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Nationally determined contributions under the Paris Agreement

Revised synthesis report by the secretariat

Summary

This is an update of the key findings of the synthesis report on nationally determined contributions contained in document FCCC/PA/CMA/2021/8, which was published on 17 September 2021. It takes into account information from the 165 latest available nationally determined contributions communicated by the 192 Parties to the Paris Agreement and recorded in the interim registry of nationally determined contributions as at 12 October 2021.

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Abbreviations and acronyms

2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
ACE	Action for Climate Empowerment
CDM	clean development mechanism
CH ₄	methane
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
COP	Conference of the Parties
COVID-19	coronavirus disease 2019
GDP	gross domestic product
GHG	greenhouse gas
GWP	global warming potential
GWP-100*	global warming potential values with a 100-year time-horizon
HFC	hydrofluorocarbon
INDC	intended nationally determined contribution
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
IQR*	interquartile range
LT-LEDS	long-term low-emission development strategy(ies)
LULUCF	land use, land-use change and forestry
N ₂ O	nitrous oxide
NAP	national adaptation plan
NDC	nationally determined contribution
NF ₃	nitrogen trifluoride
PFC	perfluorocarbon
REDD+	reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks (decision 1/CP.16, para. 70)
SDG	Sustainable Development Goal
SF ₆	sulfur hexafluoride
SLCP*	short-lived climate pollutant
SR1.5	Intergovernmental Panel on Climate Change Special Report on Global Warming of 1.5 °C
SSP	Shared Socioeconomic Pathway

* Used exclusively in figures.

II. Executive summary

1. This report has been prepared in response to the requests from COP 21 and CMA 2¹ for the secretariat to prepare a synthesis report on NDCs submitted by Parties. In view of the postponement from 2020 to 2021 of the United Nations Climate Change Conference to be held in Glasgow and the impact of the COVID-19 pandemic on the preparation of NDCs, the secretariat informed Parties that it would publish two editions of the NDC synthesis report: an initial version by 28 February 2021 and the full version in advance of the pre-COP meeting, scheduled for 30 September to 2 October 2021. Further, on 3 September 2021, the secretariat notified Parties that in order to ensure that COP 26 has before it the latest information available, the secretariat will provide an update of the key findings of the report shortly before its start, by 25 October 2021.

2. This update of the key findings of the NDC synthesis report synthesizes information from the 165 latest available NDCs, representing all 192 Parties to the Paris Agreement, including the 116 new or updated NDCs communicated by 143 Parties, recorded in the interim NDC registry as at 12 October 2021, covering 94.1 per cent of the total global emissions in 2019, which are estimated at 52.4 Gt CO₂ eq without LULUCF.²

3. The COP and CMA guidance³ on the information necessary for clarity, transparency and understanding of NDCs was used as a framework for synthesizing the relevant information contained in the communicated NDCs, which was supplemented by the synthesis of other information included in the NDCs but not covered by the guidance. The synthesized information is presented for all the represented Parties taken together.

4. Almost all⁴ Parties provided the information necessary to facilitate clarity, transparency and understanding of their NDCs in accordance with the COP guidance, with almost all Parties that submitted new or updated NDCs already applying the relevant further CMA guidance.

5. All Parties provided information on mitigation targets or mitigation co-benefits resulting from adaptation actions and/or economic diversification plans. The mitigation targets range from economy-wide absolute emission reduction targets to strategies, plans and actions for low-emission development. In their NDCs:

(a) Most Parties provided quantified mitigation targets, expressed as clear numerical targets, while some included strategies, plans and actions as components of their NDCs for which there is no quantifiable information;

(b) Most Parties communicated economy-wide targets, covering all or almost all sectors defined in the 2006 IPCC Guidelines, with an increasing number of Parties moving to absolute emission reduction targets in their new or updated NDCs;

(c) In terms of GHGs, almost all NDCs cover CO₂ emissions, most cover CH₄ and N₂O emissions, many cover HFC emissions and some cover PFC, SF₆ and/or NF₃ emissions;

(d) Some Parties provided information on mitigation co-benefits resulting from their adaptation actions and/or economic diversification plans, mostly in combination with other targets;

(e) Most of the Parties that submitted new or updated NDCs have strengthened their commitment to reducing or limiting GHG emissions by 2025 and/or 2030, demonstrating increased ambition in addressing climate change.

¹ Decision 1/CMA.2, para. 10.

² Unless otherwise noted, in this report global GHG emission totals exclude emissions from forestry and land use or LULUCF but include emissions from international maritime transport and international aviation.

³ Decisions 1/CP.21, para. 27; and 4/CMA.1 and annex I.

⁴ The following terms are used in this report to indicate the percentage of Parties whose NDCs mention particular information: “a few” for less than 10 per cent; “some” for 10–40 per cent; “many” for 41–70 per cent; “most” for 71–90 per cent; and “almost all” for more than 90 per cent.

6. Almost all Parties communicated an NDC implementation period of until 2030, while a few specified an implementation period of until 2025, 2035, 2040 or 2050. Many Parties identified 1 January 2021 as their starting date for NDC implementation; some others indicated that they started implementing their NDC in or before 2020; and a few Parties will start doing so from 2022.

7. Almost all Parties provided quantified information on their mitigation targets and reference points. Of the Parties that submitted new or updated NDCs, almost all updated the basis for defining their targets, including reference points and/or 'business as usual' scenarios. Although such updates lead to higher-quality NDCs, for some Parties they lead to significant changes in the estimated emission levels for 2025 and 2030 for reasons other than changes to target levels.

8. Most Parties provided information on voluntary cooperation under Article 6 of the Paris Agreement. Almost all of them stated that they plan to or will possibly use at least one type of voluntary cooperation. At the same time, some Parties have set qualitative limits on their use of voluntary cooperation for achieving their mitigation targets.

9. Of the Parties that communicated new or updated NDCs, the share that indicated planned or possible use of at least one type of voluntary cooperation has increased (from 46 to 85 per cent) since their previous NDCs. Similarly, the share of those Parties that have set qualitative limits on their use of voluntary cooperation has sharply increased (from 20 to 36 per cent) since their previous NDCs.

10. Total global GHG emission level (without LULUCF), taking into account implementation of the latest NDCs of all Parties to the Paris Agreement, is estimated to be around 54.7 (52.7–56.7) Gt CO₂ eq in 2025⁵ and 54.9 (51.5–58.3) Gt CO₂ eq in 2030,⁶ which are:

(a) In 2025, 58.1 per cent higher than in 1990 (34.6 Gt CO₂ eq), 15.5 per cent higher than in 2010 (47.4 Gt CO₂ eq) and 4.3 per cent higher than in 2019 (52.4 Gt CO₂ eq);

(b) In 2030, 58.7 per cent higher than in 1990, 15.9 per cent higher than in 2010 and 4.7 per cent higher than 2019.

11. In comparison, the total GHG emissions of the Parties that communicated new or updated NDCs are estimated to be 26.3 Gt CO₂ eq in 2019, and total GHG emission levels resulting from implementation of their NDCs are estimated to be around 25.6 (24.7–26.4) Gt CO₂ eq in 2025 and 23.6 (22.2–25.0) Gt CO₂ eq in 2030, which is about 3.7 (3.3–4.1) per cent lower for 2025 and 11.0 (10.1–12.0) per cent lower for 2030 than the estimated total GHG emissions for these years according to their previous NDCs. In absolute terms, the projected emission levels for 2025 and 2030 for this group of Parties are now lower than according to their previous NDCs by 0.99 (0.91–1.06) Gt CO₂ eq and 2.92 (2.80–3.03) Gt CO₂ eq, respectively. Compared with the 2010 level, total GHG emissions of these Parties are now estimated to be 1.5 (+1.8 to -4.8) per cent lower by 2025 and 9.0 (3.6–14.5) per cent lower by 2030.

12. The total global GHG emission level, taking into account full implementation of all the latest NDCs (including their conditional elements), implies possibility of global emissions peaking before 2030, with the lower bound of the 2030 emission level (51.5 Gt CO₂ eq) estimated to be up to 1.8 per cent below the 2019 emission level (52.4 Gt CO₂ eq) and 2.2 per cent below the lower bound of the estimated 2025 emission level (52.7 Gt CO₂ eq). The implementation of most conditional elements depends on access to enhanced financial resources, technology transfer and technical cooperation, and capacity-building support;

⁵ Unless otherwise noted, for this report GWP values with a 100-year time-horizon from the AR6 have been used. For NDCs that include estimates of GHG emissions calculated using other GWP values (e.g. from previous ARs), a conversion has been applied. For further information, including on estimation methods and approaches, see document FCCC/PA/CMA/2021/8/Add.3.

⁶ Unless otherwise noted, in this report the average of the quantification is followed by a range that represents the minimum and maximum values after aggregation, since several Parties presented conditional and unconditional elements of their NDCs and, in some cases, ranges of values for both.

availability of market-based mechanisms; and absorptive capacity of forests, and other ecosystems.

13. The total global GHG emission level in 2030, taking into account implementation of all the latest NDCs, is expected to be 15.9 per cent above the 2010 level. According to the SR1.5,⁷ to be consistent with global emission pathways with no or limited overshoot of the 1.5 °C goal, global net anthropogenic CO₂ emissions need to decline by about 45 per cent from the 2010 level by 2030, reaching net zero around 2050. For limiting global warming to below 2 °C, CO₂ emissions need to decrease by about 25 per cent from the 2010 level by 2030 and reach net zero around 2070.

14. In the context of the carbon budget consistent with 50 per cent likelihood of limiting warming to 1.5 °C, cumulative CO₂ emissions in 2020–2030 based on the latest NDCs would likely use up 89 per cent of the remaining carbon budget, leaving a post-2030 carbon budget of around 56 Gt CO₂, which is equivalent to the average annual CO₂ emissions in 2020–2030. Similarly, in the context of the carbon budget consistent with a likely chance of keeping warming below 2 °C, cumulative CO₂ emissions in 2020–2030 based on the latest NDCs would likely use up around 39 per cent of the remaining carbon budget.

15. The information in paragraphs 10, 13 and 14 above implies an urgent need for either a significant increase in the level of ambition of NDCs between now and 2030 or a significant overachievement of the latest NDCs, or a combination of both, in order to attain cost-optimal emission levels suggested in many of the scenarios considered by the IPCC for keeping warming well below 2 °C or limiting it to 1.5 °C. If emissions are not reduced by 2030, they will need to be substantially reduced thereafter to compensate for the slow start on the path to net zero emissions. The SR1.5 identifies net zero CO₂ emissions as a prerequisite for halting warming at any level.

16. Some Parties provided information on long-term mitigation visions, strategies and targets for up to and beyond 2050, referring to climate neutrality, carbon neutrality, GHG neutrality or net zero emissions. These Parties' total GHG emission level is estimated to be 14.3 (13.6 to 14.9) Gt CO₂ eq in 2030, which is a reduction of 26 (22–29) per cent compared with the 2010 level.

17. Mindful of the inherent uncertainty of such long-term estimates, the information indicates that these Parties' total GHG emission level could be 83–88 per cent lower in 2050 than in 2019, with annual per capita emissions estimated at 1.0–1.4 t CO₂ eq. Global per capita emission levels by 2050 under the well-below 2 °C and 1.5 °C scenarios are very similar, at 1.6–2.4 t CO₂ eq and 0.6–1.2 t CO₂ eq, respectively.

18. Almost all Parties explained their approach to NDC preparation and implementation. Many linked their NDCs to their commitment to transitioning to a sustainable and/or low-carbon and resilient economy, taking into account social, environmental and economic factors as well as the SDGs. In addition, many Parties indicated that they have integrated their NDC targets, goals and policies into national legislative, regulatory and planning processes as a means of ensuring implementation.

19. Many Parties highlighted policy coherence and synergies between their domestic mitigation measures⁸ and development priorities, which include the SDGs, and for some that communicated new or updated NDCs, LT-LEDS and green recovery from the COVID-19 pandemic.

20. Many Parties referred to formal arrangements in place for domestic stakeholder consultation. Most of them indicated that they conducted consultations and engagement in

⁷ IPCC. 2018. *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*. V Masson-Delmotte, P Zhai, H-O Pörtner, et al. (eds.). Geneva: World Meteorological Organization. Available at <https://www.ipcc.ch/sr15/>.

⁸ In this report, (domestic) mitigation measures refers to specific domestic policies and actions that contribute to achieving mitigation objectives identified in NDCs, including adaptation actions and economic diversification plans with mitigation co-benefits.

an inclusive and participatory manner, with some Parties specifically referencing gender-sensitive consultations.

21. Parties are increasingly⁹ recognizing gender integration as a means to enhance the ambition and effectiveness of their climate action. Most Parties provided information related to gender in their NDCs and many affirmed that they will take gender into account in implementing them.¹⁰ Of the Parties that referenced gender in their previous NDCs, most elaborated more on the topic in their new or updated NDCs. Some included information on how gender had been or was planned to be mainstreamed in NDC implementation.

22. Some Parties described the role of local communities and the role, situation and rights of indigenous peoples in the context of their NDCs, describing the specific vulnerabilities of indigenous peoples that are particular to their circumstances, the importance of drawing on indigenous and local knowledge to strengthen climate efforts, and arrangements to enable greater participation in and contributions to climate action by indigenous peoples.

23. Almost all Parties provided information on using one or more ACE elements¹¹ to promote implementation of mitigation and adaptation activities, and in their new or updated NDCs Parties generally communicated more clearly and in more detail on general principles, past achievements, future commitments, and needs and gaps in relation to ACE.

24. Most Parties included adaptation-related information in their NDCs. Some of the adaptation components were designated as adaptation communications. Parties provided information in particular on adaptation-related research; vulnerabilities; adaptation measures, in particular NAPs and sectoral actions; contingency measures; synergies with mitigation and other global frameworks; and monitoring and evaluation of adaptation.

25. In comparison with the INDCs, more of the NDCs contain adaptation information. The adaptation components of the NDCs, where included, indicate increased focus on national adaptation planning, in particular on the process to formulate and implement NAPs. The new or updated NDCs include, in comparison with the same Parties' previous NDCs, more information on time-bound quantitative adaptation targets and the associated indicator frameworks, more specific links between adaptation efforts and efforts towards the SDGs, and more specific information on synergies and co-benefits between adaptation and mitigation.

26. In terms of adaptation priorities, the NDCs illustrate that Parties continue to focus on food production and nutrition security; freshwater resources; terrestrial and wetland ecosystems; human health; key economic sectors and services; disaster risk management and early warning; human habitats and urban areas; coastal areas and sea level rise; ocean ecosystems; and livelihoods and poverty.

27. Almost all Parties outlined domestic mitigation measures as key instruments for achieving mitigation targets of their NDCs and/or targets for sectors or areas, such as energy supply, transport, buildings, industry, agriculture, LULUCF and waste.

28. Domestic mitigation measures for renewable energy generation were most frequently mentioned by Parties, followed by measures for improvement in the energy efficiency of buildings. Some Parties communicated quantitative targets for the share (ranging from 15 to 100 per cent) of renewable energy in electricity generation by 2030; and many of those target shares fall within or above the IPCC range of 47–65 per cent consistent with 1.5 °C pathways.¹² For the Parties that communicated new or updated NDCs, renewable energy generation continued, as in their previous NDCs, to be the most frequently indicated

⁹ The share of Parties that referred to gender and consider it a cross-cutting issue in the new or updated NDCs has increased significantly since their previous NDCs.

¹⁰ For more information on gender under the UNFCCC, see <https://unfccc.int/topics/gender/workstreams/chronology-of-gender-in-the-intergovernmental-process>.

¹¹ ACE denotes work under Article 12 of the Paris Agreement; its objective is to empower all members of society to engage in climate action through education, training, public awareness, public participation, public access to information, and international cooperation on these issues (the six ACE elements).

¹² The interquartile range of global renewable energy share in electricity generation by 2030 consistent with the emission pathways to 1.5 °C with no or limited overshoot in the SR1.5.

mitigation option, with the share of Parties indicating this option sharply increasing since their previous NDCs (from 55 to 87 per cent).

29. Renewable energy generation and shifting to low- or zero-carbon fuels were frequently indicated as being relevant to reducing the carbon intensity of electricity and other fuels, including by increasing the electrification rate of the supply and electrifying end-use of energy. Improving energy efficiency and shifting to more efficient modes of transport were often referenced in relation to reducing energy demand. Across all priority mitigation areas, Parties frequently indicated waste-to-energy, improved management of manure and herds, and fluorinated gas substitution as key mitigation options relevant to reducing non-CO₂ emissions. Parties often linked measures to the concept of circular economy,¹³ including reducing and recycling waste. Carbon pricing was frequently identified as efficiently incentivizing low-carbon behaviours and technologies by putting a price on GHG emissions.

30. In terms of measures for enhancing carbon sequestration in soil or vegetation, afforestation, reforestation and revegetation, sustainable forest management, and reduced deforestation and forest degradation were most frequently indicated. Many developing country Parties referred to reducing deforestation as a priority with high mitigation potential, including by implementing REDD+ activities.

31. The SR1.5 identifies mitigation options considered relevant to aligning with 1.5 °C pathways, including:

(a) Halting investment in unabated coal by 2030. A few Parties communicated corresponding measures, such as phasing out use of unabated coal to produce electricity by 2025;

(b) Phasing out of sales of fossil-fuel passenger vehicles by 2035–2050. A few Parties communicated corresponding measures, including banning new registration of diesel and gasoline vehicles after 2030;

(c) Requiring newly constructed buildings to be near zero energy by 2020. Some Parties communicated corresponding measures, such as requiring new buildings constructed after 1 January 2020 to consume almost zero energy;

(d) Expanding forest cover by 2030. Some Parties communicated quantitative targets for increasing national forest cover, such as increasing forest cover to 60 per cent of the national territory without competing for land with the agriculture sector.

32. Some Parties considered mitigation co-benefits resulting from their adaptation action and/or economic diversification plans. In their new or updated NDCs more Parties reported on mitigation co-benefits of adaptation action and economic diversification plans, including information on specific projects, measures and activities with the resulting co-benefits, compared with the information in their previous NDCs. Similarly, more Parties provided information on their consideration of social and economic consequences of response measures, and of just transition and/or economic diversification.

33. Adaptation actions and economic diversification plans with mitigation co-benefits include afforestation and reforestation activities, climate-smart agriculture, reducing food waste, vertical farming, adapting coastal ecosystems, conservation plans for protected areas, nature-based solutions, increasing the share of renewable sources in energy generation, improving energy efficiency, carbon dioxide capture and storage, fuel switch and fuel price reforms in the transport sector, and moving to circular economy for better waste management.

34. Almost all Parties mentioned some or all means of implementation in their NDCs, although the structure and depth of that information varied significantly. While some Parties included a dedicated section on means of implementation or separate sections on finance, technology and/or capacity-building, many mentioned or referred to aspects of means of implementation in other sections of their NDCs.

35. Many Parties provided quantitative estimates of financial support needs for NDC implementation. In their new or updated NDCs some Parties provided quantitative estimates

¹³ Circular economy refers to the continual use of resources and minimization of waste to reduce demand for exploiting new resources, including minerals, fossil fuels and biomass.

of financial support needs, with many of them providing updated quantitative estimates and many others providing estimates for the first time.

36. Many Parties identified certain types of technology that they intend to use for implementing adaptation and mitigation actions, such as energy-efficient appliances, renewable energy technologies, low- or zero-emission vehicles, blended fuel and climate-smart agriculture. Further, the main areas of technology needs mentioned by Parties were energy, agriculture, water, waste, transport, and climate observation and early warning.

37. Most Parties identified capacity-building as a prerequisite for NDC implementation. Capacity-building needs for formulating policy, integrating mitigation and adaptation into sectoral planning processes, accessing finance and providing the information necessary for clarity, transparency and understanding of NDCs were identified. In the new or updated NDCs, compared with in their previous NDCs, more Parties expressed capacity-building needs for adaptation.

38. Some Parties referred to the potential impacts of the COVID-19 pandemic in their new or updated NDCs. The longer-term effects of the related changes in national and global GHG emissions will depend on the duration of the pandemic and the nature and scale of recovery measures. At this stage, it is unclear how the observed drop in total CO₂ emissions from 2019 to 2020 (estimated at around 7 per cent in the contribution of Working Group I to the AR6 (cross-chapter box 6.1)¹⁴) associated with the impacts of COVID-19 and the effect of global recovery packages could affect global GHG emission levels in 2025 and 2030.

¹⁴ IPCC. 2021. *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. V Masson-Delmotte, P Zhai, A Pirani, et al. (eds.). Cambridge: Cambridge University Press. Available at <https://www.ipcc.ch/report/ar6/wg1/>.

III. Mandate

39. Under Article 4, paragraph 2, of the Paris Agreement, each Party is to prepare, communicate and maintain successive NDCs that it intends to achieve. The communicated NDCs are to be recorded in a public registry maintained by the secretariat.¹⁵

40. COP 21 invited Parties to communicate their first NDC no later than when the Party submits its respective instrument of ratification, acceptance or approval of or accession to the Paris Agreement. A Party is also considered to have satisfied this provision, unless the Party decides otherwise, if it had communicated an INDC prior to becoming a Party to the Paris Agreement.¹⁶

41. COP 21 requested Parties whose INDC pursuant to decision 1/CP.20 contains a time frame:

(a) Up to 2025: to communicate by 2020 a new NDC, and to do so every five years thereafter pursuant to Article 4, paragraph 9, of the Paris Agreement;

(b) Up to 2030: to communicate or update by 2020 their NDC, and to do so every five years thereafter pursuant to Article 4, paragraph 9, of the Paris Agreement.¹⁷

42. COP 21 decided that Parties shall submit their NDCs to the secretariat at least 9–12 months in advance of the relevant CMA session with a view to facilitating the clarity, transparency and understanding of the NDCs, including through a synthesis report prepared by the secretariat.¹⁸

43. Recalling that decision, CMA 2 requested the secretariat to make the synthesis report available to COP 26.¹⁹

IV. Background, scope and approach

A. Background

44. Owing to the circumstances related to the COVID-19 pandemic, the Bureau of the governing bodies, at its meeting on 28 May 2020, decided to postpone from November 2020 to November 2021 the Glasgow Conference, including COP 26.²⁰

45. The pandemic has had an adverse impact on many Parties' NDC preparation process, leading to challenges in meeting the timelines stipulated in decision 1/CP.21.

46. In view of the postponement of the Glasgow Conference and the impact of the pandemic on the NDC preparation process, the secretariat notified Parties on 13 August 2020 that it was planning to publish two editions of the NDC synthesis report: an initial version by 28 February 2021 based on the NDCs recorded in the interim NDC registry as at 31 December 2020; and the full version containing all the latest information, to be made available to COP 26 in accordance with decision 1/CMA.2.

¹⁵ Until the modalities and procedures for the operation and use of the public registry have been finalized under the Subsidiary Body for Implementation, NDCs are being recorded in the interim NDC registry (available at <https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx>).

¹⁶ Decision 1/CP.21, para. 22.

¹⁷ Decision 1/CP.21, paras. 23–24.

¹⁸ Decision 1/CP.21, para. 25.

¹⁹ Decision 1/CMA.2, para. 10.

²⁰ The notification is available at https://unfccc.int/sites/default/files/resource/message_to_parties_and_observers_dates_of_cop_26.pdf.

47. The initial version of the NDC synthesis report, along with its three technical addenda, was published on the UNFCCC website on 26 February 2021.²¹ It synthesizes information from 48 NDCs, representing 75 Parties, submitted as at 31 December 2020 as new or updated NDCs in response to paragraphs 23–24 of decision 1/CP.21, or as new NDCs in case the Party's INDC was not converted automatically in accordance with paragraph 22 of that decision.

48. The full version of the NDC synthesis report, along with its three technical addenda, was published on 17 September 2021 on the basis of all NDCs recorded in the interim NDC registry as at 30 July 2021.²²

49. On 3 September 2021, the secretariat notified Parties²³ that in order to ensure that COP 26 has before it the latest information available, the secretariat will issue an update of the key findings of the report shortly before its start, by 25 October 2021. The update of the key findings of the synthesis report contained in this document takes into account new or updated NDCs submitted to the secretariat between 31 July and 12 October 2021.

B. Scope

50. This is an update of the key findings of the NDC synthesis report being prepared for COP 26. It synthesizes information from the 165 latest available NDCs, representing all 192 Parties to the Paris Agreement,²⁴ recorded in the interim NDC registry as at 12 October 2021.^{25, 26} The three technical addenda referred to in paragraph 48 above could not be updated owing to the limited time available for the preparation of the update.

51. The 165 NDCs comprise 116 new or updated NDCs from 143 Parties²⁷ and 49 NDCs from Parties that have not communicated new or updated NDCs in response to paragraphs 23–24 of decision 1/CP.21.

²¹ Available at <https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs/ndc-synthesis-report>.

²² FCCC/PA/CMA/2021/8 and Add.1–3. Available at <https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs/ndc-synthesis-report>.

²³ The message to Parties is available at <https://unfccc.int/documents/306494>.

²⁴ The European Union and its 27 member States communicated one joint NDC in accordance with Article 4, paras. 16–18, of the Paris Agreement, which for this report has been counted as one NDC representing 28 Parties.

²⁵ A list of the NDCs covered by this version of the NDC synthesis report is available at <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement/nationally-determined-contributions-ndcs/NDC-submissions>.

²⁶ Between 13 and 25 October 2021 the secretariat received new/updated NDCs from a number of Parties: Bahrain, Chad, Ghana, Japan (full version following up on the interim version submitted on 12 October 2021), Nauru, Pakistan (full version following up on the abridged version submitted on 12 October 2021) and Saudi Arabia. The secretariat also received an NDC submission from Iraq, which, at the time of the preparation of this report, was not a Party to the Paris Agreement. These NDC submissions have not been considered in this update.

²⁷ Albania, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Australia, Bangladesh, Barbados, Belarus, Belize, Benin, Bhutan, Bosnia and Herzegovina, Brazil, Brunei Darussalam, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Canada, Chile, Colombia, Congo, Costa Rica, Cuba, Democratic People's Republic of Korea, Dominican Republic, Ecuador, Ethiopia, Eswatini, European Union (and its 27 member States), Fiji, Gambia, Georgia, Grenada, Guinea, Guinea-Bissau, Honduras, Iceland, Indonesia, Israel, Jamaica, Japan, Jordan, Kenya, Kuwait, Kyrgyzstan, Lao People's Democratic Republic, Lebanon, Liberia, Malawi, Malaysia, Maldives, Mali, Marshall Islands, Mauritania, Mauritius, Mexico, Monaco, Mongolia, Montenegro, Morocco, Myanmar, Namibia, Nepal, New Zealand, Nicaragua, Nigeria, North Macedonia, Norway, Oman, Pakistan (abridged), Palestine, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Qatar, Republic of Korea, Republic of Moldova, Russian Federation, Rwanda, Saint Lucia, Samoa, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Singapore, Solomon Islands, Somalia, South Sudan, South Africa, Sri Lanka, Sudan, Suriname, Switzerland, Tajikistan, Thailand, Togo, Tonga, Tunisia, Uganda, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland,

52. Under Article 4, paragraph 8, of the Paris Agreement, in communicating their NDCs, Parties are to provide the information necessary for clarity, transparency and understanding in accordance with decision 1/CP.21 and any relevant decisions of the CMA.

53. For first NDCs, including those communicated or updated by 2020, this information may cover, as appropriate, quantifiable information on the reference point (including, as appropriate, a base year); time frames and/or periods of implementation; scope and coverage; planning processes; assumptions and methodological approaches, including for estimating and accounting for anthropogenic GHG emissions and, as appropriate, removals; and how the Party considers that its NDC is fair and ambitious in the light of its national circumstances, and how it contributes towards achieving the objective of the Convention as set out in its Article 2.²⁸

54. CMA 1 adopted further guidance on the information necessary for clarity, transparency and understanding of NDCs. In communicating their second and subsequent NDCs, Parties shall provide the information necessary for clarity, transparency and understanding contained in annex I to decision 4/CMA.1 as applicable to their NDCs. In addition, CMA 1 strongly encouraged Parties to provide this information in relation to their first NDC, including when communicating or updating it by 2020.²⁹

55. The guidance on the information necessary for clarity, transparency and understanding is without prejudice to the inclusion of components other than information on mitigation in an NDC.³⁰

C. Approach

56. The guidance on the information necessary for clarity, transparency and understanding of NDCs was used as a framework for synthesizing the relevant information contained in the communicated NDCs,³¹ which was supplemented by the synthesis of other information included in the NDCs but not covered by the guidance, such as on adaptation, means of implementation necessary for NDC implementation, domestic mitigation measures,³² and economic diversification plans and response measures.

57. The synthesis covers only the information communicated by Parties in their NDCs and the synthesized information is presented for all those Parties taken together.

58. In this report, the following terms are used to indicate the percentage of Parties whose NDCs mention particular information: “a few” for less than 10 per cent; “some” for 10–40 per cent; “many” for 41–70 per cent; “most” for 71–90 per cent; and “almost all” for more than 90 per cent.

V. Synthesis of information contained in nationally determined contributions

A. Overview

59. This report considers the 165 latest available NDCs,³³ representing all 192 Parties to the Paris Agreement, recorded in the interim NDC registry as at 12 October 2021, covering

Ukraine, United Republic of Tanzania, United States of America, Uruguay, Vanuatu, Viet Nam, Zambia and Zimbabwe.

²⁸ Decisions 1/CP.21, para. 27; and 4/CMA.1, para. 9.

²⁹ Decision 4/CMA.1, paras. 6–10 and annex I.

³⁰ Decision 4/CMA.1, para. 8.

³¹ As per decision 1/CP.21, para. 25.

³² In this report, (domestic) mitigation measures refers to specific policies and actions that contribute to achieving mitigation objectives identified in NDCs, including adaptation actions and economic diversification plans with mitigation co-benefits.

³³ The NDC of the European Union has been counted as reflecting the inclusion of particular information by its 27 member States.

94.1 per cent of total global emissions in 2019, which are estimated at 52.4 Gt CO₂ eq³⁴ without LULUCF (and around 56.0 Gt CO₂ eq with LULUCF³⁵).

60. Almost all Parties provided the information necessary for clarity, transparency and understanding of their NDCs in accordance with Article 4, paragraph 8, of the Paris Agreement and decision 1/CP.21, paragraph 27. Of the Parties that submitted new or updated NDCs, almost all provided such elements of information, already applying the CMA guidance referred to in paragraph 54 above.

61. Most Parties provided information on adaptation, with a few identifying the adaptation component of their NDC as their adaptation communication, and a few provided information organized around the elements identified in the annex to decision 9/CMA.1.

62. In addition, almost all Parties provided other information, such as on the means of implementation necessary for NDC implementation; domestic mitigation measures; and/or economic diversification plans and response measures.

B. Scope and coverage

63. All Parties provided information on mitigation targets or mitigation co-benefits resulting from adaptation actions and/or economic diversification plans in their NDCs (see figure 1), which range from economy-wide absolute emission reduction targets to strategies, plans and actions for low-emission development, to be implemented within a specified time frame or implementation period:

(a) Some Parties included absolute emission reduction targets expressed as an emission reduction from the level in a specified base year, ranging from 7.2 to 88.0 per cent. A few other Parties specified a year or time frame in which their emissions are expected to peak or reach a maximum level of absolute emissions (e.g. by 2030). In addition, a few of these Parties expressed their target as a carbon budget in addition to the absolute target, establishing an overall limit on GHGs to be emitted over a specified period of time (e.g. between 2021 and 2030);

(b) Many Parties included relative targets for reducing emissions below the 'business as usual' level by a specified target year, either for the whole economy or for specific sectors, ranging from 5 to 103.5 per cent and thus achieving carbon neutrality; or emission intensity targets for reducing specific GHG emissions per GDP unit relative to a base-year (e.g. 1990) level;

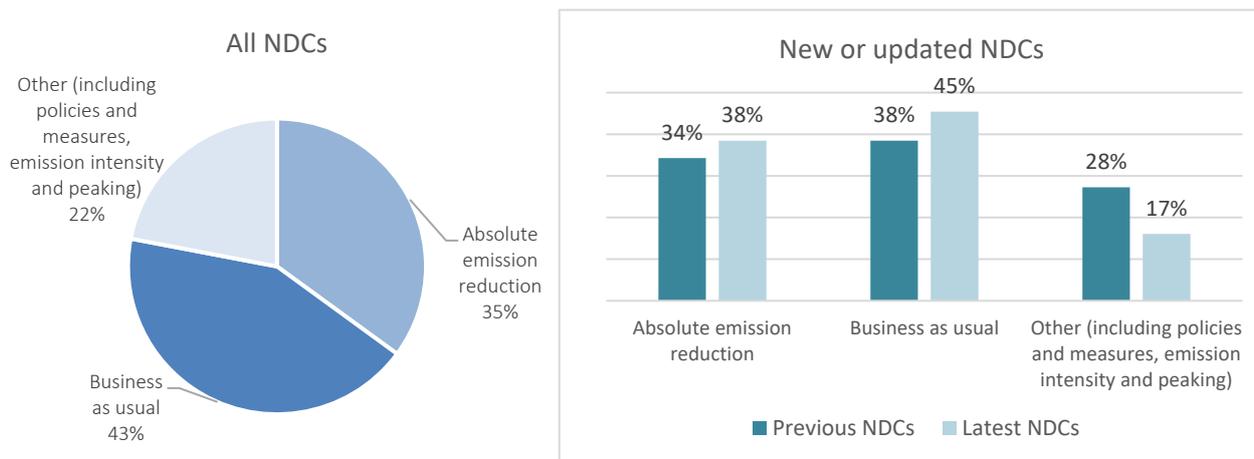
(c) Some Parties included strategies, plans and actions for low-emission development reflecting their particular national circumstances;

(d) Some Parties provided information on mitigation co-benefits resulting from their adaptation actions and/or economic diversification plans, mostly in combination with other targets.

³⁴ Including emissions from countries that are not Parties to the Paris Agreement, a harmonization factor to ensure comparability with SSP scenarios assessed by the IPCC, and emissions from international aviation and maritime transport, which accounted for approximately 1.2 and 1.5 per cent, respectively, of total global emissions in 2019.

³⁵ In line with anthropogenic land-use emissions and removals in the scenarios assessed by the IPCC, although actual directly induced net emissions from LULUCF could be higher.

Figure 1
Types of mitigation target and share of Parties that communicated them in nationally determined contributions



64. Total global GHG emission levels (without LULUCF) taking into account implementation of the latest NDCs of all Parties to the Paris Agreement are estimated to be around 54.7 (52.7–56.7) Gt CO₂ eq in 2025 and 54.9 (51.5–58.3) Gt CO₂ eq in 2030³⁶ (see figure 2).

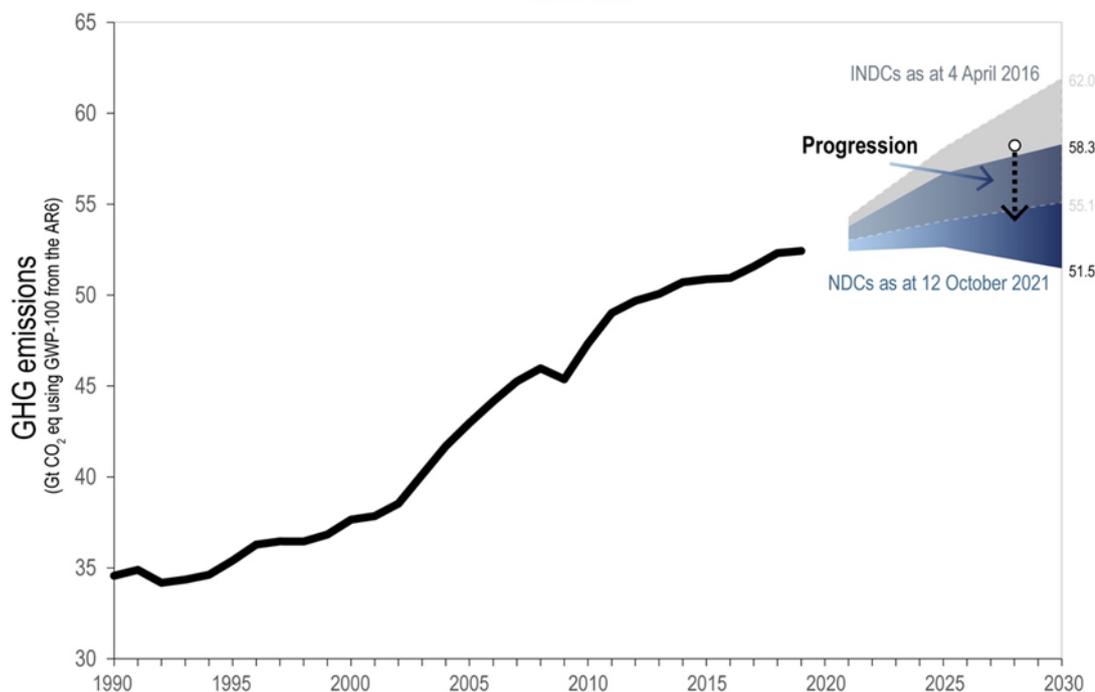
65. Most Parties' NDCs are unconditional, at least in part, with many including more ambitious conditional elements. The implementation of most conditional elements depends on access to enhanced financial resources, technology transfer and technical cooperation, and capacity-building support; availability of market-based mechanisms; and absorptive capacity of forests and other ecosystems. Total GHG emission levels resulting from implementation of the unconditional elements of the NDCs are estimated to be 55.5 (54.3–56.7) Gt CO₂ eq in 2025 and 56.4 (54.4–58.3) Gt CO₂ eq in 2030 (see figure 2).

66. When considering only the new or updated NDCs, the total GHG emissions of the relevant Parties are estimated to be around 25.6 (24.7–26.4) Gt CO₂ eq in 2025 and 23.6 (22.2–25.0) Gt CO₂ eq in 2030.

67. Of the Parties that submitted new or updated NDCs, most included unconditional components, and many included additional conditional elements. Compared with their previous NDCs, some 20 per cent more Parties included unconditional elements in their new or updated NDCs.

³⁶ Unless otherwise noted, in this report the average of the quantification is followed by a range that represents the minimum and maximum values after aggregation for the Parties NDCs, since several presented conditional and unconditional elements of their NDCs and, in some cases, ranges of values for both.

Figure 2
Projected range and progression of emission levels



Note: The projected ranges cover the higher-emission end for unconditional elements of NDCs to the lower-emission end when also taking conditional elements of NDCs into account. Emissions from international aviation included are assumed constant by 2030 at the 2019 level (~628 Mt CO₂); emissions from international maritime transport of 755 Mt CO₂ eq in 2018 are assumed to be on a linear trajectory by 2030 towards the international maritime sector's target of halving emissions by 2050 compared with the 2008 level. The comparison of total emissions resulting from implementation of the INDCs and the latest NDCs includes the difference in assumed bunker emissions (approximately 390 and 540 Mt CO₂ eq lower emissions in 2025 and 2030, respectively).

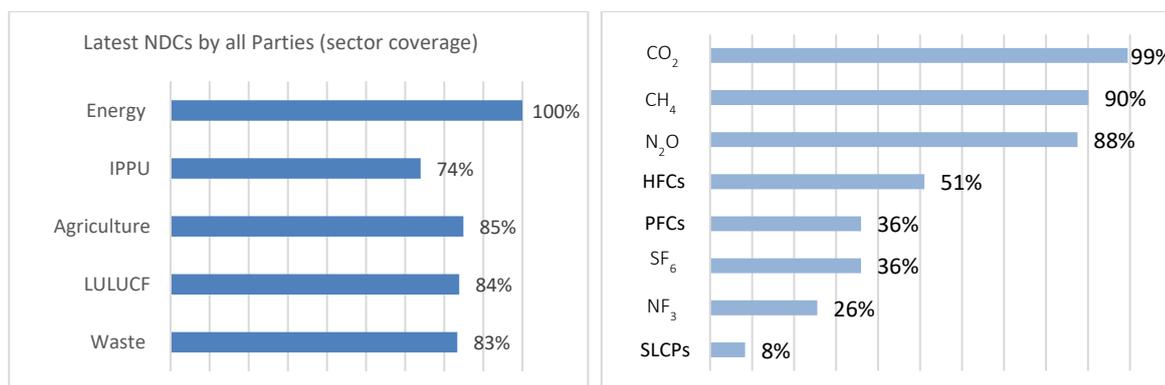
68. All Parties provided information on the scope and coverage of their NDCs, including sectors and gases covered.

69. Most Parties have economy-wide NDCs, with many covering all sectors defined in the 2006 IPCC Guidelines. All NDCs cover the energy sector, most cover agriculture, LULUCF, waste and IPPU (see figure 3).

70. Some Parties provided information on coverage of specific sectors of national importance, which are often a subset of one or more IPCC sectors, such as shipping and aviation, cooling, food production, transport, mining or buildings, while others mentioned specific carbon pools, oceans or blue carbon.

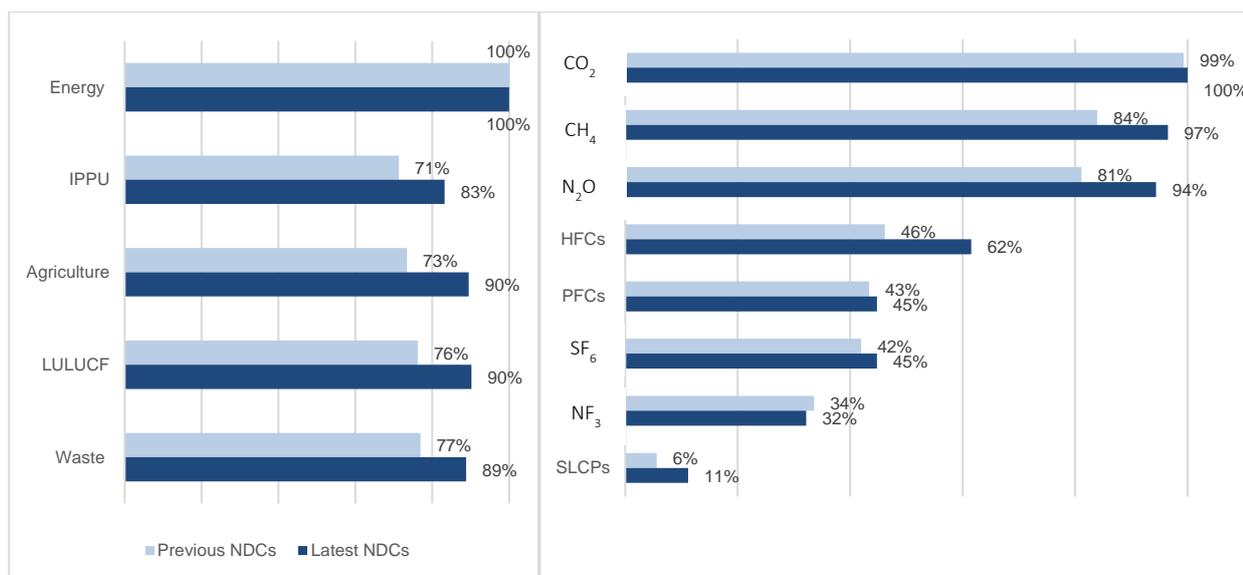
71. Almost all NDCs cover CO₂ emissions, most cover CH₄ and N₂O emissions, many cover HFC emissions and some cover PFC, SF₆ and NF₃ emissions. Some Parties included additional gases or emissions, including short-lived climate pollutants, such as black carbon, sulfur dioxide and non-methane volatile organic compounds (see figure 3).

Figure 3
Sectors and greenhouse gases covered in nationally determined contributions



72. The coverage of sectors and gases has increased in the new or updated NDCs compared with the Parties’ previous NDCs, covering 99.0 per cent (25.5 Gt CO₂ eq) of the Parties’ total economy-wide emissions in 2019, up from 97.3 per cent (25.1 Gt CO₂ eq) previously, resulting in most Parties having economy-wide NDCs, covering all 2006 IPCC Guidelines sectors (see figure 4).

Figure 4
Sectors and greenhouse gases covered by Parties that submitted new or updated nationally determined contributions



73. Most Parties provided information on how they are striving to include all categories of anthropogenic emissions and removals in their NDCs over time, as well as explanations for the exclusion of any categories. Some Parties stated that they already have economy-wide NDCs including all sectors and GHGs. Some other Parties explained why certain sectors and/or gases had been excluded, such as owing to categories being negligible or insignificant, data unavailability or inaccuracy, or lack of technical capacity.

74. In addition to communicating information on mitigation targets or plans for the near to medium term, many Parties provided information on long-term mitigation visions, strategies or targets for up to and beyond 2050 that either have already been formulated or are under preparation. Of those Parties, most referred to climate neutrality, carbon neutrality, GHG neutrality or net zero emissions by 2030, 2040, 2050, 2060 or mid-century.^{37, 38}

³⁷ As at 12 October 2021, 33 Parties had communicated LT-LEDS, 32 of which had communicated a new or updated NDC; see <https://unfccc.int/process/the-paris-agreement/long-term-strategies>.

³⁸ See document FCCC/PA/CMA/2021/8/Add.3 for additional information on long-term goals.

C. Time frames and/or periods of implementation

75. All Parties communicated in their NDCs the time frame and/or period of implementation, which refers to a time in the future by or in which an objective is to be achieved.

76. Almost all Parties communicated a time frame and/or period of implementation of until 2030, while a few specified periods of until 2025, 2035, 2040 or 2050. Many Parties indicated 1 January 2021 as their starting date for NDC implementation; some started implementing their NDC in or before 2020; and a few Parties will start doing so from 2022.

77. All Parties communicated a target year, expressing a single-year target, a multi-year target (i.e. for a period of consecutive years) or multiple target years (i.e. several non-consecutive target years) depending on the target.

78. Most Parties communicated a single-year target for 2030, while a few indicated a single-year target for 2025, 2035 or 2040. A few Parties communicated multiple target years, including when target years were associated with the implementation of different policies and measures. A few other Parties indicated having a multi-year target for NDC implementation.

D. Quantifiable information on the reference point (including, as appropriate, a base year)

79. Most Parties provided quantified mitigation targets, expressed as clear numerical targets, while some included strategies, plans and actions as referred to in Article 4, paragraph 6, of the Paris Agreement or policies and measures as components of their NDCs for which there is no quantifiable information (see para. 63 above).

80. Most Parties also provided information on the reference year, base year, reference period or other starting point for measuring progress towards the target. Most of those Parties are measuring the achievement of their targets against a base-year level, with many selecting 1990 and others selecting a year between 2000 and 2020. Some have chosen to measure progress in terms of a deviation from a level in the target year, with most selecting 2030; and a few provided a reference period.

81. Almost all Parties further provided information on the reference indicator used to express their target. Most of those Parties chose as the reference indicator absolute GHG emissions, some the 'business as usual' GHG emission level, a few a GHG emission budget, and a few others emission intensity per GDP unit or sectoral 'business as usual' levels. Most Parties provided a quantified value for their reference indicator for either the base year, the target year or both, as appropriate.

82. Of the Parties that submitted new or updated NDCs, most updated the basis for defining their targets, including reference points and 'business as usual' scenarios. Although such updates lead to higher-quality NDCs, for some Parties they lead to significant changes in the estimated emission levels for 2025 and 2030, for reasons other than changes to target levels.

83. Most Parties that included strategies, plans and actions as referred to in Article 4, paragraph 6, of the Paris Agreement provided other information for clarification, including on expected levels of emission reduction or prevention, increased forest coverage, reduction of deforestation, energy efficiency targets, renewable energy share or other non-GHG policy targets.

84. Most Parties provided information on the sources of the emission data used for quantifying the reference point, many referring to national inventory reports and many to biennial reports, biennial update reports and/or national communications. Some Parties also referred to national documents and statistics, such as sector activity reports; national development plans and/or strategies; economic development projections; national climate change plans; energy master plans; national statistics on economy, energy and/or trade; waste

management strategies; national resource plans; energy road maps; national forest reports; and socioeconomic forecasts.

85. Many Parties presented information on the circumstances in which they may update the values of their reference indicators, such as owing to significant changes in specific financial, economic, technological and/or political conditions, or to impacts due to extreme natural disasters; or depending on scale of access to support and other means of implementation, expected improvements or modifications to activity data, variables or methodologies used in estimating national emissions, baselines or projections, or the results of the ongoing negotiations on common metrics; or to reflect the actual situation during the implementation period.

E. Assumptions and methodological approaches, including for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals

1. Intergovernmental Panel on Climate Change methodologies and metrics

86. Most Parties communicated information on the IPCC methodologies they used for estimating emissions and removals. Many referred to the 2006 IPCC Guidelines and some to the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, while a few others mentioned that they used both sets of guidelines to cover different sectors.

87. Many Parties provided information on the metrics they used for estimating emissions and removals. Many of them used GWP values over a 100-year time-horizon from the AR5, while some used such values from the AR2 and some those from the AR4. A few Parties used GWP values as well as global temperature potential values from the AR5 for estimating their mitigation targets.

88. Most Parties also communicated information on the assumptions and methodological approaches to be used for accounting anthropogenic GHG emissions and, as appropriate, removals, corresponding to their NDCs. Most of them referred to the 2006 IPCC Guidelines, while some others referred to the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* or the *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Some also mentioned the *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* and/or the *IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry*.

89. In addition, some Parties also referred to the standard methods and procedures contained in the *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol* and the *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*.

2. Assumptions and methodological approaches

90. Many Parties expressed mitigation targets as a deviation from a ‘business as usual’ level, with most presenting quantitative baselines and mitigation scenarios and most providing updated information on the assumptions and approaches used to develop ‘business as usual’ scenarios, baselines or projections, such as baselines and projections being based on historical data and trends in emissions and economic parameters. Most of those Parties referred to key parameters and variables such as GDP and population and growth thereof, and cost–benefit analysis. They also provided sector-specific parameters, including energy consumption, energy demand and production, electricity grid capacity, urbanization rate, transportation network changes and vehicle numbers, forest growth rate, livestock trends, per capita waste generation, and energy and waste statistics per tourist.

91. A few Parties communicated additional information on other approaches used for estimating sector- or activity-specific emissions or baselines, including using regional data sources for downscaling data or generating data at the national level, and calculation tools or approaches for estimating short-lived climate pollutants or precursor emissions. Some Parties mentioned using specific modelling tools for estimating their emissions or baselines, such as The Integrated Market Allocation-Energy Flow Optimization Model System, Long-range

Energy Alternatives Planning, the Greenhouse Gas Abatement Cost Model, Green Economy Modelling, the PROSPECTS+ emissions scenario tool and the Ex-Ante Carbon-balance Tool.

92. Of the Parties that submitted new or updated NDCs, almost all provided more detailed information than previously on the assumptions, methodological approaches and procedures used for developing their baselines or mitigation scenarios.

3. Land use, land-use change and forestry

93. Some Parties consider addressing emissions and subsequent removals due to natural disturbances on managed land if such events occur. Almost all of them mentioned that they may use a statistical approach to identifying natural disturbances following relevant IPCC guidance.

94. Some Parties stated that emissions and removals from harvested wood products will be accounted for as part of their NDCs, with almost all indicating that they will use the production approach.

95. Some Parties mentioned that the effects of age-class structure in forests will be taken into account when estimating the mitigation contribution of forests by using a projected forward-looking forest reference level taking into account current management practices.

4. Voluntary cooperation under Article 6 of the Paris Agreement

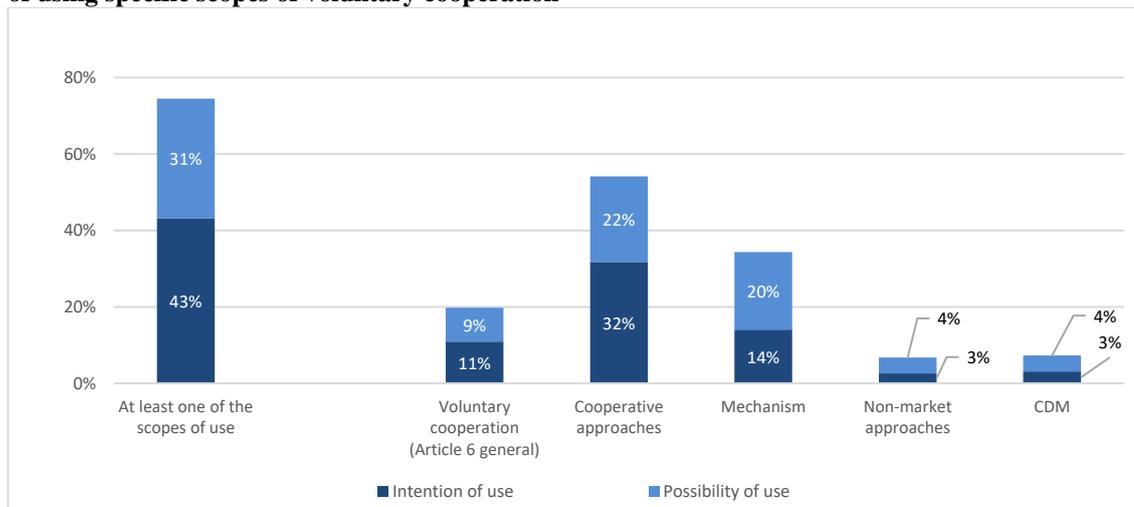
96. Most Parties provided information relating to voluntary cooperation. Almost all of them communicated that they plan to or will possibly use voluntary cooperation in at least one of its scopes in implementing their NDCs (see figure 5) by directly or indirectly³⁹ referring to the scopes in their NDCs: general use of voluntary cooperation under Article 6; use of cooperative approaches under Article 6, paragraph 2; use of the mechanism under Article 6, paragraph 4; use of non-market approaches under Article 6, paragraph 8; and use of the CDM.⁴⁰ The share of Parties that indicated that they plan or will possibly use voluntary cooperation in at least one of its scopes has increased from 46 to 85 per cent in the new or updated NDCs compared with those Parties' previous NDCs.

97. Many Parties communicated planned or possible use of cooperative approaches, followed by planned or possible use of the mechanism. Some mentioned that they plan to or will possibly make general use of voluntary cooperation, a few Parties indicated that they plan to or will possibly use the CDM, and a few referred to non-market approaches.

³⁹ In this report, indirect references include international cooperation under Article 6, market-based mechanisms and non-market mechanisms.

⁴⁰ Only direct references to use of the CDM were considered: an indirect reference to the CDM such as "international market-based mechanisms" was not considered a reference to the CDM.

Figure 5
Share of Parties indicating in nationally determined contributions the intention to use or possibility of using specific scopes of voluntary cooperation



98. Some Parties communicated the use of voluntary cooperation as a condition for achieving their mitigation targets.

99. On the other hand, some Parties have set limits on their use of voluntary cooperation: a few have limited their use of voluntary cooperation to achieving their conditional mitigation targets only; a few have set quantitative limits on their use of voluntary cooperation for achieving their mitigation targets, such as achieving unconditional targets primarily through domestic efforts but partially through voluntary cooperation; and some have set qualitative limits on their use of voluntary cooperation for achieving their mitigation targets, such as using units that adhere to standards and guidelines to ensure additionality, permanence or avoidance of double counting of emission reductions. The share of Parties that have set qualitative limits on their use of voluntary cooperation has increased, from 20 to 36 per cent, in the new or updated NDCs compared with those Parties’ previous NDCs.

F. Planning and implementation processes

100. Almost all Parties provided information on their NDC planning processes and most also referred to their implementation plans, communicating information on their institutional arrangements, stakeholder engagement processes and policy instruments, including legislation, strategies, plans and policies.

1. Domestic institutional arrangements

101. Most Parties indicated that domestic institutional arrangements are a key element of coordinating, planning and implementing climate change policy and action at the national and international level and fostering public participation. Most of them referred to specific arrangements in place for NDC preparation, such as inter-institutional commissions, councils and committees, led by a designated entity with a coordination role and including members from public entities, the private sector, non-governmental organizations and/or academia. A few other Parties communicated that such arrangements are under development.

102. Most Parties referred to formal arrangements in place for consulting various stakeholders, including the general public, local communities, indigenous peoples, private entities, business and trade associations, civil society organizations, youth associations, women’s associations, regional development partners, academia and research communities. Almost all of those Parties indicated that they conducted such consultation and engagement processes in an inclusive and participatory manner. Some of these Parties specifically referenced gender-sensitive consultations, referring to specific guidelines for ensuring gender sensitivity, such as during public consultations, and highlighting the inclusion of national gender machineries, gender and women’s groups, or non-governmental organizations in the process.

103. A few Parties mentioned the Marrakech Partnership for Global Climate Action,⁴¹ which, under the leadership of the high-level champions, supports implementation of the Paris Agreement by strengthening collaboration between national Governments and cities, subnational regions, businesses, investors and civil society to accelerate action on climate change. In this context, some of those Parties also highlighted the voluntary commitments announced or pledged in collaboration with non-Party stakeholders.⁴²

104. Many Parties mentioned specific policy instruments in place to facilitate NDC implementation in addition to institutional arrangements, and some others mentioned instruments being under development. Such policy instruments include energy and/or climate strategies, low-emission development strategies, NDC implementation road maps, NDC action plans, laws and regulations on climate change, sectoral national mitigation and adaptation plans and NDC investment plans.

105. Some Parties included information on their domestic measurement, reporting and verification systems, while many others indicated that such systems are under development. Those Parties acknowledged the important role of such systems in continuously monitoring and tracking the status and progress of their NDCs and mitigation efforts, and highlighted that the results will be reflected in national inventory reports and/or biennial transparency reports, ensuring national and international transparency. A few Parties also highlighted that the feedback from such systems will be used to guide the preparation of their subsequent NDCs.

2. Gender

106. Most Parties provided information related to gender in their NDCs and some affirmed that they will take gender into account in implementing them.⁴³

107. Of the Parties that provided gender-related information, most referred to relevant policies and legislation or affirmed a general commitment to gender equality, while some included information on how gender had been or was planned to be mainstreamed in NDC implementation, and some on specific tools and methods, such as gender analyses or assessments, gender indicators, gender-disaggregated data, and gender-responsive budgeting, and a few included gender as a criterion for prioritizing activities.

108. Many Parties that referred to gender in their NDCs treated it as a cross-cutting issue to be addressed across adaptation and mitigation, with some focusing on adaptation. Some Parties considered gender exclusively in the context of adaptation. Some Parties mentioned taking gender into account in formulating and implementing their NAPs.

109. Many Parties referred to their planned gender-sensitive or gender-responsive climate action or generally elaborated on gender aspects in the context of specific sectors, including in the context of agriculture, energy, disaster, water, health, land use and forestry, fisheries, waste and education.

110. Some Parties highlighted the importance of providing capacity-building, finance and technology for gender-specific action and of these means of implementation being gender-responsive.

111. Some Parties implicitly or explicitly considered gender as it intersects with other social factors. Some Parties explicitly considered specific genders in the context of their differentiated needs and perspectives and the gender-differentiated impacts of and contributions to climate change and climate action. Most of them framed women as being vulnerable and some framed women as stakeholders or agents of change. A few Parties explicitly considered other genders.

⁴¹ See <https://unfccc.int/climate-action/marrakech-partnership-for-global-climate-action>.

⁴² Voluntary commitments by Parties and non-Party stakeholders are reported and tracked in order to capture the extent of climate action taken globally on the global climate action portal (<https://climateaction.unfccc.int/>) and in the Yearbook of Global Climate Action (see, e.g., https://unfccc.int/sites/default/files/resource/2020_Yearbook_final_0.pdf).

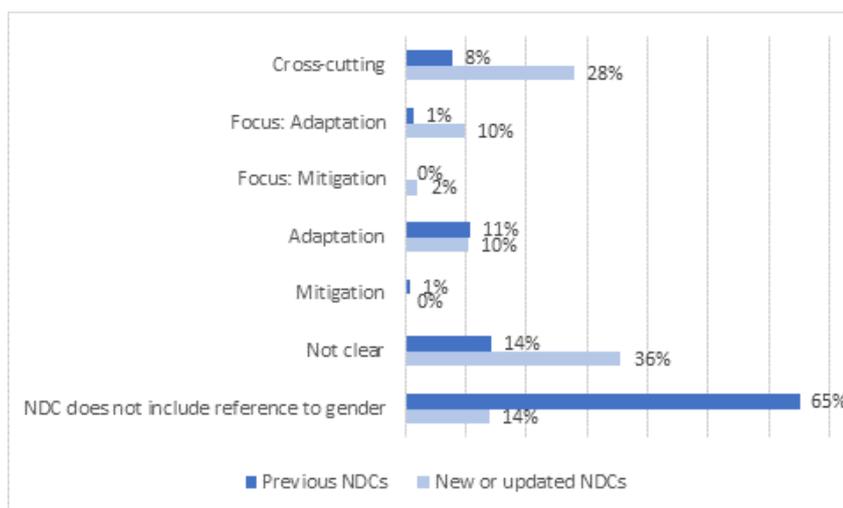
⁴³ For more information on gender under the UNFCCC, see <https://unfccc.int/topics/gender/workstreams/chronology-of-gender-in-the-intergovernmental-process>.

112. Parties are increasingly considering gender in their NDCs and recognizing gender integration as a means of increasing the ambition and effectiveness of their climate action. The share of Parties referring to gender in the new or updated NDCs compared with their previous NDCs has increased significantly and the share of Parties considering gender as a cross-cutting issue has also risen (see figure 6).

113. Most Parties referenced gender in their first NDCs or for the first time in their new or updated NDCs, and many elaborated more on gender than in their previous NDCs, while a few considered gender to a similar or decreased extent.

Figure 6

Reference to gender in nationally determined contributions



3. Indigenous peoples and local communities

114. Some Parties described the role of indigenous peoples and local communities in the context of their NDCs, including the situation and consideration of the rights of indigenous peoples at the national level, such as legal and consultative arrangements for protecting their rights. They emphasized the vulnerabilities of indigenous peoples relating to their intrinsic relationship with forests and ecosystems and conditions of poverty. The benefits of drawing on indigenous knowledge and expertise, in particular for adaptation, were highlighted, as was the importance of combining traditional and modern practices and of ensuring the participation and leadership of indigenous peoples in climate efforts. Parties outlined how indigenous peoples were engaged in NDC preparation, including through consultations on sectoral proposals, risk assessment and analysis of indigenous knowledge.

115. In addition, some of those Parties elaborated on how actions identified in the NDC aim to benefit indigenous peoples by, for example, enhancing access to finance and technology; building capacities for reducing vulnerabilities as well as for leadership, negotiations and indigenous-led climate action; generating payments for ecosystems services; providing development opportunities; enhancing market access to indigenous products; and diversifying livelihoods. A few Parties specifically elaborated on the role of local communities in climate action, highlighting the importance of empowering such communities, building their capacity to adapt and ensuring their participation in related activities, such as through community-based adaptation plans, decentralization strategies and livelihood improvements, as well as through adaptation measures, such as mangrove restoration, that enhance the resilience of local communities to climate change.

4. Action for Climate Empowerment⁴⁴

116. Almost all Parties provided information on using one or more ACE elements to promote implementation of mitigation and adaptation activities. Some Parties indicated their

⁴⁴ ACE denotes work under Article 12 of the Paris Agreement; its objective is to empower all members

intention, and the support needed, to systematically address ACE by developing national ACE strategies, incorporating ACE and its elements into general climate policies and plans, upholding ACE as a guiding principle and cross-cutting priority for climate action, and setting specific ACE-related targets.

117. Many Parties elaborated on climate education measures such as updating formal, informal and non-formal education curricula and programmes, establishing laws and policies to ensure provision of climate education, mainstreaming climate change in national education strategies and plans, and providing training and resources for teachers and educators. Many Parties included information on training measures, including integrating climate change into training programmes for civil servants and other stakeholders.⁴⁵ The need for training was also highlighted in the context of achieving just transition and accessing green jobs.

118. Many Parties provided information on measures for raising public awareness, such as developing communication strategies, disseminating knowledge through traditional and new media, and implementing awareness-raising campaigns for specific sectors, such as health, biodiversity and energy efficiency. Most Parties mentioned public participation, including information on institutional arrangements (see paras. 101–105 above). Some Parties included information on public access to information, providing details on developing regulations and systems to guarantee and facilitate access to climate information and data.

119. In the new or updated NDCs, Parties generally communicated more clearly, and in more detail, than previously on general principles, past achievements, future commitments, and needs and gaps in relation to ACE. More Parties are explicitly referring to ACE as a necessary means of mobilizing and empowering society to deliver the mitigation and adaptation objectives outlined in their NDCs.

5. Best practices and other contextual matters

120. Many Parties communicated best practices for NDC preparation, such as institutionalizing climate policy development within joint planning frameworks; strengthening stakeholder capacity to participate more substantively in NDC preparation and implementation; designing planning and reporting systems for transparency and public scrutiny; incorporating experience and lessons learned from INDC preparation and implementation efforts; conducting extensive stakeholder consultation and peer review to enhance their understanding of the NDC; conducting a preliminary assessment of pre-2020 efforts to identify gaps and needs and develop an NDC road map; mainstreaming NDC goals in existing strategies, plans and policies to obtain political support and benefit from existing arrangements; partnering with regional and international organizations to develop a robust NDC; and establishing a scientific and quantitative system for analysing and assessing progress of implementation.

121. Although the first global stocktake will not be conducted until 2023, on the basis of their national circumstances and development pathways, many Parties highlighted other contextual aspirations and priority areas, such as maximizing synergies between short- and long-term climate commitments and the SDGs; adaptation and climate-resilient development; collaboration and support by developed country Parties and international organizations; deploying low-emission technologies to drive emission reduction, safeguarding food security and eradicating poverty; involving youth, local governments and communities and/or indigenous groups in a gender-responsive manner; just transition of the workforce; social and climate justice; circular economy; integrated resource management; oceans or blue carbon; disaster risk reduction; human health; energy production from renewable sources and/or energy efficiency; and reducing risks caused by loss and damage.

122. Of the Parties that submitted new or updated NDCs, some provided information on how their NDC preparation was informed by activities or events relevant to the collective

of society to engage in climate action through education, training, public awareness, public participation, public access to information, and international cooperation on these issues (the six ACE elements).

⁴⁵ See paras. 202–205 below for more information on training measures in the context of capacity-building.

assessment of progress in addressing climate change, such as the United Nations Secretary-General's calls to strengthen climate action and ambition during the 2018 high-level event on climate change, the recommendations from the Talanoa Call for Action, and/or the best available science, such as the SR1.5.⁴⁶

G. Mitigation co-benefits resulting from adaptation action and/or economic diversification plans

123. Some Parties considered mitigation co-benefits resulting from their adaptation action and/or economic diversification plans and a few mentioned that such co-benefits have been taken into account in their mitigation efforts. Many of those Parties considered social and economic consequences of response measures and included an economic diversification plan and/or a just transition or social pillar for designing climate policies that foster a just and equitable transition, and managing changes arising in relevant sectors due to the implementation of climate policies. Some other Parties considered positive and/or negative economic and social consequences of response measures without linking them to the mitigation co-benefits of their adaptation action and/or economic diversification plans. Some Parties presented their sectoral mitigation and adaptation plans in agriculture, energy, forestry, tourism and transport sector as transition or diversification plans.

124. The Parties highlighted unequal impacts on different groups of society or the workforce as consequences of response measures, with impacts on the workforce⁴⁷ being the most frequently mentioned. Some plan to address such impacts by including the concept of just transition in their overall NDC implementation, such as a just transition mechanism and just transition funds; laws and strategies for protecting workers; a social mechanism for job creation, skills development and employment policies; and a consultation process for social protection. A few Parties paid special attention to addressing impacts of response measures on vulnerable groups and communities in relation to poverty, job opportunities and inequality during transition.

125. Some Parties considered economic diversification as part of their national development plans and climate policies to boost the country's resilience to climate change and response measures. A few of them linked such plans to an existing poorly diversified economy and the impact of response measures on sectors of high economic importance, such as extraction of fossil fuels. Those Parties specifically mentioned economic diversification plans or actions focused on high-emitting sectors and sectors of economic importance. Such plans include enhancing education; increasing the share of energy generation using renewable sources; improving energy efficiency through regulatory measures, pricing signals and technology deployment in the fisheries, industry and buildings sectors; carbon dioxide capture and storage in the oil and gas industry; implementing fuel switch and fuel price reforms in the transport sector; moving to circular economy for better waste management; and adopting sustainable tourism practices to build the tourism sector.

126. Some Parties described how their adaptation action contributes to emission reduction, including their intention to consider mitigation co-benefits in NAP formulation. In terms of sectors, some described the potential co-benefits of various agricultural adaptation measures, including climate-smart agriculture, reducing food waste and vertical farming. Adaptation of coastal ecosystems was highlighted as another source of co-benefits, in particular planting mangroves and seagrass beds. Other sectors with potential co-benefits mentioned were forestry, natural resources and the environment, energy and waste.

127. Most Parties identified agriculture as a high priority for adaptation, either explicitly or as part of cross-sectoral adaptation efforts, and most are aiming to use mitigation

⁴⁶ IPCC. 2018. *IPCC Special Report on the Impacts of Global Warming of 1.5 °C above Preindustrial 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*. V Masson-Delmotte, P Zhai, H-O Pörtner, et al. (eds.). Geneva: World Meteorological Organization. Available at <https://www.ipcc.ch/sr15/>.

⁴⁷ Such as low-income groups, women, young people, indigenous peoples and people with disabilities.

opportunities in the sector. Many Parties highlighted the need to focus on activities that have positive effects on mitigation and adaptation while ensuring food security.

H. Fairness and ambition in the light of national circumstances

128. Almost all Parties explained, using different metrics, how they consider their NDCs to be fair and ambitious in the light of their national circumstances.⁴⁸

129. Those Parties included qualitative and/or quantitative information on how their NDCs represent progression⁴⁹ and highest possible ambition, such as through increased estimated level of emission reductions; earlier projected peaking of emissions; enhancing mitigation efforts; increasing unconditional elements; including long-term targets; introducing and/or enhancing policies; elaborating on adaptation action; integrating climate goals into national policy instruments; enhanced linkages with the SDGs; using more accurate data and moving to higher-tier estimation; establishing arrangements for monitoring and/or tracking progress of implementation; enhancing the stakeholder consultation process; developing sector-based action plans for implementation; and presenting additional information to facilitate clarity, transparency and understanding.

130. Many Parties framed fairness consideration within their past, current and future share in global and/or per capita emissions compared with global averages, or in relation to the trends in one or several metrics. Of the Parties that communicated new or updated NDCs, some indicated that, despite COVID-19 and its impacts on their economies, they are committed to implementing their NDCs to address climate change.

131. Many Parties provided information on ambition by linking their NDCs to their commitment to transition to a sustainable and/or low-carbon and resilient economy; some expressed that they have incorporated their NDC goals and policies into national legislative, regulatory and planning processes as a means of ensuring implementation; some addressed ambition in the context of the inclusive design of their NDCs, considering various cross-cutting aspects, such as investment plans, gender-responsiveness, education and just transition.

132. Many Parties expressed that their NDCs are in line with the long-term goals of the Paris Agreement or with the mitigation pathways for limiting global warming to well below 2 or 1.5 °C above pre-industrial levels. Of the Parties that communicated new or updated NDCs, most highlighted that they have enhanced their mitigation and/or adaptation contributions.

133. Total global GHG emission levels (without LULUCF) taking into account implementation of the latest NDCs of all Parties to the Paris Agreement are estimated to be around 1.4 Gt CO₂ eq, or on average 2.6 per cent, by 2025 and 3.6 Gt CO₂ eq, or on average 6.2 per cent, by 2030 below the levels indicated in the INDCs as at 4 April 2016.

134. When compared with implementation of the previous NDCs of Parties that had submitted new or updated NDCs as at 12 October 2021, implementation of their new or updated NDCs is estimated to result in a lower level of emissions by 3.7 (3.3–4.1) per cent in 2025 and 11.0 (10.1–12.0) per cent in 2030.

⁴⁸ Metrics include capabilities; historic and current responsibility; climate justice; share in global emissions; level of per capita emissions; vulnerability to the adverse impacts of climate change; development and/or technological capacity; mitigation potential; cost of mitigation actions; degree of progression or progression beyond the current level of effort; and link to objectives of the Paris Agreement and its long-term global goals.

⁴⁹ In this report, the term “progression” is used to refer to the difference between the estimated emission levels associated with implementation of Parties’ INDCs communicated to the secretariat as at 4 April 2016 and those according to the NDCs available in the interim NDC registry as at 12 October 2021. In the figures in this report the progression is shown from INDCs as at 4 April 2016 (grey shading), covered in document FCCC/CP/2016/2, to NDCs as at 12 October 2021 (blue shading), aggregated in this report.

I. Contribution towards achieving the objective of the Convention as set out in its Article 2, and towards Article 2, paragraph 1(a), and Article 4, paragraph 1, of the Paris Agreement⁵⁰

135. The information necessary to facilitate clarity, transparency and understanding of NDCs includes information on:⁵¹

(a) How the NDC contributes towards achieving the objective of the Convention as set out in its Article 2;

(b) How the NDC contributes towards Article 2, paragraph 1(a), and Article 4, paragraph 1, of the Paris Agreement.

136. Almost all Parties communicated information on the contribution of their NDCs towards achieving the objective of the Convention as set out in its Article 2, and towards Article 2, paragraph 1(a), and Article 4, paragraph 1, of the Paris Agreement.

137. Many Parties indicated that their level of emissions in the future is expected to fall within the scope of a global emission pathway that is consistent with the goal of keeping the global average temperature increase below 2 or 1.5 °C.

138. In that context, Parties highlighted their national mitigation and/or adaptation efforts, NDC targets, LT-LEDS, development pathways for decoupling emissions from economic growth, and mobilization of domestic and international support.

139. The projected total GHG emission level in 2025 is 58.1 per cent higher than in 1990 (34.6 Gt CO₂ eq), 45.2 per cent higher than in 2000 (37.7 Gt CO₂ eq), 27.2 per cent higher than in 2005 (43.0 Gt CO₂ eq), 15.5 per cent higher than in 2010 (47.4 Gt CO₂ eq), 7.5 per cent higher than in 2015 (50.9 Gt CO₂ eq) and 4.3 per cent higher than in 2019 (52.4 Gt CO₂ eq) (see figure 7).

140. For 2030, the projected total GHG emission level is 58.7 per cent higher than in 1990, 45.7 per cent higher than in 2000, 27.7 per cent higher than in 2005, 15.9 per cent higher than in 2010, 7.9 per cent higher than in 2015 and 4.7 per cent higher than 2019 (see figure 7).

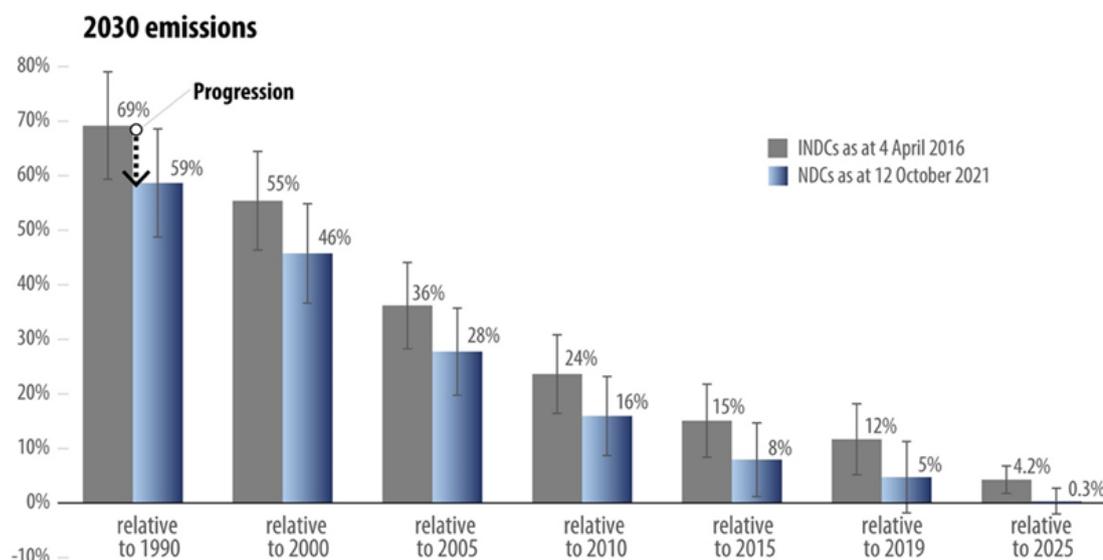
141. In comparison, the estimated total GHG emission levels for 2030 associated with implementation of Parties' INDCs implied stronger emission increases above historical levels: 69.2 (59.3–79.1) per cent above the 1990 level, 23.6 (16.4–30.9) per cent above the 2010 level and 11.6 (5.1–18.2) per cent above the 2019 level (see figure 7).

142. For Parties that communicated new or updated NDCs, their total GHG emissions are estimated to be 26.3 Gt CO₂ eq in 2019, and total GHG emission levels resulting from implementation of their NDCs are estimated to be around 25.6 (24.7–26.4) Gt CO₂ eq in 2025 and 23.6 (22.2–25.0) Gt CO₂ eq in 2030, which is about 1.5 (+1.8 to –4.8) per cent lower by 2025 and 9.0 (3.6–14.5) per cent lower by 2030 than in 2010 and 2.8 (+0.4 to –6.0) per cent lower by 2025 and 10.3 (4.9–15.6) per cent lower by 2030 than in 2019.

⁵⁰ See document FCCC/PA/CMA/2021/8/Add.3 for additional information, including on estimation methods and assumptions used.

⁵¹ Decision 4/CMA.1, annex I, para. 7.

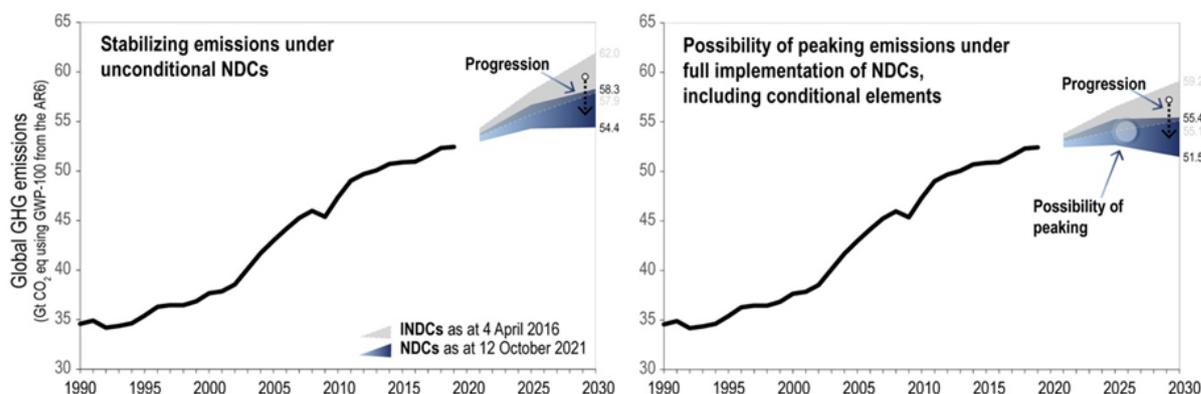
Figure 7
Projected total emission levels in 2030 compared with historical levels and the estimated 2025 level



143. The total GHG emission level resulting from implementation of the unconditional elements of the NDCs is projected to be 7.5 (3.8–11.2) per cent higher in 2030 than in 2019; whereas the total GHG emission level resulting from implementation of the NDCs including conditional elements is projected to be only 2.0 per cent (–1.8 to +5.7) higher in 2030 than in 2019, indicating, if all NDCs (including their conditional elements) are fully implemented, the possibility of peaking of global emissions before 2030, with the lower bound of the 2030 emission level (51.5 Gt CO₂ eq) estimated to be up to 1.8 per cent below the 2019 level (52.4 Gt CO₂ eq) and 2.2 per cent below the lower bound of the estimated 2025 level (52.7 Gt CO₂ eq) (see figure 8).

144. In comparison, considering the full implementation of INDCs (including their conditional elements), a continuously increasing trend in emissions was estimated up to 2030, resulting in a global emission level of approximately 9.0 (5.1–12.8) per cent above the 2019 level. Implementation of only the unconditional elements of the INDCs was estimated to result in a global emission level in 2030 of approximately 14.3 (10.5–18.2) per cent above the 2019 level (see figure 8).

Figure 8
Historical and projected total global emissions according to nationally determined contributions



Note: Emissions with LULUCF in 2030 resulting from implementation of the new or updated NDCs are estimated to be 58.9 (57.0–60.8) Gt CO₂ eq considering unconditional elements and 56.0 (54.0–58.0) Gt CO₂ eq assuming full implementation.

145. According to the latest NDCs, per capita emissions will equal 6.7 (6.5–7.0) t CO₂ eq in 2025 and, slightly lower, 6.5 (6.1–6.9) t CO₂ eq in 2030, which is, on average, 1.7 per cent lower in 2025 and 5.5 per cent lower in 2030 than in 2019.

146. Some Parties provided quantifiable information on their long-term mitigation visions, strategies and targets for up to and beyond 2050, many of which communicated LT-LEDS in response to Article 4, paragraph 19, of the Paris Agreement.⁵² The total GHG emission level of those Parties is estimated to be 14.3 (13.6–14.9) Gt CO₂ eq in 2030, which is 26 (22–29) per cent below their emission level in 2010.

147. On the basis of the information provided on long-term mitigation visions, strategies and targets in the NDCs, the total emissions in 2050 of the Parties with long-term targets are estimated at 2.2–3.2 Gt CO₂ eq. Mindful of the inherent uncertainty of such long-term estimates, the information indicates that these Parties' total GHG emission level could be 83–88 per cent lower in 2050 than in 2019, with annual per capita emissions estimated at 1.0–1.4 t CO₂ eq. Global per capita emission levels by 2050 under the well-below 2 °C (“lower 2 °C”) and 1.5 °C scenarios (“1.5 °C with limited overshoot”) are very similar at 1.6–2.4 t CO₂ eq and 0.6–1.2 t CO₂ eq, respectively.

148. The COVID-19 pandemic was mentioned by some Parties in the new or updated NDCs, but most have not reflected the potential impacts of the pandemic in their NDCs. The longer-term effects of the related changes in national and global GHG emissions will depend on the duration of the pandemic and the nature and scale of recovery measures.

Comparison with scenarios considered by the Intergovernmental Panel on Climate Change

149. According to the SR1.5, net anthropogenic CO₂ emissions need to decline by about 45 per cent from the 2010 level by 2030 (40–60 per cent interquartile range), reaching net zero around 2050 (2045–2055 interquartile range), in order to be consistent with global emission pathways that feature no or limited temporary overshoot of the 1.5 °C warming level. The contribution of Working Group I to the AR6⁵³ conveyed a similar message in that the “very low GHG emissions” scenario considered is the only scenario in which warming is limited to around 1.5 °C and features net zero global CO₂ emissions around 2050. For limiting global warming to below 2 °C, CO₂ emissions need to decline by about 25 per cent from the 2010 level by 2030 on most pathways (10–30 per cent interquartile range) and reach net zero around 2070 (2065–2080 interquartile range). Deep reductions are required for non-CO₂ emissions as well.⁵⁴

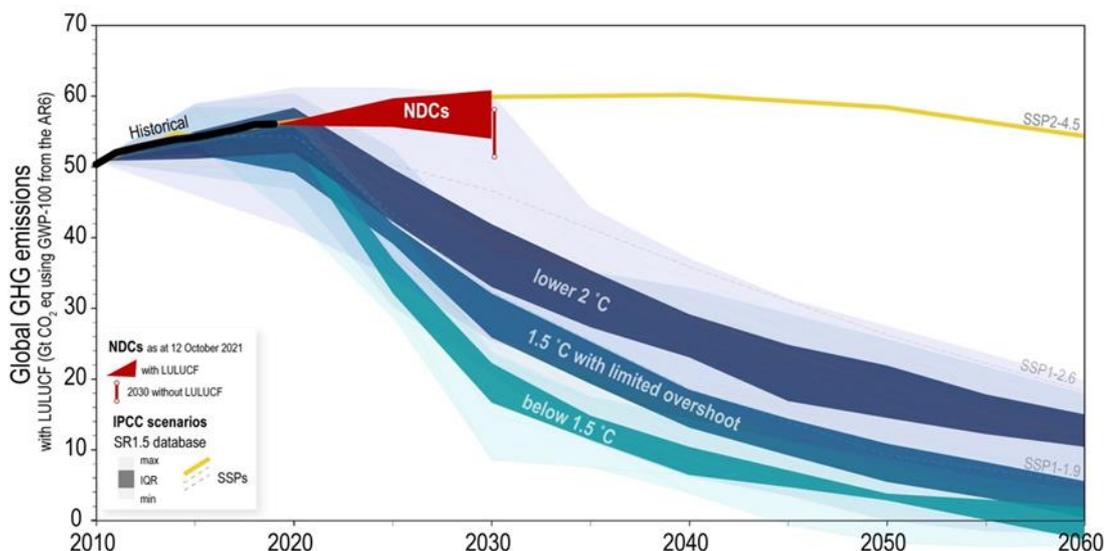
⁵² As at 12 October 2021, 33 Parties had communicated LT-LEDS, 32 of which had communicated a new or updated NDC; see <https://unfccc.int/process/the-paris-agreement/long-term-strategies>.

⁵³ IPCC. 2021. *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. V Masson-Delmotte, P Zhai, A Pirani, et al. (eds.). Cambridge: Cambridge University Press. Available at <https://www.ipcc.ch/report/ar6/wg1/>.

⁵⁴ Further information on all IPCC scenarios is available at <https://data.ene.iiasa.ac.at/iamec-1.5c-explorer/>.

Figure 9

Comparison of global emissions under scenarios assessed in the Intergovernmental Panel on Climate Change Special Report on Global Warming of 1.5 °C with total global emissions according to nationally determined contributions



Note: The assessed global emission ranges (including LULUCF) for the IPCC scenarios provided in the SR1.5 (table 2.4) are shown with interquartile ranges. The illustrative SSP scenarios considered in the contribution of Working Group I to the AR6 are indicated (SSP2-4.5 by a yellow solid line, with an estimated end-of-century temperature of 2.7 (2.1–3.5) °C). The total GHG emission level resulting from implementation of the latest NDCs is compared with the emission levels for three of the scenario groups in the SR1.5 scenario database: a group of scenarios in which global mean temperature rise is kept at all times below 1.5 °C relative to the 1850–1900 (“below 1.5 °C”); a group of scenarios in which warming is kept at around 1.5 °C with a potential limited overshoot and then decrease of global mean temperature rise below 1.5 °C by the end of the century (“1.5 °C with limited overshoot”); and a third group that implies warming of well below 2 °C, that is above 1.5 °C by 2100 but with a likely chance of it being below 2 °C at all times (“lower 2 °C”). The latter group features scenarios with strong emission reductions in the 2020s or only after 2030.

150. The total global GHG emission level in 2030 taking into account implementation of the latest NDCs is expected to be 15.9 per cent above the 2010 level. Taken together with the information in figure 9 and paragraph 149 above, this implies an urgent need for either a significant increase in the level of ambition of NDCs between now and 2030 or a significant overachievement of the latest NDCs, or a combination of both, in order to attain cost-optimal emission levels suggested in many of the scenarios considered by the IPCC. If emissions are not reduced by 2030, they will need to be substantially reduced thereafter to compensate for the slow start on the path to net zero emissions. The SR1.5 identifies net zero CO₂ emissions as a prerequisite for halting warming at any level.

151. On the basis of the latest NDCs, cumulative CO₂ emissions in 2020–2030 are estimated to be around 444 (431–458) Gt.

152. In the context of the carbon budget consistent with 50 per cent likelihood of limiting warming to 1.5 °C, cumulative CO₂ emissions in 2020–2030 based on the latest NDCs would likely use up 89 per cent of the remaining carbon budget, leaving a post-2030 carbon budget of around 56 Gt CO₂, which is equivalent to the average annual CO₂ emissions in 2020–2030. Similarly, in the context of the carbon budget consistent with a likely chance of keeping warming below 2 °C, cumulative CO₂ emissions in 2020–2030 based on the latest NDCs would likely use up 39 per cent of the remaining carbon budget.

J. Adaptation

153. Adaptation involves responding to climate change by assessing impacts, vulnerability and risk; planning and implementing adaptation; making contingency arrangements for when impacts occur; addressing losses; and monitoring and evaluating adaptation efforts.

Arrangements have been developed under the Convention to facilitate adaptation, in particular NAPs, institutions such as the Adaptation Committee and the Least Developed Countries Expert Group, partnership structures for closing knowledge gaps, and provisions to facilitate support for, and transparency of, adaptation. Under the Paris Agreement, Parties may include an adaptation component in their NDCs.

1. Scope

154. Most Parties included an adaptation component in their NDCs, a few of which were designated as adaptation communications. In particular, they provided information on vulnerability and national circumstances; efforts to enhance adaptation-related research; adaptation measures, in particular NAPs and sectoral actions; contingency measures; synergies between adaptation and mitigation as well as with other global frameworks; and monitoring and evaluation of adaptation.

155. The information provided illustrates how Parties have advanced adaptation since the INDCs. For example:

(a) An increasing number of Parties provided information on adaptation, indicating the importance attached to adaptation by Parties from all regions and groups;

(b) Many Parties described the status of their process to formulate and implement NAPs, demonstrating how the NAP has been established as the main national instrument for adaptation and a key source of information for the NDCs.

156. Compared with their previous NDCs, Parties that communicated new or updated NDCs provided more detailed information on, in particular:

(a) Their national frameworks, thereby describing more integrated frameworks, in contrast to the multiple frameworks and individual projects described previously;

(b) Quantitative time-bound targets,⁵⁵ in contrast to the qualitative and open-ended adaptation objectives provided previously, with a few highlighting the indicator frameworks that they intend to use for monitoring progress;

(c) Mitigation and sustainable development co-benefits of adaptation, as well as on other synergies between mitigation and adaptation.

157. Some Parties identified the adaptation component as their adaptation communication, a few provided information organized around the elements identified in the annex to decision 9/CMA.1 and a few announced their intention to prepare an adaptation communication.

2. Impacts, risk and vulnerability

158. Almost all of the adaptation components described key climatic changes, referring in particular to temperature increase, extreme temperatures, precipitation changes and sea level rise. These were identified as triggering various climate impacts, in particular extreme events (including rainfall events, storms and cyclones), flooding, drought, heatwaves, saltwater intrusion, ocean acidification, coral bleaching, erosion, landslides, fires and thawing ice and permafrost. Parties described how impacts affect vulnerable areas. Of particular concern are agriculture and other aspects of food security, water, biodiversity and ecosystems, health systems, infrastructure (in particular energy, transportation and tourism) and loss of territory, livelihoods and habitats. Parties highlighted groups and areas that are particularly vulnerable. As factors of vulnerability, they highlighted, for example, dependence on climate-sensitive sectors, status as a small island developing State, having complex and vulnerable ecosystems, location of population and infrastructure on coasts, and economic factors, in particular poverty and lack of other institutional, financial and technical capacities. Vulnerability has also increased as a result of COVID-19.

3. Enhancing adaptation-related research for policymaking

159. Most of the Parties that included an adaptation component considered how to enhance adaptation-relevant research, data, information and monitoring, and ensure that adaptation

⁵⁵ See document FCCC/PA/CMA/2021/8/Add.1 for more details on quantitative targets.

efforts are informed by science. Some of the adaptation components described efforts to enhance research through, for example, data collection programmes, national census on impacts, monitoring systems, observation networks, research centres, strengthened weather services, climate and risk modelling, risk maps with climate data and scenarios, and international cooperation. Research efforts focus in particular on oceans, coastal areas, land use and ecosystems. Research related to specific impacts includes development of flood or multi-hazard monitoring systems, sea level research programmes and remote sensing monitoring of hydrometeorological extremes. To ensure that adaptation is guided by robust science and projections, Parties are aiming to develop, for example, integrated climate information systems, open-source data, data pooling and sharing platforms for accessing information, and forecasting tools and scenarios.

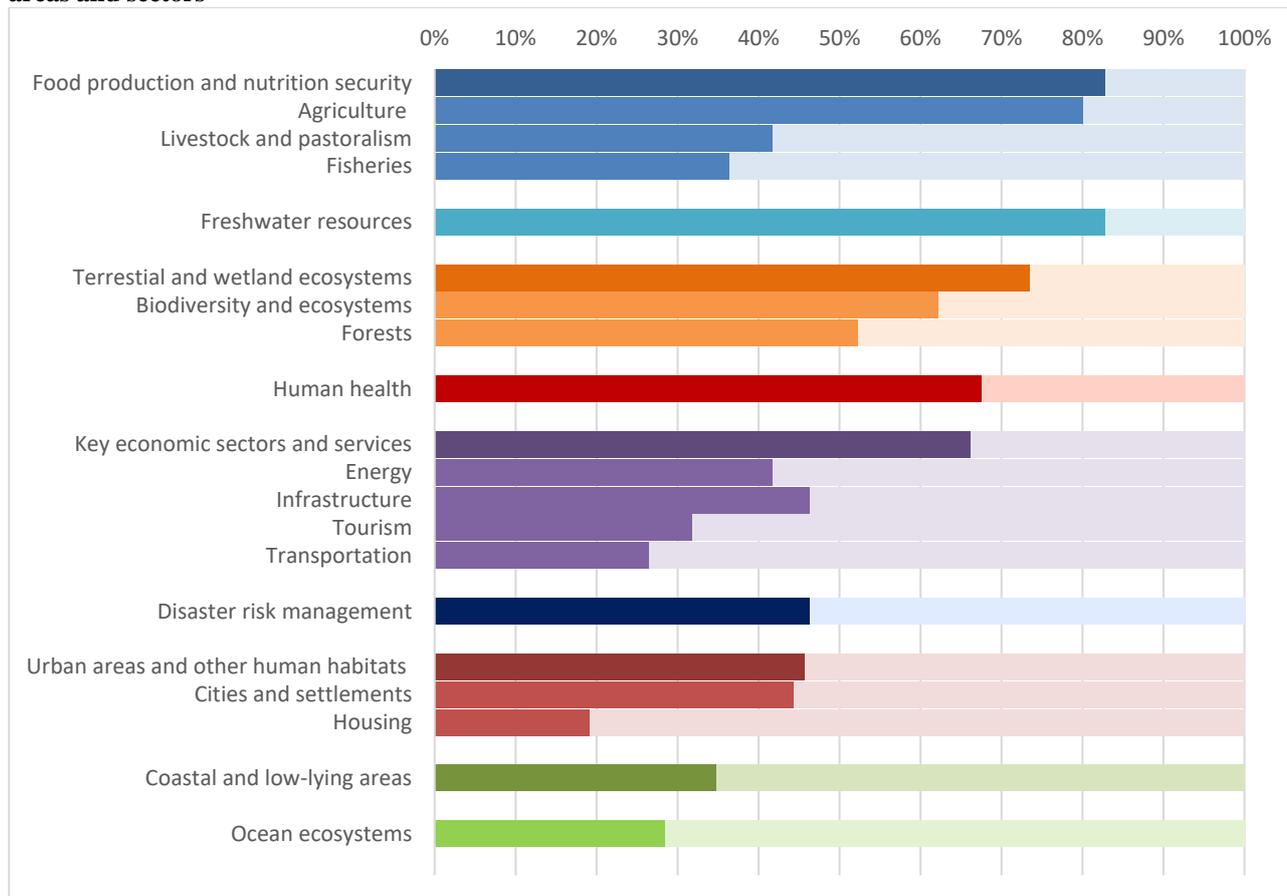
4. Pre-emptive adaptation

160. Many Parties that provided an adaptation component described the process for formulating and implementing their NAP and its status. Some indicated that they have developed a NAP, while others identified their intention to do so, including a timeline for completion or update and/or implementation. Some Parties outlined links between their NAP and NDC, including how the NAP provided the basis for the adaptation component, how both build on the same vulnerability assessment, and how the NAP and NDC can be aligned. Some Parties described the scope of their NAP, including in relation to enabling risk and vulnerability analysis; integrating adaptation into development planning; enhancing climate information; strengthening adaptive, institutional, policy and technical capacities; outlining and prioritizing adaptation needs, objectives, milestones and actions as well as costs of adaptation; providing a framework for planning, implementation and coordination; integrating adaptation across frameworks and sectors; enhancing financing, engagement and gender-responsiveness; strengthening monitoring and evaluation (including by defining quantifiable goals and indicators for priority sectors); and enabling consideration of co-benefits between mitigation and adaptation.

161. Parties also described other policy frameworks relevant to adaptation, including information on how such frameworks provide a basis for adaptation efforts and how adaptation is integrated into and strengthened under other frameworks, such as adaptation-specific frameworks, national climate plans, local government or community-level plans, sectoral plans relevant to adaptation priorities, disaster risk reduction policies, national and regional development frameworks and UNFCCC frameworks (e.g. national adaptation programmes of action, technology needs assessments and the economic diversification initiative). A few Parties highlighted the inclusion of adaptation considerations in their national constitution.

Figure 10

Share of adaptation components of nationally determined contributions referring to specific adaptation priority areas and sectors



162. Parties provided a wide range of information on adaptation in various priority areas (see figure 10). The key efforts in those priority areas are described below.⁵⁶

163. Climate impacts pose multiple risks to food security, including reduced production of major crops (wheat, rice and maize) and redistribution of marine fisheries.⁵⁷ In most adaptation components, measures for adapting food production systems and ensuring food security were prioritized, encompassing adaptation efforts in the areas of agriculture, livestock and fisheries. In agriculture, adaptation is being pursued via sectoral vulnerability analysis research, planning, diversification, financial mechanisms and insurance, systems for agroclimatic information and improvements to post-harvest processing. As technical solutions, Parties are focusing on, for example, temperature-, pest-, disease-, flood- and/or drought-resistant crops, seed banks, enhanced pest and disease control, enhanced irrigation and water use, and sustainable, climate-smart and integrated land-use and cultivation methods. Many adaptation components highlighted measures for enhancing resilience, sustainability and productivity of livestock and pastoralism, including research, disease control, rangeland management, more resilient breeds and feeds, insurance and diversification. The measures for enhancing sustainability of fisheries involve research, diversification, capacity-building, sustainable management, habitat protection and financial instruments (e.g. insurance).

⁵⁶ See document FCCC/PA/CMA/2021/8/Add.1 for information on specific measures and quantitative targets in each priority area.

⁵⁷ See pp.17–18 of IPCC. 2014. Summary for Policymakers. In: CB Field, VR Barros, DJ Dokken, et al. (eds.). *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge and New York: Cambridge University Press. Available at <https://www.ipcc.ch/report/ar5/wg2/>.

164. Climate change is expected to have negative impacts on human health up to 2050, including increased likelihood of undernutrition from diminished food production; injury, disease and death from more intense heatwaves and fires; and higher risks from food-, water- and vector-borne diseases.⁵⁸ Health was identified as an adaptation priority in many of the adaptation components, with relevant policy frameworks and plans described. The importance of building the capacity of health institutions and enhancing information and awareness was highlighted. Enhancing the climate resilience of public health systems was a recurring theme, with Parties aiming to build or improve related infrastructure. Parties are focusing on enhancing impact and disease surveillance and monitoring, providing training and education to healthcare professionals and communities, and performing vulnerability assessment and mapping. Measures tend to focus on improving sanitation and hygiene practices, as well as responding to climate-sensitive vector- or water-borne diseases, respiratory impacts and heatwaves.

165. According to current climate change projections, a large fraction of terrestrial species face an increased risk of extinction, with many regions projected to experience increased tree mortality and forest dieback owing to increased temperatures and drought.⁵⁹ Most adaptation components described adaptation efforts to protect terrestrial ecosystems and forests, with Parties aiming in particular to increase protected areas and connectivity, enhance urban biodiversity and forest areas, conserve vulnerable or threatened species, restore degraded lands and ecosystems and implement sustainable forest management and reforestation.

166. Global populations experiencing water scarcity and affected by major river floods are projected to increase, and climate change is expected to reduce raw water quality and pose risks to drinking water quality.⁶⁰ In most adaptation components, freshwater resources were identified as a priority area and measures for enhancing availability, efficiency and quality of water supplies were presented, including enhancing or building water infrastructure and water resource plans, strategies and systems. Parties are aiming to strengthen watershed management, efficiency of water use and irrigation. Integrated water resources management, protection and restoration of water-related ecosystems such as forests, wetlands and rivers, and supply diversification were highlighted measures. Efforts to promote transboundary water management and cooperation were also included.

167. Low-lying coastal areas are increasingly exposed to the risks associated with sea level rise as a result of increasing warming, which include saltwater intrusion, flooding, and infrastructure damage.⁶¹ Many adaptation components included measures for protecting coastal and low-lying areas, including river deltas, and addressing sea level rise, erosion and saltwater intrusion. A few identified preventing loss of land as a main adaptation objective, with efforts including assessing and monitoring impacts on and vulnerability of coasts and national plans for coastal protection and management, implementing nature-based solutions for coastal restoration and protection and defining standards, regulations and guidelines for construction and flood protection. Parties also described efforts to adopt integrated coastal zone management approaches.

168. Coastal ecosystems are being affected by ocean warming, sea level rise, oxygen loss, acidification, intensified marine heatwaves, and salinity intrusion. Sea level rise is impacting coastal ecosystems through habitat contraction, geographical species shift, and loss of ecosystem functionality and biodiversity.⁶² Some adaptation components outlined efforts to adapt ocean ecosystems to promote sustainable development while safeguarding oceans. Measures are focused on investing in ocean and the ‘blue’ economy and protecting marine and coastal ecosystems, with a focus on coral reefs, and seagrass and mangrove restoration and conservation. To support these measures, Parties identified steps to establish or strengthen related monitoring, surveillance and assessment systems and programmes.

⁵⁸ As footnote 57 above, pp.19–20.

⁵⁹ As footnote 57 above, pp.14–15.

⁶⁰ As footnote 57 above, p.14.

⁶¹ See p.8 of the SR1.5.

⁶² See p.13 of IPCC. 2019. Summary for Policymakers. In: H-O Pörtner, DC Roberts, V Masson-Delmotte, et al. (eds.). *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate*. Available at <https://www.ipcc.ch/srocc/chapter/summary-for-policymakers/>.

169. Climate change is expected to impact key economic sectors. For instance, patterns of energy demand will change in particular in terms of heating and cooling needs, and supply will be affected depending on sources, technologies and regions.⁶³ Many adaptation components described efforts to adapt key economic sectors and services, in particular energy, infrastructure, transportation and tourism. Efforts in the energy sector include impact analysis and planning, protection of hydropower resources and installations, diversification (e.g. by expanding clean energy), energy efficiency, energy conservation (through standards, labels and awareness) and storage. A few Parties outlined adaptation plans for the mining sector, which include tools for ensuring operability of hydrocarbon facilities. Parties are aiming to ensure resilience of infrastructure through, for example, risk assessments for critical infrastructure, building codes and resilience standards, associated education, elevation and nature-based solutions. Transportation was a focus area in some adaptation components, with adaptation measures including enhancing risk evaluation, such as by using geographic information systems, and developing green road infrastructure. Tourism is to be addressed through, for example, mainstreaming climate risk in sectoral policies; financial instruments and insurance; diversification towards, for example, green tourism; and protecting key locations (e.g. winter resorts, coasts and heritage sites). In some adaptation components, the industrial sector was considered in adaptation planning.

170. Climate change is projected to slow down economic growth and make poverty reduction more difficult.⁶⁴ Some adaptation components identified livelihoods as an adaptation priority area. Innovative livelihood strategies, social safeguards for vulnerable, financial assistance economic diversification were identified as being helpful in responding to loss of livelihoods.

171. Many key climate risks will impact urban areas,⁶⁵ and major impacts are projected in rural areas on water supply, food security and agricultural income.⁶⁶ Human habitats and settlements, including urban areas, were identified as priority areas in many adaptation components. Efforts in this area are aimed at adapting and enhancing the resilience of both rural and urban settlements, responding to human mobility needs and addressing forced displacement. Measures include conducting research to understand the links between climate and migration; improving housing and other infrastructure; establishing temporary resettlement and shelter programmes to support displaced people; creating migration opportunities and arrangements for relocation, while ensuring the right to remain. Some efforts are focused on adaptation of cities and urban areas, including through planning, vulnerability and risk assessment, upgrading informal settlements and creating urban greening and nature-based solutions.

172. Many adaptation components described measures for enhancing disaster risk management and early warning systems. Policy and institutional measures include enhancing risk assessment and monitoring, integrating disaster risk management into adaptation efforts, and establishing early warning systems, including a national multi-hazard early warning system, community-based systems, or systems specific to particular areas or sectors (e.g. coasts and rivers, forestry and ecosystems, water, agriculture, transportation, infrastructure, health and tourism) or hazards (e.g. for sea level rise, extreme events, disease outbreaks, drought and floods).

5. Contingency measures

173. Contingency measures for dealing with emergencies and impacts that occur regardless of adaptation efforts were highlighted in some adaptation components, such as strengthening resilience to impacts beyond the limits of adaptation through NAPs; search and rescue, contingency or emergency plans and systems; emergency shelters; humanitarian assistance civil defence; evacuation procedures; emergency or contingency funding; food reserves;

⁶³ As footnote 57 above, p.19.

⁶⁴ As footnote 57 above, p.20.

⁶⁵ See p.538 of IPCC. 2014. *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. CB Field, VR Barros, DJ Dokken, et al. (eds.). Cambridge and New York: Cambridge University Press. Available at <http://www.ipcc.ch/report/ar5/wg2>.

⁶⁶ As footnote 65 above, p.616.

disaster insurance schemes; livelihood protection policies; and support for displaced persons. For the agriculture and livestock sectors, Parties referred to insurance and risk management mechanisms, as well as post-disaster relief. In the fisheries sector, measures include using financial instruments such as insurance against extreme events and establishing a minimum income for fishers. Measures were also suggested for health, infrastructure, coasts and tourism.

6. Monitoring and evaluation, and understanding progress

174. Many Parties described in their adaptation components their efforts to enhance monitoring and evaluation of adaptation, such as by focusing on tracking progress, reducing vulnerability, improving efficiency and effectiveness of actions, NAP implementation and support. Approaches included using systems for integrating climate and adaptation information, sectoral monitoring tools (e.g. in agriculture and tourism) and a platform for integrating tools for monitoring climate risk and low-emission development. Some of those Parties identified and described their intention to apply global, national or sectoral quantitative indicators for monitoring the development of specific climate parameters and impacts, and monitoring progress of specific measures and/or sectoral performance, including towards targets linked to a specific baseline. Quantified targets were identified in particular for the water, agriculture, forestry, sanitation, livestock, health, energy, transportation, hygiene, infrastructure and biodiversity sectors. See document FCCC/PA/CMA/2021/8/Add.2 for an overview of more specific targets defined for key adaptation areas.

7. Synergies with mitigation and sustainable development

175. Some Parties elaborated on synergies between adaptation and mitigation (mitigation co-benefits of adaptation action are covered in chap. IV.G above). A few Parties identified how their mitigation action can generate adaptation co-benefits. For example, in the energy sector, using renewable energy can also enhance energy security and access to water and reduce pollution. Other mitigation measures, such as fuel switching, increasing efficiency, and forest preservation, afforestation and reforestation, were described as having adaptation co-benefits (e.g. mangrove forests protect coastlines). The health co-benefits of emission reductions were also highlighted.

176. Some Parties described how their adaptation actions relate to sustainable development frameworks, describing the overall linkages and synergies between their adaptation efforts and efforts towards the SDGs; identifying the essential role of adaptation in the achievement of SDGs, as well as the role of sustainable development in successful adaptation; and emphasizing the importance and benefits of integrating implementation of climate and SDG-related efforts. Further, some Parties specified how adaptation in specific priority areas contributes to achieving individual SDGs. Figure 11 provides an overview of the specific synergies identified between adaptation efforts and efforts towards SDGs.

Figure 11
Synergies between efforts in adaptation priority areas and efforts towards Sustainable Development Goals identified in nationally determined contributions

Adaptation Priority Area	Sustainable Development Goal																
	1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	4 QUALITY EDUCATION	5 GENDER EQUALITY	6 CLEAN WATER AND SANITATION	7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	10 REDUCED INEQUALITIES	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION	14 LIFE BEYOND WATER	15 LIFE ON LAND	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	17 PARTNERSHIPS FOR GOALS
Food production and nutrition security	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Freshwater resources	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Urban areas and other human habitats	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Key economic sectors and services	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Terrestrial and wetland ecosystems	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Ocean ecosystems	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Coastal and low-lying areas	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Livelihoods	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Health	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue

Note: The shading reflects how frequently linkages were identified by Parties: the darker the shading, the more frequently linkages were identified.

K. Domestic mitigation measures

177. Under Article 4, paragraph 2, of the Paris Agreement, Parties shall pursue domestic mitigation measures with the aim of achieving the objectives of their NDCs.

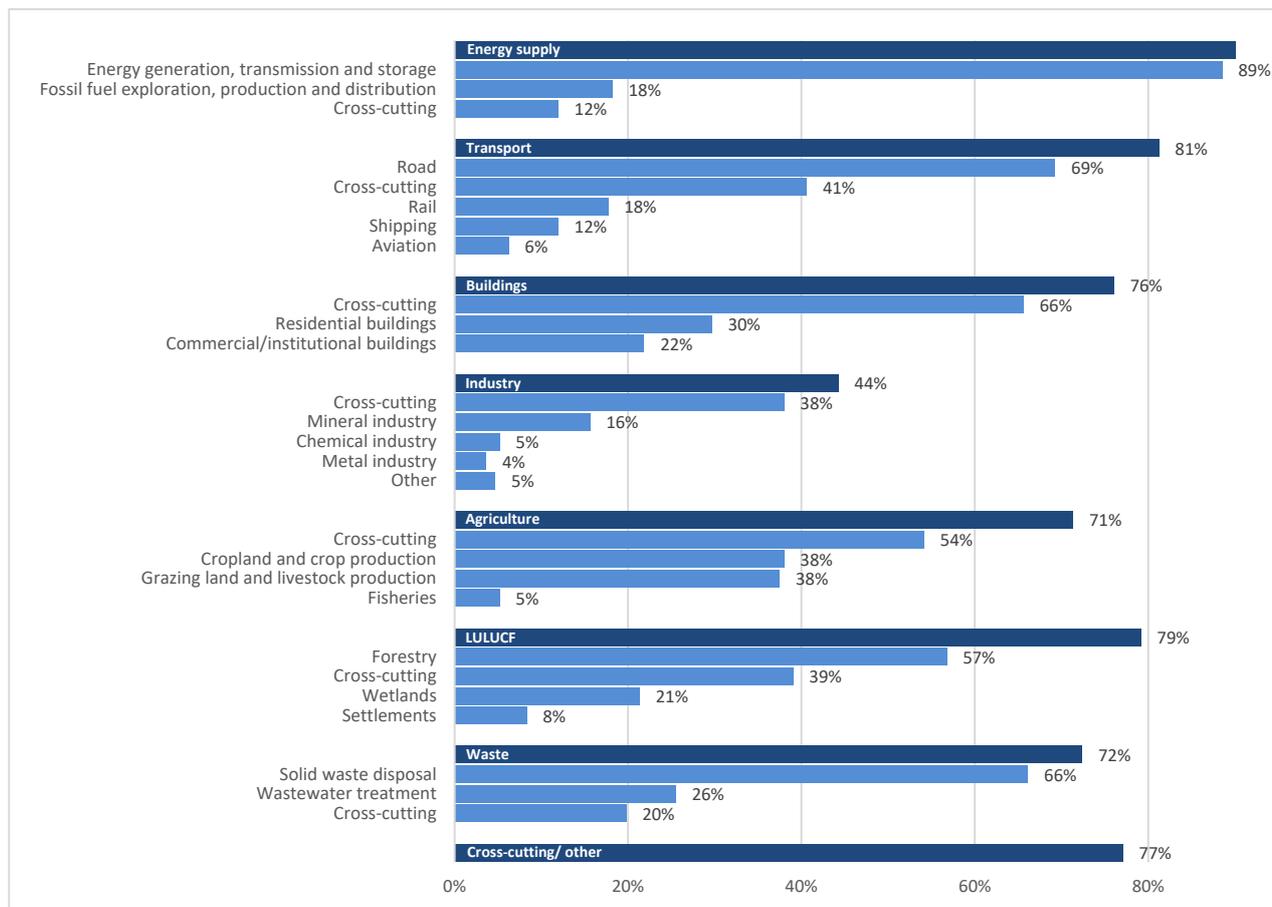
178. Almost all Parties outlined such measures in their NDCs as key instruments for achieving mitigation targets of their NDCs and/or specific priority areas of national importance, which are often a subset of one or more IPCC sectors, including energy supply, transport, buildings, industry,⁶⁷ agriculture, LULUCF and waste. Most Parties communicated measures in the priority areas of energy supply, transport, LULUCF, buildings, agriculture and waste, while much fewer indicated measures in industry (see figure 12).

179. Many Parties communicated one or more quantitative mitigation targets specific to priority areas or sub-areas, which support and underpin their overall mitigation targets. Such quantitative mitigation targets were provided most frequently for energy supply by many Parties, followed by LULUCF and cross-cutting or other.

⁶⁷ Covers measures targeting emissions from fuel use in industry, industrial process emissions and emissions from product use. For the scopes of the other priority areas, including cross-cutting or other, see document FCCC/PA/CMA/2021/8/Add.2.

Figure 12

Share of Parties referring to specific priority areas and sub-areas for domestic mitigation measures in nationally determined contributions



Note: If a Party communicated more than one measure for a specific priority area or sub-area, it was counted as one Party communicating measures for that area.

1. Sub-areas and mitigation options under priority areas

180. Of the sub-areas under priority areas communicated, energy generation, transmission and storage was most frequently identified by most Parties, followed by road transport; cross-cutting sub-area⁶⁸ under buildings; solid waste disposal; forestry; and cross-cutting sub-area under agriculture(see figure 12), which together cover the most frequently indicated mitigation options⁶⁹ (see figure 13).

181. Renewable energy generation was the most frequently indicated mitigation option, followed by improving energy efficiency of buildings; afforestation, reforestation and revegetation; multisector energy efficiency improvement; cross-cutting mitigation option under agriculture; and improving energy efficiency of transport (see figure 13). Some Parties communicated quantitative targets for renewable energy share (ranging from 15 to 100 per

⁶⁸ Covers measures applicable to more than one sub-area under a priority area. For example, the cross-cutting sub-area under buildings covers measures applicable to both residential buildings and commercial or institutional buildings, and the cross-cutting sub-area of energy supply covers measures applicable to both energy generation, transmission and storage, and fossil fuel exploration, production, transport and distribution.

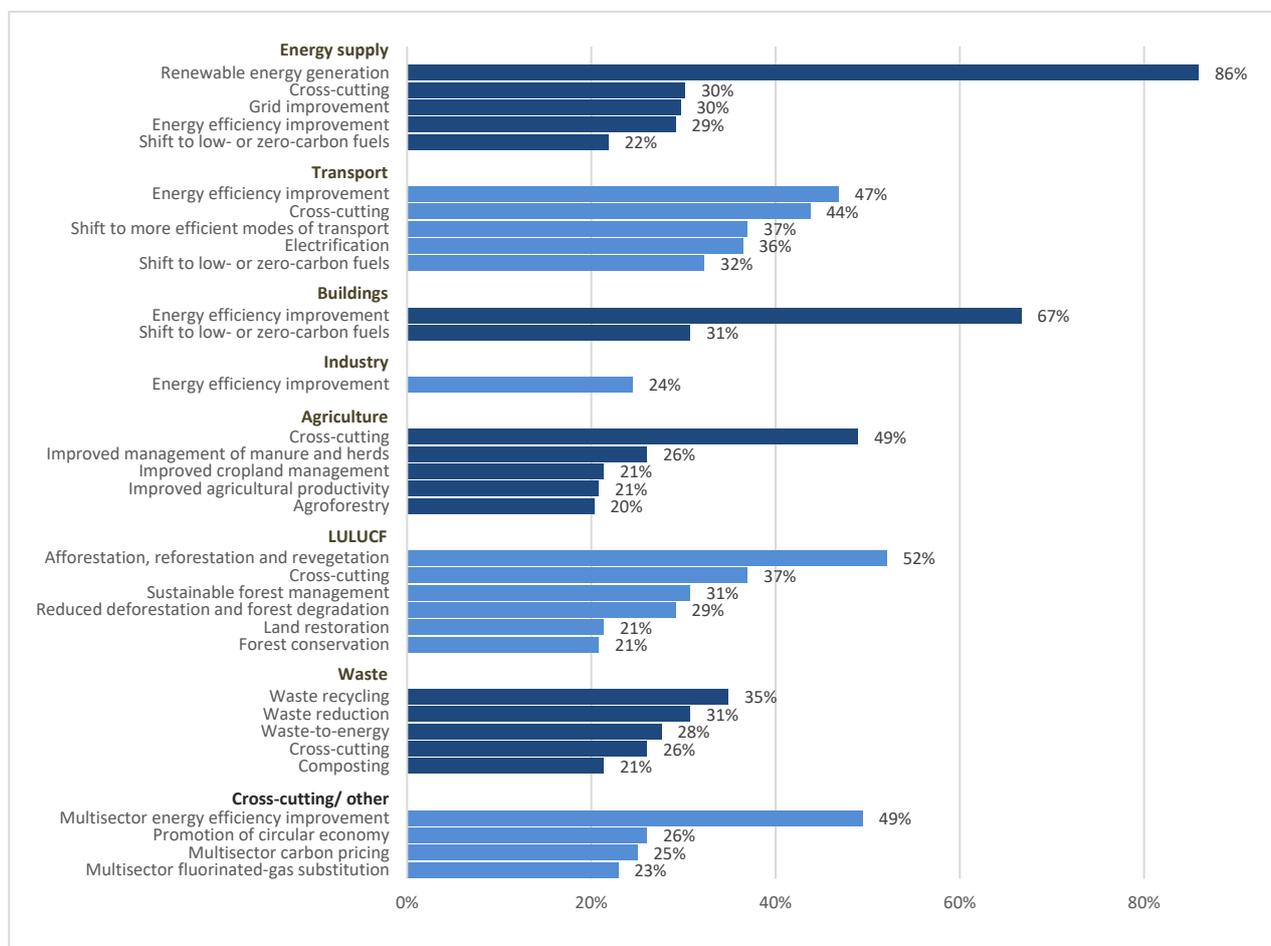
⁶⁹ Refers in this report to expected key mitigation effects or categories of domestic mitigation measures, which were identified by analysing the trend in the measures set out in the new or updated NDCs and by referring to those identified in the previous NDC synthesis report and relevant IPCC reports, including the SR1.5.

cent) in electricity generation by 2030; and many of those target shares fall within or above the IPCC range of 47–65 per cent consistent with 1.5 °C pathways.⁷⁰

182. For the Parties that communicated new or updated NDCs, renewable energy generation continued, as in their previous NDCs, to be the most frequently indicated mitigation option and focus of quantitative mitigation targets, with the share of Parties indicating this option and target sharply increasing from 55 to 87 per cent and from 34 to 59 per cent, respectively, since their previous NDCs.

Figure 13

Share of Parties referring to the frequently indicated mitigation options in nationally determined contributions



Note: If a Party communicated more than one measure for one of the frequently indicated mitigation options, it was counted as one Party communicating measures for that option.

183. In the priority areas related to supply and end-use of energy such as energy supply, transport, buildings and industry, renewable energy generation and shifting to low- or zero-carbon fuels were frequently or widely indicated as key mitigation options relevant to reducing the carbon intensity of electricity and other fuels (see figure 13); electrification was mentioned in relation to increasing the share of final energy supplied by electricity and switching fuel use from fossil fuels to electricity in end-use sectors such as transport and buildings, benefiting from electricity with reduced carbon intensity; and improving energy efficiency and shifting to more efficient modes of transport were often referenced in relation to reducing energy demand.

184. More broadly across all priority areas, Parties frequently indicated waste reduction, waste-to-energy, improved management of manure and herds, and fluorinated gas substitution as key mitigation options relevant to reducing non-CO₂ emissions (see figure 13). In addition, Parties often communicated mitigation options related to circular economy,

⁷⁰ The interquartile range of global renewable energy share in electricity generation by 2030 consistent with the emission pathways to 1.5 °C with no or limited overshoot in the SR1.5.

including reducing and recycling waste and promoting circular economy. Measures related to multisector carbon pricing were frequently identified as efficiently incentivizing low-carbon behaviours and technologies by putting a price on GHG emissions.

185. Most Parties included mitigation measures in the area of LULUCF in their NDCs. In terms of key mitigation options relevant to enhancing carbon sequestration in soil or vegetation, afforestation, reforestation, revegetation, sustainable forest management and reduced deforestation and forest degradation were most frequently indicated (see figure 13). In this context, many developing country Parties referred to reducing deforestation as a priority with high mitigation potential, including through efforts to implement REDD+ activities. Many Parties highlighted the importance of socioeconomic and environmental non-carbon benefits resulting from these mitigation activities, including for adaptation.

186. The SR1.5 identifies mitigation options considered relevant to aligning with 1.5 °C pathways, including:

(a) Halting investment in unabated coal by 2030. A few Parties communicated corresponding measures, such as phasing out use of unabated coal to produce electricity by 2025;

(b) Phasing out of sales of fossil-fuel passenger vehicles by 2035–2050. A few Parties communicated corresponding measures, including banning new registration of diesel and gasoline vehicles after 2030;

(c) Requiring newly constructed buildings to be near zero energy by 2020. Some Parties communicated corresponding measures, such as requiring new buildings constructed after 1 January 2020 to consume almost zero energy;

(d) Expanding forest cover by 2030. Some Parties communicated quantitative targets for increasing national forest cover, such as increasing forest cover to 60 per cent of the national territory without competing for land with the agriculture sector;

(e) Reducing food waste and loss.⁷¹ A few Parties communicated measures for reducing food waste as part of waste reduction, such as taking action through voluntary agreements with the food industry and expanding food waste collection to achieve zero food waste to landfill by 2030.

2. Coherence and synergies with development priorities

187. Many Parties highlighted policy coherence and synergies between their mitigation measures and development priorities. The share of Parties highlighting policy coherence and synergies has increased from 50 to 69 per cent in the new or updated NDCs compared with their previous NDCs.

188. Some identified domestic mitigation measures in the context of the longer-term measures and policies set out in their LT-LEDS and/or other relevant national long-term low-emission development strategies or laws; for example, by identifying domestic mitigation measures for the NDC on the basis of programmes of actions or mitigation options set out in the national LT-LEDS, by formalizing net zero emission targets by 2050 and by requiring governments to report on the implementation of measures in their NDCs at least once every five years to ensure oversight of progress towards the 2050 targets.

189. In addition, some Parties clarified the alignment between their mitigation measures and efforts towards specific SDGs, highlighting the multiple co-benefits of their measures for sustainable development and the cost-effectiveness of their measures in relation to sustainable development under their fiscal constraints, including those due to the COVID-19 pandemic. For example, some Parties communicated one or several specific SDGs in relation to which there are synergies with their priority areas or mitigation measures (see figure 14),

⁷¹ The SR1.5 refers to food waste as inappropriate human consumption of food that leads to food spoilage associated with inferior quality or overproduction, while it refers to food loss as the decrease in mass and nutritional value of food due to poor infrastructure, logistics and lack of storage technologies. The SR1.5 further states that decreasing food waste and loss contributes to land transition in line with 1.5 °C pathways by limiting various demands for land, including for production of food and livestock feed, that may compete with demand for land for afforestation.

with energy supply measures contributing to achieving SDG 7 (affordable and clean energy) and LULUCF measures contributing to achieving SDG 15 (life on land) most frequently indicated; and a few considered contribution to achieving SDGs as a criterion for identifying such measures to be included in their NDCs.

Figure 14

Synergies between efforts in mitigation priority areas and efforts towards Sustainable Development Goals identified in nationally determined contributions

Mitigation priority area	Sustainable Development Goal																
	1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	4 QUALITY EDUCATION	5 GENDER EQUALITY	6 CLEAN WATER AND SANITATION	7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	10 REDUCED INEQUALITIES	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	17 PARTNERSHIPS FOR THE GOALS
Energy supply																	
Transport																	
Buildings																	
Industry																	
Agriculture																	
LULUCF																	
Waste																	
Cross-cutting/other																	

Note: The shading reflects how frequently linkages were identified by Parties: the darker the shading, the more frequently linkages were identified.

190. Further, some of the Parties that communicated new or updated NDCs highlighted synergies between their mitigation measures and green recovery from the impacts of the COVID-19 pandemic, such as implementing a “Green New Deal” for accelerating implementation of the measures identified in the updated NDC.

L. Means of implementation

191. Almost all Parties provided information on some or all means of implementation in their NDCs, although the structure and depth of that information varied significantly. While some Parties included a dedicated section on means of implementation or separate sections on finance, technology and/or capacity-building, many mentioned or referred to aspects of means of implementation in other sections of their NDCs.

192. Some Parties provided information on specific climate finance, technology and capacity-building projects, including, for some, detailed information on financial and technical requirements, implementing entities and time frames.

193. Some Parties highlighted South–South, triangular or regional cooperation as support mechanisms for NDC implementation, including for specific aspects of financial assistance, capacity-building and technology development and transfer.

1. Finance

194. Almost all Parties provided information on finance as a means of NDC implementation, with most characterizing finance in terms of international support needed and some mentioning finance in relation to domestic implementation only. A few mentioned finance in the context of providing financial support for other countries’ NDC implementation. Many Parties provided qualitative information on how finance will be used as a means of implementation either in general or through specific actions for financing mitigation or adaptation support, such as earmarking public expenditure, establishing climate funds or supporting financial systems. Many also included quantitative information on financial investment or expenditure to support their NDCs, such as on financing specific technology development funds, economy-wide budgetary programmes or specific projects and needs for financial support.

195. Many Parties provided quantitative estimates of financial support needs, which were often expressed as total amounts over the time frame of the NDC. Many of them provided updated quantitative estimates of financial support needs and some others provided estimates

for the first time in their new or updated NDCs. Most of those Parties also made efforts to differentiate quantitative estimates for conditional actions reliant on international support from those for unconditional actions that may be financed from domestic sources.

196. Some Parties provided information on financial support needs across mitigation and adaptation themes or sectors, and a few provided total estimates. Mitigation finance is needed across renewable energy, energy efficiency, transport and forestry, while adaptation finance is needed for activities related to water, agriculture, coastal protection and resilience.

2. Technology development and transfer

197. With regard to information on technology development and transfer for NDC implementation, most Parties covered qualitative aspects and many also quantitative aspects.

198. Many Parties referred to technology development and transfer in the context of actions that inherently address both adaptation and mitigation or focus on mitigation. Many Parties also made reference to climate technology for adaptation.

199. Information provided by Parties on climate technology related matters was mainly on specific technologies to be deployed; technology needs; policy, regulatory and legal aspects; technology innovation, research and development; and support required by Parties or support provided by Parties for technology development and transfer.

200. In terms of specific technologies that Parties intend to use for achieving their adaptation and mitigation targets, the most frequently identified were cross-sectoral energy-efficient appliances and processes, enhanced utilization of renewable energy technologies such as hydropower, solar, wind and biomass, low- or zero-emission vehicles, blended fuel, waste to energy technologies and climate-smart agriculture.

201. Technology needs mentioned by Parties were mainly in the areas of energy, agriculture, water, waste, transport, climate observation and early warning. As regards technology innovation, research and development, some Parties included information on promoting collaboration between countries and promoting institutions, mechanisms, tools and business models that foster progress in this area. Actions on policy, regulatory and legal aspects commonly referred to by Parties include developing or updating policies and strategies to promote technology innovation, promoting use of renewable energy and accelerating adoption and transfer of climate technologies. A few Parties included specific information on their intended provision of support to developing country Parties, while some Parties indicated the support needed for development and deployment of clean technologies, for example in the areas of energy, energy efficiency and agriculture. Some Parties referenced technology needs assessments and technology action plans in identifying priority technology needs in adaptation and mitigation.

3. Capacity-building

202. Many Parties identified capacity-building as a prerequisite for NDC implementation. Many Parties provided a specific section containing information on capacity-building needs. Capacity-building needs were identified for formulating policies, integrating mitigation and adaptation into sectoral planning processes, accessing finance, and providing the necessary information for clarity, transparency and understanding of NDCs. Capacity-building needs were assessed in three ways: by thematic area, by sector and by category.

203. With regard to thematic areas, many Parties provided information on cross-cutting capacity-building needs, whereas many others expressed capacity-building needs for adaptation and some others for mitigation. Also, a few Parties indicated capacity-building needs for addressing loss and damage and many Parties identified their efforts or needs in relation to sectoral capacity-building. Many Parties identified capacity-building needs that were multisectoral, followed by some others that identified needs relating to the subsector other,⁷² buildings and infrastructure, energy and/or health.

⁷² Covers capacity-building needs and gaps applicable to sectors that do not fall within the sectors identified for the data analysis, such as sustainable tourism, empowerment of women, youth engagement, coastal areas, waste management, GHGs and land.

204. With regard to capacity-building categories, many Parties referred to cross-cutting capacity-building needs, mainly for facilitation of training, education, peer-to-peer learning and awareness-raising. Some Parties emphasized the importance of capacity-building to support institutional strengthening in order to ensure the sustainability and retention of capacities at the national level.

205. The share of Parties that referred to capacity-building in specific sections of their new or updated NDCs increased significantly compared with their previous NDCs, with the number of Parties indicating that capacity-building needs were mostly of a multisectoral nature having risen significantly. The number of Parties expressing capacity-building needs for adaptation also increased, this being the thematic area in which most capacity-building needs were expressed. Parties continued to emphasize the importance of capacity-building to support institutional strengthening in their new and updated NDCs.
