APPENDICES

1. The UN Secretariat has compiled an impressive amount of materials for the Court's dossier in these proceedings, including a number of scientific reports "likely to throw light upon the question[s]".[582] Rather than repeat those reports, the Appendices below highlight key scientific facts and policy issues on climate change that are relevant to IUCN's statement and the Questions in these proceedings.

2. **Appendix I** concerns the anthropogenic interference with the climate system and its current and projected impacts.

3. **Appendix II** concerns the net-zero targets and pathways to stay below the 1.5°C temperature threshold.

4. **Appendx III** discusses the mitigation of climate change through Nature-based Solutions (NbS).

5. **Appendix IV** contains IUCN's observations on relevant provisions of the UNFCCC, the Kyoto Protocol and the Paris Agreement, which were not fully discussed in the main body of this statement.

[582] Statute of the International Court of Justice, Article 65(2).

APPENDIX I: ANTHROPOGENIC CLIMATE CHANGE

I. Natural Greenhouse Effect and Anthropogenic Interference with the Climate System

6. The 'natural' greenhouse effect – i.e. the trapping of heat by the Earth's atmosphere – is necessary for life on Earth. Without it, "the average temperature at Earth's surface would be below the freezing point of water".[583]

7. The greenhouse effect[584] has naturally occurred on Earth long before human civilization. However, since the Industrial Revolution, the greenhouse effect has increased due to human activity, with unprecedented levels of emissions of greenhouse effect-causing gases into the atmosphere.[585]

8. Human-led greenhouse gas (GHG) emissions increase the global surface temperature constitute 'anthropogenic' interference with the climate system.[586]

A. Greenhouse gases

9. GHGs are "gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation".[587] The primary GHGs present in the Earth's atmosphere are water vapour (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and ozone (O_3).[588]

10. GHGs are emitted from a variety of sources and economic sectors and activities, mainly from energy and transportation systems and industrial processes, as well as from agriculture and land use changes, including deforestation. GHGs accumulate in the atmosphere over time, and the increase of GHG atmospheric concentrations increases the atmosphere's heat-trapping function.[589]

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[583] IPCC, 2007: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [S Solomon, D Qin, M Manning, Z Chen, M Marquis, KB Averyt, M Tignor and HL Miller (eds)], 115.

[584] Le Treut, H., R. Somerville, U. Cubasch, Y. Ding, C. Mauritzen, A. Mokssit, T. Peterson and M. Prather, 2007: *Historical Overview of Climate Change*. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, p 97, 115-116.

[585] IPCC Archive, Working Group I: The Scientific Basis, 1.3 Human-induced Climate Variations. Available at: https://archive.ipcc.ch/ipccreports/tar/wg1/044.htm.

[586] IPCC, 2007: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [S Solomon, D Qin, M Manning, Z Chen, M Marquis, KB Averyt, M Tignor and HL Miller (eds)], 135.

[587] UNFCCC Article 1(5).

[588] In addition to these GHGs, the Kyoto Protocol also covers sulphur hexafluoride (SF_6), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). There are also some man-made GHGs, such as *halocarbons* and other chlorine- and bromine-containing substances, dealt with under the Montreal Protocol.

[589] In 2019, atmospheric CO_2 concentrations (410 parts per million) were higher than at any time in at least 2 million years. See IPCC AR6 SPM (2023) 4.

11. They are long-lived and well-mixed in the atmosphere, which means emissions from different sectors and countries are combined and dispersed globally in the atmosphere, where they remain for varying durations of time. Once emitted, these gases contribute to the greenhouse effect for hundreds or thousands of years. Different GHGs have different warming potency – also known as global warming potential (GWP) – and this depends on their ability to absorb energy and how long they remain active in the atmosphere.[590]

B. Climate Change Science: the IPCC

12. The "state of scientific, technical and socio-economic knowledge on climate change, its impacts and future risks, and options for reducing the rate at which climate change is taking place"[591] is regularly and comprehensively assessed by the Intergovernmental Panel on Climate Change (IPCC).[592]

13. The IPCC was established by the WMO and UNEP to provide governments with scientific information that they can use to develop climate policies.

14. Volunteer scientists at the IPCC assess thousands of scientific papers, and issue assessments of climate science, environmental and socio-economic impacts of climate change, as well as formulate climate change response strategies "that are policy relevant, but not policy-prescriptive: they may present projections of future climate change based on different scenarios and the risks that climate change poses and discuss the implications of response options, but they do no not tell policymakers what actions to take".[593]

15. Since its establishment in 1988, IPCC assessment reports have fed directly into international climate policymaking and the Climate Conferences held under the framework of the UNFCCC. The IPCC works "on a comprehensive, objective, open and transparent basis",[594]

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[590] "The impact of greenhouse gas emissions upon the atmosphere is related not only to radiative properties, but also to the time-scale characterizing the removal of the substance from the atmosphere. Radiative properties control the absorption of radiation per kilogram of gas present at any instant, but the lifetime … controls how long an emitted kilogram is retained in the atmosphere and hence is able to influence the thermal budget. …GWPs [global warming potentials] are a measure of the relative radiative effect of a given substance compared to another, integrated over a chosen time horizon. The choice of the time horizon depends in part upon whether the user wishes to emphasise shorter-term processes (e.g., responses of cloud cover to surface temperature changes) or longer-term phenomena (such as sea level rise) that are linked to sustained alterations of the thermal budget (e.g., the slow transfer of heat between, for example, the atmosphere and ocean). In addition, if the speed of potential climate change is of greatest interest (rather than the eventual magnitude), then a focus on shorter time horizons can be useful." IPCC Archive Working Group I: The Scientific Basis, 6.12 Global Warming Potentials, Available at: https://archive.ipcc.ch/ipccreports/tar/wg1/247.htm.

[591] The Intergovernmental Panel on Climate Change, https://www.ipcc.ch/

[592] IPCC Factsheet, 'What is the IPCC?' [2021] https://www.ipcc.ch/site/assets/uploads/2021/07/AR6_FS_What_is_IPCC.pdf

[593] ibid.

[594] Principles Governing IPCC Work, para 2. Available at: https://www.ipcc.ch/site/assets/uploads/2018/09/ipcc-principles.pdf.

assessing the best available science and representing the minimum global consensus in the areas above.[595]

C. Anthropogenic Interference with the Climate System

16. In its Sixth Assessment Report, the IPCC confirmed that "human activities, principally through the emissions of GHGs, have 'unequivocally' caused warming of the climate system", with increases in atmospheric GHG concentrations from around the year 1750.[596]

17. In addition, the IPCC found that GHG emissions have been rising, with 2010-2019 levels higher "than in any previous decade".[597] In fact, 17% of all "historical cumulative net CO_2 emissions since 1850 occurred between 2010 and 2019".[598] This percentage is very likely to even higher in the current decade, as the most recent data estimates that total global GHG emissions in 2021 were similar to or even surpassed emissions in 2019,[599] and that GHG emissions in 2022 reached a new record high.[600]

18. This scientific finding that humans influence the climate system is included in the second preambular paragraph of the UNFCCC, which refers to the States Parties' concern that:

> "human activities have been substantially increasing the atmospheric concentrations of greenhouse gases, that these increases enhance the natural greenhouse effect, and that this will result on average in an additional warming of the Earth's surface and atmosphere and may adversely affect natural ecosystems and humankind."

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[595] "IPCC's reports are regarded as the most authoritative source of information on the science of climate change since they are subject to extensive review by experts and governments, ensuring the highest standards of quality and policy relevance." https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/dg-research-and-innovation-welcomes-intergovernmental-panel-climate-change-ipcc-report-2023-03-20_en

[596] IPCC AR6 SPM (2023) 4.

[597] ibid.

[598] IPCC, 2022: Summary for Policymakers. In: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926.001., 10. The IPCC issues "comprehensive assessment reports every 5 to 7 years" and special reports periodically on topics agreed to by its member governments. IPCC reports often build on previous reports and reflect new findings in the literature. IPCC reports are subject to intensive, multi-year, reviews. The IPCC also produces summaries of its reports to guide policy-makers. These summaries are subject to line-by-line political consensus. As IPCC reports take several years to compile the reports, the latest emission numbers are from 2019. IPCC, 'IPCC agrees on the set of scientific reports for the seventh assessment cycle. Available at: https://www.ipcc.ch/2024/01/19/ipcc-60-ar7-work-programme/; IPCC, 'Preparing Reports'. Available at: https://www.ipcc.ch/about/preparingreports/.

[599] UNEP 2022, *Emissions Gap Report 2022: The Closing Window — Climate crisis calls for rapid transformation of societies*, xvi.

[600] WMO, 'Greenhouse Gas Concentrations Hit Record High. Again' Available at: < https://wmo.int/news/media-centre/greenhouse-gas-concentrations-hit-record-high-again>. See also, UNEP 2023, *Emissions Gap Report 2023: Broken Record,* 4; IEA (2023), CO_2 Emissions in 2022. Available at: https://www.iea.org/reports/co2-emissions-in-2022.

19. The anthropogenic element is prominent in the concept of climate change, defined in Article 1(2) of the UNFCCC 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."

20. Indeed, it is this anthropogenic interference that is driving climate change,[601] the rise in global average temperatures, ocean acidification, the rise of sea levels, the warming of oceans and many other adverse impacts on the climate system. Anthropogenic interference pose threats to human and natural systems, as well as to the very existence of some States.

II. Historic and Current Levels of GHG emissions

21. Since 1750, the world has emitted over 1.5 trillion tons of CO_2.[602] Historical emissions matter because it is the absolute accumulation of GHGs in the atmosphere over time that drives climate change.[603] In the 18th century, only a few countries were responsible for the vast majority of historical emissions.[604]

22. This picture has changed. Since the beginning of the industrial revolution, GHG emissions have continued to increase rapidly, rising to uncharted levels in human history.[605] Atmospheric CO_2 concentrations are now 50% higher than pre-industrial levels.[606] CO_2 emissions increased from 10.9 billion tons per year in the 1960s to approximately 36.6 billion tons per year in 2022.[607]

23. The amount of CO_2 in the atmosphere today is comparable to where it was around 4.3 million years ago, during the mid-Pliocene epoch, when sea level was about 22.86 metres (75 feet) higher than today, and the average temperature was 7 degrees Fahrenheit higher than in pre-industrial times.[608]

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[601] Glossary: Climate Change. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Climate_change

[602] H Ritchie and M Roser (2020) - "CO_2 emissions" Published online at OurWorldInData.org. Available at: https://ourworldindata.org/co2-emissions; IPCC AR6 SPM (2023) para A.1.3.

[603] Historical emissions and the absolute volume of CO_2 emissions being determining for current warming provide "the scientific basis for the cabon budget, the total amount of CO_2 that can be emitted to stay below any given limit on global temperatures", CarbonBrief, 'Analysis: Which countries are historically responsible for climate change'. Available at: https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/.

[604] Hannah Ritchie (2019) - "Who has contributed most to global CO2 emissions?" Published online at OurWorldInData.org. Available at: https://ourworldindata.org/contributed-most-global-co2.

[605] ibid; IPCC AR6 SPM (2023).

[606] WMO, 'Greenhouse Gas Concentrations Hit Record High. Again'. Available at: https://wmo.int/news/media-centre/greenhouse-gas-concentrations-hit-record-high-again.

[607] NOAA, 'Greenhouse gases continued to increase rapidly in 2022'. Available at: https://www.noaa.gov/news-release/greenhouse-gases-continued-to-increase-rapidly-in-2022#:~:text=The%20main%20driver%20of%20increasing,the%20Global%20Carbon%20Project%20%2C%20which.

[608] ibid.

24. Updated scientific data, which used methods as close as possible to the most recent IPCC AR6 reports, produced estimates of key climate indicators which show that human-induced warming reached 1.14°C over the 2013-2022 decade, and 1.26°C in 2022.[609] According to some reports, 2024 has seen global warming exceeding temperatures of 1.5°C over a 12-month period.[610] Between 2013 and 2022, "human-induced warming has been increasing at an unprecedented rate of over 0.2°C per decade".[611] Even if States take immediate action on their most ambitious plans, GHG emissions and atmospheric concentrations are projected to keep increasing at least until 2025.[612]

25. Despite scientific assessments about the devastating consequences of climate change, global GHG emissions continue to increase, although regional contributions differ.[613]

26. In fact, contributions differ dramatically. Least developed countries and SIDS contributed minimal emissions – less than 0.4% and 0.5% of historical cumulative CO_2 emissions respectively.[614] There is a similar gap between more and less developed countries when we look at present day emissions. The world's top seven emitting States account for approximately 50% of current global GHG emissions. Emissions from all G20 countries account for 76% of current global GHG emissions. This means that the remaining countries in the world only emit 24% of the current global GHG emissions.[615]

III. The Scientifically Assessed Current and Projected Impacts of a Warming Climate System

27. In this Section, IUCN discusses the current impacts of climate change on people, nature and society, followed by its projected impacts. Impacts of temperature increases below 1.5°C are also discussed below.

A. Observed Climate Change Impacts

28. Climate change already plays a dire impact on human well-being and our planet.[616]

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[609] P Forster et al, 'Indicators of Global Climate Change 2022: Annual update of large-scale indicators of the state of the climate system and human influence' (2023) 15(6) Earth System Science Data
[610] Copernicus Climate Change Service, 'Surface Air Temperature for January 2024'. Available at: https://climate.copernicus.eu/surface-air-temperature-january-2024.
[611] ibid.
[612] UNFCCC Subsidiary Body for Scientific and Technological Advice and Subsidiary Body for Implementation, 'Technical Dialogue of the First Global Stocktake. Synthesis Report by the Co-Facilitators on the Technical Dialogue.' (8 September 2023) FCCC/SB/2023/9, p 16.
[613] IPCC AR6 Headline Statements from the Summary for Policymakers. Available at https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_HeadlineStatements.pdf.
[614] IPCC, Climate Change 2022: Mitigation of Climate Change SRM, B.3.2.
[615] UNEP 2023, *Emissions Gap Report 2023: Broken Record,* 4; IEA (2023), CO2 Emissions in 2022. Available at: https://www.iea.org/reports/co2-emissions-in-2022.
[616] IPCC AR6 SPM (2023) para A.2.

29. As "[i]t is unequivocal that human influence has warmed the atmosphere, ocean and land",[617] the IPCC assessed that increased weather and climate extremes have already led to "irreversible impacts, as natural and human systems are pushed beyond their ability to adapt".[618] It reported that "[c]limate change has already caused substantial damages, including increasingly widespread, pervasive, and irreversible losses in terrestrial, freshwater, coastal, and open marine ecosystems" and species extinctions.[619]

30. Other forms of damage are approaching irreversibility, such as hydrological changes from retreating glaciers and changes in mountain and Arctic ecosystems from permafrost thaw.[620] As explained by the IPCC:

> "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)."[621]

31. June to August 2023 was the warmest summer on record.[622] On 4 July 2023, the world experienced its hottest average temperature ever at 17.04°C. This record was broken the next day, with the global average temperature reaching 17.06°C. That further increased to 17.08°C on 6 July 2023.[623]

32. The average global surface temperature in July was 1.12°C above average, ranking it as the warmest July in the US National Oceanic and Atmospheric Administration's (NOAA) 174-year record, and likely the warmest month in the past 120,000 years.[624] WMO predicts that temperatures over the next five years will surge to record levels.[625]

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[617] IPCC AR6 WGI, Headline Statements from the Summary for Policymakers, A.1.
[618] IPCC AR6 WGII, Summary for Policymakers, B.1 IPCC, 2022: Summary for Policymakers [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)]. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3–33.
[619] ibid, 9, B.1.2.
[620] ibid.
[621] ibid, B.1.
[622] Copernicus Climate Climate Change Service, 'Summer 2023: the hottest on record' (5 September 2023) <https://climate.copernicus.eu/summer-2023-hottest-record.
[623] Copernicus Climate Change Service, 'July 2023 Sees Multiple Global Temperature Records Broken' (8 August 2023) < https://climate.copernicus.eu/july-2023-sees-multiple-global-temperature-records-broken >.
[624] National Oceanic and Atmospheric Administration (NOAA), 'Record Shattering: Earth had its Hottest July in 174 Years' (14 August 2023) < https://www.noaa.gov/news/record-shattering-earth-had-its-hottest-july-in-174-years>; United Nations News, 'It's Official: July 2023 was the Warmest Month Ever Recorded' (8 August 2023) < https://news.un.org/en/story/2023/08/1139527>
[625] WMO, 'Global Temperatures Set to Reach New Records in Next Five Years' (17 May 2023) < Global temperatures set to reach new records in next five years (wmo.int)>

33. Sea surface temperatures also broke historic records around the world in 2023. The Copernicus Climate Change Service documented that on 31 July 2023, average daily sea surface temperatures reached 20.96°C, which was the highest in the organization's dataset, with the largest sea surface temperature anomaly by far for any July in the dataset.

34. These record high sea surface temperatures are associated with several marine heatwaves, including sea surface anomalies as large as 3°C in the Mediterranean, and reaching "5.5°C along the coasts of Italy, Greece and North Africa".[626] Sea surface temperatures reached record breaking levels in July and August 2023 in the Caribbean Basin.[627] Every day in August 2023 has seen global average sea surface temperatures exceeding the previous record.[628]

B. Ongoing Irreversible Impacts on Natural and Human Systems

35. This level of heat stress in the oceans is causing significant coral bleaching events that experts opine will cause catastrophic and permanent reef mortality.[629] Reefs in Panama, Colombia, El Salvador, Costa Rica, Mexico and other countries in the Caribbean, including The Bahamas and Cuba, are suffering significant bleaching events, and corals are dying from unprecedented levels of ocean heat stress.[630]

36. It has been observed that "[e]cosystems are rapidly changing in response to climate change and other global change drivers, not only in response to temperature changes but also associated changes in precipitation, atmospheric carbon dioxide concentration, water balance, ocean chemistry, and the frequency and magnitude of extreme events. Ecosystems vary in their sensitivity and response to climate change because of complex interactions among organisms, disturbance and other stressors".[631]

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[626] Copernicus Climate Change Services, 'Global Sea Surface Temperature Reached Record High' (8 August 2023) <https://climate.copernicus.eu/global-sea-surface-temperature-reaches-record-high.
[627] NOAA, 'The World Just Sweltered Through Its Highest August On Record' (14 September 2023) <https://www.noaa.gov/news/world-just-sweltered-through-its-hottest-august-on-record#:~:text=August%202023,-The%20average%20global&text=For%20the%20fifth%2Dconsecutive%20month,month%20in%20NOAA's%20climate%20record>; NOAA, 'The Ongoing Marine Heatwaves in U.S. Waters Explained' (14 July 2023) <https://www.noaa.gov/news/ongoing-marine-heat-waves-in-us-waters-explained>; NOAA, 'Global Oceans Roiled by Marine Heatwaves, with More on the Way' (28 June 2023) <https://research.noaa.gov/2023/06/28/global-ocean-roiled-by-marine-heatwaves-with-more-on-the-way/>.
[628] Copernicus Climate Change Service, 'Summer 2023: The Hottest on Record' (5 September 2023) <https://climate.copernicus.eu/summer-2023-hottest-record>
[629] The Guardian, 'Huge Coral Reef Bleaching Event Unfolding Across The Americas Prompts Fear of Global Tragedy' (11 August 2023) <https://www.theguardian.com/environment/2023/aug/11/coral-bleaching-central-america>.
[630] ibid.
[631] ibid. "Climate change ultimately drives terrestrial biodiversity loss and affects ecosystem carbon storage both directly and indirectly via land use change, i.e. climate change-driven cropland expansion."

37. The extent and magnitude of the current impacts are greater than the IPCC's estimates in previous assessment reports.[632] Human-induced climate change is driving the increasing frequency, intensity and duration of extreme weather events, including droughts, wildfires, terrestrial and marine heatwaves, cyclones, and major flooding.[633] These events indicate that, even at an increase of just 1.1°C, which is the current level of temperature increase above pre-industrial level, the climate system can no longer be considered safe for all, everywhere.

38. The effects and risks arising from climate change are unequally distributed. While climate change affects all countries, not all countries are equally vulnerable. Across regions and sectors, the most vulnerable people and systems are disproportionately impacted by climate change.[634] Despite their much lower contributions to global emissions, these populations are most negatively affected by climate impacts and climate extremes, and have the least capacity to adapt to, or survive, these impacts.

39. For example, 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.[635]

40. Where climate hazards interact with high levels of vulnerability, climate change contributes to humanitarian crises such as displacement, flood and drought-related acute food insecurity and malnutrition.[636] The IPCC estimates that approximately 3.3 to 3.6 billion people live in situations that are highly vulnerable to climate change.[637] Global hotspots of high human vulnerability are found in West, Central and East Africa, Central and South America, SIDS, and the Arctic.[638]

41. Any loss of or damage to ecosystems, and the services they provide, has cascading and long-term impacts on people, especially for Indigenous People and local communities (IPLCs) directly dependent on ecosystems to meet their basic needs.[639]

42. Climate change has already adversely affected the physical health of global populations, increasing diseases, trauma from climate extremes, loss of livelihood and culture, exposure to wildlife smoke, atmospheric dust, and cardiovascular and respiratory distress.

[632] ibid.
[633] IPCC AR6 SPM (2023) para A.2.1-7.
[634] IPCC AR6 SPM 'Impacts, Adaptation and Vulnerability' (2022) 9.
[635] ibid, 12.
[636] ibid, 11.
[637] ibid, 12.
[638] ibid.
[639] ibid, 12.

C. Future Climate Change Impacts

43. The impacts described above will continue and increase in the near term (2021-2040) mainly due to cumulative CO_2 emissions in all pathways considered by the IPCC.[640]

44. The IPCC reported that :

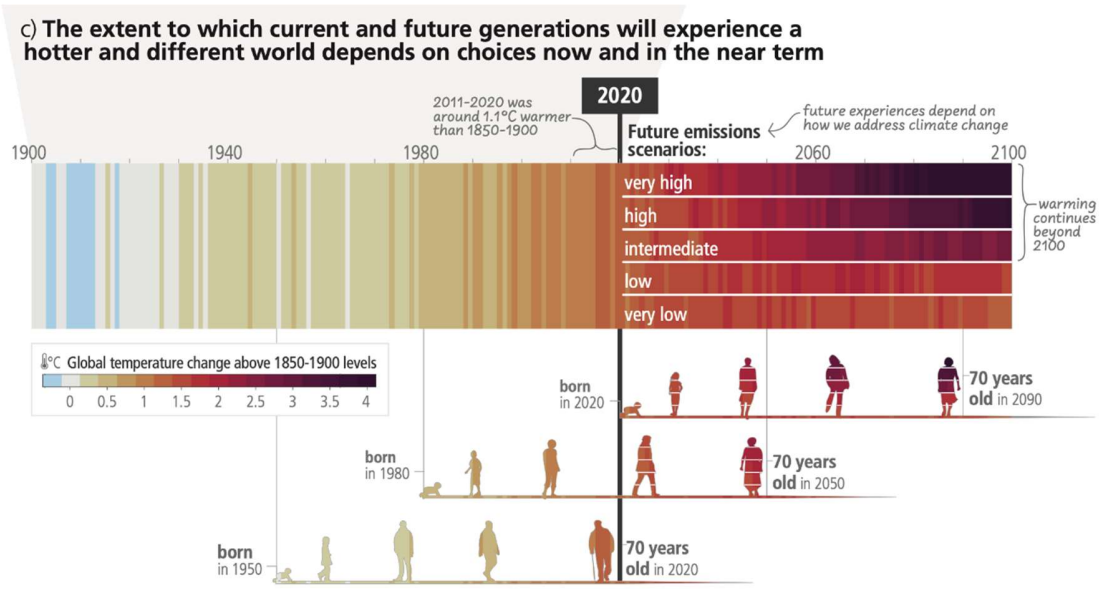
> "[c]ontinued emissions will further affect all major climate system components. With every additional increment of global warming, changes in extremes continue to become larger. Continued global warming is projected to further intensify the global water cycle, including its variability, global monsoon precipitation, and very wet and very dry weather and climate events and seasons."[641]

45. Other projected changes include the reduction of almost all cryospheric elements, further sea level rise, and increased ocean acidification and deoxygenation.[642] Heatwaves and droughts, extreme sea level events, and wildfire are projected to become more frequent. Tropical cyclones and extra-tropical storms are projected to become more intense.[643]

46. In addition, higher global warming levels increases the probability of low-likelihood, high impact events.[644] At higher levels of warming, tipping points, which are critical thresholds beyond which a system reorganizes, often abruptly and/or irreversibly, in the climate system may be reached, leading to abrupt and irreversible changes, such as accelerated Antarctic ice-sheet melt and forest dieback.[645]

[640] IPCC AR6 SPM (2023) para B.1.1.
[641] ibid, para B.1.3.
[642] ibid.
[643] ibid, para B.1.4.
[644] ibid, para B.3.
[645] ibid.

47. As demonstrated in the figure below reproduced from the IPCC's Sixth Assessment report summary for policy makers, children and future generations are likely to experience the worst impacts of climate change.[646]



48. Climate change will also have transboundary economic effects, through impacts on supply chains, markets, and natural resource flows, with increasing transboundary risks across many sectors, including water, energy and food sectors.[647] By 2100, the value of global assets at risk of a 1-in-100-year coastal floodplain is projected to be between US$7.9 and US$12.7 trillion.

49. By 2100, currently 1-in-100-year extreme sea level events are projected to occur at least annually in more than half of all tidal gauge locations.[648] Approximately a billion people globally are projected to be at risk from coastal-specific climate hazards by mid-century.[649]

50. The impacts of climate change impede economic growth, increase debt levels in vulnerable countries, and can roll back existing development gains.

51. Further, concurrent and repeated hazards will occur in all regions, and multiple risks can compound by interacting with each other, creating new vulnerabilities.

[646] ibid, Figure SPM.1.
[647] IPCC AR6 SPM 'Impacts, Adaptation and Vulnerability' (2022) para B.5.3.
[648] ibid, para B.4.5.
[649] ibid.

D. Impacts of 1.5ºC Warming

52. Even if global average temperatures were kept below 1.5°C, there remains increased risks of unavoidable, irreversible or abrupt changes.[650] This includes species extinctions and irreversible loss of biodiversity. Many changes from past, present and future GHG emissions are irreversible for centuries to millennia, especially changes in the ocean and ice sheets.

53. Reaching 1.5°C in the near-term would cause unavoidable increases in multiple climate hazards and multiple risks to ecosystems and humans.[651] For example, coral-dominated ecosystems are projected to be almost non-existent at an increase of just 1.2°C. This would produce dire consequences.[652] Tropical coral reefs provide habitats to thousands of species and provide food, livelihoods, coastal protection, and cultural sustenance for millions of people.[653]

54. At 1.5°C of increase in temperature, climate change is expected to be a poverty multiplier, making poor people poorer, and increasing the number of people living in poverty.[654] Climate change could force more than 3 to 16 million people into extreme poverty from impacts on agriculture and food prices alone.[655]

E. Impacts on the Ocean, Ozone layer, Biodiversity and Land

55. The ocean is critical to the climate system. It is a natural sink and reservoir for atmospheric greenhouse gases, absorbing and storing some 25% of carbon dioxide out of the atmosphere and 90% of the atmospheric heat. This happens through the process of photosynthesis by plant-like organisms (phytoplankton) and by chemical processes, either as a dissolved gas or, over a longer time, as carbonate sediments on the seafloor. The ocean contains some 50 times the quantity of carbon dioxide found in the atmosphere and roughly 20 times the quantity of carbon dioxide currently contained in terrestrial plants and soils. Without the protective force of the ocean, the harmful impacts of anthropogenic climate change would be greater and the average temperature increase may have already reached 2°C.

56. The scientific community has long been warning that the capacity of the ocean to fulfil this important climate regulating role is at risk. The ocean's critical sink and reservoir function is performed by its marine life, including phytoplankton, sea grass, mangroves, coral reefs and its collective force and biodiversity. Thus, part of the solution to reduce GHG emissions, lies in protecting and preserving the marine environment.

57. It is the recognition of the crucial climate regulating services provided by the ocean and its marine environment that underlies the obligation in Article 4(1)(d) of the UNFCCC for the Parties to sustainably manage and conserve the ocean as a sink and reservoir. Similarly, an

[650] IPCC AR6 SPM (2023) 18.
[651] IPCC AR6 SPM 'Impacts, Adaptation and Vulnerability' (2022) 13.
[652] IPCC 'Global Warming of 1.5 ºC' (2018) 226.
[653] ibid.
[654] IPCC 'Global Warming of 1.5 ºC' (2018) 244.
[655] ibid.

express reference to the ocean is found in the preamble of the Paris Agreement: "[n]oting the importance of ensuring the integrity of all ecosystems, including oceans, and the protection of biodiversity".

58. Climate change and increased GHG emissions can also negatively impact the ozone layer. Although GHGs warm the lower atmosphere (i.e. the troposphere), they generate a cooling effect in the upper atmosphere (i.e. the stratosphere). Accordingly, as GHGs emissions increase, the upper atmosphere is increasingly experiencing more extreme, and more frequent, low temperatures. These cold conditions enable the creation of what is known as 'polar stratospheric clouds'.[656] These clouds transform chlorine from non-reactive into reactive gases in the stratosphere, which promote the rapid depletion of ozone.[657]

59. Climate change also impacts biodiversity. Studies have identified "profound transformation of the biosphere [that]" due to climate change, including "both continuous and abrupt changes in the distribution of ecosystems and species".[658]

60. Land plays an important role in the climate system. From 2007-16, land absorbed almost 30 per cent of global GHG emissions.[659]

61. 'Desertification, land degradation and drought' has been widely adopted by expert communities as a collective term, given the closely interlinked nature of these environmental problems. Desertification concerns land degradation in arid, semi-arid, and dry sub-humid areas, often collectively known as drylands.[660] Land degradation is described by the IPCC as a negative trend in land conditions expressed as long-term reduction or loss of at least one of the following: biological productivity, ecological integrity, or value to humans.[661] Land degradation can affect any terrestrial zone and may include soil erosion, vegetation loss, reduction in land fertility, or decrease in water quality.[662]

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[656] WMO, *Scientific Assessment of Ozone Depletion: 2022*, GAW Report No. 278 (WMO 2022), 282.
[657] ibid, 277-278.
[658] T Conradi and others, 'Reassessment of the Risks of Climate Change for Terrestrial Ecosystems' [2024] Nature Ecology & Evolution.
[659] ibid, IPCC SPM 'Climate Change and Land' (2019) 10.
[660] IPCC SPM 'Climate Change and Land' (2019) 6; IPBES SPM 'Assessment Report on Land Degradation and Restoration' (2018) 26; UNCCD Article 1(a).
[661] ibid, IPCC SPM 'Climate Change and Land' (2019) 6. Land degradation is defined in UNCCD art 1(f) as "reduction or loss, in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as soil erosion caused by wind and/or water; deterioration of the physical, chemical and biological or economic properties of soil; and long-term loss of natural vegetation"; Land degradation is defined by the IPBES as: "the many human-caused processes that drive the decline or loss in biodiversity, ecosystem functions or ecosystem services in any terrestrial and associated aquatic ecosystems." (IPBES SPM 'Assessment Report on Land Degradation and Restoration' (2018) 18).
[662] IPBES SPM 'Assessment Report on Land Degradation and Restoration' (2018) 11; IPCC SPM 'Climate Change and Land' (2019) 16.

62. Land degradation can diminish land-based carbon sinks and cause further GHG emissions.[663] Additionally, desertification, land degradation and drought has other negative environmental and socioeconomic consequences including loss of biodiversity and ecosystem services, reduction in agricultural productivity, food and water insecurity, and impacts on human health.[664] It can induce migration, erode cultural identity and indigenous knowledge, and generate conflict.[665] Vulnerable groups experience the greatest negative effects.[666]

63. Desertification, land degradation and drought is caused by both human activities and climate factors. Its human drivers include expansion of crop and grazing lands into native vegetation, unsustainable agricultural and forestry practices, urban expansion, infrastructure development and extractive industry.[667]

64. Climate change contributes to and exacerbates processes of desertification, land degradation and drought through, for example, increase in rainfall intensity, flooding, drought frequency and severity, heat stress, dry spells, wind, sea-level rise and wave action, and permafrost thaw.[668] These climate-induced impacts occur particularly in low-lying coastal areas, river deltas, drylands and in permafrost areas.[669]

65. According to the IPCC, all modelled pathways that limit warming to 1.5ºC or well below 2°C require land-based mitigation and land-use change.[670] IPBES has also reported that avoiding land degradation could provide more than one third of the most cost-effective greenhouse gas mitigation activities required by 2030 to keep global warming to below 2°C.[671]

66. Thus, mitigating against climate change is an important element of combatting against desertification, land degradation and drought. Conversely, combatting against the human drivers of desertification, land degradation and drought is also a key land-based climate mitigation strategy.

[663] ibid,, 10.
[664] IPBES SPM 'Assessment Report on Land Degradation and Restoration' (2018) 11 and 22.
[665] ibid, 24 and 26.
[666] ibid, 10.
[667] ibid, 10.
[668] IPCC SPM 'Climate Change and Land' (2019) 10.
[669] ibid, 7 and 23.
[670] ibid, 24.
[671] IPBES SPM 'Assessment Report on Land Degradation and Restoration' (2018) 10.

APPENDIX II: PATHWAYS TO 1.5°C, NET-ZERO EMISSIONS AND THE NEED FOR SYSTEMIC CHANGE

I. Defining 'Net-Zero' targets

1. As countries move forward with the implementation of the Paris Agreement, including the design and implementation of mitigation targets and measures based on 'net-zero' GHG emissions, it is important to define the key elements of this goal, including 'net-zero emissions', setting the time frame for reaching this goal, which sectors and GHGs to include, and the role of carbon removal and storage and international transfers in achieving net-zero emissions.

2. Achieving 'net-zero CO_2 emissions' ('carbon neutrality') or net-negative CO_2 emissions requires not only rapid and deep GHG emission reductions across all sectors but also the protection of GHG sinks and the significant enhancement of GHG removals. In this context, nature and ecosystems play a crucial role. The capacity of terrestrial sinks and reservoirs, such as soils, wetlands, peatlands, mangroves and forests to sequester and store CO_2, as well as the adoption of practices and processes in the use and management of land (e.g. management of practices in agricultural land, avoiding conversion of natural forest land to other uses) to limit emissions and enhance removals, will be key in achieving net-zero CO_2 emissions.

3. An important nuance relates to the GHGs covered by the net-zero emission target. While several GHGs contribute to global warming, cumulative carbon dioxide emissions are reported by the IPCC as the primary determinant of temperature change in this century. noting that "[l]imiting global mean temperature increase at any level requires global CO_2 emissions to become net zero at some point in the future".[672] Nearly all IPCC pathways consistent with the 1.5°C goal include net-zero GHG emissions between 2050 (CO_2) and 2070 (non-CO_2).

4. Other relevant GHGs include methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF6), and nitrogen trifluoride (NF3). Although some of them are "shorter-lived" (such as methane and HFCs) and do not accumulate in the atmosphere for a long time, they are still strong drivers of climate change.

5. A second key issue relates to terminology, as a variety of terms has been used by public and private stakeholders to designate such targets, including 'net-zero emissions' and 'zero emission' targets, 'climate neutrality', 'carbon neutrality', and 'deep decarbonisation'. In addition to understanding these terms, it is also relevant to consider whether they refer to domestic or international targets.
6. While 'carbon neutrality' refers to net-zero emissions of CO_2 only, 'climate neutrality' refers to net-zero emissions of all GHGs (CO_2 and non-CO_2).

[672] IPCC, 1.5 degree Warming (2018).

7. Further, the Court may find the following definitions helpful:

Source:

- A physical unit or process that releases a GHG into the atmosphere (such as fuel combustion, cement production, livestock management, and waste disposal).

Sink:

- A physical unit or process that removes and stores a GHG from the atmosphere (such as photosynthesis and other biological sinks, geochemical sinks and direct air capture and storage).

Removals:

- Transfer of a GHG (primarily CO_2; and therefore also often referred to as 'Carbon Dioxide Removal' – CDR) from the atmosphere by a sink to long-term storage within a pool, such as trees, soil, or geologic, terrestrial, oceanic reservoirs, and in products.

Net-zero emissions:

- At the global level, 'net-zero GHG emissions' refers to a global balance between anthropogenic emissions and removals of GHGs over a given time period (typically a year);
- At the country level, net-zero emissions (excluding international transfers of GHG mitigation outcomes) refers to keeping GHG emissions from sources within the national territory in the target year in balance with GHGs removed from the atmosphere by sinks within the country's territory in the target year. These definitions refer to anthropogenic GHG emissions and removals in units of 'CO_2 equivalent'. Countries can further specify the proportion of the target being met through emission reductions versus removals (in either definition) or the proportion of domestic GHG mitigation versus international transfers of GHG mitigation outcomes (in the second definition).
- Based on these definitions, countries might have, within a given time period, net-zero emissions, net-positive emissions (i.e. annual GHG emissions are higher than annual GHG removals within the territory), or net-negative emissions (i.e. annual GHG emissions are lower than annual GHG removals within the territory).
- Other important elements include the target time frame (i.e. range of years), boundary (i.e. comprehensive or partial coverage of GHGs) and the use or exclusion of international transfers of GHG mitigation outcomes (e.g. to include or not transfer of carbon credits).

8. As outlined above, one important aspect relates to the use or exclusion of offsets towards 'net-zero'. This is a controversial topic and poses some limitations and risks under the Paris Agreement's global governance framework, including the fact that the treaty envisions a goal of global net-zero GHG emissions ("balance of anthropogenic emissions and removals").[673]

9. The widespread resort to offsets might help to balance emissions in some countries, but might also hamper efforts towards net-negative emissions at large. Moreover, the use of

[673] Paris Agreement Article 4(1).

offsets might undermine the efforts of some countries to promote real emission reductions in their territories.

10. Further, if not balanced with appropriate safeguards, offsetting approaches can create conflicts and challenges for host countries in their efforts to enhance domestic ambition.

11. A further aspect is equity in reaching global net-zero emissions around 2050. While it is understood that this is a global goal, some countries might need longer to reach it.[674] This is in line with the principle of CBDR-RC, in light of different national circumstances.[675] If the timeline of reaching net-zero emissions is not to be overshot, those countries with greater capacity and responsibility need to take deeper cuts and to reach territorial net-zero or net-negative emission far ahead of 2050, in order to allow countries which need longer to also get there by 2050. They might also be required not to contribute to increasing emissions elsewhere through the 'export' of emissions in whatever way and manner; making it more difficult to reach a global balance.

12. Another important aspect concerns Carbon Dioxide Removals (CDR) measures and technologies. While the exploration, development and deployment of CDR are considered key elements for the achievement of the goals of the Paris Agreement, such technologies and practices are in their early stages, so there are uncertainties relating to the methodologies for calculating their impact, as well as questions about the permanence of carbon storage. This means that these measures still need time for further development. In this regard, support for 'nature-based solutions' (discussed further in Appendix III) should be considered especially attractive, in addition to the multitude of environmental and social co-benefits that they entail if correctly and carefully implemented.

II. The Need for Systemic Transitions

13. Rapid and far-reaching transitions across all sectors and systems are necessary to achieve deep and sustained emissions reductions and to secure a liveable and sustainable future for all. While this type of systemic change will be unprecedented in terms of scale, the IPCC notes that it is not unprecedented in terms of speed. Scaling up mitigation and adaptation action is where international law and policy can serve a vital role. Regulatory and economic instruments can support deep emissions reductions, if scaled up and applied more widely. Finance, technology and international cooperation are critical enablers for accelerated climate action. The magnitude and rate of climate change depend strongly on near-term mitigation and adaptation action.

14. In addition, emission reductions can have co-benefits for Sustainable Development Goals. The IPCC observed that eradicating extreme poverty, energy poverty, and providing decent living standards can be achieved in the near-term without significant global emissions

[674] ibid.
[675] ibid, Article 2(2).

growth. The IPCC also states unequivocally that policy and law matter. It finds that policies that address financial, governance and institutional constraints can overcome blockages to mitigation and adaptation action and lead to better implementation of climate-resilient development.

15. Only a small window of opportunity to enable comprehensive, effective, and innovative responses currently exists. Climate resilient development pathways are progressively constrained by every increment of warming, particularly beyond 1.5°C. Climate action becomes increasingly difficult, expensive, and potentially unfeasible the longer we wait. Any further delay in implementing concerted, global action on adaptation and mitigation will miss the brief and rapidly closing window of opportunity to secure a livable and sustainable future for all.

16. In this connection, the IPCC's advice is clear - the choices and actions in this decade will have impacts now, and for thousands of years.

III. Phasing Out Fossil Fuels

17. It is imperative to limit warming to 1.5°C to minimise climate-related loss and damage to people and nature. Meeting this goal is also essential for the continued provision of critical ecosystem services from natural systems.

18. This requires – first and foremost – the rapid and equitable phase out of fossil fuels and fossil fuel subsidies without any further delay, and the accelerated and equitable deployment of sustainable clean energy systems worldwide. In this respect, the Decision reached during COP28 calls for a time-bound transitioning away from fossil fuels, including oil and gas, within a framework that ensures a just transition.

IV. Transition in Energy Systems

19. The deployment of renewable energy generation and distribution systems, including community-based renewable energy systems and micro-grids, must be accelerated.

20. In doing so, States must ensure a just transition by avoiding any detrimental impacts on communities, ecosystems and species and by actively pursuing net positive impacts aligned with the Kunming-Montreal Global Biodiversity Framework. This requires effective spatial planning, rigorous assessment of associated cumulative impacts and actively building sustainability goals into policy and regulatory frameworks.

21. As pointed out jointly by IPBES and IPCC, technology-based measures that are effective for climate change mitigation can sometimes threaten biodiversity and should be evaluated in terms of their overall benefits and risks.Recent studies have documented that, in the absence of adequate risk mitigation measures, renewable energy systems can have negative

population-level impacts on avian and marine species that extend well beyond the immediate vicinity of the installations.[676]

22. Further, the growing demand for minerals and metals required for the energy transition is placing increased pressure on protected areas.[677]

23. IUCN, together with its members and partners, has developed guidance for mitigating the biodiversity impacts associated with solar and wind energy development for project developers . [678] This seeks to provide a practical framework for managing risks and improving overall outcomes related to biodiversity and ecosystem services by deploying the mitigation hierarchy during planning and implementation.

V. Carbon Dioxide Removal (CDR) Technologies

24. The IPCC has defined carbon dioxide removal (CDR) as "technologies, practices, and approaches that remove and durably store carbon dioxide (CO_2) from the atmosphere".[679] Once removed from the atmosphere, carbon is storaged "either in reservoirs such as vegetation, soils, geological formations, or the ocean, or in manufactured products".[680]

25. Natural CO_2 removal is not considered CDR. CDR activities are deliberate, and they comprise "different [] methods and associated implementation options, with different timescales and risk factors".[681]

26. In its message to the UNFCCC States Parties, during COP28, IUCN cautioned against the reliance on " unproven, untested and unregulated geoengineering technologies to reach net-zero emission goals".[682] CDR is one of the two categories of 'geoengineering',[683] the other being solar radiation management (SRM). Both CDR and SRM involve "significant social

[676] Conkling TJ et al. 2022 Vulnerability of avian populations to renewable energy production. R. Soc. Open Sci. 9, Madsen et al. 2006, Wind turbine underwater noise and marine mammals: implications of current knowledge and data needs, Marine Ecology Progress Series, vol. 309.
[677] Whieldon et al 2022 ,https://www.spglobal.com/esg/insights/featured/special-editorial/rocks-and-hard-places-the-complicated-nexus-of-energy-transition-minerals-and-biodiversity
[678] IUCN, 'IUCN position paper for UNFCCC COP28' 3.
[679] IPCC AR6 WGIII: CDR Factsheet.
[680] ibid.
[681] ibid.
[682] IUCN Position Paper for UNFCCC COP28. Available at: https://www.iucn.org/sites/default/files/2023-09/iucn-position-paper-for-unfccc-cop28-en.pdf.
[683] IPCC, 2012: Meeting Report of the Intergovernmental Panel on Climate Change Expert Meeting on Geoengineering [O. Edenhofer, R. Pichs-Madruga, Y. Sokona, C. Field, V. Barros, T.F. Stocker, Q. Dahe, J. Minx, K. Mach, G.-K. Plattner, S. Schlömer, G. Hansen, M. Mastrandrea (eds.)]. IPCC Working Group III Technical Support Unit, Potsdam Institute for Climate Impact Research, Potsdam, Germany, pp. 99, 2.

and environmental risks". The precautionary approach should be applied, considering the negative impact that geoengineering techniques may entail.[684]

[684] IUCN Position Paper, p 3-4 reads: "IUCN urges all Parties to collectively avoid overshooting the temperature rise targets agreed to under the Paris Agreement, and particularly cautions against reliance on the deployment of unproven, untested and unregulated geoengineering technologies to reach net-zero emission goals. It notes the high risks that these technologies can pose for human and natural systems, and the adverse and potentially irreversible impacts that overshoot entails. The IPCC Sixth Assessment Report makes it clear that in pathways with overshoot, societies face higher risks to infrastructure, low-lying coastal settlements and associated livelihoods. Also, as it clearly states, 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, glacier melt, or by accelerating and higher committed sea level rise" (IPCC 2023 AR6 Synthesis Report SPM). Other recent scientific studies also warn that exceeding 1.5°C of global warming can trigger multiple climate tipping points, including collapse of the Greenland and West Antarctic ice sheets, die-off of low-latitude coral reefs and widespread abrupt permafrost thaw with their consequent adverse impacts (Armstrong McKay et al 2022). This also highlights the need to invest in long-term observation, data recording and early warning systems. There is growing interest today in exploring new geoengineering technologies such as solar radiation modification (SRM), ocean fertilisation and alkalinisation, and other novel carbon dioxide removal (CDR) methods in combatting the climate crisis. However, it is important that a precautionary approach be taken with respect to these emerging technologies, including to ensure that they do not delay or lower national ambition on the GHG emission reductions that are urgently required across all sectors today. This is essential given their unproven nature, the significant social and environmental risks that they pose, the moral hazard that they can drive and – most importantly – the critical unresolved issues around their ethics, consent, equity and governance (UNEP 2023, Smith et al 2023). Likewise, carbon capture and storage (CCS) technologies should not be used to delay rapid decarbonisation." See also, Shepherd JG, 'Geoengineering the Climate: An Overview and Update' (2012) 370 Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences 4166.

APPENDIX III: THE ROLE OF NATURE, ECOSYSTEMS AND NATURE-BASED SOLUTIONS (NbS)

1. The scientific evidence set out in the recent reports of the IPCC and IPBES demonstrate that this current decade represents a critical window of opportunity for tackling the inter-dependent crises of biodiversity loss, land degradation and climate change in a coherent and mutually supportive way. As addressed above, climate change is one of the main drivers of biodiversity loss and increases the severity and frequency of hazards such as droughts and wildfires, changing the ranges in which species can thrive, and altering food webs. At the same time, ecosystem loss and land degradation release enormous GHG volumes, reduce the ability of ecosystems to absorb carbon from the atmosphere, and exacerbate the impact of climate hazards.

2. Thus, an integrated approach is essential to address the challenges of climate change, biodiversity, and land degradation, while enhancing, instead of sacrificing, social equity. The concept of 'Nature-based Solutions' (NbS) emerged within the last decade, informed by the position that through working with, rather than against, nature, the drivers and impacts of climate change can be addressed while enhancing biodiversity and securing the ecosystems that support human well-being.

3. The concept of NbS was developed during the 2009 UNFCCC negotiations. It was subsequently introduced in the 2013-2016 IUCN Global Programme. IUCN adopted a formal definition of NbS at the 2016 World Conservation Congress and Members' Assembly. This definition was reflected in the outcomes of the United Nations Environment Assembly:

> "Actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits."[685]

4. Within the context of climate change, NbS is an umbrella term for a wide range of actions and interventions that involve enhancing and working with nature to help both climate change mitigation and adaptation. To clarify, NbS are not single-issue actions, and measures that can have detrimental social or environmental impacts, such as the use of monoculture forest plantations as a mitigation strategy, should not be framed as a NbS. These actions, which reduce ecosystem integrity as well as social wellbeing, do not meet the NbS definition.

5. In 2022, at the UNFCCC COP27, the initiative named Enhancing Nature-based Solutions for an Accelerated Climate Transformation (ENACT) was launched to coordinate global efforts to drive collective actions across climate change, ecosystem degradation, and biodiversity loss through NbS.

[685] UNEP/EA.5/Res.5.

6. Two-thirds of the Parties to the Paris Agreement included NbS actions in their NDCs, aiming to reduce GHG emissions and improve ecosystem resilience. NbS have also started to feature more prominently in other national legal and policy documents, including National Adaptation Plans, climate laws, disaster risk reduction strategies.

7. Nature-based solutions can deliver land-based mitigation and adaptation options through protection, restoration and sustainable management of natural carbon sinks and reservoirs. There is also mitigation potential from NbS in coastal and marine ecosystems.

8. A conservative interpretation of the existing evidence, taking into account the uncertainties and the time needed to deploy safeguards, indicates that by 2030, NbS implemented across all ecosystems can deliver emission reductions and removals of at least 5 GtCO2e per year, to a maximum estimate of 11.7 GtCO2e per year. By 2050, this rises to at least 10 GtCO2e per year, to a maximum estimate of 18 GtCO2e per year. This is a significant proportion of the total mitigation needed.

9. Approximately 62 per cent of this contribution is estimated to come from NbS related to forests; about 24 per cent from solutions in grasslands and croplands; and 10 per cent from additional solutions in peatlands. The remaining 4 per cent will come from solutions implemented in coastal and marine ecosystems.

10. The contribution from NbS will require adherence to strict social and environmental safeguards. Much careful work has already been undertaken on the formulation of such safeguards. This is reflected in guidelines such as the IUCN Global Standard for Nature-based Solutions,[686] which offers specific criteria and indicators to enable the coherent design, execution, and evaluation of NbS. The application of such a framework is essential to increase the scale and impact of NbS, prevent any unanticipated negative outcomes or misuse, and help to fund agencies, policy makers and other stakeholders to assess the effectiveness of interventions.

11. Under the UNFCCC and the Paris Agreement Article 5(2), the Cancun safeguards for REDD+ (Reducing Emissions from Deforestation and forest Degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks)[687] also provide important safeguards that should be taken into account when developing and implementing NbS for climate action.

12. However, NbS should not be used as a substitute for, or as a reason to postpone, the rapid, ambitious and continuous GHG emission reduction efforts required today, to achieve the objective of net-zero emissions by the middle of this century as provided under the Paris Agreement.

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[686] IUCN, 'Global Standard for Nature-based Solutions. A user-friendly framework for veritifcation, design and scaling up of NbS' (IUCN, 2020) <https://portals.iucn.org/library/sites/library/files/documents/2020-020-En.pdf?>.
[687] Decisions 1/CP.16 and 12/CP.17 Guidance on systems for providing information on how safeguards are addressed and respected and modalities relating to forest reference emission levels and forest reference levels as referred to in decision 1/CP.16.

13. IUCN stresses that any use of NbS for offsetting purposes must be limited to compensate only for those residual emissions that cannot otherwise be abated through emission reduction efforts and must be governed by robust accounting systems to prevent any double-counting, and follow adequate social and environmental safeguards. In this respect, IUCN highlights the need for robust accounting systems that can help reduce current discrepancies in emissions reporting.

14. The land sector can provide numerous NbS and is key for achieving 'net-zero' GHG emissions. As noted by the IPCC, land provides the basis for human livelihoods and well-being including food supply, freshwater and multiple other ecosystem services, as well as biodiversity.

15. At the same time, human activity has already directly affected more than 70 per cent of the global ice-free land surface. Land can be simultaneously a source and a sink of CO_2 due to both anthropogenic and natural drivers, making it difficult to separate anthropogenic from natural fluxes.

16. The IPCC reports that activities related to "Agriculture, Forestry and Other Land Use (AFOLU)" accounted for around 13 per cent of CO_2, 44 per cent of methane (CH4), and 81 per cent of nitrous oxide (N2O) emissions from human activities globally during 2007-2016, representing 23 per cent of total net anthropogenic GHG emissions.[688] This is a significant share, and is more than the total emissions from other key sectors such as transportation.

17. Further, agricultural emissions have increased since the turn of the century and, under a business-as-usual scenario, and in the face of an expected increase in demand for agricultural products, are expected to rise sharply over the coming years and decades, largely due to the projected increase in the world population (from seven billion today to almost 10 billion in 2050), and changes in diets due to a wealthier middle class particularly in emerging economies.[689]

18. The IPCC notes that transitions in global and regional land use are found in all pathways limiting global warming to 1.5°C, but their scale depends on the pursued mitigation portfolio. Due to the multiple objectives which the land sector serves, difficult choices will have to be made. In this connection, the IPCC notes that:

> "such large transitions pose profound challenges for sustainable management of the various demands on land for human settlements, food, livestock feed, fibre, bioenergy, carbon storage, biodiversity and other ecosystem services. Mitigation options limiting the demand for land include sustainable intensification of land-use practices, ecosystem restoration and changes towards less resource-intensive diets. The implementation of land-based mitigation options would require overcoming socio-

IPCC SPM 'Climate Change and Land' (2019) 3-36, 7-10.

[689] Food and Agriculture Organization, 'The State of Food and Agriculture 2016 (SOFA): Climate change, agriculture and food security' (Food and Agriculture Organization, 2016) <https://www.fao.org/publications/card/en/c/18679629-67bd-4030-818c-35b206d03f34/>.

economic, institutional, technological, financing and environmental barriers that differ across regions".[690]

19. Land-based climate change mitigation activities can be effective and support biodiversity conservation goals, but it can also negatively impact conservation goals. The 2019 Global Assessment Report on Biodiversity and Ecosystem Services by the IPBES warns that:

> "the large-scale deployment of bioenergy plantations and afforestation of non-forest ecosystems can come with negative side effects for biodiversity and ecosystem functions. Nature-based solutions with safeguards are estimated to provide 37 per cent of climate change mitigation until 2030 needed to meet the goal of keeping climate warming below 2°C, with likely co-benefits for biodiversity. Therefore, land-use actions are indispensable, in addition to strong actions to reduce greenhouse gas emissions from fossil fuel use and other industrial and agricultural activities. However, the large-scale deployment of intensive bioenergy plantations, including monocultures, replacing natural forests and subsistence farmlands, will likely have negative impacts on biodiversity and can threaten food and water security as well as local livelihoods, including by intensifying social conflict."[691]

20. Agriculture is amongst the sectors already suffering from the heaviest negative impacts of climate change. Extreme weather events are having a profound effect on agricultural performance worldwide and will likely be both more frequent and more intense in the future. Not only does this influence levels of agricultural production, but it is also expected to alter the present conditions of agriculture in almost all countries worldwide, posing risks for other important goals like food security.[692]

21. At the same time, the mitigation potential of agriculture is large, equivalent to around 6 billion tons of carbon dioxide per year. Around 90 per cent of this potential lies in increasing carbon sinks, primarily through sequestering carbon in the soil, reducing emissions from inputs (e.g. fertilizers) and livestock management (e.g. manure management). This can be promoted, among other means, through the implementation of practices such as agroforestry, improved grazing land management, crop rotations and fallows, residue management, reduced tillage and the restoration of degraded lands.[693]

22. In addition, considering that CDR technologies are still in their infancy, NbS are gaining increasing recognition due to their huge potential and easier implementation. The IPCC emphasized that all modelled pathways that limit global warming to 1.5°C or below 2°C require land-based mitigation and land-use changes, with most pathways including different combinations of reforestation, afforestation, reduced deforestation, and bioenergy.

[690] IPCC SPM 'Climate Change and Land' (2019) 24.

APPENDIX IV: OTHER RELEVANT PROVISIONS OF THE UNFCCC, KYOTO PROTOCOL AND PARIS AGREEMENT

I. UNFCCC and Kyoto Protocol

1. As explained in the main body of this statement, the UNFCCC is the foundational international treaty to address climate change and provides the normative background for the development of the UN climate regime.

2. The Parties' obligations are informed by the ultimate objective of the UNFCCC contained in its Article 2, which is to "achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system".

3. The level of interference with the climate system that is considered "dangerous" was unclear at the time of the adoption of the UNFCCC. Now, the Paris Agreement's Article 2(1)(a) clarifies that "avoiding dangerous interference" requires:

> "holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change".

4. Under Article 4(1) of the UNFCCC, all Parties have legal obligations to:

   a) Develop, periodically update, and publish national inventories of anthropogenic emissions and removals of all greenhouse gases not controlled by the Montreal Protocol;
   b) Formulate, implement, publish and regularly update national and regional climate change mitigation and adaptation programmes;
   c) Promote and cooperate on various issues, such as in:
      i. development, application and transfer of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases in all relevant sectors;
      ii. scientific, technological, technical, socio-economic and other research, systematic observation and development of data archives related to the climate system;
      iii. in the full, open and prompt exchange of relevant scientific, technological, technical, socio-economic and legal information related to the climate system and climate change, and to the economic and social consequences of various response strategies; and
      iv. in education, training and public awareness related to climate change and encourage the widest participation in this process, including that of non-governmental organizations.

5. Under Article 4(2) of the UNFCCC, developed country Parties and other Parties included in UNFCCC's Annex I have the obligation to:

   a) adopt national policies and take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs;
   b) communicate detailed information on these policies and measures, with the aim of returning individually or jointly to their 1990 GHG emission levels these anthropogenic;
   c) coordinate as appropriate with other Annex I Parties, relevant economic and administrative instruments; and
   d) identify and periodically review its own policies and practices.

6. Under Article 4(3) of the UNFCCC, developed country Parties and other developed Parties included in UNFCCC's Annex II shall:

   a) provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their reporting obligations under UNFCCC Article 12(1);
   b) provide such financial resources, including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of climate change implementing measures;
   c) assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation to those adverse effects; and
   d) shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know- how to other Parties, particularly developing country Parties.

7. The Parties are guided by a set of principles contained in Article 3 of the UNFCC, including:

   a) protecting the climate system for the benefit of present and future generations of humankind,
   b) equity,
   c) common but differentiated responsibilities and respective capabilities,
   d) full consideration for the specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden;
   e) taking take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects,[694]
   f) comprehensiveness,[695]

[694] UNFCCC Article 3(3) states "Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost."
[695] Meaning that climate change measures should "cover all relevant sources, sinks and reservoirs of greenhouse gases and adaptation, and comprise all economic sectors" as outlined in UNFCCC.

g) promotion of sustainable development,
h) appropriateness and integrated with national development programmes, taking into account that economic development is essential for adopting measures to address climate change.

8. The UNFCCC reflects the principle that, in order to create an effective and fair response to the threat of climate change, due regard needs to be given to Parties' different circumstances. The principle of 'common but differentiated responsibilities and respective capabilities' (CBDR-RC) acknowledges that developed countries should take the lead in the joint effort of combatting climate change and its adverse effects.[696] Based on the premise that climate change is a common concern of humankind, which requires the widest possible cooperation by all countries, the UNFCCC recognizes different contributions to environmental harm ('causality'), as well as different capacities to take mitigation measures ('capability'). Accordingly, the UNFCCC has addressed differentiation not only by enshrining CBDR-RC, but also by establishing more demanding and substantively stronger obligations for the Parties explicitly listed in its annexes.[697]

9. The principles of the UNFCCC guide the Paris Agreement.[698] However, as the latest and most specific international climate treaty, the Paris Agreement's provisions, to the extent that they differ from the UNFCCC's, modify and replace some of the UNFCCC obligations.

10. One such modification is apparent in the use of the CBDR-RC principle in the Paris Agreement, which now applies "in the light of different national circumstances".[699] The addition of this qualifier allows a wide range of considerations to be taken into account when differentiating between different Parties, and is not limited to historical responsibility.[700]

11. Several of the legal obligations under the UNFCCC, especially on transparency, were superseded by corresponding obligations in the Paris Agreement.[701] A notable exception is the obligation of developed country Parties to provide financial resources to developing countries.[702] This obligation applies "in continuation of their existing obligations under the Convention".[703]

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[696] UNFCCC ibid, art 3(1) "The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof."
[697] L Rajamani, 'The Doctrinal Basis for and Boundaries of Differential Treatment in International Environmental Law', in L Rajamani (ed), *Differential Treatment in International Environmental Harm* (Oxford University Press 2006).
[698] Paris Agreement preamble.
[699] ibid, Articles 2(2) and 4(3).
[700] See main submission Part III.
[701] For example, UNFCCC 'Decision 1/CP.21 Adoption of the Paris Agreement' para 98 states "that the modalities, procedures and guidelines of this transparency framework shall build upon and eventually *supersede* the measurement, reporting and verification system established by decision 1/CP.16…" (emphasis added).
[702] UNFCCC Article 4(3).
[703] Paris Agreement Article 9(1).

12. As mentioned in the main body of this statement, Article 17 of UNFCCC provided for the future development of Parties' obligations through successive protocols. Only one such protocol – the Kyoto Protocol[704] – has been adopted. It entered into force in 2005.

13. The Kyoto Protocol strengthened the commitments in UNFCCC's Article 4(2)(a) and (b) for developed countries and other Parties included in UNFCCC's Annex I. It did not introduce any new commitments for Parties not included in Annex I (i.e. developing country Parties).

14. The Kyoto Protocol was designed to set up specific, successive commitment periods for Annex I parties. During those commitment periods, Annex I Parties had quantified emission reduction and limitation obligations.[705] The first commitment period was from 1 January 2008 to 31 December 2012. The second commitment period was from 1 January 2013 to 31 December 2020.

15. The mitigation commitments of developed country Parties under the Kyoto Protocol are now superseded by NDCs under the Paris Agreement.

16. The Kyoto Protocol set up significant monitoring and reporting obligations, which are now largely included in the Enhanced Transparency Framework established under Article 13 of the Paris Agreement. The protocol's rules on carbon markets,[706] have been superseded by Article 6 of the Paris Agreement.

17. Thus, the Kyoto Protocol is now of limited normative value in identifying States obligations to protect the climate system, but it remains in force until discontinued by a decision by its Parties.

II. Other Relevant Provisions of the Paris Agreement

A. Further Obligations of States

18. In addition to the obligations discussed in the main text of this statement, the Paris Agreement contains further obligations for its Parties on reporting and transparency, adaptation and the provision of support. Each of these obligations is discussed further below.

Reporting and Transparency

19. With respect to reporting, each Party has the legal obligation, on a biennial basis, to provide information on its national GHG inventory in a National Inventory Report and information necessary to track progress made in implementing and achieving its NDC.[707] In addition,

[704] Kyoto Protocol.
[705] ibid, Article 3.
[706] See ibid, Articles 7, 12 and 17.
[707] Paris Agreement Articles 13(7)(a) and (b).

each developed county party shall report on the financial, technology and capacity building support provided to developing countries.[708]

20. All this information is to be provided through a Biennial Transparency Report (BTR),[709] the first of which is due on 31 December 2024, and then every two years thereafter. Article 13 of the CMA contains detailed guidance on how reporting should be done.[710]

21. These reporting obligations under the Paris Agreement are crucial elements for the effective functioning of the Agreement, as well as to promote mutual trust and confidence. After Parties have submitted their BTRs, each report will undergo an independent technical expert review.

22. The Parties are also obliged to participate in a facilitative, multilateral consideration of progress (FMCP).[711] This requires the Parties to participate in a written question and answer session and in a working group session, where any other Party can ask questions to a Party with respect to its financial efforts under Article 9 (discussed below) and its implementation and achievement of its NDC(s).

Adaptation

23. In order to increase the ability to adapt to the adverse impacts of climate change and foster climate resilience and low GHG emission development,[712] each Party has an obligation to, as appropriate, engage in adaptation planning processes and the implementation of adaptation actions.[713] Though not a legal obligation, each Party should also submit an adaptation communication either as part of their NDC or independently. The adaptation plan is recorded in a public registry on the UNFCCC website.

Means of support (finance, technology-transfer and capacity building)

24. The provision and mobilization of finance, capacity support and technology transfer are important enablers to enhance mitigation ambition.

25. Developing country Parties – in continuation of their existing obligations under the UNFCCC – have the collective obligation to provide financial resources to assist developing country Parties with respect to both mitigation and adaptation.[714]

[708] ibid Article 13(9).
[709] The National Inventory Report can also be submitted as a self-standing report, and does not have to be part of the BTR.
[710] UNFCCC 'Decision 18/CMA.1, Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement'.
[711] Paris AgreementArticle 13(11).
[712] ibid, Article 2(1)(b).
[713] ibid, Article 7(9).
[714] ibid, Article 9(1).

26. "Provision of financial resources" is understood as applying to public sources of finance only. Wider sources, instruments and channels of finance, such as private sources, are captured in the concept of "mobilizing climate finance".[715] As part of a global effort, developed country Parties should continue to take the lead in mobilizing climate finance.[716] The commitment to mobilize USD 100 billion annually from 2020 is to be understood in this context.[717]

27. In several places in the Paris Agreement, the purpose of financial support is specified. For example, continuous and enhanced international support shall be provided to developing country Parties for adaptation action,[718] for preparation and submission of NDCs,[719] or for the implementation of reporting and transparency obligations.[720]

28. Further, each developed country Party has the obligation to communicate on a biennial basis indicative information on the finance to be provided and mobilized (on an *ex-ante* basis).[721] This obligation to provide biennial finance communications is independent from the reporting information under Article 13 as mentioned above, and the communications will be recorded on the UNFCCC website.[722]

29. Apart from these obligations, the Paris Agreement also contains a number of other provisions that may be relevant to the Court's consideration of the Questions.

B. Other Relevant Provisions

Human Rights

30. The Paris Agreement is the first international climate treaty that explicitly refers to human rights. In its preamble, the Parties acknowledged that:

> "Parties should, when taking action to address climate change, respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity".

[715] see ibid, Article 9(3).
[716] ibid.
[717] UNFCCC 'Decision 1/CP.21' para 53. Parties currently negotiate a new quantified collective finance mobilization goal, to be adopted at the CMA meeting in 2024.
[718] Paris Agreement Article 17(13).
[719] ibid, Article 4(5).
[720] ibid, Article 13(14).
[721] ibid, Article 9(5).
[722] See UNFCCC, Biennial Communications received in accordance with Article 9, paragraph 5, of the Paris Agreement <https://unfccc.int/Art.9.5-biennial-communications>.

31. In later CMA decisions, this paragraph was extended to also include a reference to a "right to a clean, healthy and sustainable environment".[723]

32. These rights establish the normative background for the implementation of the Paris Agreement. They have to be taken into account when the Parties implement their domestic actions on climate change. However, they arguably do not establish new rights in addition to those human rights obligations that already apply to the Parties in their international or national commitments.

Loss and Damage

33. As part of the Paris Agreement, States recognized the importance of averting, minimizing and addressing loss and damage associated with the adverse impacts of climate change under its Article 8(1). While Article 8 of the Paris Agreement recognises the loss and damage associated with climate change, the decision adopting the Paris Agreement clarifies that "Article 8 does not involve or provide a basis for any liability or compensation".[724]

34. Loss and damage include impacts from extreme events and slow-onset events. Slow-onset events are understood to include events such as sea level rise, ocean warming, ocean acidification, and adverse effects such as coral reef bleaching and death.

35. The Parties also agreed to enhance understanding and support with respect to loss and damage.[725] The work of the Parties on loss and damage is supported by the Warsaw International Mechanism for Loss and Damage.[726]

36. In 2022, the Parties to the Paris Agreement expressed alarm at the outcomes of the IPCC Sixth Assessment Report, and agreed to establish new funding arrangements to assist developing countries that are particularly vulnerable to the adverse effects of climate change. This includes providing and assisting in mobilizing new and additional resources, including

[723] See for the latest decisions (at the time of writing): UNFCCC 'Decision -/CMA.5 Outcome of the First Global Stocktake' preamble, which states: "Acknowledging that climate change is a common concern of humankind and that Parties should, when taking action to address climate change, respect, promote and consider their respective obligations on human rights, *the right to a clean, healthy and sustainable environment*, the right to health, the rights of Indigenous Peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity"-(emphasis added).
[724] UNFCCC 'Decison 1/CP.21' para 51.
[725] Paris Agreement Article 8(3).
[726] ibid, Article 8(2).

a fund for responding to loss and damage.[727] In 2023, the guidelines for operationalisation of the new funding arrangements and the fund were adopted.[728]

Carbon Markets

37. The Paris Agreement enables the Parties to cooperate voluntarily with each other in order to increase ambition in their mitigation and adaptation actions and to promote sustainable development.[729] Such cooperative approaches may include (i) bilateral arrangements that involve the transaction of internationally transferable mitigation outcomes;[730] (ii) a centralized mechanism that allows the trading with emission allowances and also include the possibility for the participation of private actors;[731] and (iii) the possibility for Parties to cooperate in a way that does not involve market-based approaches.[732] Some details for these approaches were agreed in 2022, but other details remain outstanding.[733]

[727] UNFCCC 'Decisions 2/CP.27 Funding arrangements for responding to loss and damage associated with the adverse effects of climate change, including a focus on addressing loss and damage' (17 March 2023) UN Doc FCCC/CP/2022/10/Add.1, para 2 and UNFCCC 'Decision 2/CMA.4 Funding arrangements for responding to loss and damage associated with the adverse effects of climate change, including a focus on addressing loss and damage' (17 March 2023) UN Doc FCCC/PA/CMA/2022/10/Add.1, para 2.

[728] UNFCCC 'Decision -/CP.28 and -/CMA.5 Operationalization of the new funding arrangements, including a fund, for responding to loss and damage referred to in paragraphs 2–3 of decisions 2/CP.27 and 2/CMA.4', advanced unedited versions, <https://unfccc.int/sites/default/files/resource/cma5_auv_10g_LnDfunding.pdf>.

[729] Paris Agreement Article 6(1).

[730] ibid, Article 6(2).

[731] ibid, Article 6(4).

[732] ibid, Article 6(8).

[733] UNFCCC 'Decision 2/CMA.3 Guidance on cooperative approaches referred to in Article 6, paragraph 2, of the Paris Agreement' (8 March 2022) UN Doc FCCC/PA/CMA/2021/10/Add.1; UNFCCC 'Decision 3/CMA.3 Rules, modalities and procedures for the mechanism established by Article 6, paragraph 4, of the Paris Agreement' (8 March 2022) UN Doc FCCC/PA/CMA/2021/10/Add.1; UNFCCC 'Decision 4/CMA.3 Work programme under the framework for non-market approaches referred to in Article 6, paragraph 8, of the Paris Agreement' (8 March 2022) UN Doc FCCC/PA/CMA/2021/10/Add.1.