll were told that they must be relocated

80. Doug Abrahms, *Interim Nuke Dump Site at Skull Valley May be on Fast Track*, RENO GAZETTE-JOURNAL, July 27, 2001, 1A ("reservation already is surrounded by toxic waste dumps, a military bombing range, a magnesium plant that topped the Environmental Protection Agency's list of toxic polluters in the mid-1990s and an army site that incinerates chemical and germ-warfare agents. . .").
81. KULETZ, *supra* note 1, at 189-90.
82. Abrahms, *supra* note 80.
83. de Ishtar, *supra* note 3, at 288-89.
84. NEW AMERICAN DESK ENCYCLOPEDIA 787-88 (1989).
85. *Id.*; de Ishtar, *supra* note 3, at 288.
86. de Ishtar, *supra* note 3, at 288-89 (internal citation omitted).
87. NUCLEAR TESTS, *supra* note 49, at 2.

from their fertile atoll to Rongerik, an infertile sandbar.[88] The U.S. Navy told the leader of the Bikinians that the bomb tests were "for the good of mankind," and that the move was only temporary.[89] In December of 1947, the Bikinians were moved from Rongerik, where they had been near starvation, to Kwajelein.[90] Eventually, they were brought to Kili, their present-day home.[91] Kili is a single island, not an atoll, so it lacks a protected harbor or lagoon suitable for fishing.[92]

In 1954, the "Bravo" test of the first hydrogen bomb was conducted over Bikini.[93] Its force was equivalent to 1000 Hiroshima bombs.[94] Although the day's prevailing winds blew toward inhabited islands, the test went forward without any warning to the islanders.[95] Fallout rained thick on Rongelap and Ailinginae Atolls, with lighter "mists" on Utirik.[96] Japanese fishing boats were also caught unaware in the fallout, with the most notorious being the *Daigo Fukuryu Maru* and its twenty three crewmen.[97] All were struck with radiation sickness, including nausea, vomiting, burns and hair loss.[98] The boat made the two-week journey home, where crew members were all admitted to hospitals.[99] For many months, they required blood transfusions, vitamins, and antibiotics until their white blood cell counts returned to normal levels.[100] A number of crewmen experienced liver failure, which may have been caused by contaminated transfusions or by the consumption of radiation-contaminated food on the trip home.[101] The condition of the crewmen suffering liver failure was no doubt exacerbated by weakened immune systems.[102]

The situation on Rongelap, however, was far worse. Flakes of fallout rained down like the snow about which the children had heard from the Christian missionaries, so they played in it.[103] Within hours, the islanders were experiencing burns, hair loss, nausea, vomiting, and all of the other attendant symptoms of radiation poisoning.[104] While the United States military immediately moved its vessels and

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88. de Ishtar, *supra* note 3, at 288.
89. Darlene Keju-Johnson, *For the Good of Mankind*, 2 SEATTLE J. SOC. JUST. 309 (2003).
90. de Ishtar, *supra* note 3, at 289.
91. *Id.*
92. *Id.*
93. *Id.*
94. *Id.*
95. *Id.*
96. de Ishtar, *supra* note 3, at 289.
97. EXPOSURE, *supra* note 1, at 129.
98. de Ishtar, *supra* note 3, at 289.
99. EXPOSURE, *supra* note 1, at 141.
100. *Id.*
101. *Id.* at 143-44.
102. *Id.*
103. Lijon Eknilang, *Learning from Rongelap's Pain*, 2 SEATTLE J. SOC. JUST. 315 (2003).
104. *Id.* at 315-16.

troops out of harm's way, the islanders on Rongelap were not evacuated for two days.[105] The Utirik islanders were not moved for three days.[106] During the Able and Baker tests in the 1940s, the islanders were evacuated; however, they were left in place during Bravo, and thus absorbed its full power.[107] The AEC reported to the media that some Marshallese had been "unexpectedly exposed to some radioactivity, there were no burns, all were reported well."[108]

B. *The Islanders' Culture and Sacrifice*

Marshall Islanders traditionally lived on cultivated foods such as breadfruit, arrowroot, makmok (tapioca), and coconuts. Their diet also relied heavily on fish and other seafood caught in the atolls.[109] The tests destroyed or contaminated the food on many islands, leaving the islanders to subsist on rice and canned food irregularly supplied by the U.S. military.[110] Some traditional foods were particularly impacted by contamination, so eating them posed even greater risks. An example is the popular coconut crab.[111] When the coconut crab molts, it eats its old shell in order to regain lost minerals.[112] By engaging in that process, however, it reabsorbs any contaminants in the shell, thus accumulating the contaminants throughout its life.[113] Although some Marshall Islanders were told by the Atomic Energy Commission to avoid the crabs, most were not, and they continued to consume the contaminated crabs.[114]

It is apparent from the accounts of the Marshall Islanders that all islands are not of the same quality and they certainly don't view each island as fungible.[115] The Bikinians still long to return to Bikini Atoll.[116] The people of Rongelap were loathe to leave, even in the face of evidence that to stay was to foreclose any future for their children.[117]

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105. de Ishtar, *supra* note 3, at 289.
106. *Id.*
107. *Id.*
108. *Id.* at 290.
109. Eknilang, *supra* note 103, at 316.
110. *Id.*
111. EXPOSURE, *supra* note 1, at 135.
112. *Id.*
113. *Id.*
114. *Id.* In 1974, the Atomic Energy Commission was replaced by the Energy Research and Development Administration and the U.S. Nuclear Regulatory Commission. U.S. NUCLEAR REGULATORY COMM'N, Atomic Energy Commission, http://www.nrc.gov/reading-rm/basic-ref/glossary/atomic-energy-commission.html (last modified Jan. 19, 2005).
115. *See generally* de Ishtar, *supra* note 3, at 289; Keju-Johnson, *supra* note 89, at 309; Eknilang, *supra* note 103, at 320.
116. EXPOSURE, *supra* note 1, at 129.
117. Eknilang, *supra* note 103, at 319-20.

C. A Human Radiation Experiment?

The United States used its careless exposure of the indigenous Marshall Islanders to its medical scientific advantage, leading some islanders to believe they were intentionally used as guinea pigs.[118] The AEC established a secret medical study to track the exposed Rongelap and Utirik islanders.[119] Utirik islanders were allowed to return to their island just a few months after the Bravo tests.[120] In 1957, the U.S. declared Rongelap safe and returned the islanders to their home.[121] Though both islands contain residual radiation, the DOE Brookhaven Laboratory, to this day the agency responsible for looking after the health of the exposed islanders, justified the decision to return the Rongelap people as affording "most valuable ecological radiation data on human beings."[122] Though the island was, in Brookhaven's view "perfectly safe for human habitation," the radiation level was excess of any "other inhabited location in the world."[123] The U.S. government had decided to capitalize on its carelessness and use the indigenous Marshall Islanders as unwitting test subjects.

D. Health Consequences

By the late 1950s and early 1960s, the evidence of harm from the tests was clear. Stillbirths and miscarriages doubled for exposed women.[124] Thyroid problems and developmental retardation became commonplace.[125] More than half of the children on Rongelap during the Bravo test developed thyroid problems by 1966, and by 1973, nearly 70 percent had developed thyroid tumors.[126] Several islanders have been stricken with leukemia.[127] Rongelap islanders found that many of their staple foods would no longer grow or bear fruit, and what plants or fish they could find often made them sick, although it had never done so before the tests.[128] Former inhabitants of Rongelap and other islands affected by the fallout have also suffered infertility and borne children with terrible abnormalities.[129]

Most often heard about are the "jellyfish babies."[130] Born with a limbless, boneless torso, these babies have transparent skin and die

118. Keju-Johnson, *supra* note 89, at 310-11.
119. de Ishtar, *supra* note 3, at 290.
120. *Id.*
121. *Id.*
122. *Id.* at 290-91.
123. *Id.* at 291.
124. *Id.*
125. *Id.*
126. *Id.* at 291-92.
127. Eknilang, *supra* note 103, at 317; EXPOSURE, *supra* note 1, at 129-30.
128. Eknilang, *supra* note 103, at 316.
129. *Id.* at 317; EXPOSURE, *supra* note 1, at 131.
130. Eknilang, at 103, at 318.

within a day or two.[131] Some women have given birth to things they can only describe as "apples," "turtles," "octopuses," or "strands of purple grapes."[132] Many women die in giving birth to these deformed babies.[133] Marshall Islanders' have been reluctant to discuss these abnormal births because of the native belief that reproductive abnormalities indicate that a woman has been unfaithful to her husband.[134] None of these cancers or reproductive anomalies were known to the Marshall Islands prior to atomic testing, and yet no epidemiological study of the exposed islanders has been completed.[135] The DOE doctors assigned to Rongelap and Utirik continue to tell the islanders that there is no risk and that they are fine, when it is quite clear that they are not.[136] Convinced that their chronic lack of energy and other illnesses were related to the persistent contamination on Rongelap, the islanders petitioned the U.S. to move them - it refused.[137]

E. Persistent Contamination

In 1968, the AEC told the exiled Bikinians that they could return to their atoll; the islanders, however, decided against a community-wide homecoming, but permitted individuals to return.[138] In 1975, the same agency found Bikini's wells and home-grown food to be too radioactive for human consumption.[139] In 1978, the Bikinians were moved back to Kili.[140] In 1985, without the U.S.'s help, the Rongelap islanders moved to Mejato Island in Kwajalein Atoll.[141] Mejato does not produce enough food for everyone, so the displaced Rongelap islanders remain dependent on food aid from the U.S.[142] Kwajalein Atoll has mostly been taken over by a U.S. military base and missile test range.[143] The former inhabitants of Kwajalein Atoll were moved to Ebeye, a sixty-acre island that has been expanded to less than 100 acres to accommodate its 12,000 inhabitants.[144]

Deprived of many of the fertile islands by contamination or by U.S. military facilities and testing grounds, the Marshallese are now dependent upon U.S. aid for most of their revenue.[145] Although a number of agreements have been negotiated and congressional acts have been

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131. *Id.*
132. *Id.*
133. *Id.*
134. *Id.*
135. *Id.* at 317-18; Keju-Johnson, *supra* note 89, at 312.
136. EXPOSURE, *supra* note 1, 134, 137.
137. Eknilang, *supra* note 103, at 319.
138. de Ishtar, *supra* note 3, at 291.
139. *Id.* at 292.
140. *Id.*
141. Eknilang, *supra* note 103, at 320.
142. *Cf. id.* at 320.
143. de Ishtar, *supra* note 3, at 294.
144. *Id.*
145. *Id.* at 298-300.

passed to provide the Marshallese with some compensation for the loss of health and life (usually in response to litigation),[146] the destruction of Marshallese culture and land remains largely uncompensated.[147] While the U.S. pays a rent of $15 million per year for Kwajalein, it continually fails to provide funds for adequate food for displaced islanders, medical care for the victims of radioactive contamination, personal injury or property damage compensation.[148] Bikini Islanders were given $25,000 cash and a $300,000 trust fund that yields $15 per year per person for the destruction of their ancestral home.[149] Enewetak Islanders were given even less.[150] None of the agreements mentioned here provide any apparent compensation for physical and mental pain and suffering.

The DOE doctors monitor only the inhabitants of Rongelap and Utirik, though fallout affected many other islands and atolls.[151] Those with thyroid tumors are shipped off to Guam or to the mainland U.S. to get the tumors removed, all the while admonished to speak to no one but DOE representatives.[152]

Marshall Islanders have been repeatedly removed or driven off of from their ancestral homelands in order to make way for nuclear tests and military facilities.[153] Radioactive fallout contaminated many islands and atolls other than Bikini, Enewetak, Rongelap, and Utirik, but the U.S. persists in its failure to fully assess and take responsibility for the health effects of the bomb tests on the Marshallese.[154] Kwajalein Atoll is the site of continuing military activity and is the testing and development ground for President Reagan's "Star Wars" intercontinental ballistic missile program and all of its progeny, including the current administration's programs.[155] The U.S. military and DOE continue to exploit the Marshall Islanders, by failing to pay adequate compensation for the loss of land, health, and cultural heritage.[156] As an active destroyer of Marshall Islands land and resources, the U.S. has utterly failed its duties as a trustee, instead choosing conduct that indicates only self-interest and contempt for the islanders.

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146. *See generally*, Ann C. Deines, et al., *Marshall Islands Chronology: 1944 to 1990* (Jan. 11, 1990), *available at* http://worf.eh.doe.gov/ihp/chron/.
147. *See generally*, Eknilang, *supra* note 103, at 319-20; de Ishtar, *supra* note 3, at 290, 299-301; Alvarez, *supra* note 16, at 12-13.
148. *Id.* at 299-300. "Under the new agreement, rent on Kwajalein was increased from the previous $ 13 million per year to $ 15 million per year from October 2003 to 2014, with a further increase to $ 18 million per year until 2023." *Id.*
149. *Id.* at 290.
150. *Id.*
151. Keju-Johnson, *supra* note 89, at 312.
152. *Id.*
153. *See generally* de Ishtar, *supra* note 3, at 288.
154. *Id.* at 292.
155. *Id.* at 295.
156. *Id.* at 297-99.

For the American nuclear weapons machine, the islanders were forced to sacrifice a significant proportion of their ancestral lands and foods, their autonomy, and their health. Again, issues of procedural and distributive justice are involved, along with the "amplified disparate impact," similar to that felt by indigenous peoples of the American West.[157] A small island nation bore the weight of decisions made in Washington, D.C., half a world away - all of this without the islanders' consent, real benefit, or compensation remotely approaching their loss.

THE NUCLEAR TESTS OF THE FORMER SOVIET UNION IN KAZAKHSTAN

The indigenous Marshallese and residents of the fallout shadow of the Nevada Test Site were, unfortunately, not the only victims of nuclear testing during the Cold War. The Soviet Union carried out around 456 above- and below-ground tests at the Semipalatinsk test site in the Kazakh Republic, now the independent country of Kazakhstan.[158] While many U.S. tests were announced beforehand (though no one was warned of the dangers of fallout), the Soviet tests were carried out in total secrecy.[159] No warning or explanation was given to the surrounding villages and towns, though the tests frequently resulted in significant property damage.[160]

A. *Kazakh Origins and the Interaction with Russia*

Kazakhstan, a large Central Asian nation, is made up of mountains, arid and semi-arid steppe, and desert.[161] Kazakhstan has a long history of Turkish tribal influence and fighting off Mongol hordes vying for control of the steppe.[162] Kazakhs traditionally have made their living as nomads, moving with their herds of sheep, goats, horses, and camels and sleeping in yurts.[163] Traditional Kazakh culture is so pastoral that it is customary to inquire about the health of a person's livestock before the health of the person himself.[164]

Prior to Russian control, the Kazakhs divided themselves into the Great, Middle, and Small Hordes.[165] The three groups are not thought to have been divided so much by clan or other ethnic or familial differences as by Kazakhstan's geography, which afforded win-

157. Kuehn, *supra*, note 9, at 10683-85.
158. EXPOSURE, *supra* note 1, at 73.
159. *Id.* at 72, 74.
160. *Id.* at 73.
161. *See* MARTHA BRILL OLCOTT, THE KAZAKHS 3 (1987) [hereinafter KAZAKHS].
162. *Id.* at 5.
163. *Id.* at 16.
164. *Id.* at 20.
165. *Id.* at 10.

ter and summer ranges for three separate groups.[166] Russian control and influence in Kazakhstan began in the 18th century, when the Small and Middle Hordes pledged allegiance to the Russian monarchy in exchange for protection from the invading Mongols.[167] The territory of the Great Horde was not brought under Russian control until the mid-19th century.[168] Once under Russian control, the monarchy sent ethnic Russians to settle and farm Kazakh territory, hoping that the example would lead the Kazakhs to abandon their nomadic lifestyle and become more sedentary, predictable neighbors.[169] Islam, more prevalent in the south owing to the closer proximity to the influence of Muslim states, was restricted and Christianity encouraged.[170] The Kazakh nomads tended to incorporate only some of the elements of Islam, particularly the ceremonial aspects, combining it with elements of preexisting animistic and shamanistic beliefs.[171] Even today, Islam as practiced in most parts of Kazakhstan is more ritualistic than doctrinal.[172]

Though the steppe land made better pasture than cropland owing to the arid climate, the Russian settlers continued to move into Kazakhstan and plow up valuable pasturage.[173] The loss of pasturage to farming coupled with restrictions on migration routes contributed to the decline of Kazakh nomadism.[174] By the decade before World War I, three million Europeans had settled in Kazakhstan, where less than five million Kazakhs remained.[175] In 1916, the Kazakhs staged an unsuccessful uprising against the Russians, protesting taxation, animal quotas, and the draft.[176] After Russia deported hundreds of thousands of Kazakhs in retribution, famine followed.[177] It is estimated that 1.5 million Kazakhs died of starvation between 1926 and 1939;[178] other estimates put the death toll closer to four to six million.[179] Poorly planned mass farming collectivization drives in the 1930s put a permanent end to the nomadic lifestyle, already rendered nearly impossible by land restrictions.[180] The Soviet state took over all

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166. *Id.* at 10-11.
167. *See id.* at 31, 34-40, 71-72.
168. *See id.* at 71-72.
169. *Id.* at 84.
170. MARTHA B. OLCOTT, KAZAKHSTAN: UNFULFILLED PROMISE 207-208 (2002) [hereinafter PROMISE].
171. *Id.*
172. *Id.*
173. KAZAKHS, *supra* note 161, at 83.
174. *Id.* at 99.
175. *Id.* at 83.
176. PROMISE, *supra* note 170, at 13.
177. *Id.* at 207-08.
178. KAZAKHS, *supra* note 161, at 184.
179. PROMISE, *supra* note 170, at 13.
180. KAZAKHS, *supra* note 161, at 185, 187.

Kazakh lands, assigning a parcel to each family, but the parcels were not enough to support a reasonably sized herd.[181]

In the 1950s and 1960s, the head of the Soviet government initiated the "Virgin lands" program, meant to plow up the "underutilized" grassland in central and northern Kazakhstan for winter wheat.[182] The "Virgin land" was, in reality, valuable pasturage. Nonetheless, the Soviet leadership pushed on, dedicating twenty-four million acres of grassland to wheat farming in a region with inadequate rainfall and further hampering the ability of the Kazakhs to feed their livestock.[183] The encroachment of Russian settlers in the 1890s at the behest of the Russian monarchy, the aftermath of the 1916 uprising, and the 1930s collectivization drives, followed by the Virgin Lands program are pointed to by some Kazakh nationalists as evidence of three different attempts at the genocide of the Kazakhs by Russia.[184]

B. *Semipalatinsk and the Soviet Nuclear Bomb Effort*

The Soviets also began using Semipalatinsk, Kazakhstan, as a nuclear weapons test site.[185] The Soviet weapons complex utilized the labors of several tens of "secret cities," which do not appear on maps.[186] Soviet scientists, technicians and military personnel lived in this closed city, designing and testing weapons that would rock the region until 1989.[187]

Semipalatinsk test site (STS) was created by Soviet decree in 1947.[188] It encompasses an area of 18,500 square kilometers.[189] The area around Semipalatinsk, located in the East Kazakhstan *oblast* (area), is predominantly grassland and mountains.[190] Though census data indicates that the population of East Kazakhstan *oblast* is almost evenly split between ethnic Kazakhs and ethnic Russians, this diverse population is concentrated in the cities.[191] Small villages and settlements, however, are populated chiefly by ethnic Kazakhs, who are generally very poor and uneducated.[192]

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181. *Id.* at 186.
182. *Id.* at 224.
183. *Id.* at 237.
184. PROMISE, *supra* note 170, at 13.
185. EXPOSURE, *supra* note 1, at 305.
186. Kurchatov was also called Moscow-21, Moscow-400, and Semipalatinsk-121. A more complete list of Soviet secret cities can be found in MURRAY FESHBACH, ECOLOGICAL DISASTER: CLEANING UP THE HIDDEN LEGACY OF THE SOVIET REGIME 73, 110-11 (1995).
187. *Id.*; KAZAKH TRAGEDY, *supra* note 1, at 15.
188. KAZAKH TRAGEDY, *supra* note 1, at 15.
189. *Id.* at 16.
190. *Id.*
191. KAZAKHS, *supra* note 161, at 261-62.
192. *Id.*; Interview with Dana Tumenova, a Kazakh immigrant whose family lived near Semipalatinsk, Spring 2004.

Approximately forty-five other nuclear tests were conducted in locations in the western *oblasts* of Kazakhstan.[193] All of these areas are decidedly dominated by ethnic Kazakhs.[194] To make way for STS, thousands of Kazakh families were moved.[195] Many more thousands, however, remained around the borders of STS in the villages of Kainar, Karaul, Sarzhal, and Znemenka, on the southern and southeastern borders, and in Dolon and Mayskoye along the northeastern edges.[196]

C. Hundreds of Bombs and High Dose Human Experimentation

Between 1949 and the US-UK-USSR agreement to ban aboveground nuclear testing in 1963, the Soviets detonated 118 atomic bombs above-ground at Semipalatinsk.[197] In 1953, the Karaul village was evacuated in anticipation of a test, with the exception of forty adult males left as guinea pigs.[198] For years, the army physicians tracked the men's illnesses and deaths. All were dead by 1995, with most failing to reach age fifty.[199] Most died of cancer, leukemia, or mental disorders.[200] It is estimated that the men were exposed to over 200 rads.[201] In Karaul, fallout contamination activity reached 250 Roentgens/hour ("R/h"),[202] in Dolon, 200 R/h, and in Kainar and Sarzhan, 150 R/h.[203]

Karaul residents, who had been evacuated during the 1955 tests, were returned when the activity was 40-60 R/h, still a dangerous level.[204] After 1963, tests moved underground in the Balapan area of the STS and into the mountain in the Degelan area.[205] Nevertheless, whole families have been wiped out by radioactive contamination.

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193. NTI, *Kazakhstan: Nuclear Test Sites Overview*, http://www.nti.org/db/nisprofs/kazakst/weafacil/weafatop.htm (last modified Nov. 7, 2002).
194. NTI, *Kazakhstani Facilities Map*, http://www.nti.org/db/nisprofs/maps/kaz.htm (last visited Dec. 18, 2005); PROMISE, *supra* note 170, at 247-48. Ten nuclear weapons were detonated over the Kazakh portion of Kapustin Yar and a nuclear explosion was detonated near the town of Aralsk; peaceful nuclear explosions were conducted at Azgyr (17), Lira (6), Say-Utes (3), and seven seismic tests at other locations. NTI, *Kazakhstan: Nuclear Test Sites Overview*, *supra* note 193. The Soviets also conducted about 130 tests in the Arctic Ocean on and around the island of Novaya Zemlya. FESHBACH, *supra* note 186, at 43.
195. KAZAKH TRAGEDY, *supra* note 1, at 16.
196. *Id.* at 27. This is not an exhaustive list.
197. *Id.* at 17.
198. *Id.* at 136.
199. *Id.*
200. *Id.*
201. EXPOSURE, *supra* note 1, at 75. A rad is a unit of measure used to determine the radiation absorbed dose. For a more detailed explanation of radiation exposure and dose units, *see infra* note 222.
202. EXPOSURE, *supra* note 1, at 75.
203. KAZAKH TRAGEDY, *supra* note 1, at 17.
204. *Id.*
205. *Id.*

One activist reported that all six of her uncles from Karaul had died of cancer in their thirties.[206]

D. Environmental and Food Contamination—Health Effects Emerge

Pasturage and food sources were contaminated with fallout, so villagers residing near the STS not only ingested radioactivity but also absorbed it through their skin.[207] STS-area sheep had a higher radiochemical concentration than those in other *oblasts*; milk was also extremely contaminated, and animal bones contained from four to thirty-five times the concentration of radionuclides as in outside areas.[208] Increased rates of cancers, leukemia, and cardiovascular disorders were recorded by a regional health facility posing as a veterinary medicine lab, which reported the results to Moscow without sharing them with area residents.[209]

In the late 1950s, physicians noted abnormal skin and hair, increased cancer rates, cardiovascular abnormalities, and weakened immune systems in residents of Kainar, a village of about 5000.[210] The doctors called the illness Kainar syndrome, but were at all times forbidden by the Soviets from finding the cause of the illness to be radiation poisoning.[211] Also in Kainar, doctors found that 90% of patients examined in 1992 and 1993 suffered from some kind of immune deficiency, while 114 of the 3200 children under fourteen had congenital deformities and central nervous system problems.[212] Southern villages from Znaminka to Kainar are home to a high concentration of children with serious limb deformities.[213] It is no great surprise that Kainar and the other southern villages seem to have the sickest populations, since the Soviet army conducted tests when the wind was blowing southward, toward the villages, and away from the larger cities in the north and northeast, such as Semipalatinsk.[214]

In 1990, Semipalatinsk *oblast* had a 40% higher rate of cancer than a control group.[215] Infant mortality grew five to ten percent after 1950.[216] Stillbirths doubled between 1960 and 1988,[217] while rates of neurological disorders, psychiatric disorders, and mental and physical retardation have increased rapidly.[218] The average lifespan dropped

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206. EXPOSURE, *supra* note 1, at 74.
207. KAZAKH TRAGEDY, *supra* note 1, at 19.
208. EXPOSURE, *supra* note 1, at 77.
209. KAZAKH TRAGEDY, *supra* note 1, at 20.
210. *Id.* at 21.
211. *Id.*
212. *Id.*
213. EXPOSURE, *supra* note 1, at 78.
214. *See id.* at 73-75.
215. KAZAKH TRAGEDY, *supra* note 1, at 21.
216. *Id.*
217. PROMISE, *supra* note 170, at 20; EXPOSURE, *supra* note 1, at 79.
218. KAZAKH TRAGEDY, *supra* note 1, at 21 (explaining the symptoms of "Kainar Syndrome," named for the village near Semipalatinsk where the disease was

three to four years,[219] declining to sixty-five years.[220] Sarzhal village's young men found themselves impotent and committed suicide at high rates.[221] One and a half million people in the *oblasts* around STS have been exposed to doses of greater than one rem[222] and have heritable chromosomal changes.[223] All over Kazakhstan, life expectancies and general health continue to be affected by nuclear waste and chemicals left over from missile and rocket tests. A 1.5 million hectare area in West Kazakhstan has been destroyed by missile and rocket testing and fuel contamination.[224]

E. *Nevada-Semipalatinsk and Kazakh Nuclear Freedom*

The Nevada-Semipalatinsk organization was formed in 1989 by Olzhas Snleimenor, a member of the Soviet bureaucracy.[225] During an interview with a television reporter, he released the reports of some military men that radiation had been released from the test site.[226] Suddenly, the Kazakhs were aware of what had been done to them. The organization used Gorbachev's policy of *glasnost* to air their concerns about the test site and to protest any more tests.[227] The protest movement was successful at shutting the site down. After Kazakhstan gained its independence from the Soviet Union, its first president, Nursultan Nazarbayev, closed the Semipalatinsk site.[228] Kazakhstan, per its constitution, is now a nuclear weapons-free state[229] and is engaged in continuing negotiating efforts to sign and ratify the Central Asian Nuclear Weapons Free Zone treaty.[230]

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discovered). Symptoms include weakening of the immune system, increase of oncological disease and suicide. *Id.*

219. *Id.*
220. PROMISE, *supra* note 170, at 203.
221. KAZAKH TRAGEDY, *supra* note 1, at 21.
222. Rem, or Roetgen Equivalent Man is the unit of radiation *dose* traditionally used in the United States (Sievert is now the preferred scientific unit), while Roentgen/hour is measure of *exposure* (dose and exposure are distinct). 10 C.F.R. § 20.1004 (2005). Radiation safety regulations in the United States limit annual radiation dose for members of the general population due to NRC-regulated activities (e.g. civilian nuclear power plants) to 100 mrem per year (millirem, or one one-thousandth of a rem). 10 C.F.R. § 20.1301 (2005). The annual occupational dose limit is 5000 mrem (or 5 rem) per year. 10 C.F.R. § 20.1201 (2005). *See, e.g.* IDAHO STATE UNIV., Radiation Information Network, *Radiation and Risk*, http://www.physics.isu.edu/radinf/risk.htm (last visited Dec. 18, 2005).
223. KAZAKH TRAGEDY, *supra* note 1, at 22.
224. FESHBACH, *supra* note 186, at 73.
225. KAZAKH TRAGEDY, *supra* note 1, at 23.
226. *Id.*
227. *Id.*
228. *Id.* at 24.
229. *Id.*
230. CENTER FOR NONPROLIFERATION STUDIES, Scott Parrish, *Central Asian States Achieve Breakthrough on Nuclear Weapon-Free Zone Treaty*, (Sept. 30, 2002), *available at* http://cns.miis.edu/pubs/week/020930.htm; RADIO FREE EU-

Unfortunately, Kazakhstan must make much more than declarations to rid itself of the legacy of nuclear testing. Kazakhstan has rich extractable resources with which it could help its people, but the landlocked nation is presently battling difficulties with transporting its resources, as well as corruption in its leadership.[231] The Russians take little responsibility for the consequences of the tests, finding them the problem of an old regime that no longer exists. Far from the plains of Semipalatinsk, Soviet leaders ordered a terrible experiment in nuclear world domination, in the homeland of a people of a different race and cultural background from the European Russians so prevalent Moscow. Since the Soviet regime no longer exists, the Kazakhs find themselves with even less recourse than the victims of the United States' nuclear ambitions.

CONCLUSION

The compensation of nuclear weapons testing victims is no simple matter. The victims of Soviet testing have been deprived of an existent responsible party from whom to seek compensatory damages. Victims of U.S. testing are hampered by their relative political weakness, by problems of proving causation due to, for example, the passage of time and uncertain intensity of exposure, legal procedural obstacles like sovereign immunity and, perhaps most daunting, by a political establishment in a distant city unable or unwilling to fully apologize[232] and to make real efforts to fully compensate nuclear testing victims. Thus, the burden of recognizing the human health, life and cultural tolls taken by nuclear weapons testing falls to the common citizens of countries that "benefited" from nuclear weapons testing, inasmuch as nuclear WMDs are ever a "benefit."

The burden of assuring that these human tolls are never again taken also falls to common citizens. I see two complimentary paths

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ROPE RADIO LIBERTY, Robert McMahon, *Central Asia: Treaty on Nuclear Weapon-Free Zone Advances,* (July 29, 2005), http://www.rferl.org/features article/2005/07/DC0E71D0-79C1-4213-9B23-D86453C71778.html.

231. See PROMISE, *supra* note 170, at 10.

232. On October 3, 1995, DOE offered a public apology to the victims of radiation experiments conducted between 1944 and 1974. KULETZ, *supra* note 1, at 245. While a highly publicized official U.S. government apology for radiation exposure due to nuclear testing has not been forthcoming to date, sixteen bills with apology language have been introduced to compensate radiation exposure victims since the 101st Congress. Seven of them ultimately became the Radiation Exposure Compensation Act, P.L. 101-426, in which the Congress apologized to downwinders in Arizona, Utah, and Nevada and to uranium miners. ("(c) APOLOGY- The Congress apologizes on behalf of the Nation to the individuals described in subsection (a) and their families for the hardships they have endured."). 42 U.S.C. § 2210 (2000). Most recently, Sen. Conrad Burns introduced S. 977 in May 2005 to provide compensation to NTS downwinders in Montana. S. 977, 109th Cong. (2005).

moving forward, both of which will have to be citizen-driven. First, citizens must, individually or as part of a like-minded group, continue to pressure lawmakers to provide adequate healthcare and compensation to victims of nuclear weapon radiation exposure. Second, citizens must continue to pressure lawmakers and federal regulators to pass legislation and/or adopt policies supportive of international disarmament agreements and treaties such as ratifying the Comprehensive Test Ban, which would ban all nuclear testing, including underground explosions and "peaceful" explosions,[233] and supporting international efforts to expand the Nuclear Weapons Free Zone treaty model,[234] as Kazakhstan and its neighbors are doing in Central Asia.[235]

The first path looks back to healing past wounds and attempting to put right lives and cultures greatly damaged by nuclear weapons testing. It should be supplemented with personal and organizational gifts of medical and economic aid, with special sensitivity to the unique needs of the people of Kazakhstan, the Marshall Islanders, and Native Americans. The analyses of the specific needs of each region are beyond the scope of this article, but a few things seem obvious. The location of the Marshall Islands, in the South Pacific, suggests tourism as a future industry, hampered though some of the islands may be today by the image of nuclear testing ground. Kazakhstan and many areas of the American West have significant natural resources, the exploitation of which can and does provide economic benefit. However, the benefits of natural resource extraction would be most fully realized with an approach that is conservative of the resource and the ecosystem, does not replace one environmental poison with another, and leaves open the possibility of tourism and other non-extraction based industries.

Both Kazakhs and indigenous communities in the American West are struggling with nuclear and other hazardous waste disposal from

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233. The Comprehensive Test Ban was signed by the United States in 1996, but the Senate failed to consent to ratification by a two-thirds majority vote in the Senate in 1999. THOMAS BUERGENTHAL & SEAN D. MURPHY, PUBLIC INTERNATIONAL LAW IN A NUTSHELL 341-42 (3d ed. 2002).

234. Arms Control Association, *Nuclear-Weapons-Free-Zones (NWFZ) at a Glance,* ""(July 2003) *available at* http://www.armscontrol.org/factsheets/nwfz.asp. "A nuclear-weapon-free zone (NWFZ) is a specified region in which countries commit themselves not to manufacture, acquire, test, or possess nuclear weapons. Three such zones exist today, and two others have been negotiated but have yet to enter into force. Countries in Latin America (the 1967 Treaty of Tlatelolco), the South Pacific (the 1985 Treaty of Rarotonga), and Southeast Asia (the 1995 Treaty of Bangkok) have all forsworn nuclear weapons. African countries also agreed to prohibit nuclear weapons on their continent, but the 1996 Treaty of Pelindaba has not entered into force." *Id.*; *See also* UNITED STATES DEPT. OF STATE, *Nuclear Weapons Free Zones Factsheets,* at http://www.state.gov/t/np/wmd/nnp/nwfz/ (last visited Dec. 18, 2005).

235. Parrish *supra* note 230; McMahon, *supra* note 230.

their own region, as well as the possibility of importing more from other areas. In a pragmatic sense, the waste that has already been produced must be safely disposed of somewhere and that somewhere should probably not be close to major population centers or placed on otherwise unspoiled land. However, the citizens that benefit from distant waste disposal must be made to pay the full cost of such disposal, beyond just buying cheap desert land. Sufficient fees, rent, state of the art containment, as well as good paying jobs must be provided to waste site neighbors so that the decision to host a waste site or go with some other kind of economic development is a real decision.

Part and parcel to planning the economic future of these impacted regions is the prevention of further contamination and the proliferation of nuclear and other WMDs, as well as securing existing weapons materials. Thus, the second path is also instrumental—individual citizens and concerned NGOs must pressure the U.S. foreign policy establishment to move forward on the Comprehensive Test Ban, promote Nuclear Weapons Free Zones and other disarmament treaties and agreements, and continue to aid and support the securing and dismantling of weapons stockpiles in Kazakhstan and other former Soviet states.[236]

The citizen group Nevada-Semipalatinsk successfully lobbied the Kazakh leadership to declare Kazakhstan a nuclear weapons free state very early in Kazakh independence.[237] Individual citizens and NGOs, with the participation and input of native peoples, must exert similar effort to get the United States to commit to ending nuclear weapons testing for good. The longer term goal should be for the United States, Russia, and other nuclear states to develop an international compensation regime for victims of nuclear weapons pollution- such a

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236. The U.S. Congress, under the leadership of Sen. Sam Nunn (D-GA) and Sen. Richard Lugar (R-IN), passed legislation to begin a program of "cooperative threat reduction" (CTR) 1991 to combat the "potential for the loss of weapons, theft of nuclear material, or the emigration of weapons scientists to 'rogue states'" following the break up of the Soviet Union. Michael Jasinski, *Issue Brief: Nonproliferation Assistance to Russia and the New Independent States,* (Aug. 2001), *at* http://www.nti.org/e_research/e3_4a.html. The Departments of Defense, Energy, State, and Commerce are involved in various aspects of the CTR program. The Bush Administration tried to cut funding for CTR in 2001, but Congress approved additional funding after 9/11. *Id.* "Department of Defense efforts under the [CTR Program] focus on providing assistance to the NIS countries in meeting their strategic arms reduction obligations under START I and eliminating and/or safeguarding their WMD infrastructure . . . CTR assistance was instrumental in convincing Belarus, Kazakhstan, and Ukraine to accede to the Nuclear Non-Proliferation Treaty (NPT) as non-nuclear weapon states. The transfer of all nuclear warheads from their territory to Russia (accomplished by the end of 1996), and the elimination of the strategic nuclear delivery systems and infrastructure on their territory was also supported by the CTR Program." *Id.*

237. KAZAKH TRAGEDY, *supra* note 1, at 23.

regime could operate in the form of a tax on the nuclear states to pay for medical and economic aid to be applied for by the citizens of regions impacted by testing, whether the state ultimately responsible can be made to pay directly or not. An unqualified commitment on the part of the United States and other nuclear states to end weapons testing will be an important step forward in healing the injuries to human health and culture in the Marshall Islands, Kazakhstan, the American West, and in all of the other native lands damaged or destroyed by nuclear weapons testing.