Summary report on the first meeting of the technical dialogue of the first global stocktake under the Paris Agreement

Report by the Co-facilitators of the technical dialogue

10 October 2022

Abbreviations and acronyms

ABU	Argentina, Brazil and Uruguay
AFOLU	agriculture, forestry and other land use
AGN	African Group of negotiators
AILAC	Independent Association of Latin America and the Caribbean
AOSIS	Alliance of Small Island States
AGWA	Alliance for Global Water Adaptation
AR6	Sixth Assessment Report of the Intergovernmental Panel on Climate Change
BINGO	business and industry non-governmental organization
CAN	Climate Action Network
CBDR-RC	common but differentiated responsibilities and respective capabilities of different national circumstances
CDR	carbon dioxide removal
CFs	co-facilitators
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
CRD	climate-resilient development
CSO	civil society organization
CTCN	Climate Technology Centre and Network
DCJ	Global Campaign to Demand Climate Justice
DRR	disaster risk reduction
EbA	ecosystem-based adaptation
EIG	Environmental Integrity Group
ENGO	environmental non-governmental organization
EU	European Union
ETF	enhanced transparency framework
GCB	global carbon budget
GCF	Green Climate Fund
GDP	Gross Domestic Product
GGA	global goal on adaptation
GHG	greenhouse gas
GST	global stocktake
GST1	first global stocktake
IAM	integrated assessment models
IEA	International Energy Agency
IIASA	International Institute for Applied Systems Analysis (IIASA)
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
IPCC WG	IPCC Working Group contribution to the sixth assessment report
IPLCs	indigenous peoples and local communities
LAC	Latin America and the Caribbean
LDCs	least developed countries
LMDCs	Like-minded Developing Countries
LT-LEDS	long-term low emission development strategies
LULUCF	land use, land-use change and forestry
MENA	Middle East and North Africa
M&E	monitoring and evaluation
MDB	multilateral development bank
MOI	means of implementation
NAP	national adaptation plan
NAPA	national adaptation programme of action
NBS	nature-based solutions
NDC	nationally determined contribution
NDR	needs determination report
NGO	non-governmental organization
NPS	non-Party stakeholder(s)
OECD	Organisation for Economic Co-operation and Development

OHCHR	Office of the United Nations High Commissioner for Human Rights
PCCB	Paris Committee on Capacity-Building
PPP	public–private partnership
PV	photovoltaic
RD&D	research, development and demonstration
RE	renewable energy
SB	subsidiary body
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice
SCF	Standing Committee on Finance
SCF BA	Standing Committee on Finance biennial assessment and overview of climate finance flows
SDGs	Sustainable Development Goals
SIDS	small island developing State(s)
TEC	Technology Executive Committee
TD	technical dialogue
TD1.1	The first meeting of the technical dialogue of the first global stocktake
TM	Technology Mechanism
TNA	technology needs assessment
TUNGO	trade union non-governmental organization
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization
WMO	World Meteorological Organization
YOUNGO	children and youth non-governmental organization

Contents

Page

I. Introduction

A. Mandate

1. Article 14 of the Paris Agreement established the GST and decision 19/CMA.1[1] laid out its modalities and sources of input. GST1 started at CMA 3 (2021) and will conclude at CMA 5 (2023). Following the first round of inputs and submissions for GST1, the technical assessment began at SB 56 (June 2022) and will end at SB 58 (June 2023). As part of the technical assessment component of GST1, three meetings of TD1[2] are to be held in conjunction with SB 56, SB 57 and SB 58.

2. The meetings of the technical dialogue will facilitate the expert consideration of inputs into the GST and:

(a) Undertake its work through a focused exchange of views, information and ideas in in-session round tables, workshops or other activities;[3]

(b) Organize its work in line with taking stock of the implementation of the Paris Agreement to assess the collective progress towards achieving its purpose and long-term goals, including under Article 2, paragraph 1(a–c), in the thematic areas of mitigation, adaptation and means of implementation and support, noting, in this context, that the GST may take into account, as appropriate, efforts related to its work that:

(i) Address the social and economic consequences and impacts of response measures;

(ii) Avert, minimize and address loss and damage associated with the adverse effects of climate change;

(iii) Be facilitated by two co-facilitators, who will be responsible for conducting the dialogue and for preparing a factual synthesis report and other outputs of the technical assessment, with the assistance of the secretariat.

3. Prior to TD1.1, the Chairs of the SB, consistent with decision 19/CMA.1,

(a) Prepared a non-paper and, after consulting with Parties, revised the non-paper,[4] aiming to assist Parties and NPS in their preparation for the first GST. This paper included guiding questions for the information collection and preparation component;[5]

(b) Issued a call for inputs for the GST;[6]

(c) Prepared guiding questions for the technical assessment and revised them based on views expressed at informal consultation with Parties held in October 2021 on this matter.[7]

4. In the lead-up to SB 56, we prepared and published an information note[8] on the organization of TD1.1 aimed at assisting Parties and NPS to prepare for the meeting.

5. This summary report has been prepared by us, based on the discussions held during TD1.1 in Bonn during SB 56 as mandated by decision 19/CMA.1, paragraph 31. A GST information portal containing inputs to GST1 is available here,[9] supporting a transparent,

[1] FCCC/PA/CMA/2018/3/Add.2.

[2] Note that we are using TD1 as an abbreviation for the technical dialogue under the first GST and TD1.1, TD1.2 and TD1.3 to refer to its meetings.

[3] FCCC/PA/CMA/2018/3/Add.2.

[4] Available at https://unfccc.int/sites/default/files/resource/Non-paper%20on%20Preparing%20for%20GST1_0.pdf.

[5] 2 Decision 19/CMA.1, paragraph 7.

[6] 13 Decision 19/CMA.1, paragraph 19. The call for inputs is available at: https://unfccc.int/sites/default/files/resource/Call%20for%20inputs%20SB%20Chairs_GST_reminder_Feb23.pdf.

[7] Available at https://unfccc.int/sites/default/files/resource/Draft%20GST1_TA%20Guiding%20Questions.pdf.

[8] TD 1.1 information note by the CFs is available here: https://unfccc.int/sites/default/files/resource/GST_Technical_Dialogue_Information_Note.pdf.

[9] Relevant information sources for the TD1.1 are appended to this report.

Party-driven process, with participation by NPS. This report captures and summarizes views shared during the dialogue, but is not an exhaustive summary of the inputs.

B. Objective and general approach to the 2022–2023 technical dialogue of the first global stocktake

6. TD1.1 was organized to be an open, inclusive, transparent and facilitative process that allowed Parties to engage and hold discussions with each other, and experts and NPS to consider the inputs for GST1 and assess collective progress.

7. The aim of TD1.1 was to develop more shared understanding of the latest information on the implementation of the Paris Agreement and collective progress towards the purpose and its long-term goals, in the light of equity and the best available scientific information.

8. To achieve the objectives we had set for TD1.1, we employed multiple formats for engagement, including plenaries, round tables and a world café session. These formats facilitated effective participation, as well as allowing for an in-depth discussion of topics across the scope of the GST. More specifically, the format for TD1.1 included:

(a) Two plenary sessions – one at the start of the meeting to ensure a shared understanding on the scope of the discussions at the round tables and world café; and another at the end of the meeting, at which reports from the round tables were presented and discussed;

(b) Three round tables structured around the topics of the TD (mitigation, including response measures; adaptation, including loss and damage; and finance flows and means of implementation and support (climate finance, technology development and transfer and capacity-building), facilitating interactions in smaller settings, as well as virtual observation;

(c) A world café format of 12 stations, with specific topics in the same three topics as for the round tables (see (b) above, with experts at each table facilitating dynamic, interactive exchanges across topics.

9. Across these three formats (see para 8 (a) – (c) above), a total of 63 hours of meetings and discussions were held, including 6 hours of plenary sessions, 21 hours of round-table discussions and 36 hours of discussions across 12 stations of the world café. There was also a reception organized by the COP 26 Presidency and the COP 27 incoming Presidency, with financial support from the United Arab Emirates, on 9 June 2022, which provided an opportunity for the TD1.1 participants to meet in an informal environment prior to the start of the TD1.1 discussions. We made ourselves available informally to Parties and NPS prior to, during and after TD1.1.

C. Summary of inputs received

10. Prior to the technical dialogue, we received 3 submissions from groups of Parties, 13 submissions from Parties and 68 submissions from NPS. The secretariat facilitated the online availability of these GST1 inputs and by making them available on the GST information portal[10], organized by topics of the TD as outlined in decision 19/CMA.1. The inputs covered a full range of topics, including the thematic areas of mitigation, adaptation, and finance flows and means of implementation and support, as well as loss and damage and response measures. Equity and ambition, as well as best available science were discussed in a cross-cutting manner. We encouraged all stakeholders to continue to make submissions prior to the second and third technical dialogues.

11. Under our guidance, four synthesis reports were prepared on greenhouse gas (GHG) emissions by sources and removals by sinks and mitigation efforts undertaken by Parties,[11] the state of adaptation efforts, experiences and priorities,[12] the overall effect of Parties' NDCs

[10] Available at https://unfccc.int/topics/global-stocktake/information-portal.

[11] Available at https://unfccc.int/documents/461466.

[12] Available at https://unfccc.int/documents/470435.

and overall progress made by Parties towards the implementation of their NDCs[13] and finance flows and means of implementation.[14] UNFCCC constituted bodies and forums and other institutional arrangements serving the Paris Agreement prepared nine synthesis reports for the technical assessment, with the assistance of the secretariat, in their areas of expertise.[15]

II. Summary of discussions

A. Summary of the opening plenary

1. Welcoming remarks and keynote speeches

12. The TD 1.1 opening plenary was opened with welcoming remarks from: Ms. Patricia Espinosa, UNFCCC Executive Secretary, Ms. Marianne Karlsen, Chair of the SBI, Mr. Tosi Mpanu, Chair of the SBSTA, and keynote remarks from Mr. Hoesung Lee, Chair of the IPCC.

13. In their remarks, they framed the GST as a central pillar of the Paris Agreement and as part of the global response to the threat of climate change and referenced the IPCC AR6, which highlighted the utmost urgency of climate action.

14. The welcoming remarks were followed by an overview of the plan of work for the TD1.1 at SB 56 by us while referencing our information note[16] which had been published in advance of this meeting. After the opening remarks, the floor was opened for initial contributions from negotiating groups, Parties and NPS.

2. Initial contributions by participants

15. At the opening plenary, interventions were provided by:[17] Pakistan on behalf of the Group of 77 and China; Zambia on behalf of the AGN; Senegal on behalf of the LDC group; Colombia on behalf of AILAC; Saudi Arabia on behalf of the LMDC; Trinidad and Tobago on behalf of AOSIS; Poland on behalf of the EU; Switzerland on behalf of EIG; Algeria on behalf of the Arab Group; and Brazil on behalf of ABU. Parties included: Canada; United States of America; Norway; Japan; Australia; China; India; and Norway. Observers and NPS included: BINGOs, ENGOs, farmers NGOs, indigenous peoples organizations, local government and municipal authorities, research and independent NGOs, TUNGOs, women and gender NGOs, YOUNGOs, OHCHR and WHO,; CAN International, DCJ and the International Indigenous Peoples Forum on Climate Change. In addition, written statements were submitted by: AILAC, EIG, LMDC, Arab Group, ABU, AGN, LDC, EU, Norway, Australia, farmers NGOs, BINGOs, YOUNGOs, ENGOs, DCJ, OHCHR and WHO.[18]

16. Several interventions by Parties and NPS referred to the role of the GST, including:

(a) As a critical component of the Paris Agreement that will help in tracking progress towards its purpose and long-term goals, with a view to achieving them through enhanced implementation by all Parties and the strengthening of commitments;

(b) On enhancing ambition for mitigation and adaptation, as well as mobilizing and providing climate finance for climate action, including for enhancing support for capacity-building and transfer of technology, in the light of equity, and the best available science;

(c) On strengthening the protection of people from the impacts of climate change and averting, minimizing and addressing loss and damage, and helping to increase ambition

[13] Available at https://unfccc.int/documents/461517.

[14] Available at https://unfccc.int/documents/461992.

[15] Available at https://unfccc.int/topics/global-stocktake/events-and-inputs/unfccc-and-constituted-bodies-synthesis-reports-and-webinar-for-the-technical-assessment-component.

[16] Available at: https://unfccc.int/sites/default/files/resource/GST_Technical_Dialogue_Information_Note.pdf.

[17] Throughout the technical dialogue the order of interventions started with negotiation groups, followed by Parties, observers and other NPS alternating in taking the floor.

[18] Available at: https://unfccc.int/topics/global-stocktake/components-of-the-gst/technical-dialogues-of-the-first-global-stocktake/technical-dialogue-11-td11-of-the-first-global-stocktake.

and support countries in taking their fair and equitable share to support global action and transformation.

17. Many participants expressed their support of the innovative dialogue process at TD1.1 and the learning by doing approach, stressing that:

(a) The discussions should continue to be constructive, result-oriented, as technical as possible, evidence-based and informed by expert views. They should be open, transparent, systemic, holistic, balanced, equitable and fair, comprehensive, inclusive and facilitative;

(b) The TD1 must remain Party-driven, underscoring the importance of ensuring a full representation of developing country Parties and giving more time to allow every delegation to provide its views, especially during the round tables and the world café, recognizing the participation of NPS;

(c) The amount of information available for the TD1 warranted holding discussions beyond the static consideration of issues in line with strict thematic separations, and rather to deepen considerations in a cross-cutting manner;

(d) The TD1 outputs should be fit for purpose, and the summary report should accurately and comprehensively represent Parties' and NPS' reflections on the many inputs submitted and present information in a policy-relevant manner. It was suggested that the design of the next meetings of the TD1 should incorporate feedback from how the TD1.1 was conducted.[19]

18. Interventions focused on general expectations from the TD1 and priorities for the round tables and world café. While outlining their expectations and priorities for TD, many participants referenced findings in the AR6, including:

(a) The urgency of ambitious global action on adaptation and mitigation and support, considering that climate change is a threat to human well-being and planetary health;

(b) The need to understand the IPCC outcomes in their entirety, as opposed to taking a purely mitigation-centric approach, and for balance between the thematic areas of the GST in its process and outputs;

(c) That reaching 1.5 °C in the near term and further increases beyond would cause unavoidable increases in multiple climate hazards and present multiple risks to ecosystems and humans. They stated that climate disasters were already commonplace, while global GHG emissions are still rising;

(d) That projected emission reductions implied by the ambition of current NDCs through 2030 are insufficient to limit global warming to well below 2 °C, let alone to 1.5 °C and that existing and planned fossil fuel infrastructure alone would lead to emissions that will consume the entire remaining carbon budget (RCB), consistent with the remaining temperature increase of 0.43 °C to 1.5 °C limit to global warming. Others highlighted findings from IPCC WG III that four fifths of the total carbon budget consistent with an even chance of limiting warming to 1.5 °C had already been spent. Yet others pointed to the need to consider both historical and future carbon budgets.

19. General expectations by participants were that the TD1 will:

(a) Identify implementation gaps and the associated barriers and challenges for bridging these gaps, relating to adverse effects of climate change on developing countries and regions, as well as the financial, technological and capacity-building gaps, as highlighted in the AR6;

(b) Focus on identifying and recommending available and replicable options for future actions, and opportunities and approaches for better achieving the collective goals in a systemic, equitable and transformative way, as well as addressing implementation gaps and challenges, specifically in the context of sustainable development, including the strengthening of international cooperation;

[19] FCCC/SBSTA/2022/6, para. 50/FCCC/SBI/2022/10, para. 41.

(c) Play a critical role in informing national policies and would assist countries in updating their NDCs and LT-LEDS, in the light of the latest available science (consistency between NDCs and LT-LEDS is essential);

(d) Assess the ambition and implementation gaps, and in particular the gap in mitigation, as reflected in the NDC synthesis report[20] for the technical assessment component of GST1 prepared by the secretariat under our guidance, confirming that global emissions were still on a pathway to increase by 13.7% by 2030 compared with 2010, and that if emissions were not rapidly reduced within this decade, this would expose the most vulnerable, particularly the LDCs, to unacceptable levels of risks and impacts.

20. Several negotiating groups and Parties suggested that a retrospective review and in-depth analysis of the historical pre-2020 implementation under the GST1 was needed to enhance ambition and action. In this context, they:

(a) Highlighted the historical cumulative GHG emissions, the significant gaps in pre-2020 action and specific mitigation and adaptation finance gaps;

(b) Suggested that collective progress needed to be based on a clearer picture of the historical GHG emissions, as a fundamental context to discussing efforts being undertaken to plan, implement and accelerate mitigation action, and to assess how adequate and effective the current mitigation efforts were, as well as support provided;

(c) Underscored the need for reducing emissions and for developed country Parties to take the lead and cut emissions deeper and faster than others, while cooperating with developing country Parties by providing climate finance, technology transfer and capacity-building, and prioritizing international cooperation.

21. Many participants indicated that for long-term low-emission pathways the consideration of adaptation, as well as just transitions were central, and indicated the importance of giving sufficient space to address loss and damage within the TD.

22. Just transitions were mentioned as a priority by several participants, in the context of the need for transformative change, including by urgently reducing global GHG emissions by half in this decade. Issues mentioned included:

(a) Finding new and creative ways for developing countries to maximize the potential development outcomes of this transition. Options mentioned included: green industrialization, the greening of supply chains, and the contribution of sectors such as aviation and shipping;

(b) Equity and CBDR-RC, in the light of national circumstances and the confidence that all Parties are doing their fair share, is essential to provide the motivation to enhance ambition. Gender stereotypes that lead to highly emitting activities should be revisited;

(c) Creating new pathways and international platforms to urgently phase down fossil fuels production equitably and end expansion and all types of subsidies and support for the fossil fuel industry;

(d) Fast-tracking just transitions for all countries and communities in replacing fossil fuels by sustainable and renewable energy solutions, as well as broader economic diversification and transformation;

(e) Assessing progress and barriers to collective just transitions to a low-carbon or net-zero and climate-resilient future that must inform Parties in updating and enhancing their actions, as well as international cooperation.

23. Other Parties suggested that each Party should find its most appropriate pathway to development and to achieve shared objectives based on CBDR-RC in the light of differentiated national circumstances (ILDNC), and equitable access to sustainable development. National circumstances in developing countries include the priority of eradicating poverty. The importance of enablers such as finance, technology transfer, capacity-building, intra and intersectoral interactions, cooperation between countries and

[20] https://unfccc.int/documents/461517.

regions, the sequencing, timing and stringency of mitigation actions, governance and policy design were highlighted.

24. On mitigation specifically, some Parties using data from the IPCC AR4 noted that while that report had indicated that developed countries must cut their GHG emissions by at least 25–40% below 1990 levels by 2020,[21] between 2008 and 2012, developed countries had only reduced emissions by 5%. They noted that, according to the IPCC AR6, historical cumulative net CO_2 emissions between 1850 and 2019 amounted to about four fifths of the total GCB for limiting global warming to 1.5 °C.

25. Parties suggested, that in order to ensure a steady implementation of mitigation activities, it would be effective to have a follow-up system to track progress.

26. Some participants stated that while they call for rapid fossil fuel phase-out, this was not to be used to promote harmful and questionable climate solutions, such as nuclear power, geoengineering and unsustainable biomass use, but rather prioritize ecosystem-based approaches and investments and locally adapted sustainable renewable solutions.

27. Some Parties noted the need to make significant progress in response measures and to maximize synergies and avoid trade-offs between climate action and the pursuit of other SDGs. This progress and equity and common but differentiated responsibilities and respective capabilities in the light were referred to as the basis of the understanding of the circumstances and the development context within which Parties were making their contributions and pledges. They also cited inequalities with the consideration of climate justice, as well as institutional, technological and financial capacity, and socioeconomic and human capital constraints.

28. Some NPS also noted that further consideration of national GHG inventories and mitigation potential of land use was needed and that research and innovation that was suited to specific local conditions was necessary to develop cost-effective, practical solutions for farmers. Key gaps in the capacity of rural businesses to cope with climate and other risks, as well as finance for agriculture gaps were also highlighted, as was the sector's potential contribution through the sharing of best practice and solutions, experience and knowledge, and lessons learned.

29. On adaptation, many participants strongly stated the importance of greatly enhancing adaptation and averting, minimizing and addressing loss and damage. In this context, several participants highlighted protecting and restoring ecosystems, as well as strengthening the inclusion of frontline communities, and especially of youth, women and indigenous peoples, in decision-making processes.

30. Parties stated that the conclusion of the CMA's work programme on the GGA was essential to understanding collective progress on the global goal on adaptation outlined in Article 7, paragraph 1, of the Paris Agreement, taking into account different and unique national and regional circumstances.

31. Regarding adaptation finance, Parties cited the AR6 and referenced the gap between climate finance for mitigation and that for adaptation, as well as the significant barriers to accessing different multilateral, regional and bilateral financing. They underscored that it was impossible to achieve the goals of the Paris Agreement without addressing this unprecedented financial gap in adaptation.

32. Some participants highlighted that climate finance support needed to be people-centred and gender-responsive and reach those territories and communities most vulnerable to the climate crisis. Some NPS also suggested that there was a need for new and additional finance for addressing loss and damage in a way that simplifies and facilitates direct access of the most affected groups and communities to such finance.

33. Some Parties specifically referred to the IPCC findings on loss and damage. They emphasized the need for Parties to analyse and assess the socioeconomic impacts of global warming on their economies and, in this context, assess comprehensive approaches to avert,

[21] Reference to AR4 findings and their recognition of the shared vision decision. Developing countries were to reduce emissions by 17%, which also did not happen.

minimize and address loss and damage, resulting from the emission reductions, as well as anticipatory action, disaster preparedness, humanitarian response and recovery, as priorities for discussion.

34. In referring to finance, some negotiating groups expressed disappointment that the new collective quantified goal on finance was still to be agreed and stated that the current USD 100 billion goal was set years ago and still unfulfilled. It was repeatedly stated that current climate finance was inadequate to meet the mitigation and adaptation related needs of developing countries. It was highlighted that there was a need for accelerated provision and mobilization of financial support by developed countries to developing countries as well as other sources, including increasing levels of public finance and mobilizing private finance flows.

35. Other participants noted that, although a new goal was being established, there was no clear understanding of channels or financial instruments, or of the role for the public sector of developed countries, the operating entities of the Financial Mechanism and the Adaptation Fund. Others stated that support, particularly financial which needs to be scaled up to USD trillions, were essential for enabling deep and immediate reductions in GHG emissions, for achieving the 1.5 °C goal. The need to balance finance for mitigation with that for adaptation, resilience, response measures and for addressing loss and damage was also emphasized.

36. Parties and NPS emphasized the importance of accountability and transparency and highlighted that support provided by developed countries needed to be framed as climate finance that was different from developmental assistance or other forms of finance. Many participants proposed actions needed for enhancing finance and other implementation measures and support.

37. On capacity-building, some NPS highlighted the need for capacity-building for Parties and other stakeholders, and specific reference was made to the need to facilitate access of women, girls, youth and vulnerable communities to technical education and jobs.

38. Some participants suggested that, to ensure that the design and implementation of climate policies and actions were carried out in an ethical and systemic manner,[22] Parties and other actors should be trained on engagement with indigenous peoples by respecting their rights, diversity and tradition, and on how to build trust and strengthen collaboration to improve implementation.

39. On technology, some participants suggested also focusing on measuring progress in transformational change, the long-term vision on technology and cooperation in delivery and ambition in technology frameworks.

40. Some Parties cited the AR6 relating to the unique challenges of**:**

(a) Africa, as the continent most adversely impacted by climate change. They specifically noted significant GDP losses in most African countries, as a result of historical and enduring impacts from climate change, despite the deep responsibility for addressing climate change taken by Parties in the continent and the lower per capita emissions of the African region;

(b) The MENA region, as one of the regions most impacted by climate change. This imposes many challenges relating to food security, water security, socioeconomic resilience and regional stability, as well as heavy pressure on the ecosystems of the region, which also leads to the disappearance of local lifestyles and traditional knowledge;

(c) The Pacific region, where climate change is the single greatest threat to livelihoods, security and well-being.

41. Many NPS, as well as Parties, expressed their satisfaction with the recognition of the important role that NPS played in the TD process and highlighted the contribution of indigenous peoples' knowledge to collective progress. NPS made several suggestions, including that:

[22] Note also, in this context, the importance of institutional capacity-building (see paras. 168, 195 and 208(d) below).

(a) A mandate should be given for convening stocktake meetings at the local level to feed into the GST process, similar to the Talanoa Dialogue;

(b) NDCs should include considerations of multi-level aspects, noting that the Paris Agreement acknowledges the important role of all levels of government, and that the Glasgow Climate Pact underlines the urgency for multilevel action;

(c) The TD should consider commitments from NPS, including initiatives under the Marrakech Partnership for Global Climate Action, and considering existing experience of increased national climate ambition through engagement at the local level;

(d) Round tables should include considerations of human rights, gender equality and social inclusion, as well as gender equality, intergenerational equity, the rights of indigenous peoples, labour rights, the right to access information and food security;

(e) The private sector should be included in the GST process, as an invaluable resource of expertise and real-world experience to accelerate action and increase the deployment of resources, offering pledges and commitments to contribute across all pillars.

42. Some NPS stated that the agriculture sector was both a source and a sink of GHG emissions, while also being on the frontline of climate impacts, especially for food security. They noted that farming was central to the GST thematic areas and warranted particular consideration. They highlighted that agriculture could deliver on both adaptation and mitigation, as well as on multiple environmental and community benefits, through numerous measures.

43. With regard to the health sector, some NPS further highlighted the importance of the GST in monitoring progress towards minimizing the threats of climate change to human health and well-being, as well as for maximizing health co-benefits of climate action, noting the profound direct and indirect impacts of climate change through heatwaves and other extreme weather events, disease transmission, food and water insecurity, and negative mental health impacts. The health sector, which contributed 5% of GHG emissions, and was one of three sectors most often prioritized for adaptation in NDCs, had a key role in both mitigation and adaptation.

44. Some participants referred to the need to craft concrete and truly actionable, and policy-relevant recommendations, based on the available science, namely the AR6, as well as other relevant information prepared by the UNFCCC constituted bodies, the Financial Mechanism, and other processes and inputs, in a manner that does not duplicate efforts, but that is rather building on them and which would result in benefits arising out of them.

B. Summary of the round-table discussions

1. Framing of the discussions

45. All three round tables met three times over 10, 11 and 13 June 2022. Each round-table discussion comprised an introductory framing of the discussions, three expert panels and a concluding session to summarize the discussions. Each expert panel was initiated with two short presentations by experts on specified topics, followed by a dialogue with the participation of Parties and NPS.

46. We launched the round tables by reiterating that the discussions were intended to serve as an opportunity for focused interactive dialogue among Parties, with the participation of NPS and information provided by experts. We recalled that the focus is on collective progress under each thematic area of the GST, that all elements of paragraph 6(b) of decision 19/CMA.1 will be discussed, as well as on the opportunities and challenges for enhancing action and support in the context of the guiding questions for the technical dialogue by the SB Chairs.

47. We also laid out the norms for the round tables (see box 1) and referenced the non-exhaustive list of topics for each round table that were also included in the information note for TD 1.1. The topics were generated from inputs received from Parties and NPS, as from the date of publication of the TD1.1 information note.

Box 1: Norms for discussion at the round tables:

- Participants of round tables are charged with performing an assessment of collective progress and identifying opportunities for enhanced action and support.
- The dialogue should advance knowledge that can inform Parties and NPS in enhancing their actions and support.
- Discussions should be technical, focused on data and information, and based on the best available science.
- Participants are encouraged to engage in a conversation and dialogue with one another, rather than provide prepared statements.
- Throughout the technical dialogue, all knowledge and experience should be respected as contributions to the discussion, in order to promote cooperation and build trust.

48. We selected moderators for each round table as follows:

(a) Round table 1 (Mitigation, and response measures): Mr. Carlos Fuller, Belize's Permanent Representative to the United Nations and former SBSTA Chair, and Mr. Andy Reisinger, IPCC WG III bureau member;

(b) Round table 2 (Adaptation, including loss & damage): Ms. Musonda Mumba, UNDP, and Mr. Richard Klein, Stockholm Environment Institute;

(c) Round table 3 (Finance flows and means of implementation/climate finance and finance, technology, and capacity support): Ms. Outi Honkatukia, Ministry of the Environment, Finland, and Mr. Youba Sokona, IPCC WG III Vice-Chair.

Summary of cross-cutting interventions made by participants relating to the organization of the round tables made during the closing plenary.

49. Participants reiterated their support for the design of the three round tables, noting with appreciation their interactive nature. They emphasized that this design enabled learning among participants and facilitated the exchange of ideas, experiences and views on the topics.

50. Several participants raised clarification questions relating to:

(a) The workflow, the mode of the discussions, inclusiveness, time-limit for interventions, reporting and around the open-ended nature of the discussions;

(b) The inputs to the round tables, including the fact that scientific inputs were mainly from the IPCC and proposed that the information and knowledge sources, as well as the experts invited, be made broader, including other United Nations endorsed sources and other institutions, including those providing indigenous knowledge;

(c) How the synthesis reports prepared by the secretariat under our guidance and other inputs would inform the discussions;

(d) The relation of the world café discussions to those in the round tables.

51. Some participants suggested streamlining the topics and more clearly establishing the linkages between them and requested that, in future, they receive presentations and material from the experts in advance to enable prior preparations for the meetings. Other participants suggested the following additional topics that should feature in the round tables:

(a) *Round table 2*: Reflecting on the distinction between adaptation and loss and damage; progress towards the GGA; and just transitions in the context of adaptation;

(b) *Round table 3*: Emerging economic impacts on the GDP of countries and ultimately on livelihoods.

52. In response to these questions and suggestions we clarified:

(a) The workflows during both the round-table discussions and those for the world café, including how reporting back would be conducted and the plans for preparing the TD1.1 summary report;

(b) That the discussions were designed to be held in a conversation mode and were to be as inclusive as possible, in terms of participation and topics raised, sources and inputs used and employing different methods;

(c) That the IPCC AR6 was used as a key scientific basis to kick off the dialogue, given the recent publication of IPCC WG II and WG III, and recognizing the importance of other forms of knowledge and institutions;

(d) That we will prepare a summary report after every TD1 meeting and a factual synthesis after TD1.3 (June 2023). We underscored our intention to make efforts to comprehensively reflect discussion points and all views expressed, to the extent possible, in the summary report that we will prepare after TD1.1 (the present report) and requested participants to submit their written interventions to help make sure that all points and views were well recorded;

(e) That the informal brief summaries, which were going to be presented by the rapporteurs at the wrap-up session of each round table, will feed into the round-table summary that will be presented by the moderators at the closing plenary. These oral summaries by the volunteer rapporteurs were aimed at supporting the discussions.

53. In response to the suggestion regarding the interlinkages between the issues, such as response measures, and loss and damage, as well as sustainable development, just transitions and equity, we highlighted that while the discussions are structured around the topics of the TD, issues would arise across topics and be increasingly important at TD1.2 and 1.3, and that cross-cutting issues of equity and ambition would be discussed, as relevant, under each topic.

54. Regarding the guiding questions by the SB Chairs, there was general consensus that they would be referred to as a framework for the discussions rather than attempting to respond to each question at this stage, noting that the objective was to ensure that all the guiding questions would be considered by the end of the TD1 process.

2. Summary of round table 1: Mitigation, including response measures

55. Round table 1 took stock of the implementation of the Paris Agreement and discussed how collective progress with respect to the goal in Article 4.1 contributed to achieving the long-term temperature goal in Article 2.1(a), including global peaking as soon as possible, different timing, rapid emission reductions after peaking, net-zero emissions, on the basis of equity and in the context of sustainable development and efforts to eradicate poverty. It also considered increasing the ability to foster low GHG emissions development in a manner that does not threaten food production (Article 2.1(b)). Discussions at this round table also took into account efforts related to addressing the social and economic consequences and impacts of response measures.

Expert panel 1 - Key findings from the IPCC WG III, relevant for the GST

Presentations

56. Expert panel 1 focused discussions around key findings from the IPCCWG III, relevant for the GST, including emission and implementation gaps; just transitions to net-zero emissions; transformations across systems (e.g. energy, land, urban, industry, transport, agriculture, and other systems); and carbon budgets.

57. Mr. Jim Skea, Co-Chair of IPCC WG III and Imperial College London, presented key findings of the IPCC WG III, including on emission outcomes, system transformations, and enabling conditions. Highlights from this presentation included the following:

(a) Recent emission trends between 1990 and 2019 (see figure 1(a) below) show that: global emissions continued to increased in the last three decades and reached 59±6.6 Gt CO_2-eq in 2019; CO_2 from fossil fuel and industry and methane (CH_4) contribute the highest percentages among the GHG emissions. However, the rate of emissions growth in the last decade was lower than in the previous decade, while the contribution of CO_2 from fossil fuel and industry started to decline slightly. In other words, we have slowed growth of emissions, but not yet seen global emissions reduced;

(b) Progress in reducing emissions in groups of countries showed that:

(i) 24 countries reduced their territorial CO_2 and GHG emissions (excluding LULUCF CO_2), as well as consumption-based CO_2 emissions, over at least 10 years;

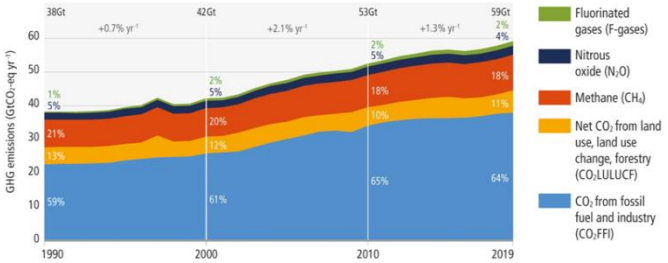
(ii) 12 countries' emissions peaked in the 2000s;[23]

(iii) 6 countries sustained reductions over a longer period since the 1970s;

(iv) 6 countries were members of the economies in a transition group where emissions dropped rapidly in the 1990s and continued declining at a slower pace thereafter;

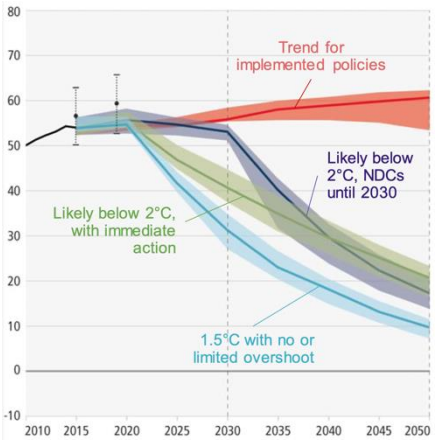
(c) These national emission reductions had been driven by both climate and non-climate policies and factors, including structural changes;

Figure 1(a): **Recent emission trends**



Source: IPCC WG III, figure SPM.1a, 2022

Figure 1(b): **Emission and implementation gaps**



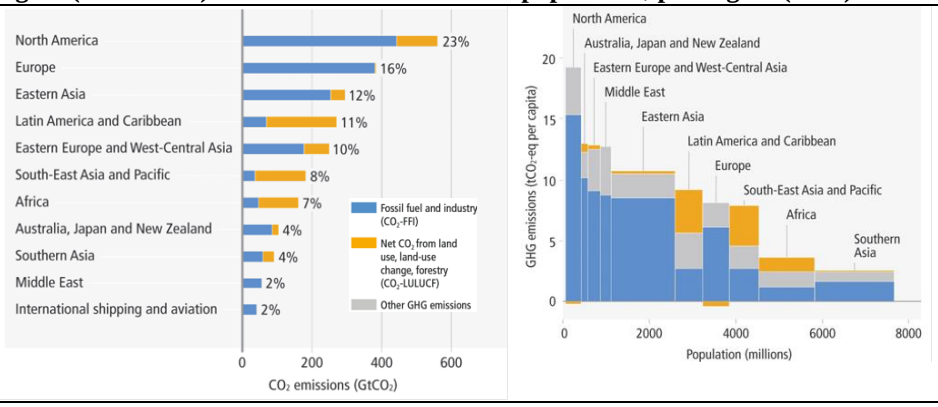
Source: IPCC WG III, figure SPM.4a

(d) Distribution of emissions, historically and in the present, in different regions (see figures 2(a) and 2(b) below), showed that GHG emissions are distributed unevenly, both in the present day and cumulatively since 1850. Emissions growth varied widely across regions and over time, and across different stages of development. Differences can be measured in absolute emissions or per capita (and other metrics, not shown here). Regional contributions to global GHG emissions continue to differ widely. Variations in regional and national per capita emissions partly reflect different development stages, but they also vary widely at similar income levels;

[23] Note that in order to achieve the long-term temperature goal set out in Article 2 of the Paris Agreement, Parties aim to reach global peaking of GHG emissions as soon as possible, recognizing that peaking will take longer for developing country Parties (Article 4.1).

Figure 2 (a): **Historical cumulative net anthropogenic CO_2 emissions per region (1850–2019)**

Figure 2 (b): **Net anthropogenic GHG emissions per capita and for total population, per region (2019)**



Source: IPCC WG III, figure SPM.2, 2022

(e) Global emissions and implementation gaps, and specifically gaps between implemented policies and NDCs based on the IPCC-assessed scenarios (see figure 1(b) above). To this end, projected global GHG emissions from NDCs announced prior to COP 26 would make it likely that warming will exceed 1.5 °C, unless more ambitious mitigation measures were implemented immediately, and also make it harder after 2030 to limit warming to well below 2 °C;

(f) System transformations are needed for achieving the indicated emission reduction levels, including for energy, land use, food systems, human settlements, transport and industry;

(g) Enabling conditions are required for implementing the NDCs, including: finance, policy and governance, technology development, deployment and transfer, and capacity-building. Mr. Skea noted that climate laws cover 53% of global emissions; regulatory and economic instruments have proven effective in reducing emissions; and 20% of emissions are covered by carbon taxes or trading systems;

(h) The unit costs of some forms of renewable energy (e.g. PV, onshore and offshore wind and concentrated solar power) and of batteries of electric vehicles have fallen rapidly. Deploying CO_2 removal would be required for GHG neutrality.

Figure 3: **Estimates of historical CO_2 emissions and remaining carbon budgets**

Global Warming Between 1850–1900 and 2010–2019 (°C)		Historical Cumulative CO_2 Emissions from 1850 to 2019 ($GtCO_2$)					
1.07 (0.8–1.3; likely range)		2390 (± 240; likely range)					
Approximate global warming relative to 1850–1900 until temperature limit (°C)[a]	Additional global warming relative to 2010–2019 until temperature limit (°C)	Estimated remaining carbon budgets from the beginning of 2020 ($GtCO_2$) *Likelihood of limiting global warming to temperature limit*[b]					Variations in reductions in non-CO_2 emissions[c]
		17%	*33%*	*50%*	*67%*	*83%*	
1.5	0.43	900	650	500	400	300	Higher or lower reductions in accompanying non-CO_2 emissions can increase or decrease the values on the left by 220 $GtCO_2$ or more
1.7	0.63	1450	1050	850	700	550	
2.0	0.93	2300	1700	1350	1150	900	

Source: IPCC WG III, figure SPM.4a, 2022

58. Mr. Joeri Rogelj, IPCC WG I and Grantham Institute, focused on emissions and implementation gaps. Four main findings were highlighted, as follows:

(a) Assessment results of contributions to warming showed that the observed warming in 2010–2019 relative to 1850–1900 was caused by well-mixed GHGs, and in particular the historical cumulative emissions of CO_2, and the current levels of CH_4 emissions;

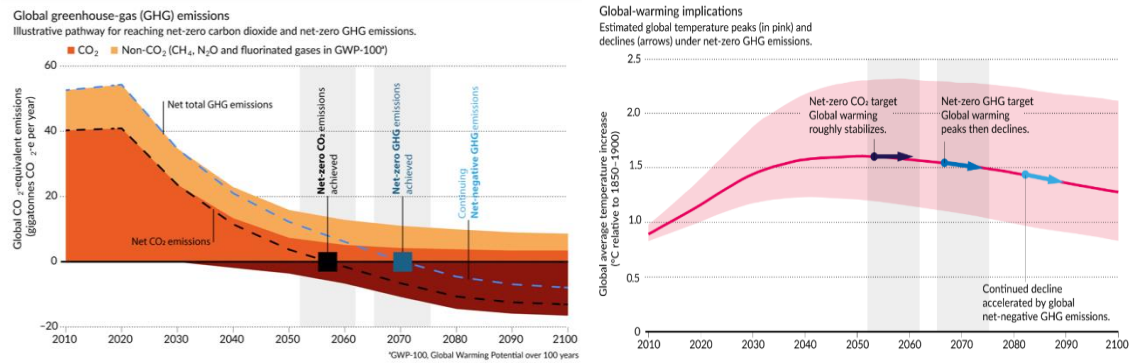
(b) Estimates of historical CO_2 emissions between 1850 and 2019 were 2390±240 Gt CO_2-eq, leaving small remaining carbon budgets to 1.5 or 2 °C, depending on the chance of exceeding a given limit;

(c) The choices and policy decisions that will determine the size remaining carbon budgets are: warming limit (e.g., 1.5, 1.7, 2 ºC); the likelihood of staying below that warming limit; and how successfully non-CO_2 warming can be limited through emission reductions (figure 3 above);

(d) From a physical science perspective, limiting human-induced global warming to a specific level requires limiting cumulative CO_2 emissions, reaching at least net-zero CO_2 emissions (see left grey bar in figure 4(a) below) resulting in global warming roughly stabilizes (see left grey bars in figure 4(b) below), along with strong reductions in other GHG emissions towards net-zero GHG emissions (see right grey bar in figure 4(a) below) resulting in global warming peaking and then declining (se right grey figure 4(b) below).

Figure 4 (a): **Illustrative pathway for reaching net-zero emissions CO_2 and net-zero GHG**

Figure 4 (b): **Estimated global temperature peaks and declines under net-zero GHG emissions**



Source: IPCC WG I SPM and IPCC WG III SPM, 2022

Discussions

59. Following the presentations, participants highlighted the significant mitigation and implementation gaps to modelled mitigation pathways in 2030 and beyond but noted that commitments by all countries since the adoption of the Paris Agreement (2015) have implied a decrease in the projected growth of global emissions.

60. On the remaining GCB, participants emphasized that much of the total GCB for limiting global warming to 1.5 ºC had already been depleted. Many highlighted that sharing the remaining small GCB needed to be viewed from the context of justice, fair share and equity. To this end, some Parties emphasized that historical emissions needed to inform such judgments and should preserve the right and ability to development and just transitions, through systemic transformation. Other Parties noted that while looking back at historical emissions was important, the conversation needed to be forward looking as well (e.g. where emissions were rising and where they were declining, and where their decline will be fastest) and emphasized that a cooperative approach is key.

61. Noting that emission reductions and highest mitigation pathways were needed at a global scale to remain within a GCB consistent with the 1.5 °C goal, and that such a pathway was beneficial at the global level, some Parties stressed:

(a) The need to look at the regional and local levels and pathways, which should be tailored to the circumstances with special focus on the local context;

(b) The fact that warming represented by IPCC pathways was not evenly distributed and affected some areas more than others, pointing to the need for just transitions;

(c) The need for CO_2 removal to meet emission targets, based on technological options for carbon capture and storage, as well as the limitations of those options. Participants discussed differences in technological readiness and risks, and the entailed potential benefits and adverse effects.

62. Participants stated that current carbon accounting tools were not fit for purpose, citing land and forest sectors, with one suggesting that the use of a new accounting tool from the United Nations Statistics Division improved the information base. Some participants

underscored the need to integrate local communities and indigenous peoples into decision-making around land and forest and the ways in which their knowledge was being considered.

63. A participant highlighted the role of businesses in raising ambition, action and implementation, and in contributing practical solutions and knowledge; the essential inclusion of workers; the importance of urban areas, noting the current, rapidly emerging and new cities; and that the electricity and power sector must be decarbonized, emphasizing that this can enable decarbonization of other sectors, such as transport and heating.

Expert panel 2 – Enabling transitions and strengthening the response

Presentations

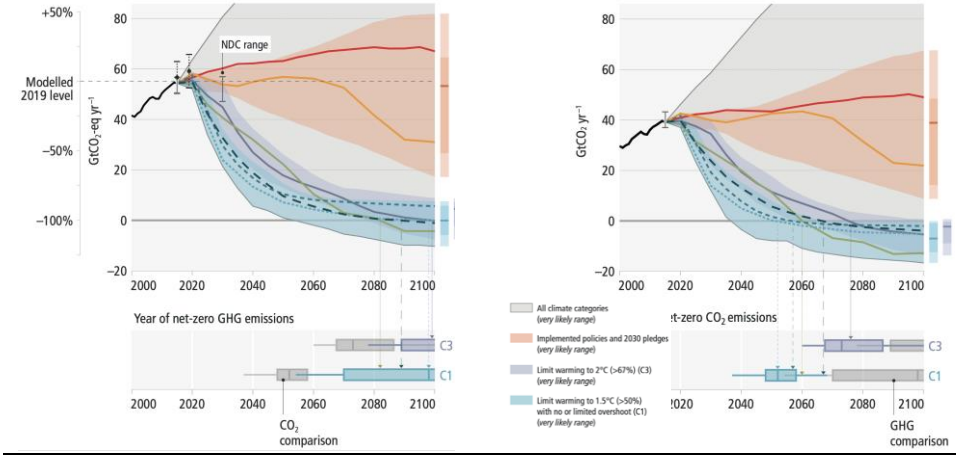
64. Expert panel 2 focused discussions on enabling transitions and strengthening the response and elaborated on mitigation options; embedding options within the wider development context; climate governance; policies and measures; international cooperation; response measures; and just transitions.

65. Mr. Chukwumerije Okereke, Alex Ekwueme Federal University of Nigeria, presented the shares of global GHG emissions under national climate change legislation in 2010, 2015 and 2020 by region (see IPCC WG III, figure TS.24) and highlighted the growth in the number of climate targets and climate policies (economic, regulatory and other instruments) across the world, as well as growth in climate laws.

66. He also highlighted the observed cost reductions of some renewable energy technologies, such as PV and wind energy, over the past decade and showed that their current levelized cost of electricity was within the range of fossil fuels. He used figures 5(a) and 5(b) below to show gaps remaining in global GHG emissions and global CO_2 specific emissions with regard to pathways resulting from implemented policies and 2030 pledges and pathways for limiting global warming to 1.5 ºC and 2 ºC.

67. Mr. Okereke illustrated the synergies among mitigation options in industry, transport, buildings, urban systems, AFOLU and energy systems and many SDGs but noted that such options may also have trade-offs, which vary depending on context and scale (see IPCC WG III, figure SMP.8).

Figure 5: **Modelled mitigation pathways that limit warming to 1.5ºC and 2ºC.**
(a): Net global GHG emissions (b): Net global CO_2 emissions

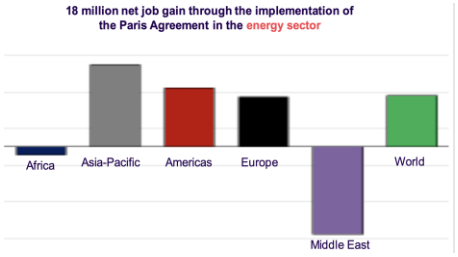


Source: IPCC WG III, figure SPM.5 (a-b), 2022

68. Mr. Okereke detailed the following criteria for assessing the effectiveness of international cooperation: environmental outcomes, transformative potential, distributive outcomes, economic performance and institutional strength. Inequality in knowledge production and asymmetry in access to technology were illustrated at the global level and at the regional level in Africa. The disparity in the voice and inclusion between countries and regions was highlighted, as well as the urgent need to close this gap. It was also stated that there was a need to amplify the voice of youth, indigenous communities and CSOs.

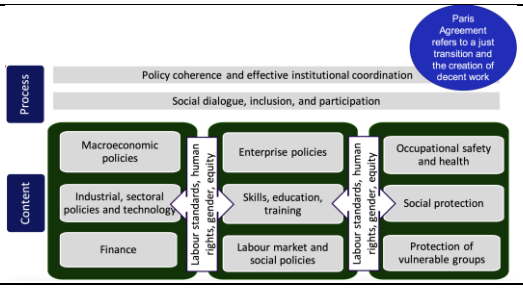
69. Mr. Kamal Moustapha, ILO, gave a presentation on just transitions and decent work creation for ambitious climate action, focusing on the socioeconomic impacts of climate action and enabling and inclusive transitions. He stated that ambition was about people and noted that the concept of just transition means making the necessary changes in economic and social systems that will lead to greater action on climate change, while not leaving anyone behind. He further noted that the net job gain projected in the energy sector, through implementation of the Paris Agreement, showed not only an overall increase but also regional differences in this labour market (see figure 6 below**).**

Figure 6: **Global and per-region socio-economic impacts of climate action**



Source: ILO, Greening with jobs – World Employment and Social Outlook, 2018

Figure 7: **A framework for a just transition**



Source: ILO, 2019

70. Mr. Moustapha made further reference to skills in a sustainable energy transition as an enabler for just transitions in the context of opportunities for job creation, as well as risks of losing current employment in several economic sectors, and emphasizing the need for skilling, upskilling and reskilling to enable smooth transitions in the labour market. For example, from the job creation potential in 2030 for a sustainable energy traction of 25 million jobs, 20 million will be new jobs requiring training and 5 million will be existing jobs that could absorb laid-off workers from the 7 million jobs at risk of destruction.

71. The need for inclusive transitions and bridging disparities, specifically the aspect of gender equity, in the context of jobs in a sustainable energy transition was also highlighted, noting that males were expected to be more affected by both creation (19 million) and loss of jobs (5 million), unless if specific policies were to be put in place to empower female participation in labour markets (for females 6 million jobs will be created and 2 million jobs will be lost).

72. A framework for just transitions towards environmentally sustainable economies and societies for all was proposed. As shown in figure 7 above, it focused on macroeconomic, sectoral and industrial policies, and noted the importance of the process, policy coherence and comprehensiveness, institutional coordination across governments, social dialogue, and inclusion and participation, and took into account human rights dimensions.

Discussions

73. Participants discussed the global implementation and ambition gap in the context of just transitions and noted the need for urgent action across all sectors to keep the 1.5ºC goal alive through a forward-looking approach. They stressed the great climate risks at higher global warming and stated that accelerated and equitable climate action was crucial to sustainable development, and discussed the need to avoid a mitigation-centric approach in addressing development and climate change, and that such an approach needed to balance mitigation with adaptation, loss and damage and means of implementation.

74. Participants emphasized that a systems transformation approach could be helpful in view of the linkages between sectors. It was further emphasized that the energy transition needed to be both ambitious and just. Implications of emission reductions at the international, regional, national and subnational level were highlighted, as well as the need for just transitions at all levels. NPS highlighted the need to incorporate the voices of indigenous peoples in just transition considerations and discussions.

75. Some participants highlighted that mitigation actions were tied to means of implementation and needed to be nationally driven and inclusive. In this context, participants

noted that just transitions will involve many sectors, depend on national and regional context and required skill development within and across sectors. Specific reference was made to the importance of just transitions as an enabling condition for increased ambition and the consideration of fairness and equity, as well as the need for transitions to be inclusive and transparent. Some participants highlighted the role of public awareness to support just transitions, and specifically the demand side measures for driving policy change.

76. Several participants noted that transformative change of collective emission reductions for achieving the 1.5 ºC target with just transitions will require financial support scaled up to USD trillions from developed to developing countries, as well as support through technology transfer and capacity-building. The roles of private finance and market mechanisms were also noted in this context, although views differed on the role and effectiveness of these instruments in providing ongoing support. The need for collaboration and support at the subnational level, taking into account respective local circumstances, was also noted by some Parties, including collaboration between local governments, as well as between cities worldwide. In this context, they noted that certain financial and institutional structures established by developed countries trapped developing countries in financial and technology debts and dependencies.

77. Reference was made by some Parties to carbon budgets in the context of equity, noting that developed countries should take the lead on reaching net-zero emissions faster, while recognizing the right of developing countries to have a policy space for sustainable development through trade-offs. Some Parties stated that equity was not yet operationalized with regard to future action and carbon budget and that there was increasing pressure on developing countries to achieve the same ambition as developed countries. It was noted by a Party that pushing developing countries to become carbon sinks without support in reducing their emissions was shifting the burden to developing countries.

78. Participants emphasized the importance of implementing NDC commitments and discussed the phase-down of fossil fuels, stating that all Parties should develop pathways towards lower emissions and equity. Some Parties suggested discussing the timeline for the transition from fossil fuels and the need for synergies with other processes and noted that the GST can help to identify what to do and how to do it and can build on success stories.

79. Several specific policy measures were suggested for enhancing transitions, through a combination of taxation and incentives, including increases in carbon tax and other measures to incentivize innovation, noting that it was possible for this to lead to technology development and reduction in emissions and that setting a tax on emissions ensured they were reduced where it was cheapest to do so.

80. Other specific proposed policies cited included, agricultural CH_4 and waste reduction; development of new clean energy industry and decarbonization of existing industry and reskilling the workforce to focus on clean energy transition. It was also emphasized that concrete measures needed to be adapted to the local context.

81. Regarding carbon accounting, some NPS noted the importance of biodiversity and natural resources in the lands and territories of indigenous peoples, and noted that disaggregated data by ethnic group or even indigenous group were missing for national action around carbon accounting.

82. International cooperation was noted by many as critical to keeping the 1.5 ºC target alive, while ensuring that no one was left behind. An environment of cooperation, solidarity, reciprocity and complementarity between developed and developing countries, as well as recognition of national circumstances, were cited as essential to just transitions.

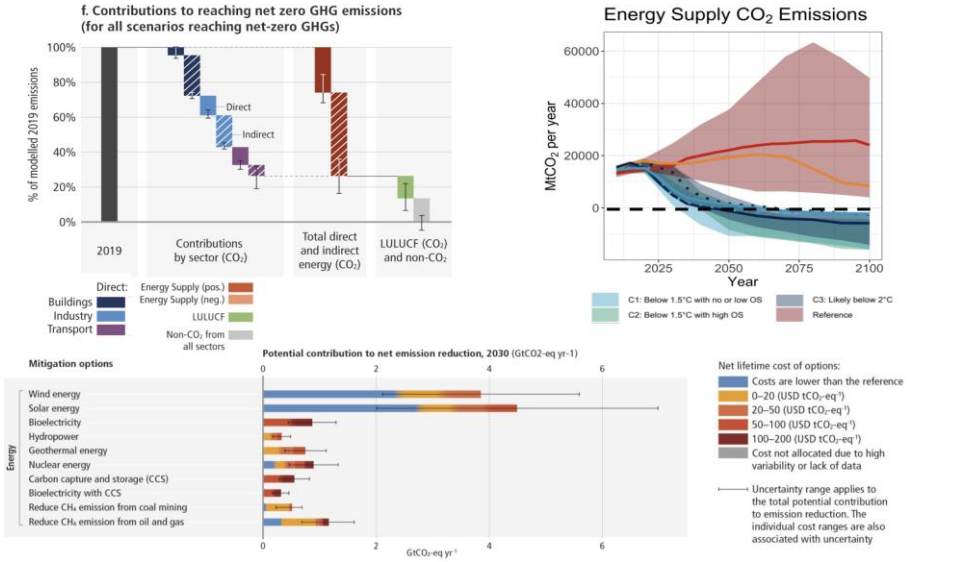
Expert panel 3 – Emissions and pathways

Presentations

83. Expert panel 3 on emissions and pathways focused on historical and current emission trends; removals by sinks; emission projections based on current NDCs; pathways and carbon budgets consistent with the temperature goals of the Paris Agreement; and near-term mitigation targets, including for non-CO_2 GHGs.

84. Mr. Matthew Gidden, IIASA, presented the key characteristics of sustainable and fair transition pathways to limit global warming. Mr. Gidden mentioned several emission pathway scenarios categorized on the basis of the probability of holding warming below a specific temperature limit, showing that even following the stringent mitigation pathways, there was a risk of substantially higher warming than the target. However, this risk could be minimized through deeper emission reductions over the next decade. According to these model pathway, CO_2 and non-CO_2 GHG emissions should peak sometime before 2025 and will be reduced by 2030 or 2040 (see figure 5 above). The CH_4 reductions can contribute to keeping peak warming levels as low as possible, but only if performed in conjunction with strong and immediate reductions in CO_2.

Figure 8: **System transformation towards net-zero**



Source: IPCC WG III figure SMP5f and 7 (abridged), figure 3.18

85. Figure 8 shows that rapid and deep GHG emission reduction pathways were enabled through an equally strong transition for global energy consumption and production in various sectors. The pathways provide estimates of energy system transformation, including on: carbon intensity of electricity supply; year of net-zero electricity; reduction in unabated fossil fuels by fuel type; uptake rate of novel fuel types, such as hydrogen; and carbon-free share of total primary energy generation. Indicators most appropriate to measure progress towards the Paris Agreement goal will depend on the regional circumstances and GHG-emitting sectors of each country. Mr. Gidden noted that solutions for decarbonizing energy and several other key sectors were readily available and cost-effective. Primary energy from non-biomass renewables, on the other hand, were more likely to grow faster.

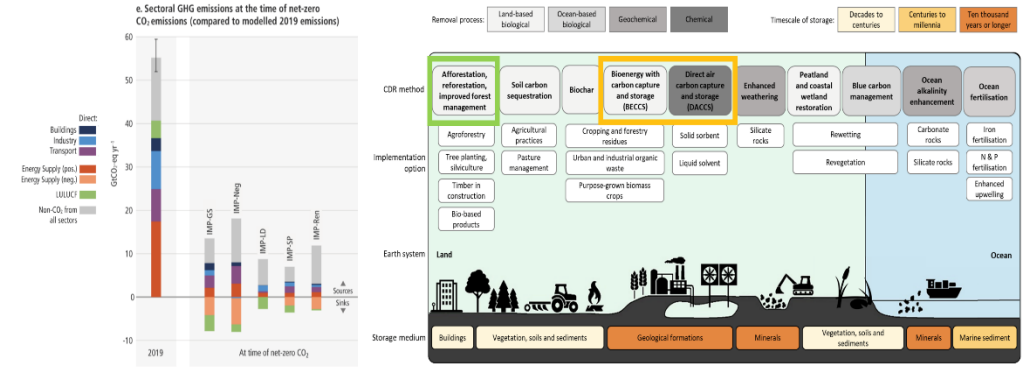
86. Mr. Gidden presented different mitigation strategies across sectors in order to achieve net-zero carbon emissions, including gross residual emissions, as well as net removals of CO_2 from the atmosphere. All mitigation pathways included CDR to some degree to arrive at net-zero CO_2 emissions in conjunction with deep mitigation across all GHG emissions. Multiple options for CDR existed at different technological readiness levels and have different co-benefits and trade-offs with sustainable development (figure 9 below).

87. Ms. María José Sanz Sánchez, Basque Centre for Climate Change, presented on nature-based CDR in long-term strategies. Ms. Sánchez focused on nature-based solutions and the AFOLU sector (i.e. forest and soil sinks, blue carbon, biochar and harvested wood products). It was noted that the technological CDR solutions were not yet operational, and therefore there was much focus on nature-based solutions of carbon sequestering through the environment, forest and soil, to help evade residual emissions.

88. Historical emissions of the AFOLU sector were shown to have contributed around 20% and sequestered around a third of global total anthropogenic GHG emissions in the past decade. In several regions, this was the largest emitting sector with 74% of the sector's emissions from land-use change and CH_4 emissions from enteric fermentation. The AFOLU

sector and its emission impacts were closely tied to global supply chains with strong links to food systems.

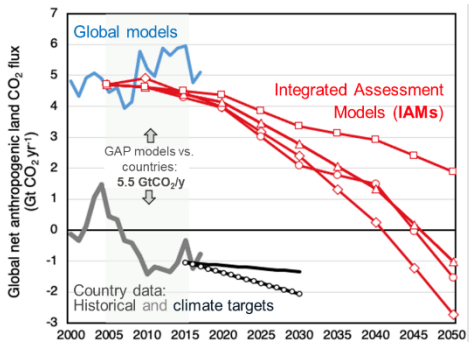
Figure 9: **Net-zero and CO_2 removal**



Source: IPCC WG III figure SMP5e, Cross-chapter box 8, figure 1

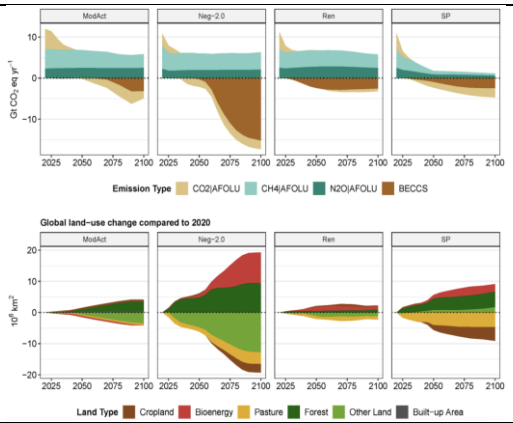
89. Global models of estimated AFOLU emissions (see figure 10 below) showed that the net CO_2 fluxes from land reported by the global bookkeeping models used were estimated to be about 5.5 Gt CO_2 yr-1 higher than the aggregate global net emissions based on national GHG inventories. However, limitations of the modelling methodology used were highlighted, noting that there was still a large uncertainty, particularly of the sector's CO_2 emissions.

Figure 10: **Global models of estimated AFOLU emissions**



Source: ILO, Grassi et al. 2021

Figure 11: **AFOLU IAM pathways**



Source: IPCC WG III, 2022

90. AFOLU IAM pathways (see figure 11 above) showed significant near-term mitigation potential at relatively low cost, but they could not compensate for delayed emission reductions in other sectors. IAM pathways relied on afforestation and bioenergy with carbon capture and storage as CDR measures for substantial reductions in CO_2 emissions, and modest reductions in CH_4 and N_2O emissions. It was noted that AFOLU mitigation options did not continue to sequester carbon indefinitely, as there could be a saturation effect. In the very long term (latter part of the century and beyond) sinks could diminish or even become sources.

91. Ms. Sánchez further showed global and regional mitigation potential for 20 land-based measures based on a comprehensive literature review of sectoral studies, concluding that synergies and co-benefits, and trade-offs, should be considered in the selection of measures for the AFOLU sector. She noted that for forests, largest economic potentials are by reducing emissions from deforestation and forest degradation followed by afforestation. For agriculture, soil management has a mitigation potential. The selection of mitigation measures depends on varying economic, political, institutional, social, cultural, environmental, and physical barriers, offering a potential to address both causes and consequences of climate change. It was noted that other services, like supporting biodiversity and securing the flow of ecosystem services for human well-being, also need to be taken into account.

Discussions

92. In the context of just transitions, many participants noted the need for actions across the full spectrum of stakeholders, including Parties, NPS, subnational entities, communities, indigenous peoples, youth, women and others. They also noted that strong safeguards will be needed to ensure that human rights are considered at all stages.

93. Parties have suggested that countries will require different timelines, energy mixes, and social and economic approaches to address transition. With regard to the social dimension of just transitions and to maximize the opportunity to enable fair transformations, participants stressed the need to factor in the information about the consequences of actions taken for reduced emissions on jobs, investments and trade was specified, as well as the need to disaggregate these data by factors such as gender, race, indigenous peoples and regional factors.

94. Referencing several countries as case studies in the context of investments, it was mentioned that drivers of the green revolution included some rare earth elements and strategic minerals, for example, from Africa, which sold at a very low cost, with enormous beneficiation elsewhere. Specific examples of energy transitions were provided, including at the regional and national level, such as for Latin America.

95. Participants highlighted the importance of sharing knowledge and experience and, in particular, success stories, as well as barriers and challenges confronted, measures taken, and legal instruments plus the support needed for technology transfer and best practice solutions.

96. Participants emphasized the need for a holistic approach, making use of partnerships and collaborating for enhancing just transitions to reducing emissions, including in sharing knowledge for setting the targets. Response measures were also discussed and the need to factor it on the basis of equity, historical responsibilities, and the different national circumstances and, in particular, the right of Parties to sustainable development, including the right for their own policy space. Some Parties emphasized that climate policies needed to be comprehensive, guided by binding climate targets and embedded in strong societal support, cooperation and climate governance. Such policies will thus enable mitigation by providing an overall direction, setting targets, mainstreaming climate action across policy domains and enhancing regulatory certainty.

97. Participants highlighted the importance of multi-level governance as a way to build consensus and capacity for climate action and foster social inclusion, as well as find ways to ensure that climate policies are mutually reinforcing. It was further noted that in preparing policies, there was no one size fits all solution.

98. The need for more information on specific sectors and enabling actions (e.g. CH_4 emissions in agriculture, energy sectors, renewables) was noted. Participants also noted the need to include justice and sustainable development, including consideration of related trade-offs for both short-term and long-term pathways, and to take into account equity considerations related to response measures (e.g. impact of energy-related inflation and security). Several impacts of long-term pathways and strategies of energy transitions were also mentioned within the context of just transitions, including on job losses and changes, investments and world trade.

99. Participants exchanged views on different options for CDR, such as land-based and technological involving carbon capture and storage. They discussed differences in technological readiness, risks and the potential for both co-benefits and adverse side-effects and noted the increased importance but also limitations of CDR in the context of net-zero emission targets and the small size of the remaining GCB. They also highlighted the importance of nature-based carbon sinks and the role of natural ecosystems in carbon sequestering. However, the need to accelerate the development of technologies and to provide more information on the potential of nature-based CDR was emphasized.

100. Participants discussed the role of the AFOLU sector, noting both the associated risks and opportunities for mitigation. The potential of action in the AFOLU sector and LULUCF activities was further discussed. Participants highlighted the need for more data to reconcile discrepancies between models and national inventories, in particular, on LULUCF, including the need for synergies in LULUCF, agriculture, forest management and other land uses.

101. Participants shared opportunities in the land sector for offsetting emissions, with some activities having immediate and significant impacts, such as avoided deforestation. They pointed out that such actions can also generate valuable co-benefits such as biodiversity conservation or watershed protection. Other participants noted that the land sector was key to reaching net-zero targets, so more work should be done to see how this sector can best contribute.

102. Some participants suggested that when designing mitigation policies involving the land sector, the inclusion of those directly using/managing the land – from farmers to indigenous peoples – was seen as key to ensuring appropriate policy responses. It was suggested that green products, such as fibre biofuels, and services will have carbon credits attached to them which will then be used by developed countries to compensate for their emissions so that carbon credits would not transfer pollution rights, but rather green products and environmental services can be exported from developing countries to be used to offset emissions of developed countries.

103. The need for more data and information was highlighted for preparing national GHG inventories to reconcile models and their disparity with national inventories, as well as irreversible effects, such as the impact of the glacier melt.

104. The permafrost thaw was highlighted, as well the need for more information on the impacts of the glacier melt, and irreversible impacts and tipping points, with these identified as an area for requiring further scientific research to better understand linkages with projection scenarios.

3. Summary of round table 2: Adaptation, including Loss & Damage

105. Round table 2 took stock of the implementation of the Paris Agreement to assess collective progress towards the global goal for adaptation (Article 7.1 of the Paris Agreement), of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal referred to in Article 2.1(a) of the Paris Agreement. It also considered increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low GHG emissions development in a manner that does not threaten food production (Article 2.1 (b)). Discussions at the round table also took into account efforts related to averting, minimizing and addressing loss and damage associated with the adverse effects of climate change.

Expert panel 1 - Key findings from the IPCC WG II relevant for the GST

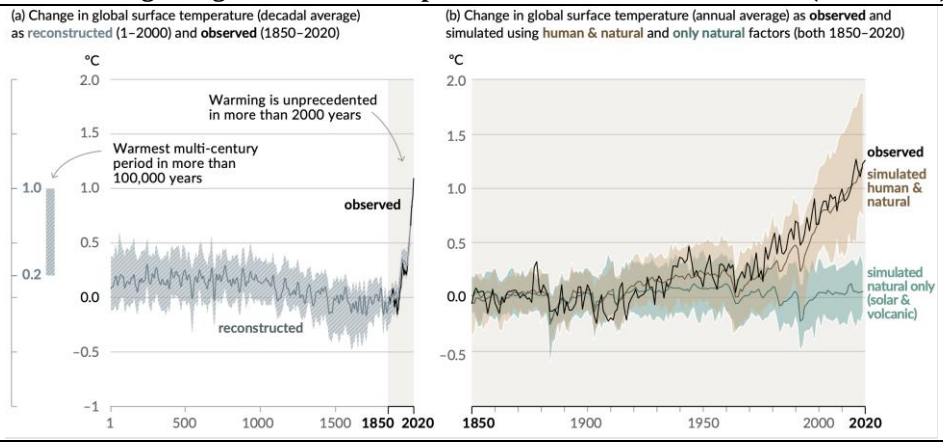
Presentations

106. Expert panel 1 focused discussions around key findings from IPCC WG II that were relevant to the GST, including observed impacts and projected risks; human and natural systems; adaptation practices and opportunities; the relationship between scenarios of global warming levels and global and local adaptation needs; and loss and damage.

107. Mr. Gregory Flato, IPCC WG I and Environment Canada, gave a presentation on the IPCC WG I contribution to AR6, focusing on quantifying climate impacts and projected risks. Using figure 12 below, Mr. Flato showed that human influence has warmed the climate at a rate that was unprecedented in at least the last 2,000 years. Mr. Flato highlighted the changes in global surface temperatures since 1850 in comparison with previous periods and compared simulated natural warming with observed and simulated warming through both natural warming and human influences – primarily the burning of fossil fuels and land-use change.

108. Mr. Flato stated that climate change was already affecting every inhabited region across the globe, with human influence contributing to many observed changes in weather and climate extremes, using the examples of an observed increase in extreme heat events in magnitude or frequency, and in an observed increase in heavy precipitation events (see IPCC WG I, figure SPM.3a-b).

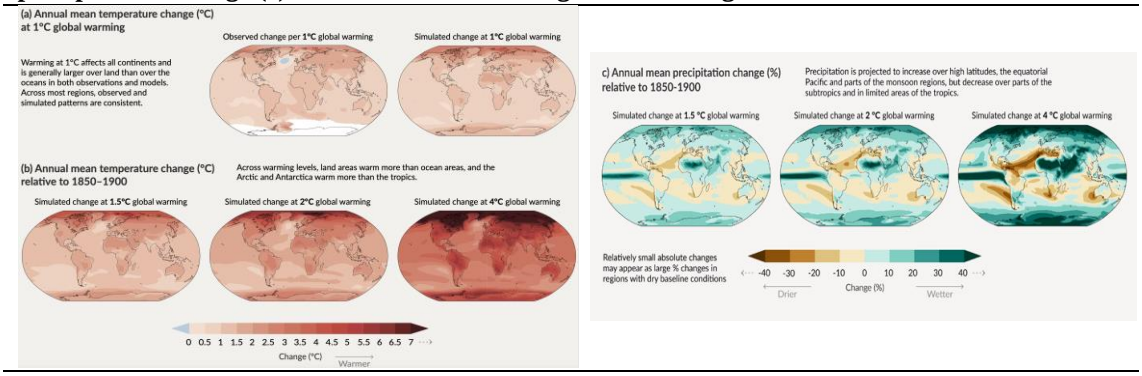
Figure 12: **Changes in global surface temperature, observed and simulated (1850–2020)**



Source: IPCC WG I figure SMP.1, 2021

109. Mr. Flato provided projections of annual mean temperature change and annual mean precipitation change, relative to 1850–1900, in several scenarios of global warming, underscoring that with every increment of global warming these changes get larger in all continents (figure 13 below). He highlighted the considerable regional differentiations that existed and the consistent pattern of higher rates of warming over land than over ocean, noting that they were larger over the high latitudes and the Arctic than in the tropics. Similar trends were quantified for a wide range of climate impact drivers, where changes in the physical climate system are related to changes in impacts and constitute the hazards that drive increasing risks.

Figure 13: **Projections of annual mean temperature change (a and b) and annual mean precipitation change (c), in several scenarios of global warming**



Source: IPCC WG I figure SMP.5a-c, 2021

110. Mr. Flato further noted that climate impact drivers were associated with increases in loss and damage in various places and constituted hazards that drive increasing risks. These drivers were categorized as hot and dry, wet and dry, coastal, open ocean, etc', and they feed directly into the quantification of risks by IPCC WG II. He referenced IPCC WG I's Interactive Atlas,[24] which provided a wealth of historical and future quantitative information. Other regularly updated sources of physical climate information were also mentioned, including, the WMO State of the Global Climate annual reports; the WMO Greenhouse Gas Bulletin with annual GHG concentration and emission summaries; and the Copernicus Marine Service Ocean State Report.

111. The presentation of Mr. Hans-Otto Poertner, Co-Chair of IPCC WG II and Alfred Wegener Institute, focused on common climate and adaptation goals (where do we stand and what is needed) on human and natural systems, drawing on the IPCC WG II. He started with reflections on developing a uniform common goal on adaptation, considering equity and justice, noting that the current imbalance with respect to climate was caused by human society and, in parallel, has direct impacts on human society and on ecosystems and biodiversity. Aiming for a sustainable future required strengthening the positive interactions between human systems and ecosystems as well as stabilizing the climate system. The

[24] https://interactive-atlas.ipcc.ch/.

challenge is to develop a common language and metric to measure adaptation success within CRD (e.g. risk levels and reduction following IPCC risk assessments), and develop a uniform common goal on adaptation, considering equity and justice, with risk-level reduction serving as a possible entry point (e.g. keeping risk levels at moderate levels or below across regions and sectors, indicators or CRD).

112. Adaptation needed to be formulated with respect to risks of climate change, concerning natural systems, the biosphere and human systems (e.g. heat-induced habitat change and loss for species and humans). The sixth mass extinction event in history with similar or related mechanisms governing the loss of wildlife, human and livestock habitats with societal consequences had commenced, with regional vulnerability due to overlapping challenges and the effects of compound risks.

113. The need to quantify to what extent adaptation capacity and limits had improved by poverty reduction, equity, justice and resource distributions, and to integrate different knowledge systems towards CRD in in individual sectors, in parallel with avoiding maladaptation.

114. A quantitative analysis at regional scale, based on risk assessment that took into account the environmental hazards, the exposure to them, and human society vulnerability, showed that human vulnerability was especially high in the lower latitudes (mainly in Africa), and not necessarily related to population density. He said that adaptation can reduce risk, through physical, ecological, technological, economic, political, institutional, psychological and social and cultural activities, but in a limited manner.

Figure 14: **Comparison of global risk assessments**

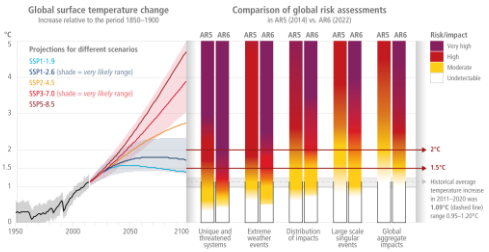
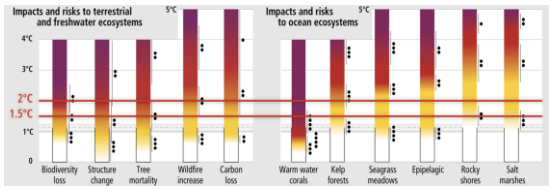


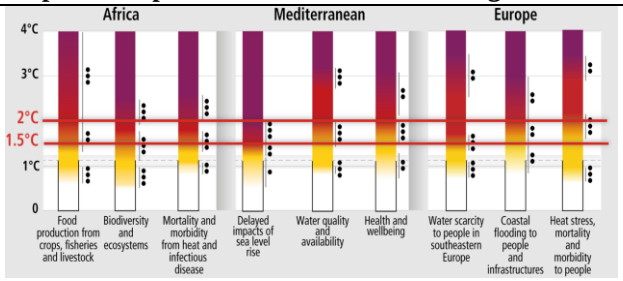
Figure 15: **Global impacts and risks to different ecosystems**



Source: IPCC WG II, figure SPM.3 and AR5, figure SPM.1

115. Regarding **the evolution of the climate risks, he demonstrated, using the burning embers diagram, that risks were developing sooner than previously assessed depending on the warming scenarios and time (figure 14 above).**

Figure 16: **Specific impacts and risks in different regions**



Source: IPCC WG II figure SMP.3, 2022

116. 127 global and regional key risks were identified and systematically categorized and highlighted some examples of key risks for SIDS. The risk assessment took into account the environmental hazards, the exposure to them, and human society vulnerability. Figures 15 and 16, illustrating global and regional environmental risks in both terrestrial and freshwater ecosystems and ocean ecosystems, provide orientation for adaptation and mitigation action and show that risks can be kept moderate more often by keeping global warming below 1.5 °C rather than 2 °C, while some ecosystems were already at a very high-risk level (e.g. warm water coral reefs).

117. Mr. Poertner noted, by comparing quantified climate risks of the Arctic and Antarctic systems, that critical risk levels to sea ice ecosystems, marine mammals and seabirds had been or were about to be surpassed in both systems, although the risk to the Antarctic was lower owing to its relative isolation.

118. Mr. Poertner emphasized the importance of closing the adaptation gap across systems and stated that this can be based on spatial planning. In this context, he highlighted actions such as strengthening the biosphere and human resilience, developing and implementing spatial planning of mosaic scapes for freshwater, marine, terrestrial and urban systems, considering the spatial needs of species and ecosystems for self-sustaining biodiversity, species compositions, ecosystem services and optimization of protected, shared and heavily used spaces with species migration corridors.

119. He noted the need to integrate conservation, climate and societal actions for CRD, including by effective and equitable conservation and restoration of approximately 30–50% of land, freshwater and ocean ecosystems that can help ensure a healthy planet.

120. The co-benefits of adaptation options to mitigation and SDGs were also presented, including in the context of forest ecosystems and the need to develop risk and adaptation trajectories within CRD was also emphasized.

Discussions

121. Participants discussed the findings, highlighting the urgency of adaptation, noting that adaptation gaps continued to grow and that any delay in action may close the window for implementation. Participants emphasized that adaption success depended on mitigation. Reference was also made to loss and damage. Participants noted that risk levels were derived from the change in systems and that risks also change with adaptation measures, which tackled risk drivers and that therefore it was important to keep more adaptation options open. In this context, loss of biodiversity was highlighted as a key risk.

122. In their interventions, several groups of Parties echoed the importance of CRD pathways, which are development trajectories that successfully integrate mitigation and adaptation actions to advance sustainable development.

123. Participants further explored methods for enhancing knowledge and understanding, measuring and quantifying key aspects of adaptation efforts and risks, including for:

(a) Defining the GGA;

(b) Collective progress and aggregated understanding on adaptation and towards the GGA and as based on future impacts and risks;

(c) Methods to enable aggregate information;

(d) Adaptation needs under different scenarios;

(e) Quantifying climate action;

(f) Assessing gaps, e.g. in implementation, finance availability and access;

(g) Assessing adequacy and effectiveness of adaptation action and support; and

(h) Measures for assessing resilience (beyond assessing aggregate risks).

124. A Party referenced the burning embers diagrams (see figures 14–16 above) as an entry point for discussion on quantitative risk measures and adaptation measures. Participants emphasized the need to measure equity and justice in the context of climate risks, adaptation and action. It was highlighted that gender and other inequalities had a compound effect on vulnerability to impacts. The linkages between the GST and GlaSS work programme were also mentioned, with some participants indicating interest in a contribution to assessment of the GGA in the GST.

125. Participants noted barriers and gaps that limit understanding of these areas, including:

(a) Limited data availability, e.g., in Africa and Latin America;

(b) Limited distribution of early warning systems across the world, with gaps in developing countries;

(c) Inequality and poverty;

(d) Limited consideration of gender information;

(e) Significant limitations posed by the challenges in modelling complex risks;

(f) Increasing transboundary risks across many sectors; and

(g) The time lag between planning for adaptation and reaping its benefits, which can greatly exceed its costs.

126. A Party noted that adaptation measures can reduce damages and contribute to reduced costs of climate change impacts and stated that investments today will contribute much more to preventing damages and costs in the future. The costs of inaction were highlighted.

127. Participants shared solutions for enhancing knowledge for adaptation, including semi-quantitative methods for considering vulnerability; considering gaps between policy formulation and implementation; the use of metrics currently applied by climate funds as orientation; and WMO's efforts to enhance monitoring networks and expansion of satellite monitoring.

128. Participants noted that indicators can be used for measuring the effectiveness of adaptation, e.g., for agriculture, coastal and water sectors. The need for local measures to reduce biodiversity loss risks was also mentioned, in particular, in the context of marine and coastal biodiversity loss.

129. Participants discussed finance aspects of economic and societal risks, including impacts on food production citing greater impact on LDCs. Gaps in finance for adaptation and for reducing risks were highlighted, as well as those in technology development and transfer and capacity-building for adaptation and risk assessment, governance and institutional and policy constraints.

Expert panel 2 – Adaptation pathways

Presentations

130. Expert panel 2 focused on adaptation pathways, including: current state of adaptation efforts; measuring progress on adaptation; decision making options for managing risks; sustainable, climate-resilient, and low emissions development pathways; opportunities, enabling conditions and good practices for near-term adaptation action.

131. Mr. Anand Patwardhan, University of Maryland, gave a presentation on framing the GST: approaches and options. He stressed the following framing statements for the stocktake on adaptation:

(a) What we are adapting to is not certain (goals and destinations, climate scenarios, GGA);

(b) What it means to be 'adapted' is not clear (process outcomes, a large range of possible climate futures, GGA);

(c) We do have a better understanding of what makes us vulnerable (risk management perspective);

(d) To get where we need to be, we need better NAPs, MOI; and

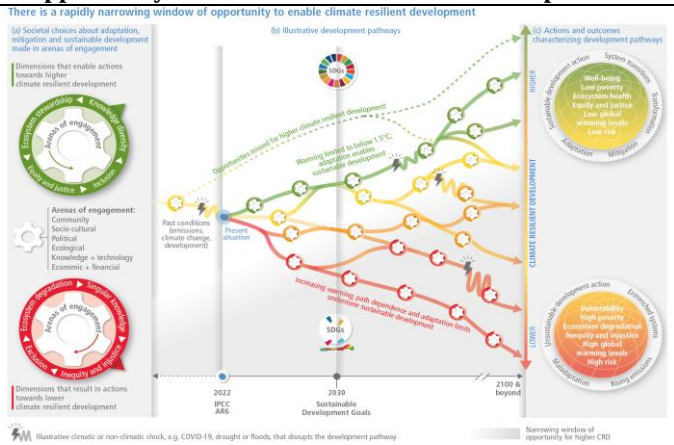
(e) Adaptation as a process of iterative risk management (focus on the process and the pathway).

132. Mr. Patwardhan showed that there was a rapidly narrowing window of opportunity to enable CRD and illustrated the notion of pathways and a long-term process of iterative risk management with choices along the way (figure 17 below).

133. Mr. Patwardhan explored aspects of the GST, including its purpose; parameters; and process (figure 18 below). The purpose is to assess progress, inform action and learn. He elaborated on parameters (what are we taking stock of) using an adaptation theory of change. He started by pointing to the measurement of needs, including: climate impacts and hazards; scenario-dependent biophysical and socio-economic risks; market and non-market costs;

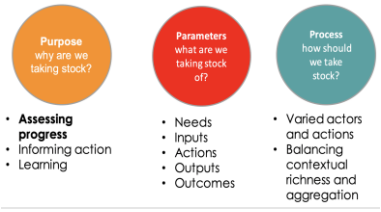
benefits (avoided loss, economic benefits, social and environmental benefits); and loss and damage.

Figure 17: **Illustration of the rapidly narrowing window of opportunity to enable climate resilient development**



Source: IPCC WG II figure SMP.5, 2022

Figure 18: **Aspects of the GST**



Source: Round table 2 presentation

134. He then turned to the measurement of inputs, including: NDCs; MOI; tracking finance (mobilization, access, and delivery); and, enabling activities. In this context, he detailed that the taking stock of NDCs through structured qualitative content analysis could serve as an example that was analysed through four high-level categories – context, goals, implementation attributes and actions, and also looking at the evolution of specific NDCs, in dimensions covered.

135. Mr. Patwardhan continued by focusing on the measurement of outputs and outcomes, including process and final outcomes to assess if the world was doing the right thing. These include measuring impact on the well-being of the identified risks from climate change: nature of impact (e.g., economic, psychosocial); extent of impact; and depth of impact.

136. He concluded the presentation with several reflections on the complexity of measuring adaptation; considering a range of metrics that could be assessed over a period of time; the importance of a learning approach; the need to balance retaining contextual richness with aggregation; and the importance of co-producing adaptation metrics with stakeholders, practitioners and knowledge holders for greater legitimacy.

137. The second presentation was given by Ms. Anne Hammill, IISD, on national adaptation planning and focused on NAPs and other planning processes, especially in developing countries in Africa, LAC, Asia-Pacific and Eastern Europe. The information was based on a recently launched website of the NAP global network,[25] which was frequently updated with new NAPs and focused on sectoral priorities, from planning to implementation, tracking and measuring progress, gender and social inclusion, and institutionalization of adaptation.

138. At the time of the presentation, 36 NAPs from the 154 developing countries had been communicated to the UNFCCC and 129 out of 154 countries had NAP processes underway, with most NAPS from Africa followed by Latin America and Caribbean regions. It was noted that these numbers did not reflect the full scope of efforts underway in countries in their national adaptation planning. She stated that priority sectors for adaptation that were repeatedly identified in the NAPs were: (1) agriculture (crops, livestock, food security); (2) water and sanitation; (3) health; (4) ecosystems and biodiversity; and (5) infrastructure. Some countries chose to use sectors as an organizing framework for addressing adaptation priorities, while others were taking a more integrated approach around identified strategic objectives or programmes.

139. Figure 19 below illustrates the transition from planning to implementation and the plan's translation into action to reduce vulnerability, build resilience and build adaptive capacity. It was noted that some NAPs included information regarding implementation, such

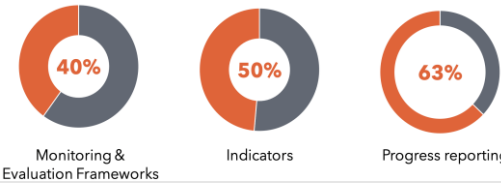
[25] https://trends.napglobalnetwork.org.

as the implementation plans, costing and chapters and strategies on financing. There were also requests from countries after submitting a NAP for help with planning their implementation. The implementation of a NAP involves much more, e.g., communication and outreach activities, translating and socializing the NAP across government, with partners, and identifying investment priorities, as well as mainstreaming the NAP priorities into core development plans and processes, project preparation and design and the development of different types of associated capacities and costs for the transition from planning to implementation.

Figure 19: **Illustration of the transition from planning to implementation**

Source: NAP Global network

Figure 20: **Tracking and measuring NAP progress**



Source: IPCC WG III, 2022

140. Ms. Hammill noted that some NAPs had significant sections about developing an M&E framework for tracking, measuring and reporting progress on adaptation, with relevant indicators identified, and with 63% of the NAPs including a commitment to progress reporting (figure 20 above). Moreover, there had been a surge in demand for capacity-building to measure progress. Learning was at the core of a lot of adaptation efforts in countries.

141. With regard to gender equality and social inclusion, she stated that there was a greater acknowledgement of gender responsiveness in recent years with more NAPs shifting from gender-sensitive language to gender responsiveness and positioning women as agents of change in a proactive approach. These improvements were also reflected in institutional arrangements for coordination and implementation, as well as more openings for intersectional approach, including human rights and empowerment.

142. Regarding institutionalizing adaptation and embedding it into decision-making by governments, several aspects were mentioned, including: cross-government coordination and collaboration, through inter-ministerial steering committees, national commissions, memorandums of understanding between ministries, etc., and considering whether these structures can be kept alive after the plan had been implemented; links between national and subnational levels to reflect local needs and experiences and sharing enabling frameworks locally and between national and regional levels for regionalization of NAPs with a focus on transboundary and cascading risks and possibly using NAPs as instruments for enhancing international cooperation; and mainstreaming for CRD, including of NAPs into subnational planning as a basis for budgets, legislation and resourcing gaps.

Discussions

143. Participants shared detailed examples of national adaptation efforts, including sectoral ones while highlighting several elements, as conducive to successful adaptation efforts. These elements included good institutional coordination and governance; inclusive stakeholder engagement and capacity-building; participatory planning processes, and addressing local level priorities; local and regional synergies; mainstreaming and integrating adaptation into sectoral and agencies' adaptation plans; developing youth-driven just transitions; consideration of transboundary dimensions and collaboration; NBS as key for

adaptation;[26] 'no regrets' measures; deployment of early warning systems; resilient infrastructure; sectoral risk analysis; and disaster risk reduction.

144. A Party mentioned specific adaptation actions that could enhance resilience that were reflected in their updated NDC, including early warning, infrastructure and city design, and actions with mitigation co-benefits (e.g., wastewater management, green protection, tree planting and combating desertification).

145. Priority sectors were highlighted by another Party as key adaptation areas, emphasizing that support needed to be designed holistically, considering links between food systems; food networks across regions to ensure adjustments in food disruptions; smooth instability of supply; improve agroecological health; improve ability for regenerative food production; and related capacity-building. A Party mentioned having a resilience working group focusing on infrastructure, public health and biodiversity among other priority areas. The consideration of equity and rights were highlighted by many as particularly important for adaptation, including aspects of gender equality and social inclusion.

146. The importance of NAPs as a key planning instrument was highlighted with several Parties describing the status of their NAP, as well as the challenges they had encountered and some good practices. Data and information gaps were emphasized as central to limiting action, especially in LDCs and SIDS. A NPS highlighted the need to consider non-economic impacts, including social and cultural impacts and differential vulnerabilities. Participants also reflected on how links between the GGA, the GST, and national adaptation frameworks, including the NAPs could be strengthened. There was interest to explore potential indicators in this regard, to draw lessons from the NAP process to inform the GGA and link NAP priority sectors more closely with the GGA, as well as to establish a space for closed interaction between consideration of the GGA and the GST.

147. As possible sources of methodological information, IPCC reports were highlighted, as was the United Nations Environment Programme Adaptation Gap Report with four dimensions of risk, planning, implementation and finance, and addressing the gap between planning and implementation. Some also highlighted existing relevant international efforts on assessing progress, in particular, towards the GGA and emphasized the importance of drawing on such efforts to assess progress in adaptation.

148. Some participants highlighted existing gaps in action and inadequacy of support, in particular, considerable challenges with accessing funding for NAPs and for adaptation implementation. Parties emphasized the need to identify what additional resources were needed to support countries to transition from planning to implementation.

149. Participants cited examples of natural systems with high risks and impacts, including areas such as coral reefs and mountain glaciers where the risks of irreversible losses were particularly high:

(a) A Party highlighted the example of mountains with high risk but low financial and structural capacity, in particular, in the Global South and mentioned solutions such as mountain-lands approach that prioritized resilience solutions, including a low-carbon green economy (transport systems); sustainable waste management systems; biodiversity conservation; countries that had pledged to build resilience mountain infrastructure; national and local stakeholders engagement and capacity-building; funding for mountain communities through engaging the private sector; domestic planning and M&E; and geopolitical commitment. The impacts of mountainous glacier melt were also highlighted by another Party, including impacts on agricultural production, hydro generation and permanent residual damage.

(b) Mangroves and coastal ecosystems were highlighted by an NPS as providing substantive adaptation benefits and safeguards, in addition to biodiversity and mitigation benefits.

[26] Bearing in mind ongoing conversations about the definition of this concept and highlighted that climate and ecosystems issues were interlinked.

(c) Another NPS mentioned water as one of the key adaptation areas of concern and that its management can provide cross-cutting and sectoral benefits and risk reduction.

Expert panel 3 – Global state of adaptation action and support

Presentations

150. Expert panel 3 focused on the global state of adaptation action and support, including: future opportunities and challenges (gaps in adaptation planning and implementation; protecting, conserving and restoring nature and ecosystems).

151. Ms. Diana Reckien, IPCC WG II and University of Twente, gave a presentation on adaptation and adaptation pathways, focusing on the current state of adaptation, enabling conditions and good practices for near-term adaptation, and the measurement of progress on adaptation.

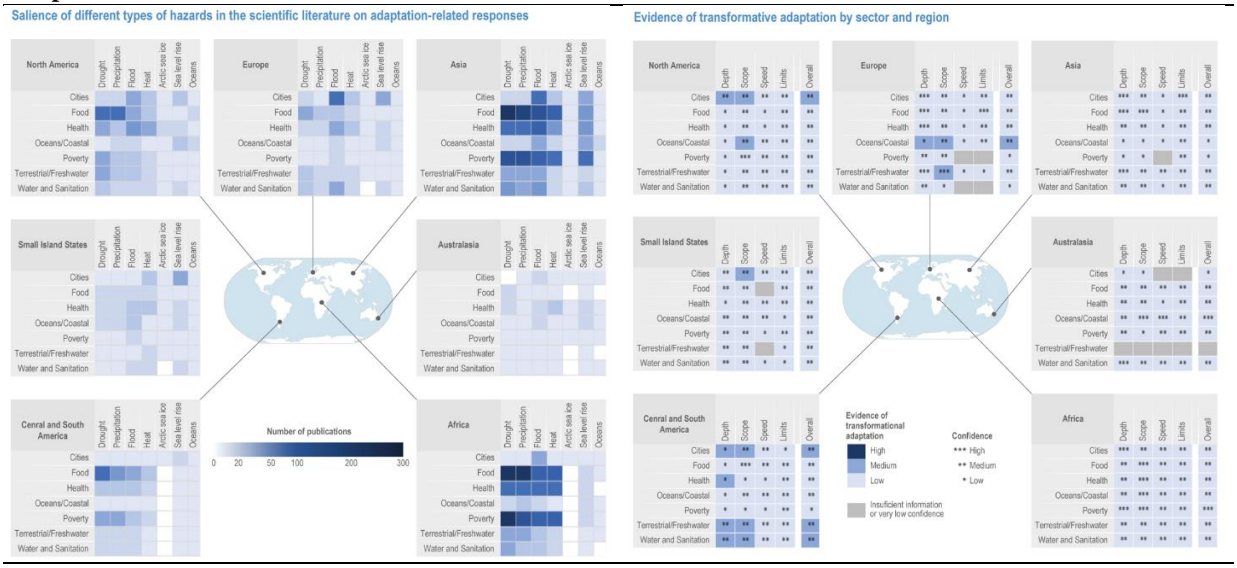
152. On the aspect of the current state of adaptation, she pointed out, using figures 21 and 22 below, that:

(a) Based on scientific literature on salience of different types of hazards on adaptation-related responses in each continent, despite the progress made on adaptation, most adaptation was still fragmented, uneven and focused on planning; and,

(b) Further analysis of evidence of transformative adaptation measures, by sector and by region showed that transformational adaptation was rare but will become increasingly needed with increasing warming.

Figure 21: **Salience of different types of hazards in the science literature on adaptation-related responses**

Figure 22: **Evidence of transformative adaptation by sector and region**

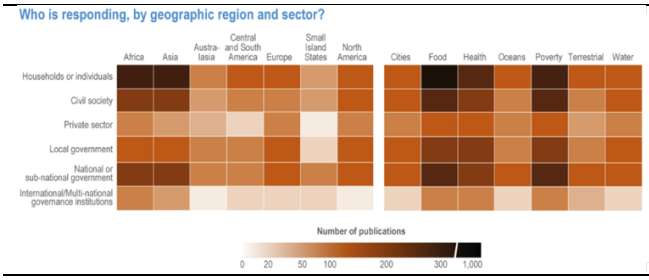


Source: IPCC WG II, Chapter 16, 2022

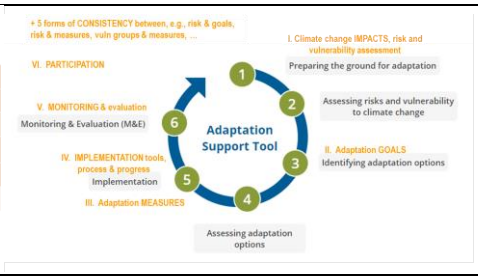
153. Using figure 23 below, which reflects an analyses of documented adaptation by various actors across sectors, geographic regions and systems, it was stated that so far the bulk of adaptation was taken up by households and individuals, with large gaps in the private sector adaptation and in international and multi-national governance institutions.

Figure 23: **Documented adaptation response by various actors across geographic regions and sectors and systems**

Figure 24: **Successful adaptation versus maladaptation and structural problems**



Source: NAP Global network



Source: Reckien et al

154. With regard to enabling conditions for adaptation, the presentation focused on governance, finance and wider benefits. Essential governance enabling conditions mentioned were: political commitment and follow-through across all levels; institutional framework and the need to have clear goals and priorities; monitoring and evaluation of adaptation measures, which was essential to track progress; and inclusive governance that prioritizes equity and justice with direct participation.

155. Ms. Reckien stated that public governance had the largest role for adaptation, in particular, for transformative adaptation and that private sector governance was used for specific actions but so far highly underutilized and communities and individuals were important for certain adaptation, filling in gaps in public governance.

156. It was noted that climate finance for mitigation and adaptation, as defined in the Copenhagen commitment, USD 100 billion/year by 2020, had not been met yet, while the absolute estimated adaptation costs were higher for developed countries, and so were the costs as a percentage of the national income, and making self-financing comparatively more difficult for developing countries.

157. The crucial role of international finance was highlighted, as well as the wider benefits of addressing climate change impacts, such as improved roads, reliable and renewable energy, clean water, food security, green buildings, green spaces youth access and habitat restoration and connectivity, among others, were also highlighted as enabling conditions, all contributing to achieving the SDGs. In this context, an assessment of the wider benefits for ecosystem services, ethnic groups, gender aspects, low-income groups, transformational adaptation, and GHG emissions, analysed potential contribution of adaptation related options to maladaptation and successful adaption.

158. In terms of finance, she highlighted that there was a large gap between estimated costs of adaptation and tracked adaptation finance, and this gap had widened, the private sector financing for adaptation had been increasingly promoted, but was limited, especially in developing countries, and there were key challenges in demonstrating financial return on investment, and particularly in developing countries, because of the risk to investors.

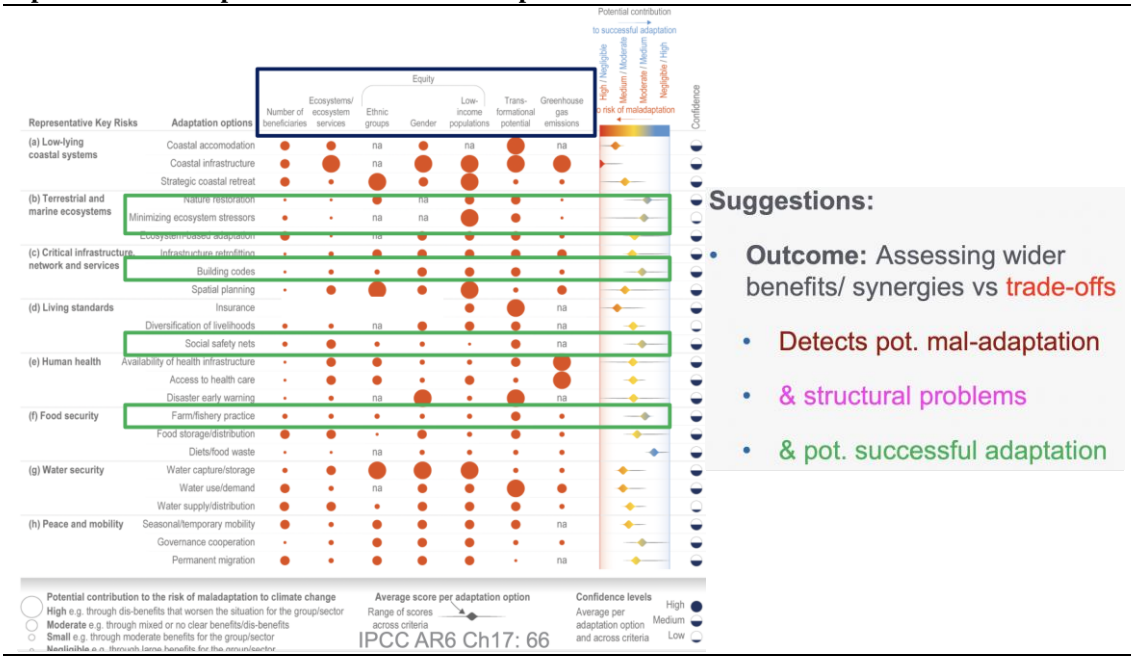
159. As an example, Ms. Reckien pointed to a recent research on the quality of adaptation planning in EU cities, demonstrating that 50% of EU cities had adaptation plans, with most recent plans (after 2018) in Eastern Europe, Ireland and France, and that newer plans were better in quality, with climate networks and national guidelines proving to be useful, but that there was little investment in M&E and public participation, while the bulk of the investments were focused on adaptation planning, assessments, setting adaptation goals and measures and implementation tools.

160. With regard to measuring progress on adaptation, very significant challenges were highlighted, relating to: defining what was adaptation, which risks and which dimensions were measured; what goals were set; comparability challenge of due context dependent metrics; aggregation of metrics, with no universal, global reference metric; measuring input, process, output, or outcome (all were important, but output indicators dominated); and data scarcity in some regions with data being either very generic at global level or local patchy and scarce data. It was mentioned that several measures were currently used in the literature, reporting, existing global data sets or tracking financial flows, and it was suggested to focus on assessing the wider benefits and trade-offs, synergies with the SDGs, aspects of successful adaptation versus maladaptation and structural problems, and assessing quality of adaptation

planning, with focus on cities, using the adaptation support tool, illustrated in figures 25(a) and (b) below, for assessing plan quality.

Figure 25(a): **Potential contribution of 24 adaptation-related options to maladaptation and successful adaptation**

Figure 25(b): **Measuring progress**



Source: IPCC AR6 Ch 17

161. Mr. Mark Pelling, IPCC WG II and King's College London, gave the second presentation on a view on urbanizing adaptation systems and focused on the global state of adaptation action and support and future opportunities and challenges. He based his presentation on the IPCC WG II, with focus on the urban sector, and aimed to introduce the concept of a global mega trend around urbanization. It considered the ways in which an urbanizing world shape risk vulnerability and capacities to adapt, noting that it was an interconnected world with rural impact on the urban, e.g., food security, and of urban impact on the rural, e.g., remittance flows.

162. Regarding the global urban transition, Mr. Pelling argued that it offers a time-limited opportunity to work toward climate-resilient development. The world was urbanizing as reflected by growth of urban populations, as well as investment in infrastructure. It was noted that between 2015 and 2020 urban populations grew by more than 397 million people and that more than 90% of that was in less developed regions. He further noted that unplanned and informal settlements in low- and middle-income nations, and smaller and medium-sized urban centres were experiencing the most rapid growth in population and in vulnerability and exposure. By 2050, an additional 2.5 billion people were projected to live in urban areas, with up to 90% of this increase in Asia and Africa, and more than a billion people located in low-lying cities and settlements were expected to be at risk from coastal-specific climate hazards.

163. He further highlighted that climate risks were shaped by urbanization, noting that urbanizing systems generate both intensified risk and opportunities for intensified resilience and observed impacts were direct, cascading and can be compounding, while adaptation was responding to build current and future resilience, addressing compound hazards and risks through co-benefits, extending from adaptation-based adaptation of systems, and integrating adaptation across systems, sectors and jurisdictions, and recognizing that supply chains connect rural and urban (e.g. food-market-distribution) and that infrastructures were interconnected (e.g. energy, transport and trade work relationships).

164. The urban adaptation gap, describing the status of exposure to climate associated risks in cities across region was identified through an analysis by region of unresolved risks for highest and lowest income quintiles against direct hazards (river flooding, coastal flooding and heat) and systemic risks (water and food security).

165. Mr. Pelling highlighted that there was a gap between existing risks and ability to manage these risks in all regions and for all hazards today; gaps were most pronounced for river and coastal flooding. He further highlighted that this adaptation gap had significantly higher impact on the 20% poorest than on the 20% richest. Some very quick gains were possible and required deploying planned adaptation, especially for riverine flooding, however, even if all planned and currently possible adaption was to be deployed, the adaptation gap and its inequity would persist, considering that adaptation relies on sustainable development and mitigation.

166. Trajectories in urban adaptation policy and action were presented, noting that: many cities have developed adaptation plans but many of these were not yet implemented; there was an increasing array of adaptation options available, predominantly of physical infrastructure, rapid uptake of ecosystem-based adaptation, slower uptake into action of social policy options and some hybrid experiments; interconnected infrastructure expands across rural and urban areas, with limited independent evaluation; intersectional, gender-responsive adaptation was increasing at local level through community-based adaptation, but there was less evidence of upscaling and strategic action; inclusive approaches included participatory planning for infrastructure and risk management in informal and underserviced neighbourhoods, the inclusion of indigenous knowledge and local knowledge, and efforts to build local leadership, especially among women and youth; and that adaptation was beginning to provide alignment between NDCs, NAPs, SDGs and DRR.

167. It was noted that urban adaptation already contributed to CRD, with CRD bringing together adaptation, mitigation and sustainable development. An analysis across different adaptation actions and metrics of CRD showed that there was lots of scope for co-benefits, but no single adaptation action resolves all CRD elements, but urban planning opens most scope, while physical infrastructure can be effective in reducing risks, but also constrained future options. The CDR category where there was most consistent lack of capacity was the extent to which actions prevented the shifting of risk and exposure from one place or population to another, because of adaptation. It was noted that integrated adaptation planning approaches can enable planning and monitoring of interactions between CRD elements.

168. Finally, regarding the enabling environment, it was noted that ensuring the urbanization of 2.5 billion people by 2050 reduced climate risk and enhanced CRD will require: multi-level leadership and institutional capacity, bringing together local city national actors and transnational networks, not only of cities and local governments, but also, for example, of slum-dwellers, international science and enhancing city level capacity, learning and advocacy; addressing the finance gaps, integrating sub-national entities and multiple adaptation approaches, including nature-based solutions, social policy and hybrid approaches; and evaluation for consequences of adapting to direct, systemic and compound risks, consequences of adaptation for the urban adaptation gap and its inbuilt inequity and consequences of diverse adaptations for CRD.

Discussions

169. Participants highlighted several gaps that limit the effectiveness of adaptation efforts, including in the availability of finance and referenced the current USD 100 billion collective goal which was not met, as well as the need to define a new finance goal; lack of continuity in finance for NAPs; as well as the limited reach of climate finance to vulnerable groups. The finance gaps to LDCs and SIDS were particularly highlighted and specifically in relation to finance for addressing the gap between planning and implementation, noting the gaps between the Global North and the Global South.

170. Some participants noted that the limited number of submissions of NAPs illustrated the limited resources available and participants expressed concerns that resource gaps will get worse as implementation will necessarily require more resources. The fragmentation of adaptation and excessive focus on planning was highlighted as an additional challenge. It was noted that integrating adaptation efforts with other plans and policies can help in this regard.

171. Gaps were also highlighted in the consideration of gender aspects, in particular, women's role as leaders, rather than just as a group to be consulted, as well as the consideration of the leading role of indigenous peoples and young people. The importance of

integrating indigenous and local knowledge in NAPs, and adaptation actions was highlighted and, in particular, regarding ecosystems and biodiversity conservation and management. The importance of considering vulnerable groups, including local communities, indigenous peoples, women and youth in collective efforts to establish climate data records was emphasized. Participants stated that while examples of successful actions in this regard at the national level existed, it was also noted that guidelines for the integration of indigenous knowledge would make such integration more effective and that such guidelines were already available on some contexts.

172. Participants also noted that the gaps disproportionally affected the poorest and most vulnerable countries and constituencies. Gaps were also noted as leading to maladaptation and specifically gaps in inclusiveness. The link between adaptation and loss and damage, resulting from soft and hard limits to adaptation was widely emphasized.

173. Nature-based solutions and ecosystem-based adaptation were highlighted (but noting that a definition of NBS had not been universally or formally adopted, yet), including mangrove restoration and coastal protection measures. Participants also highlighted the agriculture and food sectors, including, e.g., smart agriculture, managed fisheries and food supply networks. It was noted that integration of climate resilience in overseas assistance can enhance efforts and mobilize additional funds. The Adaptation Action Coalition was mentioned as one initiative to overcome the adaptation fragmentation issue and accelerate global adaptation action. The need for capacity-building was also emphasized. The Adaptation Academy was mentioned in this context as a new programme of training for LDCs.[27]

174. Various suggestions were made to illustrate ways to bridge some of the gaps mentioned, including specific examples and experiences shared by Parties and NPS, including on:

(a) Using a whole-society approach rather than a project-based approach, as well as the need to assess risks and develop adaptation action at transboundary and regional levels, in particular concerning shared ecosystems or forced displacement;

(b) Using public funds for enabling adaptation, given that adaptation projects, in particular, in the infrastructure sector, which tended to require large amounts of public investment and faced difficulties in attracting private finance;

(c) Enabling environments as a key solution for deploying mitigation options at scale. For example institutional and regulatory capacity, innovation, finance, improved governance and collaboration across scales, and multi-objective policies enable enhanced mitigation and shifts in development pathways;

(d) Using specific methodologies and metrics for assessing risk, adaptation and resilience measures and various useful data sharing tools and sources (e.g., Copernicus data portal, National Oceanic and Atmospheric Administration's climate resilience toolkit, AGWA's water sector focused solutions, and United Nations Environment Programme Adaptation Gap Report).

175. Participants reflected on how the GST can contribute to adaptation efforts, in particular:

(a) The importance of considering the link between the Glasgow–Sharm el-Sheikh work programme on the global goal on adaptation and the GST;

(b) That the GST should focus on ways to define and track adaptation finance, recognize the soft and hard limits to adaptation;

(c) The need to mainstream adaptation into domestic and international adaptation planning and support;

(d) That the GST had a key role in considering local and indigenous knowledge, as well as the contributions of indigenous peoples to upholding of natural systems, and that

[27] Other relevant initiatives include: Global Commission on Adaptation, GAMI, Adaptation Research Alliance, African Adaptation Initiative etc.

these strengths can be drawn upon by e.g., considering the GST report by Local Communities and Indigenous Peoples Platform Facilitative Working Group;

(e) That the GST should consider humans rights in its deliberations;

(f) That efforts would also benefit from attention to transboundary issues (e.g. the implications of polar ice cap melt for countries closer to the equator), and promoting transboundary adaptation;

(g) Creating a strong domestic enabling environment, including domestic policies and other initiatives for mobilizing finance and deploying technologies; and

(h) Integrating understanding of multiple benefits/co-benefits of adaptation in informing planning.

4. Summary of round table 3: Finance flows and means of implementation / climate finance and finance, technology and capacity support

176. Round table 3 took stock of the implementation of the Paris Agreement to assess collective progress towards making finance flows consistent with a pathway towards low GHG emissions and climate-resilient development (Article 2.1 (c) of the Paris Agreement). It also considered how support for developing countries across finance, technology and capacity-building (Articles 9, 10, and 11 of the Paris Agreement) had enabled collective progress towards the long-term temperature goal (Article 2.1 (a) of the Paris Agreement) and increased the ability to adapt to the adverse impacts of climate change and foster climate resilience and low GHG emissions development, in a manner that does not threaten food production (Article 2.1 (b) of the Paris Agreement).

Expert panel 1 - Technology

Presentations

177. Expert panel 1 on technology focused discussions around the state of efforts on technology development and transfer; international cooperation on innovation; and overall progress on systems of innovation at the national and other levels.

178. Ms. Heleen de Coninck, Eindhoven University of Technology, and Ambuj Sagar, Indian Institute of Technology Delhi, gave a joint presentation on technology focusing on innovation, technology development and transfer based mainly on Chapter 16 of IPCC WG III, with reflections on the GST.

179. The presentation stated that technology was an enabler of accelerated climate action. Using figure 26 below, they pointed out that there was a strong unit cost reduction in several granular technologies, including renewable energy technologies and batteries for electric vehicles. It was noted that some options were increasingly technically viable, rapidly becoming cost-effective and had relatively high public support but that many options faced institutional barriers. They also noted that adoption of low-emission technologies was slower in most developing countries, particularly the LDCs, and that learning was a significant contributor to cost reductions.

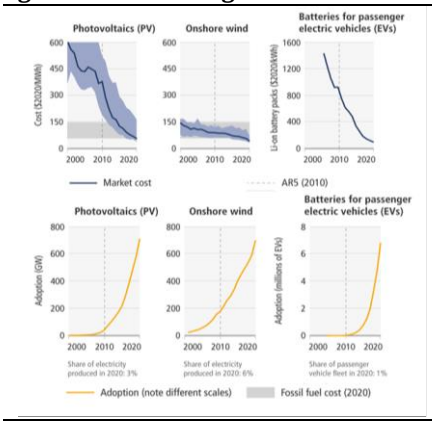
180. Ms. de Coninck and Mr. Sagar further highlighted that advances in technology and innovation can be an enabler of accelerated mitigation and specifically in electricity, with renewable energy installed capacity starting to take over from fossil fuel-based power capacity.

181. They further stated that technological development was not linear. Even for a mature technology, there was still room for improvements, innovation, lower costs and advancement. The role of public policies, including economic instruments, regulatory instruments and the need of their adjustment to the phase of development of the technology, as illustrated in figure 27 below, was also emphasized.

182. The presenters emphasized that technology was a systemic issue, involving a range of actors (e.g., universities, research organizations, technology firms, consultancies, law firms, governmental agencies, CSOs), that interacted with each other in order to achieve specific objectives (e.g., generate new knowledge, develop new products) that were embedded in an

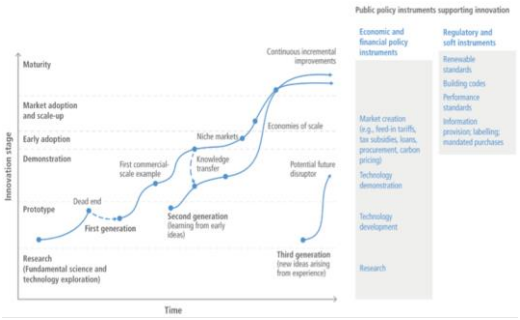
institutional context, including formal rules, such as laws and informal restraints (e.g., culture and codes of conduct) that governed the behaviour of the actors and interactions among them.

Figure 26: **Unit cost reductions and adoption increase of several granular technologies**



Source: IPCC WG III, 2022

Figure 27: **Innovation and technology development**

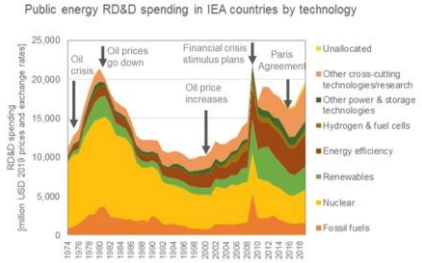


Source: IPCC WG III, 2022

183. It was noted that these "innovation systems" underpinned the process of successful development and deployment of new and improved technologies and every country needed to have its own innovation system, institutions and capabilities in place in order to be able to engage with this technological change much more effectively. A matrix of multiple input, output, outcome, structural and systemic indicators, as well as categories of actors and policies across different functions, was developed to monitor technologies and the innovative systems, as a systemic issue.

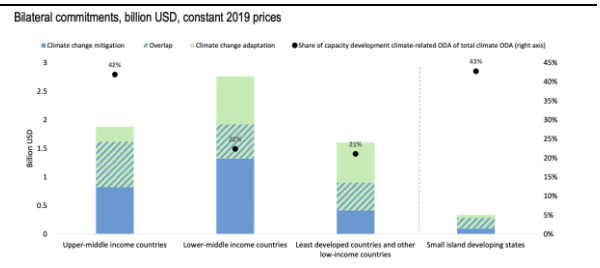
184. Ms. de Coninck and Mr. Sagar stated that policies can strengthen innovation, e.g., through creation of markets policies (e.g. feed-in tariffs, subsidies/tax rebates for electric vehicles, standards and labelling programme for energy-efficient appliances) that can attract investors, through the removal of systemic barriers (e.g., information provision to public, enhanced interaction between academia and industry, increased legitimacy for low-emission technologies) and highlighted the need for greater investments in RD&D. As shown in figure 28 below, data on limited RD&D spending for non-OECD countries, non-energy and private sector was very limited.

Figure 28: **Public energy RD&D spending in IEA countries by technology**



Source: IEA

Figure 29: **Division of capacity-building support to different country categories and to different categories of climate action**



Source: Casado-Ascensio, J et al. OECD Report Strengthening Capacity for Climate Action in Developing Countries, 2022

185. It was emphasized that developing countries had not benefitted from technological opportunities (e.g., deploying low-carbon technologies) for several reasons, including high costs, lack of supporting technological systems and infrastructure, weaker planning and implementation capacities, human resource constraints and other development priorities.

186. The presenters emphasized that international cooperation on innovation was a critical enabler for accelerated climate action, e.g., through supporting developing countries in their efforts to develop, adapt and deploy climate technologies. Such international cooperation could take place through different channels (e.g., multilateral, regional, bilateral) and focus areas (RD&D) and could include engaging the private sector and other relevant stakeholders.

187. Regional cooperative action and South–South cooperation were noted as important for facilitating technology development and transfer. The presents stated that there were great benefits in strengthening international cooperation efforts, through many channels (multilateral, plurilateral, and bilateral) and foci (RD&D support) of international cooperation noting new ideas and approaches of "Innovation Cooperation", climate relevant innovation-system builderS, universities as capacity-building hubs, etc.

Discussions

188. Participants highlighted the critical role of technology development and transfer and innovation for achieving the purpose and long-term goal of the Paris Agreement. Some participants noted that there had been considerable collective progress made in strengthening cooperative action on technology development and transfer for the implementation of mitigation and adaptation actions and increased support for developing countries for technology development and transfer.

189. They also noted the important role of the GST in assessing progress on what had worked and had not worked and on what can be replicated going forward, as well as in backward assessments both from a structural approach and the contextual approach and its role in helping to understand the dynamics of technology. It was further noted that the GST can also take stock of support provided by developed countries to developing countries, as well as outline modalities of how the world addressed inequalities and measured gender responsiveness. It was also suggested that the GST can strengthen the linkage between technology and financial mechanisms.

190. Some participants emphasized the need for improved climate technology monitoring, including at a sectoral level. They identified a need for sound indicators, including quantification of technology transfer, including e.g., technology transfer flows in the private sector. Participants further suggested to assess the processes that underly technology development and transfer beyond assessing the hardware. It was also suggested to assess the appropriateness of the technologies to the local context.

191. Reference was made to various gaps, barriers and challenges for technology development and transfer, including financial, economic, technical, capacity and expertise, policy, and regulatory and institutional challenges. In this context, it was noted:

(a) That the adoption of climate technologies was slower in these countries although developing countries were playing a key role in achieving the transformational change envisioned in the Paris Agreement and they identified specific barriers identified by developing countries in their technology needs assessments;

(b) That the lack of data from developing countries and the need for improved monitoring and tracking of progress for critical transformative climate technologies, including at the sectoral level, constitute a barrier to measuring progress in technology development and transfer;

(c) The conflict of interest and corporate capture are a constraint to implementation;

(d) The need for new technologies to complement existing technologies in areas of emission avoidance, removal, abatement and storage, as well as for aspects of adaptation, was noted.

192. Participants referred to various enablers and solutions to overcome the barriers and challenges referred to in paragraph 191 above. The enablers mentioned included:

(a) A strong domestic enabling environment in place, in terms of policy, legal and regulatory framework, including policies, legislations and strategies to domestically incentivize technological development and innovation, as well as safeguards to avoid negative impacts of technology development and transfer and ensure that they were not harming the environment or detrimental to human rights;

(b) Mainstreaming climate technology development and transfer into other policies and other national planning processes; avoiding multiple levels of bureaucracy; and

following a whole of society approach, while engaging all relevant stakeholders from the onset, including women, children and other groups, in the planning and implementation;

(c) Access to finance for technology development and transfer, from both public and private sources, in particular, for LDCs and SIDS, and ensuring different technologies to support different elements for energy transition;

(d) Stimulating participation of stakeholders from all sectors of society in the technology transition, and facilitating collaboration across systems, sectors and disciplines;

(e) Utilizing endogenous capacities and integrating local technologies and indigenous practices in technology planning and implementation, to ensure contextually-appropriate technology portfolio and scaled-up implementation;

(f) Mobilizing resources from public and private sources and through domestic and international channels;

(g) Mainstreaming technology development and transfer across climate and development agendas, enabling countries to shift to more sustainable development trajectories;

(h) Establishing cooperative actions and knowledge partnerships to facilitate RD&D on climate technologies and improve the availability of data and information on technology development and transfer.

193. Some participants highlighted the importance of solutions for accelerating technology development and innovation, including:

(a) Implementing appropriate technologies adapted to local circumstances, building on existing and indigenous knowledge and practices and using local governance structures;

(b) Incentivising academia and institutions for climate technological development, transfer and education, and innovation, and research centres for local solutions and including youth technology innovation labs;

(c) Exploring of PPP opportunities, and non-state initiatives; integrating technologies across sectors, e.g., energy and agriculture and achieving transformational change through green technologies and green jobs;

(d) Using TNAs through technology action plans to create the right incentives, was mentioned.

194. Participants highlighted the role of the Technology Mechanism in providing support to developing countries for technology development and transfer activities and the added value of the process for conducting TNAs in identifying technologies and fostering their implementation. It was also suggested that the CTCN be made more inclusive and should consider regional balance and indigenous people.

Expert panel 2 – Capacity-building

Presentations

195. Expert panel 2 on capacity-building focused on institutional and systemic capacity; and adequacy and effectiveness of support towards increasing the ability for climate-resilient and low-emission development.

196. Ms. Sonja Klinsky, Arizona State University and Ms. Minette Nago, University of Göttingen, gave a joint presentation on capacity-building focusing on capacity-building in the context of enabling transitions and strengthening the response.

197. The experts noted that there was no chapter on capacity-building in the IPCC AR6 report, and their presentation was therefore based on data from various sources. They emphasized that capacity-building had always been central to the Convention and the UNFCCC process from the onset, referencing capacity-building frameworks developed from the Kyoto Protocol adoption in 1997, through the Paris Agreement adoption in 2015 and beyond.

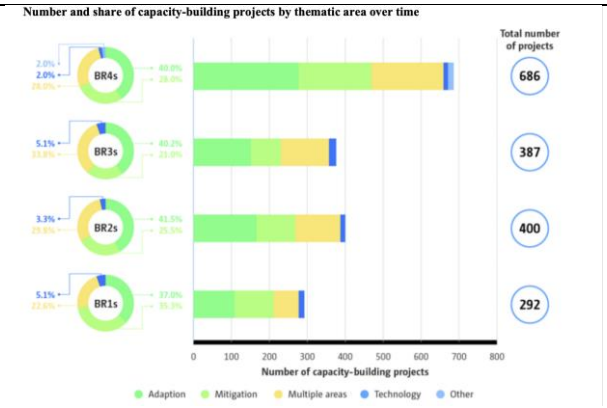
198. It was further noted that despite the centrality of capacity there was still uncertainty about what exactly it was, and there were many different definitions of the term. The presenters referenced the definition by Mr. Youba Sokona (2021) that "capacity is not the ability to implement someone else's agenda but the ability to set and pursue your own agenda" and pointed to the fact that it encompassed the idea of empowerment and self-defining of own agenda, which was central for a country-driven process.

199. It was emphasized that capacity-building happens at every scale (e.g., state, municipality, public participation, and community levels) and this was crucial for climate action. The presenters underscored the difference between generic or foundational capacities (broad-based capacities) and specific capacities that were related to specific tasks and highlighted the central role of learning by doing to capacity-building and for specific capacities to feed into generic capacities.

200. They identified the question who was shaping capacity as key. In this context, the wide and long-standing recognition of need for demand-driven capacity-building and mobilization was noted, while assessed patterns were found to correspond to donor preferences and not demand-driven. For example, the OECD Report on Capacity Development[28] was cited, noting that of USD 10.7 billion in climate-related capacity support in 2018–2019, 70% of related official development assistance from the Development Assistance Committee went to middle income countries, while the LDCs and low-income countries received only 24.3% of the total amount, and SIDS only 5.3%.

201. Figure 29 above illustrates the division of capacity-building support to different country categories and to different categories of climate action with a very strong focus on climate change mitigation and less for adaptation. Figure 30 below, illustrating capacity-building support for both adaptation and mitigation based on the UNFCCC Synthesis Report (SYR), shows somewhat different results on this matter.

Figure 30: **Division of capacity-building projects to different categories of climate action over time**



Source: UNFCCC Secretariat, 2022. Synthesis report for the technical assessment component of the first GST

202. It was noted that the discrepancy between the findings referred to in paragraph 200 above pointed to the challenge of how capacity-building was defined and tracked, and which overarching assessments were undertaken, considering that capacity-building happens at all scales and across all contexts. The limited assessment of effectiveness or transparency, especially from the perspective of the intended beneficiaries was also noted as a key challenge.

203. The presenters shared information on a proposed approach for assessing capacity-building inputs at any scale and across different elements of capacity (e.g., mobilizing skills, accessing financial and knowledge resources, strengthening institutions and actors, facilitating connections, integrating assessments and learning, etc.), and across different elements of the whole process (e.g., the national/local context of the climate challenge;

[28] Available here: https://www.oecd.org/tax/transparency/documents/capacity-building-report-2022.htm.

enabling actors to respond to the climate challenge; integrated sustainable development transitions; assessing progress and enabling course corrections, etc).

204. The main barriers and challenges to capacity-building and ways to address them, were summarized under the following three categories with several examples provided:

(a) Knowledge and politics: Challenge - knowledge and power systems shaped capacity-building approaches in ways that may be counter to the interests of intended recipients (e.g., 'trendy knowledge'). To mitigate this, capacity-building could focus on recipient country agendas and employ a demand-driven approach.

(b) Integration: Challenge - scientific knowledge was not always integrated with practice, which undermined success. To mitigate this, structures for shared decision-making at every step of the process could be established.

(c) Communication: Challenge - media and communication flows (languages, channels) between participants in knowledge creating and sharing. To mitigate this, strategies for multidirectional communication and using languages and media in coherence with the context of knowledge recipients could be developed.

205. The presenters concluded by sharing information on metrics for tracking progress on capacity-building and capacity-building needs. They suggested that existing options for collating information e.g.,: amount and distribution of climate finance dedicated to various forms of capacity-building; extent to which explicit, concrete capacity support requests have been met; evidence of domestic national level comprehensive capacity-building assessments; number of country-driven and in-house implementation efforts; number of country- and programme-level studies of capacity-building effectiveness; and number of national plans that identify which institutions or actors were responsible for implementing recommendations from assessments of effectiveness.

Discussions

206. Participants widely agreed that capacity-building was essential for the required transformative changes to happen at global, regional, national, and local levels, and across all relevant aspects and sectors. The importance of building capacities at the systemic, institutional and individual levels was highlighted by many. The important role of research, training, education, institutional strengthening, and policy development was specifically highlighted. Participants acknowledged that progress had been made in capacity-building for various aspects of climate change and noted that a lot of expertise existed in the various countries, as well as highlighted progress in expertise in developing countries.

207. Noting the capacity-building needs and gaps relating to the implementation of the Paris Agreement, participants discussed ways to measure progress in capacity-building and related indicators. It was suggested that the number of NDCs that had been prepared and updated, and the number of NAPs prepared can provide an indication of capacity development. The increasing number of climate-related laws and regulations was also suggested as an indicator for increased capacity.

208. Participants noted several challenges relating to capacity-building, including on:

(a) Determining the effectiveness of capacity-building and the need to define credible criteria and indicators for measuring impact and long-term effectiveness of actions.

(b) Tracking capacity-building in development finance was noted as both a potential indicator and a challenge.

(c) Accessing capacity-building and related support by developing countries, particularly LDCs and SIDS, at all levels and across many aspects and issues. Challenges mentioned by a Party included: insufficient human resources in developing countries; institutions that were multitasking by performing assessment, implementation, and policy roles all together; and in tracking initiatives.

(d) Supply-driven rather than demand-driven capacity-building. It was mentioned that there seems to be a tendency for international cooperation to focus on topics or areas when providing capacity-building support, e.g., on modelling or developing GHG

inventories, whereas developing countries might be seeking other types of support, such as assistance in strengthening broader institutional capacities.

(e) Over-reliance on foreign consultants that needs to be revisited in order to move towards longer-term and country-owned strategies and approaches. A Party emphasized the need to have dedicated personnel rather than only consultancies.

(f) Language barriers and, short and insufficient training sessions. Participants pointed out the importance of not only building capacities but also ensuring that the capacities were retained, particularly at the institutional level. In this regard, the need to involve national institutions, e.g., academia, to contribute to building these capacities was proposed.

209. The importance of country ownership and country-driven capacity development was emphasized by many participants. It was noted by some that many developing countries still needed support to identify more effectively their actual capacity-building needs and gaps and priorities, particularly by moving towards more programmatic approaches rather than project-based approaches for example, by designing comprehensive capacity-building strategies and programmes. In this sense, the work of the SCF, through its 2021 NDR, was highlighted as a useful reference.

210. Several participants emphasized the importance of capacity-building at subnational and local levels, and of support for knowledge and capacity-building, that was based on local circumstances. It was further noted that capacity-building needs should be adapted to specific forms of knowledge, specific phases, and specific needs and circumstances. The importance of ensuring that all relevant NPS were involved in capacity development programmes and projects was highlighted, with a special mention of the local private sector and youth, and also ensuring adequate gender mainstreaming in their design and implementation.

211. Several participants mentioned the relevant role that constituted bodies under the UNFCCC process, such as the CTCN and the PCCB, should play in supporting capacity-building, knowledge management, technical assistance and policy recommendations. Synergies that go beyond the UNFCCC were also encouraged. It was also suggested by an NPS that the civil society efforts and inputs for capacity-building needed to be captured in the GST.

212. Several participants indicated that finance was critical for any capacity-building activity. Capacity-building for accessing climate finance was also highlighted as a key need and priority for developing countries. In this context, the usefulness of initiatives supporting accessing finance, such as the GCF Readiness and Preparatory Support Programme, were cited.

213. International, bilateral and multilateral cooperation, and, in particular, regional collaboration, were widely identified as essential enablers for capacity-building. Participants further cited the value of South–South cooperation and peer learning modalities to assist in building the capacities of developing countries and shared local solutions.

Expert panel 3 – Finance

Presentations

214. Expert panel 3, on finance, focused on the state of efforts on finance, drawing on the SCF BA and IPCC AR6.

215. Ms. Silvia Kreibiehl, IPCC, gave the first presentation on finance, based mainly on findings from Chapter 15 of IPCC WG III on finance, noting that IPCC WG III was focused on mitigation and all financial information was included in that chapter.

216. Ms. Kreibiehl commenced by stating that progress on the alignment of financial flows towards the goals of the Paris Agreement remained slow. While there was a significant momentum of commitments from private and public actors, it had not been translated yet into an alignment of finance flows. Tracked climate finance flows between 2013 and 2014, as well as 2019 and 2020, increased only by approximately 60% and, recently, this growth had slowed down while direct investment in fossil fuel remained greater than in climate finance. Moreover, climate-related finance flows were still heavily focused on mitigation, with

approximately 90–95% of tracked climate finance flows directed to mitigation while adaptation finance remained very small.[29]

217. It was emphasized that decarbonizing the economy required global action to address fundamental economic inequities in access to finance, as well as its terms and conditions, and countries' exposure to physical impacts of climate change overall resulted in a worsening outlook for a global just transition. It was highlighted that the relatively slow implementation of commitments by countries and stakeholders in the financial system to scale up climate finance, did not reflect the urgent need for ambitious climate action nor the economic rationale for ambitious climate action.

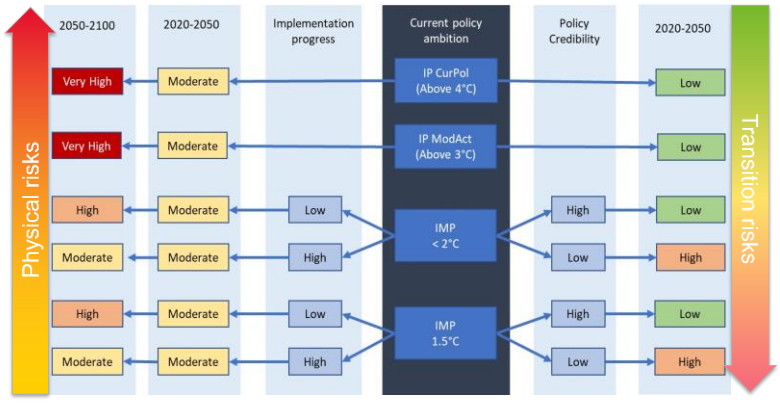
218. Downstream investment requirements for the current decade (2020–2030), in comparison to actual flows in the past years (2017–2020), demonstrating that financial flows were a factor of 3–6 below the average levels needed for the whole period of 2020–2030, to limit warming to below 1.5 °C or 2 °C were highlighted.[30]

219. Differences in tracked finance from assessed needs for mitigation were wide for all sectors, and widest for the AFOLU sector. The difference was smallest in the electricity sector. Developing countries were identified as having the biggest challenge in closing the gaps, as they are much wider, considering investment requirements in adaptation and reduction of loss and damage, and other elements required to facilitate mitigation investments.

220. It was highlighted, however, that there was sufficient global capital and liquidity to close global investment gaps. It was noted that the quantitative gap was only one indicator when it came to understanding the challenge to closing the gaps. The importance of a stronger regulatory and policy intervention to redirecting finance flows was also emphasized.

221. It was emphasized that there were significant barriers to redirect capital to climate action, both within and outside the global financial sector. Inappropriate risk assessment (including transitional risks, physical risks) was a key barrier, but clear policy choices and signals from governments and the international community can support an appropriate risk assessment as shown in figure 31 below and scaling up mitigation finance flows.

Figure 31: **An example for a risk assessment**



Source: IPCC WG III, 2022

222. Concluding with a forward-looking approach, it was stated that identified gaps were not yet turned into investment opportunities unless bankable project pipelines are created for financial markets to fill. It was noted that investors, central banks, and financial regulators were driving increased awareness of climate risks, which can support climate policy development and implementation. Ambitious global climate policy coordination and stepped-up public climate financing over the next decade can then help address macroeconomic uncertainty and alleviate developing countries' debt burden following the

[29] Note that while this is a real trend but also one that is emphasized by what is more closely tracked.

[30] Note that hat this assessment is based on all sources/flows across categories of actions, includes flows in developed countries, and that there is great heterogeneity across regions and sectors with only a few countries dominating this assessment's findings.

coronavirus disease 2019 pandemic. Innovative financing approaches could help reduce the systemic under-pricing of climate risk in markets and foster demand for Paris Agreement aligned investment opportunities. Approaches included de-risking investments, robust green labelling and disclosure schemes, in addition to a regulatory focus on transparency and reforming international monetary system financial sector regulations.

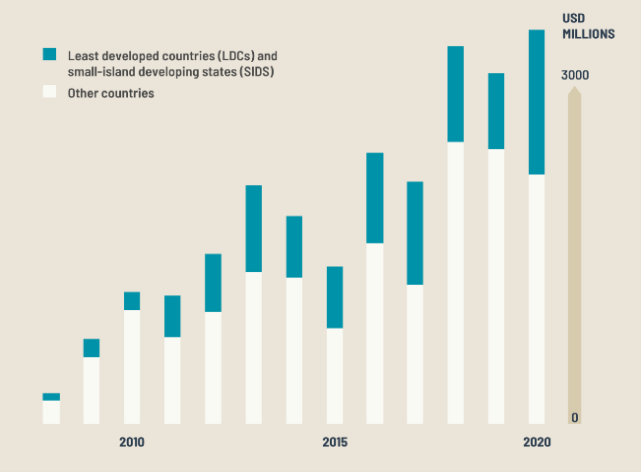
223. Ms. Charlene Watson, Overseas Development Institute, gave the second presentation on finance and focused on the state of efforts of financing climate action. The presentation was based on the SCF BA and overview of climate finance flows, (SCF BA, 2020) and several other resources.

224. Ms. Watson summarized data on climate finance from several sources and highlighted that estimated climate finance flows were well below the estimated needs. For example, the International Renewable Energy Agency's estimated needs were USD 4.4 trillion a year for energy transition (USD 131 trillion over the period to 2050 that prioritize technology avenues compatible with a 1.5 °C pathway); the SCF NDR 2021 identified costed needs of NDCs at around USD 700 billion a year; the fourth SCF BA (2021) estimated USD 775 billion a year in global total climate finance. The climate finance joint goal from developed to developing countries, however, was USD 100 billion a year, and the OECD reported climate finance mobilized and provided by developed countries in 2019 at USD 79.6 billion a year through multilateral and bilateral channels.

225. It was noted that scaling up finance flows to climate action was urgently needed to meet the objective of the Convention, and that deep and wide-ranging action is needed to make finance flows consistent with low-emission climate-resilient development pathways. The need to scale down finance flows that were misaligned with the climate objectives was also emphasized, pointing out, in particular, the COP 26 call to phase down/out the inefficient fossil fuel subsidies and investments.

226. Another question highlighted to understand if there was progress, was whether climate finance was being aligned with needs. In this context, it was noted that the NDR identified more adaptation than mitigation needs, which was not reflected in finance flows. Using figure 32, Ms. Watson highlighted that LDCs and SIDS accounted for 37% of multilateral climate fund approvals in 2020. Moreover, less than half of this was grant-based. It was also emphasized that assessing the impact of climate finance remained challenging (figure 32 below).

Figure 32: **Multilateral climate fund approvals in 2020, to LDCs and SIDS, in comparison to other countries**



Source: Climate Funds Update's 10 things to know about climate finance in 2021.

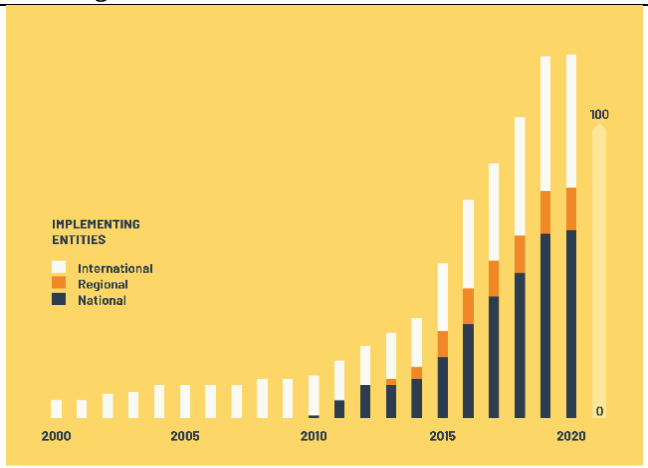
227. Participants further emphasized that it will be of critical importance to scale up finance needs to be aligned with equity, acknowledging just transitions and, noting the importance of justice and fairness in climate finance, for climate ambition, and respect, promotion and consideration of human rights obligations. It was noted that in general equity had been operationalised through CBDR-RC; however, there was not sufficient guidance for considering what was fair share in the provision of climate finance. Different national

circumstances were important in understanding CBDR-RC. It was also stated that taking stock of climate finance provision was very complicated, with multiple aspects, multiple financiers, and unclear definitions.

228. Another key question raised was whether access to climate finance was appropriate. In this context, the complex, lengthy and costly procedures to access climate finance, among others from the climate funds, was emphasized. It was, however, noted that efforts were made to ensure local level access through empowering local actors. Figure 33 below was used to show the growth in the contribution of regional, and national implementing entities to the climate finance. It was emphasized that adequacy and predictability of climate finance suffered from the access challenges.

229. Another question touched upon was that of how to assess collective progress towards the climate-consistency of finance flows. In this context, it was noted that government actors influenced finance flows through several levers, e.g., financial policies and regulations, fiscal policy levers, public finance, and information instruments, noting that each country was to take into account their specific context to achieving climate consistency. However, this created a challenge to reaching a common understanding of the scope and definition of Article 2.1 (c) of the Paris Agreement and the assessment of collective progress toward this goal.

Figure 33: **The contribution of international, regional, and national implementing entities, to the climate finance, over time**



Source: Climate Funds Update's 10 things to know about climate finance in 2021.

230. Reference was made to finance for loss and damage, noting the limited collection of information on loss and damage and related financial needs in a comparable format despite efforts made by countries to ramp up data collection and information on these financial needs. It was, however, noted that the TD was mandated to discuss efforts related to averting, minimizing, and addressing loss and damage. The impact of the global pandemic in exacerbating inequalities was also highlighted.

231. Finally, the presentation concluded that the ambition of financing climate action needed to be raised to meet the 1.5 ºC target and that effective financing of climate action should consider both quantitative and qualitative aspects; and, given the multiple viewpoints, rigorous transparency was needed in assessing the state of financing climate action, and to make sure that perspectives of justice and fairness were considered.

Discussions

232. The discussion focused on various aspects of quantity and quality of climate-related finance flows, as well as on related aspects of transparency, tracking frameworks and data availability; balance in adaptation and mitigation finance; predictability and additionality; loan- and grants-based finance and geographical distribution of flows; and alignment of climate finance with needs. The important role of Article 2.1(c) of the Paris Agreement was emphasized by many participants, including the role of institutional and enabling frameworks, principles of consistency and unaligned flows to emission-intensive activities, as well as different perspectives on its scope, definition, and link to Article 9.

233. Some participants noted the progress in commitments and disbursement, but the need to scale up finance to USD trillions, and to assess the most urgent ways to accelerate the pace for shifting finance flow scale. Interventions highlighted existing gaps, including gaps in quantity of climate finance flows from public and private sector. The gaps in adaptation finance and lack of balance with mitigation finance were also highlighted.

234. The quality and effectiveness of climate finance was discussed with regards to challenges to access to climate finance stating that the procedures were complex, lengthy and costly. Efforts to ensure local level access and empowering local actors, as well as the impact on and inclusion of vulnerable countries, local communities, women and indigenous groups were mentioned.

235. Participants discussed considerations of just transition and equity with regards to geographical balance, in particular, insufficient finance for LDCs and SIDS, indebtedness, targeting vulnerable countries and communities, local level inclusion of marginalized groups and gender, and finance for addressing loss and damage. In this context, insufficient finance for loss and damage, as well as the limited information on related financial needs were noted.

236. The challenges to assessing collective progress towards the climate-consistency of finance flows were mentioned and the need for inclusion of reference to the national context, as well as that for assessing private sector contributions. Despite the adoption of relevant elements of the ETF at COP 26, several challenges and opportunities for improvement were mentioned in relation to tracking and transparency of climate finance, and the alignment of financial flows were mentioned with respect to definitions and data availability on flows and impacts. Other challenges mentioned included: insufficient funding for on-ground project preparation and capacity-building; project replicability; insufficient finance for forest management and NBS; mismatch of priorities between in-country stakeholder and governments; gap in private equity and venture for climate-related technology; absence of predictability; lack of indicators to follow implementation on the ground; and failure to achieving even the USD 100 billion goal.

237. Several solutions and good practices for climate-related finance flows were mentioned, including: policies to shift financial flows, e.g., carbon pricing and correcting incentives and fossil fuel subsidies; enhancing direct access facilities and local-level programmes; improved institutional and human capital capacity-building for climate finance access and in finance related occupations; scaled-up grant-based finance, in particular, for adaptation; scaled-up private sector contribution in general and specifically for adaptation; using commercial finance to close gaps; raising co-benefits of climate actions; targeting finance on real economy investments; reducing investments costs; improving intermediation at the national level (e.g., financial hubs, value chains, sovereign banks), and through the Marrakech Partnership for Global Climate Action; improving data and methodologies; simplifying access procedures; and innovative instruments (e.g., fossil-fuels reform; green budgeting; climate swaps, payments for ecosystem services). The need to tailor solutions and finance instruments to specific conditions were highlighted.

5. Next steps following the three round-table discussions

238. Following each round-table discussions, we provided brief information on the next steps. We informed participants that the closing plenary session would provide a final opportunity for them to provide inputs on the round-table sessions and for us to share our initial reflections, including on the way forward. We indicated that, as mandated by Parties in decision 19/CMA.1, we will prepare a summary report after each of the TD meetings, which will fully reflect the views expressed in the room, as well as those submitted in writing during the session and the readouts from the various sessions. We also invited participants who carry out intersessional meetings to provide the reports from these meetings either as written inputs to the TD process, or at the next verbally during meetings of the TD. Noting the learning by doing approach, we also requested that suggestions on how to improve the process be submitted through written inputs.

239. In response to questions, we clarified that the summaries of the volunteer rapporteurs (see para. 53(e) above) would be taken into account by the moderators in preparing their

round-table summaries that were to be presented at the closing plenary of TD1.1, which also in turn form an input to this summary report on TD1.1.

C. Summary of the world café

240. Interactive and lively discussions were held in the world café, on a wide range of topics. Parties, NPS and experts talked with each other in small groups around tables, also known as stations. Two experts anchored each of the 12 stations for three hours and the participants moved between the stations and discussion groups in five rotations. The three clusters of stations were consistent with the round tables (mitigation, including response measures; adaptation, including loss and damage, and means of implementation and support: finance, technology and capacity), aimed to start TD1.1 with interactive discussion on specific topics within these topics. There were substantive, interactive and frank exchanges at all of the stations, and detailed notes were taken by the experts at each station. The stations covered topics of the GST:

(a) 1–4 on global emissions; global initiatives and partnerships within sectors; energy transitions; and response measures.

(b) 5–8 on current and projections of future impacts, as well as national and subnational planning processes; resilience of natural systems and ecosystem-based adaptation; and support for adaptation.

(c) 9–12 on financial flows; public finance; technology development and transfer; and capacity-building efforts.

241. While no formal links were made between the world café and the round-table discussions, participants and experts who participated in the world café session were requested to build on the world café discussions in their round-table interventions, where appropriate.

2. Global emissions; global initiatives and partnerships within sectors; energy transitions; and response measures

242. The world café discussion on **energy transitions** (station 1), was moderated and reported by Jim Skea and Angela Picciariello, IISD. The discussions at this station focused on just transitions to net-zero emissions, phase-out/phase-down of fossil fuels and removing subsidies, and response measures.

243. To stimulate conversation, the experts recalled findings from IPCC WG III, noting the decreased use of coal, oil and gas without carbon dioxide capture and storage in modelled pathways that limit warming to1.5 ºC (>50%) with no or limited overshoot (coal by 90%, oil by 65%, gas by 45%) and for 2 °C (coal by 85%, oil by 35%, gas 15%), by 2050, and stated that these required major transitions. They emphasized that it was required to apply just transition principles and implementation through frameworks of equity.

244. Several pathways were discussed emphasizing the need for rapid shifts and upscaling key investments at very large scale. However, it was noted that according to different modelled pathways, oil and gas was expected to remain in use at least until 2050, even on pathways consistent with the Paris Agreement temperature goals. The timing and scale of fossil fuels abatement and other strategies depend on regional and national circumstances and availability of abatement technologies and technology finance. Participants noted that while progress is reflected in current NDCs, there were still many solutions not covered by NDCs, e.g., local solutions that were adapted to local factors needs and capacities.

245. Participants provided specific examples of sectoral, regional, national, and multiple local contexts and challenges for energy transitions, while considering multiple factors to manage needs (e.g., electricity, water, desalinization, jobs, training). It was also noted that there were gaps in financing economic diversification, which indicated increases rather than phase-outs of fossil fuels use in many developed countries and needed to be addressed.

246. Participants discussed gaps, challenges, and solutions and what could realistically work, including by some noting the need for an international framework to address energy

transitions which also addresses different regional, national and subnational plans. The discussions highlighted socio-economic challenges and impacts of energy transition and of phasing down or phasing out of fossil fuels (e.g., loss of jobs, impacts on other sectors), as well as the co-benefits (e.g., health), and the need for pragmatic solutions, including security, which may vary between countries.

247. Participants highlighted the advantages of renewables energies, their enabling conditions and related challenges. It was noted that smaller, modular, and cheaper technologies were becoming more accessible. The importance of the deployment scale was emphasized, in regard to renewable technologies, as well as CDR. CDR and LULUCF (e.g., afforestation) were mentioned as potential complementary solutions to support the counterbalancing of emissions.

248. Just transition and equity were discussed as overarching themes. They were referred to in various contexts, from agriculture to climate justice, including the need for gender-responsive energy transitions, social protection, human rights perspective, job training, and ensuring the rural communities are not left behind. It was noted that these terms could have different meanings in some languages. Some participants emphasized that it was essential to be both ambitious and equitable and noted that for implementing transitions, it was essential to consider also adaptation as a means of avoiding increasing vulnerability for people and nature.

249. It was emphasized that a policy space for sustainable development at the international level was needed and that local solutions needed to be supported through national policies, including assuring that all solutions were properly environmentally evaluated. The importance of lifestyle change was also emphasized. The challenges of getting policies (e.g., for changing to renewables, removing fossil fuel subsidies) approved by parliaments were also mentioned. Specific solutions identified included European Green Deal, which used revenues from emissions trading schemes to modernize energy systems.

250. Some participants emphasized that from a civil society perspective, the energy transition was critical and that to follow just transition principles, there was need to consider multiple factors such as development status and national circumstances; role of private transnational companies with beneficiaries outside the country versus state oil companies; phasing out versus phasing down fossil fuels; phasing out, in parallel to economic diversification. A participant shared an example of a community-led business model which integrated just transition principles. Participants also considered enabling conditions for adopting energy transitions, especially in developing countries, in particular LDCs. International collaboration was highlighted as an essential enabler citing transnational ships and pipelines, as well as sharing knowledge and lessons learned, technology transfer and support.

251. The world café discussion on **global emissions** (station 2) was moderated and reported by Mr. Joeri Rogeli and Mr. Gustaf Hugelius, Stockholm University. It focused on global emissions, carbon budgets, and near-term emissions targets.

252. The focus of the discussions was around the findings that the world was off track to limiting warming to the Paris Agreement's temperature goal in terms of reducing global emissions, and that urgent action was needed to put the work back on track. Participants considered how to shift the global pathway in emissions.

253. Participants considered near-term targets, benchmarks and trajectories consistent with limiting warming to 1.5 °C (by 2030, 2035, and 2050), and what were the knock-on impacts of overshoot. The importance of near-term reductions by 2030 was highlighted, noting that higher near-term emissions would require steeper reductions after 2030 increasing costs, and the associated political and institutional more challenges. IPCC WG III found that, in global modelled pathways that limit warming to 1.5 °C (>50%) with no or limited overshoot, global GHG emissions are projected to fall from 2019 levels by 43% by 2030 and 84% by 2050. It was noted, based on AR6 WG III, that the emission reduction to be achieved globally by 2030 consistent with specific pathways for 1.5 °C means that global emissions need to peak by 2025.

254. Participants noted that depending on policy priorities, some policies that can drive low-carbon action could also have adverse effects. It was also noted that emissions could drop for a reason not related to climate actions (e.g., a global crisis, such as war or a pandemic such as coronavirus disease 2019). In such cases, there was often greater political will to respond quickly than there has been in response to the climate crisis. It was emphasized that national or global crisis circumstances should not be dealt with in an isolated manner. It was noted that in many democracies, the vision driving policy decisions was not long term but rather tied to election cycles. It was suggested that an emissions matrix be developed for each country, with focus on near-term actions, highlighting the "low hanging fruits", and key enabling conditions, and the long-term consequences and the legacy of contemporary decisions be considered.

255. Many participants referred to the total or GCB[31] while discussing the need to increase global ambition, taking into account the national context, considering that much of the GCB had already been spent and that the remaining GCB was very limited. Participants suggested that polarized discussions should be avoided but rather that countries should collaborate toward enabling all to achieve their highest possible ambition. It was noted that if current NDCs[32] were implemented then by 2030 the entire GCB left for 1.5 °C with a 50% probability and no overshoot would have been spent (limited or avoidance of overshoot).

256. In the context of equity and the allocation of the remaining GCB, some participants referenced historical emissions and underscored that that developing countries had the right to develop. It was noted that the IPCC WG III showed that energy demand measures, through behavioural shifts that limited energy use without reducing comfort, mobility, and quality of life, and can be consistent with low-carbon pathways as well as the SDGs. It was further noted that considerations of the GCB were presented as a snapshot of current situation without reference to equity and historical emissions, as it was just an estimate of what can be emitted to stay below a temperature level. Views differed on whether carbon budgets can integrate equity assumptions and different targets between countries or consider technology innovation and removals that could potentially expand countries' budgets. It was also suggested that the interplay between sectors may be more relevant than between countries for reducing global CO_2 and CH_4 emissions.

257. Some participants also raised the issue of how to link private sector actions (often operating internationally) to national carbon targets and linked this to the IPCC WG III findings that showed that sectoral options can help facilitate the link. Further discussions were held around demand-side measures to increase ambition and change pathways, but mainly at sectoral and individual level. Global discussions, however, could provide key information that could be used at smaller scales. Enabling conditions for emission reduction were also noted as a key to achieving the different sectoral options, e.g., finance, governance and cooperation.

258. Participants considered ways to overcome the conflicting needs for all Parties to achieve net-zero by 2050 taking into account equity considerations, while keeping 1.5 °C within reach. Some proposed that developed countries should achieve the net-zero CO_2 emissions by 2030, given their historical responsibility and national capacities, while developing countries should aim to do so by 2050. The scientific literature shows that different countries would reach net-zero at different points, depending on national circumstances. It was emphasized that all countries needed to increase ambition but noted that it was not possible to impose top-down targets on countries. A participant recalled that 100 countries had voluntarily set their own net-zero goals. It was suggested that lessons

[31] The glossary of IPCC WG III includes a definition of a carbon budget as "the maximum amount of cumulative net global anthropogenic CO2 emissions that would result in limiting global warming to a given level with a given probability, taking into account the effect of other anthropogenic climate forcers. This is referred to as the Total Carbon Budget when expressed starting from the pre-industrial period, and as the Remaining Carbon Budget when expressed from a recent specified date.",

[32] IPCC referred to NDCs announced prior to the literature cut-off date of this report, 11 October 2021, and revised NDCs announced by China, Japan and the Republic of Korea prior to October 2021 but only submitted thereafter. Note that 25 NDC updates were submitted between 12 October 2021 and the start of COP 26.

learned and international cooperation be used to strengthen individual countries' responses and build synergies with sustainable development.

259. Participants discussed land-use emissions, highlighting how different estimation approaches can generate different results and noted that the AR6 WGIII land-use emission analysis follows a bookkeeping models approach, which affects how net-zero and future warming predictions were calculated. Other impacts on land-use emissions were mentioned, e.g., CO_2 fertilization. It was concluded that it was important not to dismiss any approaches but to understand the differences between them in order to best analyse the implications.

260. The need to consider the costs of mitigation pathways was also emphasized, in the context of governance and support required, as well as the need to consider adaptation pathways, and to follow a holistic approach, and distinguish between costs, benefits and investments.

261. In addition to reducing emissions, the implications of CDR technologies as a complementary part of pathways to net-zero were discussed, noting different levels of importance for different scenarios, and taking into account risks, opportunities and trade-offs in implementing CDR technologies. The interlinkages between climate and biodiversity crises were highlighted, as well as the important mitigation potential of NBS, especially for emission reductions over the long term. Reduced effectiveness of carbon sinks was mentioned in this context, noting that some terrestrial sinks were carbon saturating (e.g., agriculture soils, ecosystems). Additionally, participants discussed the difficulty in distinguishing between the causes of emissions, e.g., between the weakening of the sink in the arctic and the release of permafrost-related emissions. They also discussed the importance of keeping carbon rich systems intact and resilient, including eliminating incentives to log or burn forests, as well as forest management to avoid saturation and considering the big potential of afforestation and soil conservation.

262. Participants highlighted that for vulnerable countries pathways options were a question of survival and limiting warming to 1.5 ºC can save many lives, and risks increase, the more we delayed action. The need to consider long-term impacts of even staying at 1.5 ºC was also highlighted. It was also mentioned that natural carbon feedback cycles (e.g., permafrost thaw, forest cover dieback) at higher temperatures can also exacerbate impacts during a temperature overshoot. It was further noted that the time lag[33] of the impact of some of the emission reduction measures was to also be considered.

263. Participants discussed the need to align data collection at the subnational level with national standards, in order to feed into national data sets. It was mentioned that there were many initiatives at the state and regional level to build capacity on data collection, and that cost-effective measures were being piloted e.g., using satellites. Baseline data could enable developing pathways of vision and actions.

264. Some participants underscored the importance of considering national circumstances, including socioeconomic barriers and the need for a social science perspective to inform the various pathways. They, however, noted that countries had different circumstances (e.g., forests, oil, gas, landlocked, temperature, etc.). Reference was made to extreme national circumstances that needed to be taken into account, e.g., war and conflict. In such cases, it was suggested to learn from experiences of other countries on recovery to pre-conflict emission levels. It was also noted that such disruptions can have impacts beyond national borders, under different scenarios (e.g., impact on trade, global trends, ambition).

265. The world café discussion on **response measures** (station 3), was moderated and reported by Mr. Kamal Moustapha and Mr. José Garibaldi, Energeia Network. It focused on economic diversification, opportunities to further enhance understanding, and use of tools and methodologies for modelling and assessing.

266. Participants discussed approaches to addressing response measures, with a view to finding a balance between being specific and general. It was emphasized that knowledge so

[33] The delay between the reduction of emissions and the reduction in GHG concentrations in the atmosphere, reduction of global temperature and of climate impacts.

far, as reflected in data and models, was still fragmented, and that there was need for more information and better understanding of response measures.

267. It was noted that response measures needed to be adapted to country context since no two countries were the same, but also that policies and ideas could be grouped into packages that can be used. Some participants emphasized the need to develop tools and policies for response measures that considered just transitions and equity and the importance of integrating inclusiveness and equity in policies, and, in particular, regarding labour.

268. Just transitions were discussed in the contexts of energy and labour, as well as economic diversification and social dialogue. It was noted that a holistic approach was needed, especially due to the intertwined nature of economic diversification and just transitions and their close relationship to social and natural dimensions of response measures. Some Parties also noted that if economy was linked to energy or natural resources, it was supporting the public sector, but also highlighted the challenges for diversification and labour mobility, especially in countries whose economies were based on a single resource.

269. Some Parties emphasized the importance of considering the national context, in particular, in regard to the socioeconomic dimension of response measures, and development pathways, and noted that climate actions of some countries could have devastating socioeconomic impacts. Some Parties referred to decisions regarding 'stranded natural assets' (left in the ground versus extracted for development), as a fundamental question of equity, noting that a lot of resources in the Global South that were not being tapped were a security for future development, and in achieving the SDGs. The importance of labour mobility was also highlighted by many. Some Parties emphasized questions around the nature of and access to the new employment opportunities that were to emerge through transitions.

270. As an example of regional context, a Party referred to the MENA region and noted the severe climate change impacts in this region, with a large population size and small economic systems that were highly dependent on local ecosystems. Several NPS mentioned cases of good and bad experiences around just transitions and noted that response measures needed to take into consideration the whole population and to have development that was fair for everybody, including a consideration of gender and intergenerational perspectives. They emphasized the need to consider not only development but also how response measures addressed protecting ecosystem integrity.

271. Participants emphasized the need for a creative approach to response measures and economic diversification, and for innovation of technology, social, and nature-based solutions to make the most of transitions. They referred to this as a process of reimaging the future in different places and collectively. It was further noted that this was also going to have consequences as to how the world collectively assessed progress and the stocktake of that progress.

272. Some Parties noted the importance of considering the need to act proactively and in a cross-cutting manner in response measures and to integrate response measures with mitigation, in order to avoid potential unintended or damaging consequences, rather than only responding to such consequences.

273. The need to enhance in-country capacity to make the shift was highlighted, as part of the transition route to shift and diversify, noting that it also depended on the country's success as it diversifies.

274. International cooperation was mentioned as an enabler for response measures and just transitions. It was also noted that some response measures had an impact on the production processes of other countries through extra-territorial effects.

275. Participants considered how to assess collective progress in response measures, including modelling methodologies to assess global economic diversification, taking into account that it was done at the national level, and adapted to the national circumstances and context.

276. The world café discussion on **global initiatives and partnerships within sectors** (station 4), was moderated and reported by Mr. Andy Reisinger, and Ramiro Fernandez, Climate Champions Team. It focused on specific initiatives, partnerships, and campaigns,

their contributions, challenges, and areas where improvements could further enhance ambition and outcomes.

277. Participants mentioned several specific initiatives and campaigns, e.g., Race to Zero, Climate Clean Air Coalition and Bonn Challenge. The discussions focused on general conclusions derived from individual initiatives.

278. Participants highlighted several key contributions and co-benefits of the global initiatives and campaigns, noting that:

(a) They played a critical role in driving the implementation of climate action by Parties and NPS, and could be reflected in the implementation and reporting of NDCs;

(b) They enabled national governments to engage in new areas, sectors and actions that were not originally defined as part of their NDC, thus allowing Parties to enhance their ambition in their next NDC;

(c) They formed an effective way to promote international cooperation among Parties and NPS and, by so doing, accelerating the implementation of specific actions;

(d) They helped to identify and refine good practices to address a specific challenge or implement a solution;

(e) They provided guidance for standards that can ultimately contribute to future regulations by designing methodologies and encouraging pioneering solutions;

(f) They enhanced progress on implementation of sectoral approaches through informal partnerships;

(g) They supported NPS in setting goals and specific targets, that gave them clarity on what they needed to do to engage in a proactive manner.

279. Participants also identified key challenges of the global initiatives and campaigns, including:

(a) A lack of clarity on what were the mechanisms of accountability of the different campaigns, partnerships and initiatives;

(b) A general lack of data availability from the different types of pledges, actions, emissions and reporting from NPS;

(c) Proliferation of initiatives that sometime competed with each other and, in some cases, created more noise than clarity;

(d) The need to avoid any type of double counting of actions and impacts between what Parties reported under their NDCs and what was reflected in the global campaigns;

(e) An unbalanced prioritization of campaigns and partnerships on mitigation, and the need to strengthen new adaptation initiatives;

(f) Specific challenges that global initiatives faced to engage with local actors;

(g) A risk of greenwashing, considering unevenness in accounting for and the proliferation of commitments, pledges and promises that were not translated to actions;

(h) A risk that the increasing engagement from NPScould be perceived as a shift of responsibility from Parties.

280. Participants suggested several areas where improvements could enhance ambition and outcomes, including:

(a) Increase coordination across government domains to ensure that sector-specific data and actions could be integrated into national plans, targets and policy approaches;

(b) Provide for capacity-building mechanisms, alongside targets and standards that allowed countries, sectors and NPS to engage in initiatives and partnerships, including initial data needs not are not met nor the capacity for coordination;

(c) Increase linkages between global initiatives and local actors;

(d) Enable flexibility in terms of standards and data requirements that balanced the need for robust accounting and demonstration of progress, with recognition of multiple entry points and data availability;

(e) Ensure that new initiatives and partnerships would provide additional depth, rather than duplicate existing initiatives;

(f) Identify priorities for partnerships and set clear expectations and strategic targets, that allowed initiatives to come to a natural end-point;

(g) Apply effective and standard measurement, reporting and verification measures and principles of transparent accounting.

3. Projections of future impacts, including national and subnational planning processes; resilience of natural systems and ecosystem-based adaptation; and support for adaptation

281. The world café discussion **on current and projections of future impacts** (station 5), was moderated and reported by Ms. Adelle Thomas, Climate Analytics and University of The Bahamas, and Mr. Harpreet Kaur Paul, Warwick Law School. It focused on limits to adaptation measures; economic and non-economic loss and damage.

282. Conversations were held around the following main topics: economic and non-economic loss and damage; ways of managing loss and damage; and enablers for managing loss and damage. Participants listed major economic and non-economic loss and damage aspects, including:

(a) The pervasiveness of existing loss and damage, with overwhelming capacities to respond and adaptation measures, particularly for compound events, e.g., drought and heatwaves; tropical cyclones and sea level rise; and back to back extreme events;

(b) The importance of paying special attention to preventing irreversible loss and damage, e.g., loss of ecosystems, loss of territory, loss of culture, loss of livelihoods), noting that some experienced loss and damage was already irreversible;

(c) Challenges to identify priority types of loss and damage, as they interact with each other and are equally important;

(d) Psychological loss and damage (anxiety, grief, fear of future), which needs more attention;

(e) Challenges to project future loss and damage. While there was some idea of levels of risk, past experiences showed a tendency to underestimate what would actually happen.

283. Key loss and damage issues identified included: loss and damage stemming from extreme weather events; loss of life; loss and damage in terrestrial, freshwater, coastal and open ocean marine ecosystems; Coastal erosion and submergence impacting coastal settlements; loss of livelihoods; loss of resilience and loss of culture.

284. Projected future loss and damage issues mentioned included: loss of territory; tipping points causing more extensive loss and damage, and loss of capacity to adapt.

285. Participants mentioned the following insights regarding ways of managing loss and damage:

(a) Responses to manage loss and damage should be flexible in order to meet changing needs;

(b) Human rights can be a critical principle of managing loss and damage;

(c) There was need for more insights on what to do when hard limits to adaptation were reached, in particular for managing loss of territory, climate migration, loss of ecosystems;

(d) There was a need to limit global temperature rise to 1.5 oC to prevent escalating and irreversible loss and damage;

(e) Technology was expected to become increasingly important, as loss and damage escalated, as well as loss of ecosystem services (e.g. coastal protection, freshwater);

(f) Top ways of managing loss and damage identified included: early warning systems and disaster risk management; sustainable and resilient infrastructure such as strengthening building codes; loss and damage finance facility for vulnerable countries; green corridors; legislation and regulation; disaster risk insurance, and; technical assistance and support to vulnerable communities.

286. Main enablers identified by participants for managing loss and damage included:

(a) Rapidly scaled up finance, including a dedicated loss and damage finance facility, particularly for slow onset events, separate from DRR and humanitarian assistance;

(b) Urgent and ambitious mitigation to limit warming to 1.5 oC, in order to prevent escalating loss and damage (1.5 oC aligned NDCs and corresponding 2050 net-zero targets);

(c) Technology and capacity-building, education and increasing understanding of loss and damage at all scales – international, regional, national, subnational – to better prepare people for loss and damage that was inevitable;

(d) Sustainable development and equity were critical, noting that currently the poorest are experiencing the worst loss and damage;

(e) Science, including attribution science, is key to assess loss and damage and identifying evidence-based approaches to manage loss and damage.

287. The world café discussion on **national and subnational planning processes** (station 6), was moderated and reported by Anne Hammill, IISD, and Mr. Espen Ronneberg, Secretariat of the Pacific Community. It focused on good practices and challenges; recognition of developing country efforts; transformative adaptation; and maladaptation.

288. Participants shared their experiences, case studies, lessons learned, ideas, and reflections on national and subnational adaptation planning processes, and on future opportunities and solutions. Overall, the participants agreed that adaptation was local and that local communities most affected by climate impacts must be involved in adaptation planning and implementation, with cross-cutting considerations of intersectional issues, while exploring synergies with mitigation actions and sustainable development. Participants also agreed that there were various challenges associated with enhancing adaptation action, including lack of adaptation financing, human and technological resources, capacities, good data and indicators, and future projections and modelling. Some solutions and best practices were proposed, and some reflections were made on issues requiring future deliberations.

289. Participants agreed that the TD in particular, and the GST process in general, could facilitate countries to frame their own national adaptation stories, especially to recognize developing countries' efforts in planning and implementing their NAPs, policies, and strategies.

290. Experiences and lessons learned, challenges and barriers, as well as opportunities and good practices were highlighted by participants for the following main aspects of addressing national and subnational planning processes:

(a) **Alignment of national and subnational adaptation planning and implementation**: Participants highlighted the importance of coherence and alignment between national, subnational, and local adaptation planning and implementation. These included vertical integration efforts for aligning national and subnational policies and actions, as well as sectoral integration and alignment into adaptation planning.

(b) **Horizontal integration of adaptation (institutional structure)**: Achieving coherence and exploring synergies through good institutional arrangements and cross-governmental collaboration could enhance adaptation planning and implementation. Participants shared their experiences and examples on horizontal integration across government ministries and agencies on adaptation.

(c) **Legal instruments**: under the horizontal integration discussions, some participants shared their experiences and ideas on how national authorities could use legal

instruments to compel subnational or sectoral actors to act on climate adaptation or to implement identified adaptation options. This was to be done to accelerate implementation, as some actors may lack the understanding or political will to enact adaptation actions. Some participants cautioned against this approach on grounds of its feasibility.

(d) **The process from planning to implementation**: Developing country Parties highlighted that the importance of the process to formulate and implement NAPs for achieving holistic, coherent, integrated, and inclusive adaptation planning, and noted that NAPs produced in a non-inclusive manner may reduce momentum and interests, due to a lack of ownership. As at the time of TD1.1, only 36 NAPs had been submitted, though 129 of 154 developing countries has NAPs under preparation, and their implementation levels varied across countries. Developing country Parties pointed out that the majority of funding and support focused purely on planning and that plans do not translate into actual implementation. Participants highlighted several enablers essential for implementation including access to finance and the need for cross-cutting and intersectional data on vulnerabilities of, and on adaptation capabilities and capacities of the local actors and implementing agencies.

(e) **Monitoring, evaluation and learning**: In the discussions on going from planning to implementation and the general challenges and barriers in implementing adaptation actions, monitoring, evaluation and learning, including data availability and analysis capacity issues, was identified as a major challenge and barrier to enhancing adaptation ambition.

(f) **Maladaptation**: Maladaptation[34] was one of the key discussion points. Participants shared on what maladaptation was, how it manifested, the sources and drivers of maladaptation, and solutions to addressing them.

(g) **Participatory approach, gender, and social inclusion**: The need for inclusive and participatory approaches in national and sub- adaptation planning, with a strong focus on cross-cutting and intersectional issues like gender, social inclusion, indigenous peoples' meaningful engagement, and the integration of local and traditional knowledge and knowledge systems, was highlighted.

(h) **Recognition of developing countries' efforts**: Developing country parties shared that domestic adaptation investments and actions taken, independent of international support by developing countries were rarely recognized as a contribution to the collective efforts of achieving adaptation. They must be well captured to showcase developing countries' efforts and investments that will hopefully inspire more adaptation financing being given at the multilateral level and to highlight adaptation as a priority for developing countries.

291. Participants discussed several aspects of transformational adaptation and considered remaining gaps in arriving at a common understanding of what transformational adaptation really entailed. Some common themes emerged as participants considered what transformation adaptation was:

(a) Foregoing long-term and status quo development in response to increased vulnerabilities and exposures to climate impacts, in the pursuit for transformative actions and sustainable development;

(b) A bottom-up and flexible approach where communities and affected populations determined their own adaptation approach, defined it in their own context, in accordance with their capacities, in a long-term, cross-cutting, intersectional manner;

(c) Establishing strong linkage with the energy transition agenda and integrating climate risk and vulnerability assessment in the transition to renewable energy to maximize synergies, avoiding trade-off and maladaptation, and ensuring long-term sustainability;

[34] From AR5, an option that would generate net social and/or economic benefits under current climate change and a range of future climate change scenarios, and represent one example of robust strategies.

(d) Responding to loss and damage from rapid- and slow-onset climate impacts, and pursuing actions that minimized loss and damage, such as relocation of communities, with an aspiration of maintaining traditional livelihoods and cultural practices;

(e) Considering that climate impacts were worsening, and the uncertainty posed great challenges in projection and modelling, participants considered whether adaptation should be planned for new extremes or new normal (shifts in averages).

292. The world café discussion on **resilience of natural systems and ecosystem-based adaptation** (station 7), was moderated and reported by Mr. Raju Chhetri, Prakriti Resources Center, and Mr. Chizuru Aoki, Global Environment Facility. It focused on impacts on natural systems, human-natural system resilience, and adaptation measures.

293. Participants shared information on EbA and NBS evidence, planning and implementation, governance, finance, capacity-building, private sector engagement, and transboundary and regional approaches.

294. Evidence, aspects and considerations of EbA discussed included:

(a) People's reliance on nature for livelihoods and sustenance, and multiple socio-economic benefits beyond climate mitigation and adaptation and but challenges to assessing and quantifying the adaptation benefits and ecosystems/nature economic value;

(b) There was more experience on biodiversity and conservation than on adaptation;

(c) There were limits to adaptation using EbA, and maladaptation must be addressed;

(d) EbA actions helped both the mitigation and adaptation actions;

(e) The global network of science institutions must support the learning, exchange, and documentation of practices; appropriate tools must be used to map the ecosystems;

(f) Considering the principle of "mother nature" – safeguarding by giving equal importance to all living things; considering relation between human and nature;

295. With regard to EbA planning and implementation, the following were discussed:

(a) EbA was based on the interlinkage of natural ecosystems and people's needs and that contextualization was important. Participants urged to have people in mind when looking at ocean, mountain, plains and other geographical landscape and ecosystems.

(b) The inclusion in discussions on impacts and benefits for IPLCs were especially relevant for NBS and EbA, given that 80% of Earth's biodiversity was found in traditional indigenous lands and territories, and IPLCs manage 40% of lands under conservation;

(c) The need for a programmatic, holistic and rights-based approach, considering the traditional values, land tenure, traditional knowledge and indigenous landscape. Land tenure rights deserved additional attention for EbA sustainability and buy-in;

(d) Gender aspects needed to be considered in participatory and inclusive planning, implementation and monitoring and evaluation process needed to be prioritized;

(e) Migration needs to be taken into account as a constraint for ecosystems and forest products and leading to loss of jobs and food insecurity;

(f) Rural people also need energy, hence pressure was on forests, and options needed to be considered;

(g) A collaborative approach among the Rio Conventions (UNFCCC, Convention on Biological Diversity and United Nations Convention to Combat Desertification) was encouraged, as IPLC and land tenure issues were front and centre of Convention on Biological Diversity and United Nations Convention to Combat Desertification discourse;

(h) One-size-fits-all approach must not be considered but rather first piloted for any initiative to see if it worked in the particular local context;

(i) Mandatory regulatory frameworks must be developed in a participatory and inclusive manner.

296. Inputs mentioned in regard to governance aspects of EbA were:

(a) For effective design and implementation, alignment between national and local governments and plans was needed, and institutional linkages were crucial. Both vertical and horizontal consideration of engagement was needed;

(b) Successful EbA required to allow the existing natural systems and ecosystems to function on their own, and heal;

(c) Often, national plans are sector-focused and not well aligned with the EbA approach at the local, community, and ecosystem levels;

(d) Clearer articulation of EbA in NDCs and NAPs was needed;

(e) More clarity must be brought on how EbA and NBS would "fit" under the GST;

(f) Regional initiatives through established regional institutions and plans (e.g., the Saudi Green Initiative);

(g) The EbA and NBS concept needed to be linked to the GGA.

297. Views shared by participants on finance in the context of EbA and NBS, included:

(a) Grant-based financing should be focused to support EbA and NBS and this was needed to catalyse action, proof of concept, and policy alignment (e.g., insurance, green bonds);

(b) Innovative finance and ecosystem services must be valued and considered;

(c) Finance was critical to breaking the vicious cycle of poverty and the impacts of climate change;

(d) Valuation enabled comparison between different EbA and NBS options with grey options, through well-established financial decision-making;

(e) Looking beyond monetization of benefits.

298. There were several views from participants on capacity-building, in relation to EbA and NBS, including:

(a) Capacity-building should be done for all stakeholders and at all levels from local to national;

(b) Data availability is an issue and there is need for additional analytical tools;

(c) The effectiveness of EbA was difficult to measure, hence countries need support for monitoring and evaluation.

(d) Indicators should be developed to see the benefit to the ecosystems;

(e) Climate rational and conservation rationale should be made clear.

299. Participants referred to the role of the private sector, including:

(a) The private sector can play a catalytic role. An example was given of a private sector entity that was interested in investing in a country and was requested to support and invest in ecosystems, by providing contributions that could be pooled to support conservation and EbA;

(b) International experience and human resources should be tapped in especially from the international private sector in order to manage large projects.

300. A few comments from participants on transboundary and regional approaches, included:

(a) Recognizing that EbA and NBS actions may go beyond national borders. Examples from West Africa, Pacific SIDS, Australia and the Arab region were shared, along with examples of community forest management;

(b) An example was shared of collaboration of Saudi Arabia with neighbouring countries on tree planting and environmental work with other countries, through a more extensive collaboration framework which includes non-climate-related activities.

301. The world café discussion on **support for adaptation** (station 8), was moderated and reported by Mr. Anand Patwardhan, University of Maryland, and Mr. Juan Pablo Hoffmaister, GCF. It focused on public financing, private sector initiatives and the Race to Resilience.

302. Most participants were in agreement that their understanding of support went beyond finance to aspects such as technology (development and transfer), capacity-building and access to climate information, noting that there were considerable needs and gaps in all these areas. Regarding technology development and transfer, participants considered how to make use of TNAs, considering that not all countries had done TNAs or assessed the needs and availability of adaptation technologies. Availability of climate information and data, as well as capacity (including technical expertise) to use the information were noted as important enablers that needed to be tracked and assessed.

303. The importance of matching support to needs (different kinds of support for different needs), was highlighted. A challenge that was identified was the lack of full clarity yet on what support was needed and how it may be provided, e.g., in the area of addressing transboundary risks and transformational adaptation.

304. General topics discussed included considering how to go beyond collection of disparate and dispersed projects to a more comprehensive view on support for adaptation; avoiding the "lamp-post" problem, observing only what was tracked, which was only the tip of the iceberg. The question of how to measure support when adaptation was fully mainstreamed was also posed.

305. Discussions around finance focused on the following topics:

(a) Finance mobilization, and matching finance support to needs;

(b) Access to finance (e.g., climate rationale, direct access) and related barriers;

(c) Finance delivery (getting down to the local level; devolution);

(d) The need to track and assess where finance was going (for what); in what form (modality – grant versus debt); and from what source;

(e) The need to track national spending on adaptation (e.g. as % of GDP), and to track household spending on adaptation (noting e.g. vulnerable households incurring private costs which they cannot afford);

(f) Framing it as "finance for adaptation" rather than just "adaptation finance", in recognition of multiple sources of finance (e.g. public, private, domestic, multilateral, etc.);

(g) Immediate finance requirements included NAP processes, and diagnoses of vulnerability;

(h) The significant lag in financing the implementation of NAPs and NAPAs;

(i) Engaging private sector finance – the need to identify what kind of support was needed from the private sector, the need to engage the private sector early in any process, and the need to take stock of benefits, as well as costs and risks, to the private sector;

(j) The importance of having built-in safeguards and stock-take or disclosure processes (e.g. to avoid leading to capital flight)

(k) The need to incentivize investment in "risky" regions and sectors, where the needs were often the greatest;

(l) Identifying key performance indicators and performance indicators for NAPs and strategies;

(m) The need to situate support in relation to national contexts (e.g. debt situation).

4. Financial flows; public finance; technology development and transfer; and capacity-building efforts

306. The world café discussion on **financial flows** (station 9), was moderated and reported by Ms. Sandra Guzman, Climate Policy Initiative, and Mr. David Ryfisch, Germanwatch. It focused on total finance flows towards mitigation and adaptation, balance between the two, and alignment toward the Paris Agreement finance goal.

307. Participants discussed the nature of the goal in Article 2.1(c) of the Paris Agreement on finance flows; the sources and levels of finance; data, metrics, and methodologies; processes and synergies; future actions required, and the interrelations between Article 9 and 2.1(c) of the Paris Agreement.

308. On the nature of the goal in Article 2.1(c), the following views were expressed:

(a) Article 2.1(c) was considered as an enabler of action, to achieve the compliance of other articles of the Paris Agreement, including a distinct role in relation to Article 9. Article 2.1(c) was still at an incipient stage and its understanding was still limited;

(b) It constituted a large aggregate of flows, across all sectors, in all countries, amounting to USD trillions needed for the transformation;

309. Some of the views shared in relation to the sources and levels of finance included:

(a) Finance flows directed to climate change cannot be assessed properly yet, due to lack of a common definition. Therefore, it was not clear what counted and what did not;

(b) Participants mentioned a need to create taxonomies and gave the example of the EU taxonomy. However, there was still a concern about what were the common definitions to harmonize such taxonomies;

(c) Finance flows from the public sector can be shifted through national budgets (phase-out of fossil fuel subsidies, divestment from maladaptation), or through different means of regulation (taxonomies, disclosure, green procurement). Relevant public finance actors at the national level, (e.g. finance ministries, central banks, financial regulators) and at the international level (e.g. Group of 20, MDBs), had a key role in the transformation of the public finance sector but were not all engaged in the climate action processes;

(d) The private sector role needed to be enhanced, at the national and international level, for mitigation and adaptation, with focus on the co-benefits of actions to increase attractiveness for private sector. Participants noted that there was a perception that private sector actions and support was progressing but there was limited transparency and accountability about their interventions, and it was not easy to assess if their actions were real or greenwashing. It was suggested that it was important to use regulatory approaches to engage the private sector at the national and international level.

310. Data, metrics and methodologies to measure finance flows were considered by participants, with the following reflections noted:

(a) It was difficult to track and measure progress towards Article 2.1(c) of the Paris Agreement in absence of clear methodologies and approaches, and insufficient data.

(b) Article 2.1(c) of the Paris Agreement references low GHG, climate-resilient pathways, but there was an absence of pathways that considered national circumstances and NDCs, which was necessary to show alignment of finance flow pathways to achieving the long-term goals;

(c) Climate finance must fit for purpose, in quantity and quality;

(d) Financial flows decisions must be evidence-focused and science-based, and data were critical;

(e) It was important to measure climate and sustainable finance flows, but also measure the extent to which carbon intensive flows had been decreasing, to measure the real transformation of the financial flows;

(f) At the sectorial level, specific metrics and methodologies were needed to determine what and how to count for certain interventions that seemed not obvious, such as projects related to energy efficiency.

311. Participants considered finance flow processes and synergies with other processes, including the following considerations from different participants:

(a) In considering the entirety of financial flows, it was important to think in a more transformative manner that changes the whole financial system. Consideration of aligning financial flows will require taking into account integrated approaches of mitigation and adaptation, and the notion of just transition, including human rights, gender equity, sustainable development, poverty eradication and other SDGs, decent jobs, and economic diversification. Just transition was emphasized both as a goal and as a principle;

(b) The need to consider mitigation and adaptation, but also finance for loss and damage;

(c) Avoiding maladaptation due to climate finance interventions was essential;

(d) It was also critical to reflect how financial flows simultaneously affected other occurring crises, e.g. biodiversity.

312. The way forward at the national and international level was discussed by participants, with the following issues, challenges and options highlighted:

(a) At the national level:

(i) The access to climate finance was a major challenge and accessing funding, e.g. from the GCF, can be very costly, mainly in time and human effort;

(ii) There was a need to keep building capacities to access, manage and implement projects at the local level, including stakeholder engagement at all levels. Institutional capacity-building was critical;

(iii) Adaptation support needs to new conditions and new climate-related phenomena (e.g. sandstorms), that countries were suffering from, had to be considered;

(iv) Climate finance had to consider the reality of developing countries, e.g. indebtedness. Some climate finance instruments had increased the levels of debt of developing countries;

(b) At the international level:

(i) There was needed to clearly define the role of the UNFCCC in the general architecture for climate finance;

(ii) It was important to have benchmarks for entities of the financial sector (banks, insurance, pensions, investors), and methodologies to track and show progress towards meeting Article 2.1(c) of the Paris Agreement, including the role of UNFCCC and actions taken outside the Convention, and taking stock of international outputs on pathways;

(iii) It was requested to follow a needs-based approach for the mobilization of finance in the future.

313. The world café discussion on **public finance** (station 10), was moderated and reported by Mr. Mahesh Roy, Institutional Investors Group on Climate Change, and Ms. Preety Bhandari, World Resources Institute. It focused on public finance's catalytic role, new and existing sources, access and capacity-building, and progress in scaling up towards the Paris Agreement goals.

314. Participants discussed various aspects of public finance, touching upon current scale-up of public finance, in particular, for adaptation, DRR, and management, and provided specific examples. Lack of enabling environment was mentioned as a key factor hampering climate finance through the private sector involvement.

315. A main theme that was widely referred was the barriers accessing climate finance, with the suggestion made to reduce the complexity of processes, in particular, for increasing developing countries' access to finance from international financial institutions. Barriers at all stages of a project cycle were mentioned: proposals, feasibility studies, reporting, criteria, metrics, forms to comply with, etc. Referenced was made to a West Africa Stakeholder survey that reported difficulties in accessing funding. Some solutions to accessing climate financed included: reducing administrative and procedural hurdles, streamlining processes, developing enabling policies and regulations, and capacity-building.

316. Global economic and structural inequities were emphasized in the context of climate finance provision. A concern regarding mismatch of both international and national public finance, with needs, in particular, of vulnerable social groups, communities, and developing countries, was highlighted. Participants emphasized that just transitions and equity considerations of climate finance provision had to be considered both international and domestically and include consideration of political economy challenges related to transition. Some participants noted that in order to scale up climate finance provision to developing countries, developed country Parties will also have to adjust their own budgetary and international finance legislation. From the donor perspective, such measures to ensure accountability and provide for environmental and social safeguards were requisite for the use of public funds drawn from taxpayers.

317. Another theme that was discussed was the expectations for highest standards and exemplarity in spending public finance, in terms of both quantity and quality (e.g. by showcasing best practices) of finance, and as related to e.g. environmental and social safeguards, human rights, inclusion, in particular of indigenous and most vulnerable groups and gender considerations, transparency, reporting and accountability. To this end, the importance of enabling environments in developing countries that set clear incentives, economic and policy actions, and strong safeguards to ensure accountability in the use of funds was raised by some participants.

318. The need for assessment of types of investments and activities financed through climate finance (e.g., roads, mining), was highlighted in the context of standards. Participants also noted that public sector finance needed to include social targets and investments, e.g. in education and job creation. The potential role of public procurement was also mentioned.

319. Transparency and tracking of climate finance were considered by many to be of high priority for public finance, in particular, and as related to expectations that private finance that leverage public interventions, will not happen at the expense of developing countries, or with other adverse impacts. The importance of assessing and addressing the gap of climate finance for adaptation and loss and damage, was particularly highlighted, in this context. The need for measurements by financial institutions and providers, with set targets, and specific metrics and indicators of performance and impact and success, was highlighted by many.

320. Many participants referred to the potential catalytic role of the climate finance provision from the public sector in relation to filling in gaps (e.g., finance for adaptation), from private finance, through approaches that are not based on profit, and by measuring progress in climate finance, and showcasing viable business models.

321. The potential role of NDCs for climate finance provision and backward-looking assessment of climate finance provision for national plans, e.g. NAPs, nationally appropriate mitigation actions, etc., was discussed. It was noted that the mitigation and adaptation ambition of many NDCs is conditional to availability of climate finance. The need to move from conditionality to cooperative approaches was also mentioned. The potential role of the GST for assessing implementation and provision of actual climate finance towards the national climate plans (e.g. NAPs and NAPAs, for assessing progress and gaps and providing forward-looking recommendations, was noted.

322. Concrete examples and options were mentioned by participants, for financial instruments, e.g., green budgeting; SDRs; debt for climate swaps; taxes; market mechanisms. Country examples of legislation and policies were shared by participants, e.g. Japan's photovoltaic renewable energy scheme for low-income households; and several examples of green budgeting.

323. Participants specifically emphasized that the loan-based (rather than grants-based) model of climate finance was not sustainable, considering the increasing debt burden on developing countries. Others noted that loans enable larger investments in profitable climate action activities, particularly in the clean energy sector, leveraging limited public funds for higher impact and that financial arrangements should be tailored to the specific investment and context. In this context, it was suggested that the assessment of climate finance reflows (through loan repayments) from developing to donor countries or MDBs was needed.

324. The world café discussion on innovation, technology development and transfer (station 11), was moderated and reported by Mr. Gabriel Blanco, IPCC and National University of Central Buenos Aires, and Mr. Ambuj Sagar, Indian Institute of Technology. It focused on investments in international cooperation, emerging technologies and needs and joint research and development initiatives.

325. The discussion was initiated with a brief summary of the AR6 WGIII findings on innovation, technology development and transfer. This summary touched on the role of national innovation systems in the development, as well as on the adoption of new and existing technologies, and on the necessary enablers to make these innovation systems stronger. Enablers included not only capacity-building and finance, but also an adequate set of public policies with a holistic approach that took into account the national and local circumstances, promote participation of relevant stakeholders, and the achievement of sustainable development goals. The summary also emphasized the role of these policies for avoiding unintended consequences, as well as social and environmental drawbacks that the implementation of certain technologies may bring under certain circumstances. The role of international cooperation in the building of solid national systems of innovation was also briefly described.

326. The presentation was followed by a set of questions posed to participants, including how the TM established under the UNFCCC can better contribute to strengthening national innovation systems, to promoting international cooperation, to building capacities, and to facilitate financing that can lead to the development and transfer of technologies.

327. Participants made comments and suggestions, including:

(a) Public policies should align RD&D activities to achieve SDGs, including mitigation of and adaptation to climate change;

(b) International cooperation should act at all levels and phases of the technology cycle;

(c) South–South cooperation had proved to be very useful in multiple dimensions;

(d) The UNFCCC TM can take advantage of the existing infrastructure in countries and regions, bring together actors at regional level, and bring (at least) seed money for local and regional initiatives, and facilitate access to finance;

(e) The role of markets should be explored to bring together small and medium-sized enterprises with RD&D institutions;

(f) The involvement of academia was needed at all stages of the technology cycle;

(g) More analysis was needed, of examples of successes and failures of international cooperation aiming at strengthening capacities and developing technologies;

(h) Support for NDEs needed to be strengthened, to enhance their prominence in their respective countries;

(i) Coordination between the CTCN and the TEC needed to be improved;

(j) Building capacities at all levels was key, and not only for governmental representatives and technical staff;

(k) Various actors/stakeholders needed to be involved in the innovation process, for ownership and acceptance of technology adoption and implementation;

(l) Coordination and alignment were needed between different technology-related initiatives under the United Nations systems, (e.g. Mission Innovation, TM, United Nations

Technology Bank for the Least Developed Countries, United Nations Commission on Science and Technology for Development;

(m) Multiple levels of bureaucracy on technology issues within United Nations needed to be avoided;

(n) LDCs and SIDS needed particular support, including for their NDEs;

(o) The TM needed to take more deeply into account local contexts and circumstances in its different activities;

(p) Improved reporting on technology developing and transfer within the TM was needed, to improve assessment;

(q) Patent issues coming from RD&D activities may deter international cooperation in these areas;

(r) Cooperation should focus on all elements of the energy transition (and other sectors), since technological solutions should be part of integral planning and strategies;

(s) Demand-side behaviour was critical for the effectiveness of technological changes;

(t) Adaptation and adoption of new technologies in countries require strong policies and institutions;

(u) International cooperation at sectoral level had proved to be successful by bringing actors together, creating standards, and promoting regulations and policies;

(v) Enhanced access requested to technologies in different "windows" needed to be tailored to national circumstances;

(w) Support and cooperation can be enhanced if countries had clear national development pathways compatible with Paris Agreement goals that, in turn, contributed to technology investment and development.

328. The world café discussion on **capacity-building efforts** (station 12), was moderated and reported by Ms. Sonja Klinsky, Arizona State University, and Ms. Minette Nago, University of Göttingen. It focused on capacity-building across reporting, mitigation, adaptation, and framework for eliciting needs.

329. Participants focused mainly on qualities and essential elements of capacity-building; identification of capacity-building challenges; strategies for capacity-building; and support to capacity-building.

330. Participants referred to the following essential aspects of qualities and elements of capacity-building:

(a) Recognizing of the importance of the multi-scalar nature of capacity-building, at individual, institutional, and systemic framing, noting the importance of bottom-up approaches, ensuring that people and communities were not left out of capacity-building efforts, acknowledging diverse forms of knowledge, including data management at all levels, and including gender responsiveness to data collection as a form of capacity-building;

(b) Recognition that capacity should be demand driven to increase likelihood of effectiveness and success; likelihood of sustainability in maintaining and embedding capacities;

(c) Identifying of reasons for why capacity-building was often supply-driven, including: over-reliance on experts; a 'cookie cutter' approach that was often taken by default; donors' use of pre-existing relationships; development of whole networks around particular funding or activity types and streams; and noting that supply-driven approach gave donors more control over final outcomes.

331. Participants identified capacity-building challenges, including:

(a) Access to information sources about capacity-building; preference of a single platform/clearing house for capacity-building information; mixed awareness of existing

UNFCCC tools and sources of data, such as a capacity-building portal, PCCB toolkit to assess capacity-building gaps and needs to implement the Paris Agreement etc.;

(b) The breadth of capacity-building makes it difficult for people within the UNFCCC system to grapple with it;

(c) Challenges in dealing with capacity-building, due to the great diversity of capacity needs;

(d) Challenge in identifying how the GST can track the full breadth and diversity of capacity-building, not only across countries, but also across scales and contexts, within the scope of the climate issues;

(e) The need for flexibility in any framework that was used, as country and community contexts hugely vary;

(f) A challenge that goes beyond the UNFCCC context, was the need for building institutional capacity, including ways of retaining capacity within institutions.

332. Participants discussed strategies for capacity-building pathways, learning, and networking, and noted key aspects and insights, including:

(a) Capacity-building pathways approach was based on the need for transformation; linking system-wide capacity-building to transformation; connecting many types of capacities; viewing capacity development as a system/process; encouraging countries to try to develop capacity-building plans as a way of recognizing this systemic aspect of capacity; recognizing a need to define a time frame; developing regulatory backing for some requirements to enhance systemic capacity-building and implementation;

(b) Within the GST context, key questions for capacity-building included a focus on what had been learned about capacity-building, and how the lessons could be scaled up.

(c) Capacity-building was not limited to one-way ‘transfer’, but was rather happening through multi-directional learning;

(d) Recognition of diverse kinds of knowledge was essential for learning capacity-building (including, e.g. indigenous knowledge, place-based knowledge, local knowledge);

(e) Peer-based learning and capacity-building was a useful approach at all levels, from individuals to institutions, and to country-to-country level, and including South–South cooperation;

(f) Team-based capacity-building and implementation efforts was an effective way of spreading information, reducing loss of capacity through turnover;

(g) Networks and connections were key for capacity-building, including across public/private sector, universities, and other entities;

(h) Learning by doing (or learning through implementation/“Do the best you can, not the best you can buy”) was an effective capacity-building strategy, and many countries and NPS had relevant experience, across multiple concrete contexts and sectors. Capacity stemming from trying and experiencing, was more context-specific, reduced reliance on experts or shifted their role to mentoring, and supported building long-term capacities;

(i) Official education institutions were important for learning and capacity-building e.g. universities and university networks

(j) Capacity-building strategies needed to mobilize existing capacities as their starting point.

333. Participants discussed aspects of funding and support for capacity-building, and highlighted the following points:

(a) Recognizing that building capacity was an integral element of climate action and a central component of MOI;

(b) Readiness finance models were useful forms of support for capacity-building/upfront capacity investments;

(c) The 10% rule assumed that 10% of any project should focus on capacity-building;

(d) Access to capacity-building should be facilitated, clear (e.g. preference to sustainability projects, over "green projects), and direct (not through third party), and with focus on sustainable projects;

(e) Capacity-building support needs to be balanced across mitigation and adaptation;

(f) Those who were supporting capacity-building also needed to change how they were doing things. Introspection was needed among funding agencies (e.g. prioritize bottom-up initiatives).

D. Summary of the closing plenary

1. Summary by the co-facilitators, of their initial impressions

334. We extended our gratitude to all the participants representing Parties and NPS for their contributions and inputs to the process, and for their active engagement in the discussions, providing views, information and a wide breadth of ideas in a very positive, informal and cordial atmosphere. We particularly thanked the experts, moderators, rapporteurs, visual artists, and the UNFCCC Secretariat team for their respective support of the multiple formats of the TD meetings.

335. We expressed confidence that TD1.1 could serve as a basis for organizing future TDs, by continuing the 'learning by doing' approach, and taking into account the experience gained at TD1.1 when planning the next TD1 meetings, adjusting where necessary.

336. We further encouraged all participants to continue discussions on the topics that were raised at TD1.1, by informally convening intersessionally, to enhance understanding and help prepare effectively for the next TD1 meetings. We indicated that our initial reflections of this first, and very constructive, session will aim to give a sense across topics of 'what we know', 'what we know works and can be replicated' and 'what we don't know but need to know', for an effective collective assessment and implementation of the Paris Agreement.

337. We noted that the world café was a new modality for many. It was aimed to launch the dialogue in a manner that allowed participants and experts to substantively engage on a wide range of topics. A summary of the discussions is included in section II C of this summary report.

2. Summary of the round-table discussions, by the round-table moderators

338. Brief summaries of each round table were presented by the round-table moderators. They were focused on the interactive discussions and reflected expressed views that were converging, as well as the underlying diverse aspects and views of the topics discussed. More details on the round-table discussions, including summaries of the expert presentations and more comprehensive summaries of the discussions with participants' inputs, are provided in Section II.B of this report.

3. Summary of comments by negotiating groups, Parties, and NPS

339. Concluding statements for the closing plenary were provided by the following negotiation groups, individual Parties and observers: Negotiating groups: Group of 77 and China, EIG, EU, ABU, AOSIS, African Group, AILAC, LMDCs, LDCs and the Arab Group; Parties: Canada, India, Australia, China, USA, Japan, Bangladesh, Norway, Bolivia (Plurinational State of) and Indonesia; observers: BINGOs, ENGOs, indigenous peoples organizations, local government and municipal authorities, RINGOs, TUNGOs, women and gender NGOs and YOUNGOs. In addition, written statements were also submitted by: AILAC, the Arab Group, ABU and Norway.[35]

[35] Submissions to the TD are available here: https://unfccc.int/topics/global-stocktake/components-of-the-gst/technical-dialogues-of-the-first-global-stocktake/technical-dialogue-11-td11-of-the-first-global-stocktake.

General comments on the GST TD process and approach

340. Participants expressed their appreciation for the format used for TD1.1 and thanked the SB Chairs, the Secretariat, and the experts, moderators and rapporteurs of the round tables and the world café and widely expressed support to the GST TD1 process, and the interactive, inclusive, accessible and constructive approach, and the learning by doing principle.

341. The world café was specifically highlighted by many, as providing a good and innovative framework for discussion, in an informal and inclusive atmosphere, and many suggested to extend the use of this format. The expert presentations were also noted for delivering a rigorous science-based overview on where we are, where we need to be and how to get there, for achieving the purpose and long-term goals of the Paris Agreement.

342. Some groups noted the good balance between inputs from Parties and NPS and some stated that their inputs prior TD1 and their active participation in a Party-driven process provided important contributions and an inclusive information basis for the TD1. The importance of the NPS inclusion in the discussions, was highlighted, and particularly the inclusion of all constituencies, including women, youth, local actors and indigenous people, workers, farmers, the private sector, and others.

343. Several participants expressed concern that there was not enough time and space for all to be heard, or to adequately discuss issues that required more detailed consideration, in particular, during the round-table discussions.

Expectation and recommendations for the next TD1 meetings

344. The importance of enhancing ambition on all aspects, for achieving the Paris Agreement goals was emphasized widely.

345. Many participants noted the need to focus more on future actions, identify barriers, and practical and actionable solutions, learning from concrete experiences for enhanced action to bridge the ambition and implementation gaps, and in general, ‘to move from the conceptual to the concrete. It was further suggested to deepen discussion on concrete cross-cutting issues and translate the discussions into tangible outcomes. The importance of science, policy and business interface, in moving into implementation mode was highlighted by an NPS.

346. Many emphasized that the TD1 should focus on challenges and opportunities for enhancing holistic, fair, and balanced implementation, and international cooperation for mitigation, adaptation, and the key enablers of finance, technology transfer, and capacity-building, in particular, for developing countries, as well as addressing response measures and loss and damage.

347. Groups suggested to have a discussion under the TD regarding the contribution of the format of TD1.1, specifically, the world café and round tables, to achieving the aims of GST1, aiming to help us in planning future meetings. It was also suggested to use intersessional meetings for further reflections toward the next TD1 meetings and format. Another suggestion was to make the expert presentations available in advance to enable better engagement in the discussions.

348. Parties and NPSs made several specific suggestions for the design of the next TD meetings, including:

(a) To continue the inclusive approach and to organize the next meetings in a manner that will facilitate full participation for small delegations;

(b) To give more time to issues that were introduced during the discussions, in particular, those highlighted to be of interest to developing countries;

(c) To seek more inputs, including information from regional reports that may be relevant to the assessment of collective progress, and information about relevant systemic transformations, barriers and enablers;

(d) To hold holistic, systemic, crosscutting, equity-oriented, backward- and forward-looking, and balanced discussions at granular level on specific themes identified to be of key importance;

(e) To include wider coverage of information resources, beyond the IPCC;

(f) To introduce multi-level and cooperative action as an additional cross-cutting theme for in-depth consideration, based on the Talanoa Dialogue experience, and formally acknowledging national and local-level dialogues;

(g) To share more national experiences and sectoral approaches.

349. Participants suggested several additional topics for discussion to be introduced and highlighted in future TD1 meetings, including:

(a) Knowledge gaps on tipping points;

(b) The demand side of mitigation, and concrete articulation between mitigation and sustainable development;

(c) Addressing emissions from sectors such as international aviation and shipping;

(d) The technical elements underpinning critical trade-offs;

(e) The GST linkage to the GGA;

(f) Specific challenges and good practices from the NAPs and other adaptation efforts;

(g) How to avoid maladaptation; ways to improve governance, and the importance of engaging all parts of governments;

(h) Indicators of inclusion of the most vulnerable, including indigenous people, in country engagement and priorities;

(i) Private sector inputs and business experiences and expertise from various sectors and jurisdictions;

(j) Opportunities for private sector actors in building resilience across supply chains and investment portfolios;

(k) Multi-level and cooperative action on all aspects, engaging the whole of society and whole of government, in particular, local and sub-national governments;

(l) NBS and ecosystem-based solutions;

(m) Examples of how indigenous knowledge around forests helped build mitigation, adaptation and resilience capacity.

350. Several participants suggested to deepen more detailed considerations on several issues, including:

(a) Energy transitions and related enablers, as well as the need to equitably phase out fossil fuels;

(b) Just transitions by integrating social protection measures in adaptation policies;

(c) Loss and damage and related finance;

(d) CBDR-RC principles.

(e) Finance needs and gaps, and finance in the context of just transitions.

351. Parties and NPS encouraged us to make the process even more inclusive in sharing individual perspectives, experiences and lessons learned in the next TD1 meetings. Parties suggested to enhance and possibly support more participation of under-represented regions and developing countries. Wider participation of NPSs was suggested, including as experts, as well as presence of experts from developing countries, from the Global South, to share their expertise, lived experiences and realities, and proposals. An NPS has specifically suggested that the GST could encourage Parties to nominate national stocktake ambassadors to help drive momentum for action.

352. Specific expectations were expressed by various participants that the TD1.1 summary report, to be prepared by us, should be balanced, comprehensive, and facilitative, in capturing all the relevant nuances under the different thematic areas of the GST.

Mitigation, including response measures

353. Participants widely emphasized the importance and urgency of action for implementation of the long-standing commitments under the Convention, the Kyoto Protocol, and the Paris Agreement on mitigation. The insufficiency of existing NDCs to achieve 1.5 ^{o}C, was noted, based on the AR6, which also offered cost-effective solutions that can be implemented before 2030. It was also noted that pre-2020 commitment still existed and will continue to persist if action is not taken.

354. A Party emphasized the need to address climate change actions not only for enhancing benefits for humans, but to address action and progress for the sake of "Mother Earth" and all living beings. Knowledge gaps on tipping points, such as irreversible losses in the field of cryosphere, forest, and sea level rise, were specifically highlighted.

355. The need to focus more on energy transitions was emphasized widely, with participants discussing which tools and instruments could be put in place as enabling actions for just and ambitious transition from fossil fuels to renewables. It was further noted that the GST outcomes must be well suited to inform NDCs, to reflect the highest possible ambition by Parties, as well as long-term strategies towards just transitions to net-zero emissions. The need to address emissions from sectors such as international aviation and shipping was underscored.

356. Groups emphasized that the most appropriate strategies, based on science and the IPCC, will depend on national and regional circumstances, including enabling conditions and technology availability. It was stated that developed countries should take the lead on enhancing mitigation efforts, by undertaking the economy-wide absolute emission reduction targets. The demand side of mitigation, was also noted, including lifestyles, and the linkages between mitigation and sustainable development.

357. Discussion of CO_2 removal methods to counterbalance residual GHG emissions, including through eco-based approaches and sustainable forest management were supported by participants, however, groups noted that these should not be confused with an automatic sink to overlook mitigation responsibilities.

358. The close relationship between increasing mitigation ambition and the need to amplifying work in response measures, specifically their economic and social consequences, was emphasized. A Party emphasized that assuring that net-zero commitments made by the private sector were robust and included not only scaling up investments in the green, but also scaling down investments in the brown, including fossil fuel subsidies.

Adaptation, loss and damage

359. Participants noted that there was direct relationship between aggregate mitigation efforts and the level of adaptation required and loss and damage accrued. The linkage of the GST to the GGA was noted by some participants as crucial for assessing progress in adaptation under the GST. The importance of accelerating the GGA process and the urgency to define a qualitative and quantitative goal for adaptation was noted in this context. Some negotiating groups noted the need to have a vision of what a climate-resilient world looks like, and how the world was going to get there.

360. Participants further noted the need to understand past, current, and future climate risks, and to discuss how to foster enabling conditions for effective and carefully designed adaptation measures and action. In this context, Parties and NPS referred to addressing gaps, assessing projected impacts and risks, and identifying next steps to scale up adaptation efforts in a targeted manner, and through linkages with other frameworks such as the SDGs.

361. The importance of monitoring and evaluation of adaptation action and progress was highlighted, as well as the need for more discussions on how to avoid maladaptation and unintended consequences or side effects, potentially causing greater harm than good. The importance of addressing loss and damage was widely emphasized.

Means of implementation: finance, technology, and capacity-building

362. Participants widely emphasized support and enablers, as essential for developing countries to scale up ambition. Many emphasized the need to overcome the current barriers and challenges faced by developing countries and vulnerable groups, including indigenous people, in accessing means of implementation.

363. The definition of a new climate finance goal was highlighted as a critical outcome of the ongoing negotiations under the CMA, and it was suggested that the GST TD1 should inform the discussion about the new collective quantified climate financing goal. Participants emphasized the need to enhance access of developing countries and vulnerable groups, including indigenous people and women to finance and to overcome the barriers.

364. The need to make finance flows consistent with a pathway towards reducing GHG and climate-resilient development, the need for a fundamental transformation of the economy and a shift in the structure of the economy and the role of financial markets in meeting the climate mitigation and adaptation goals were well noted.

365. A Party focused on the various policies and initiatives countries had put in place to improve the access and the effectiveness of Paris-aligned finance, domestically. A NPS emphasized that there was a need for technologies that matched local needs of local communities, indigenous peoples and women. This should reflect the best available knowledge, including local knowledge, traditional knowledge and knowledge of indigenous peoples.

366. Views were shared in support of the current demand-driven, context-based approach toward capacity-building. . Benefits of sharing 'real world' experiences by the private sector, to advance implementation was also noted by a NPS. The need to strengthen institutional capacity, multi-level governance, policy instruments, and capacity for enhancing change in human behaviour and lifestyles, was highlighted by participants.

367. Participants noted that capacity-building needed to address both current and emerging issues, in particular, for developing countries. A NPS also noted that capacity-building should include both indigenous peoples and governments and enable indigenous peoples' effective engagement in shaping national policies. Various participants highlighted that there were many areas and opportunities for collaboration to enhance international cooperation, including knowledge and experience sharing and good practice diffusion.

Equity and ambition

368. The importance of taking climate action in the context of sustainable development and poverty eradication on the basis of equity was highlighted by many. Groups emphasized that climate change was unjust, by nature, with extremely unequal distribution of its impacts, and there was no equitable climate future if the world failed to limit warming to 1.5ºC. Equity was raised in relation to several contexts, and across all topics.

369. Parties suggested that, in line with equity and just transitions, considering the context of historical responsibility, equity and CBDR-RC, ILDNC, developing countries will be allotted an equitable share of the remaining GCB, in pursuit of sustainable development, poverty eradication, and economic diversification.

370. NPS emphasized the need for inclusion of the most vulnerable, including indigenous peoples, women and youth, in country engagement and priorities, and the need for indicators to measure this. A NPS mentioned the need for environmental and social safeguards to ensure that all climate initiatives were done in a human-rights-based approach. Parties and NPS emphasized that in delivering assistance to the most vulnerable, there was a need to focus on the leadership role of women in adapting to climate change, as well as on the vital experiences and knowledge of indigenous peoples.

4. Other issues related to equity and ambition discussed included:[36]

(a) Equity in mitigation was referenced in multiple ways, including equitable allocation of carbon space, just transitions to net-zero emissions, how NDCs are fair and ambitious, ways that apply the best available science to common but differentiated responsibilities principles for each country's circumstances, etc.

(b) Equity in relation to adaptation was also raised in multiple ways. Some Parties highlighted an injustice of climate change, how extremely unequal its impacts are distributed at present – relating to adaptation and loss and damage. One group of Parties asserted that there is no equitable climate future if we fail to limit warming to 1.5 °C.

(c) Some participants indicated that justice and fairness in climate finance is important for climate ambition. Other Parties and NPS emphasized procedural equity, including the inclusion of indigenous people, women and other marginalized groups.

(d)

(e) Ambition, like equity, was discussed in a cross-cutting manner, based on best available science. Participants spoke to the need to enhance ambition in relation to mitigation, adaptation and means of implementation. Collective progress is being made, but there are several gaps.

(f) On ambition in mitigation, the persistence of an emissions gap makes clear the need for enhanced ambition. While updated NDCs have increased ambition, they have only closed the emission gap by one fifth, as assessed by the IPCC. Ambition includes implementation, and there are also gaps between targets and achieving them in practice.

(g) Similarly, TD1.1 heard that there is an adaptation gap. Some participants referred to the need for transformative adaptation. Others indicated that, if ambition in adaptation and mitigation was insufficient, this would lead to loss and damage.

(h) On ambition in support, participants indicated the need for increased ambition of financing climate action, given that current levels of international climate finance are several time slower that what is needed for 1.5 ºC. Increased ambition will be needed in mobilizing and providing climate finance for climate action

5. Summary of the SB Chairs closing remarks

371. The SB Chairs emphasized that the GST is critical for enhancing the collective ambition of climate action and support towards achieving the purpose and long-term goals of the Paris Agreement. They noted that the TD1 was an opportunity to engage in discussions and to consider inputs to the thematic areas of mitigation, adaptation, and finance flows and means of implementation and support, as well as considering, as appropriate, efforts that addressed the social and economic consequences and impacts of response measures, and to averting, minimizing and addressing loss and damage associated with the adverse impacts of climate change.

372. The SB Chairs further noted that it was also an opportunity to identify options, concrete ways and good practices, to enhance climate action, and support international cooperation, with a view to addressing barriers and challenges and to bridge gaps. They extended their gratitude to us, for conducting a fruitful first meeting of the TD, through innovative approaches that provided an interactive space for a rich, interactive, and focused exchange of views, information and ideas, and stimulated an open and inclusive GST process, noting specifically the exciting conversations during the world café and the round tables.

373. They suggested that TD1.1 discussion could set a standard for moving forward in a very positive way. They also thanked the UNFCCC secretariat for its contribution to a successful launch of the TD1, as well as the Parties, experts and NPS, for their active and constructive engagement in the dialogue.

[36] This list if not exhaustive. Equity and ambition are also included in under other relevant sections of this summary report.

374. The SB Chairs encouraged all stakeholders to keep engaging in the GST process and interacting actively in the dialogue and to continuously provide views on the relevant topics. They concluded by stating that the process must live up to the collective promise of the Paris Agreement, and all must work together and do all to achieve the collective goals, recognizing that there was no planet B.

6. Next steps following TD1.1

375. We informed participants that the round-table reports that were provided by the moderators would be taken into account in preparing our summary report for TD1.1 and that recordings of the plenary and round tables will also be available online.

376. We referred to TD1.1 as a start that will allow us to lay the basis for a shared understanding of the latest information, as well as comments received, including about indigenous knowledge systems, and the importance of voices from developing countries. We reflected on the 'mixed methods', of both quantitative and qualitative information, and how we found it to be valuable and appropriate.

377. We underscored that we were not looking at data for its own sake but rather to use that information to identify opportunities for more ambitious climate action, in particular, specific and operationalizable actions that can be taken within the various capacities and circumstances, as well as to enhance international cooperation and support to each other in realizing those actions together.

378. We explained that we planned to continue to make all efforts to hear the full diversity of voices, as well as to continue trying to find additional ways to have voices beyond the conference walls reflected, including during a creative space that was being planned by the incoming COP Presidency, for art, films, music and spoken inputs at COP 27.

III. Reflections on discussions at TD 1.1

379. We would like to express our deep appreciation for the constructive and open approach that Parties have taken in driving the Global Stocktake process, and in particular the technical dialogue that we have been entrusted to facilitate. We would also like to recognise the valuable participation of NPS who have enriched the technical dialogue and shared extensive knowledge. As section II above demonstrates, participation in the technical dialogue process is generating an extremely rich basis for the first Global Stocktake.

380. As we emphasized in the information note we prepared prior to TD 1.1 (link), we have deliberately taken explore opportunities for 'learning by doing' in designing the TD process. We will continue to be guided by Parties as we make continuous improvements and evolve the dialogue process.

381. We received positive feedback from Parties and NPS on the modalities employed during TD1.1 as well as constructive suggestions for improvement. The world café setting worked well in generating active discussion, as did the round tables in providing space for Parties and NPS to address their concerns in a more formal setting. However, the discussion at the round tables was not as interactive as we hoped. We recognize there is room for improvement to promote greater inclusiveness and allow for more focused and interactive discussions at future TD sessions.

382. We also greatly appreciate the numerous written submissions by Parties and NPS (see section I.C above) which we would like to encourage participants to read. Statements made at the opening and closing plenary (see paragraph 15 above) also covered many important issues. We note that these submissions contain highly valuable information, form part of the overall outputs of the GST, and we are cognisant of the need to ensure that this technical knowledge can be made as accessible and useable as possible by Parties. We have taken note of them and intend to resume discussions at TD1.2, building on what was said at TD1.1.

383. During TD1.1 participants managed to addressed all topics that had been set for discussion, albeit to varying levels of specificity. The dialogue was organized in a manner that allowed participants to engage on topics with minimal prompts to identify priorities for

the discussion and avoiding imposing constraints. During TD1.1, the dialogue started to become more granular and specific, which bodes well for moving to such a mode of discussions at TD1.2. It is notable that many participants have suggested moving from 'what' to 'how' and 'how to' as we evolve the technical process. Participants have also recommended that we move from conceptual to concrete. Alongside requests for getting into more granular discussions, we heard calls from participants to also consider broader holistic and integrated issues and approaches that incorporate the full spectrum of actions under the Paris Agreement and related avenues for international cooperation. In addition, future sessions will continue to consider equity and ambition, based on best available science across all discussions.

384. The purpose of our reflections below on topics discussed at TD1.1 is threefold: 1) to share our thoughts on what we achieved in discussions so far and highlight where there is need for more discussion/information; 2) to highlight where we have already identified opportunities and gaps in action and support for climate change action; and 3) as a way of developing a baseline in shared understanding of previous discussions to enable even better preparation and foster engagement by Parties and NPS in TD1.2.

385. Through our process and in these reflections, we aim to address areas where we see *knowledge gaps*, where we need additional information, knowledge, presentations, and/or submissions, and *attention gaps*, where we need additional time for discussion to fully consider an issue. Addressing both of these gaps will be a central focus of our planning for future TD meetings with a view to capturing discussions of how to bridge the *substantive gaps* in action and support (e.g. knowing what we know, how can we enhance action and support across mitigation, adaptation, means of implementation/support, as well as loss and damage, and response measures). Already after TD1.1, we can see how consideration of all of these topics can inform follow up discussions at future sessions.

386. Our reflections are not "final" as they offer thoughts at this point during the process. They are intended to aid the discussion to help participants understand the extent of discussions so far and where we are headed. Where relevant we have indicated topics where additional attention may be useful, and we will outline structured topics for discussion at TD1.2 in an information note, to be published in early October 2022.

2. Mitigation, including response measures *(please see paragraphs 55-104 and 242-280 for a full account of the proceedings on this matter)*

387. As evidenced through the inputs to the GST process and the contributions of participants to TD1.1, despite the collective progress that has been made on mitigation, there are a range of emission and implementation gaps that persist. The IPCC WGIII defines the term *emissions gap* as the difference between projected global emissions with national determined contributions (NDCs) in 2030, and emissions in 2030 from mitigation pathways consistent with limiting warming to 1.5 or well below 2 °C above pre-industrial levels, while the term *implementation gap* refers to the gap between NDC mitigation pledges and the expected outcome of existing policies. It would be useful as we progress through the technical dialogue to deepen our discussions how to bridge these gaps and to document relevant solutions, taking into account barriers and challenges that hinder climate action.

388. In relation to action on mitigation being taken by Parties, implementation gaps are narrowing somewhat, notably though mitigation targets and measures in NDCs. However, the outcomes of these actions are yet to reverse global emissions trends. Building from this understanding in future TD discussions, there is much to be gained from more concrete and specific discussions on mitigation opportunities across all sectors of the global economy, and deepening the consideration of real world circumstances that are faced during implementation.

389. Mitigation action is also being taken by NPS, both individually and through international cooperative initiatives. While decisions and investments by NPS in mitigation solutions are accelerating, investments in emissions intensive activities also continue to grow globally. Mitigation action by NPS is still far from the scale needed. While some have adopted good practices in accounting for their targets, others will need to improve rigour in accounting and transparency. Double counting of efforts by Parties and NPS is not consistent

with environmental integrity. It will be useful to learn more about the plans that NPS and initiatives have in place to deliver on their climate commitments, implement emission reduction targets, and invest in climate action, and how these plans will support the efforts of Parties.

390. Global emissions have continued to grow over the past three decades in absolute units, though in relative terms, the rate of emissions growth has slowed. Most of global carbon budget for 1.5 °C has been utilised and in the absence of accelerated retirement, future emissions are locked in through existing and planned infrastructure, consequently the remaining carbon budget will be depleted soon. Building on TD1.1, future dialogue sessions will continue to collectively examine equity and ambition, based on the best available science, and the just transitions deemed essential when considering options to increase ambition, in order to promote shared understanding of the diverse perspectives on these topics.

391. The need for rapid decarbonization is well documented as a key articulation of mitigation ambition, including the need to reduce global CO_2 emissions by 48% below 2019 levels by 2030. Moreover, modelled global mitigation pathways consistent with 1.5 °C in the long-term indicate the need to achieve these emission reductions by 2030, and then continue to enhance emission reductions and removals to reach global net-zero CO_2 emissions in the early 2050s as assessed by IPCC. TD1.1 identified multiple potential ways to increase ambition and address equity in mitigation as documented in the proceedings (reference relevant sections above).

392. While few countries report on the impacts of response measures or have established systems to explicitly manage the positive and negative implications of climate action, there was broad-based recognition of the importance of actively addressing social and economic issues. Understanding the socioeconomic implications of response measures to develop better informed policymaking can enable and enhance action on climate change. Parties were urged to include considerations of just transitions into low emission development strategies was invited by decision 1/CMA.3 in Glasgow.

393. Addressing the impacts of response measures relates to just transitions across a range of industrial and geographical areas and scales. On the implication for employment, participants noted that globally, millions of jobs will be created in energy transitions, potentially 3.5 times more jobs than lost. However, it remains important to consider how to support those workers whose livelihoods or wages are lost, and the communities they live in. The socio-economic implications of these transitions differ across regions and sectors, and the distributional implications for workers and communities require greater understanding and active policy action (also see summary on world café station 3 and round table 1 above). There was also recognition that economic diversification was important in sectors beyond energy and not only relevant in relation to the phase down of fossil fuels. For example, diversification in the agricultural sector can be a critical measure in enhancing food security.

394. Building of the discussions at TD1.1, future sessions should continue to expand the understanding of the implications of response measures, how to creatively incorporate considerations of these impacts into policies that support just transitions, and the importance of economic diversification across sectors to support the achievement of the Paris Agreement goals.

3. Adaptation, including loss and damage *(please see paragraphs 105-174 and 281-305 for a full account of the proceedings on this matter)*

395. Observations of climate impacts are increasing over time, and the IPCC assessed increasing risks, globally and across all regions. Actions to increase resilience and adapt to the impacts of climate change are increasing, and more adaptation action is being undertaken than what has been captured in NAPs.

396. Enhanced adaptation action is urgently needed at all levels to address a wide identified range of gaps, needs and vulnerabilities.

397. In the discussions at TD1.1, participants illustrated the language of Article 7.2 of the Paris Agreement that “adaptation is a global challenge faced by all with local, subnational,

national, regional and international dimensions." Locally-led climate-resilient development which incorporates the risks of climate change across natural and human systems into adaptation needs assessments and planning strengthens the ability to adapt to climate change impacts. We encourage participants in TD1.2 to bring forward further knowledge, experiences, and solutions across contexts to explore how to better connect national planning to global processes and subnational actions.

398. Assessing adaptation includes understanding global collective progress across contexts and spatial scales, including progress towards the GGA, and informing and enhancing action, support, and learning across different contexts. While quantified information on progress on adaptation is increasingly available, qualitative assessments continue to provide important information to assess progress to date. Tracking progression in NAPs – key instruments for adaptation planning – emerged at TD1.1 as an important way to implement adaptation pathways. Participants highlighted the important roles of monitoring and evaluation frameworks, indicators and reporting in understanding whether adaptation measures are working and the reasons why or why not. We would encourage participants to identify what is needed to transition from planning to implementation and how tracking and understanding collective progress on adaptation can become an enabler of greater action within communities facing the impacts of climate change.

399. Considerations of equity and ambition in adaptation should take into account regional and contextual factors in climate change impacts as well as the injustice of compounding impacts based on pre-existing inequalities and responsibility. It is also critical to understand adaptation needs under different scenarios and contexts. In addition, enhancing procedural equity can enable more locally-led and context specific actions. Several dimensions of adaptation ambition were raised during TD1.1, including pursuing transformative adaptation. Further attention might be given in the dialogue to transformative adaptation, while conversely avoiding maladaptation, and identifying options in between. In considering collective progress on adaptation based on equity and the best available science, future dialogues may consider pathways towards low GHG emissions and climate resilient development, that enable more equitable climate futures.

400. TD1.1 highlighted that climate impacts are growing economic and non-economic implications and residual loss and damage. The knowledge base of observed and projected impacts and risks generated by climate hazards, exposure and vulnerability has increased, with impacts attributed to climate change and key risks identified. These key risks are unfolding at a time of unprecedented uncertainty and human influence on multiple global systems.

401. Averting, minimising and addressing loss and damage in the context of sustainable development requires actions across the spectrum of climate policies. It also requires development policies and actions that reduce vulnerabilities (through poverty eradication, education, biodiversity protection, etc.) and decrease exposures (access to land, infrastructure, etc.). It is also closely related to efforts on disaster recovery post-impact from slow-onset and extreme events and should take into account the extent of economic and non-economic loss and damage. IPCC WGII emphasized the importance of integrating climate and societal impacts and responses into understanding and pursuing climate resilient development pathways.

402. There is an urgent need for more knowledge, understanding, support, policy and actions to comprehensively address risks and losses and damages. The capacity of some governments to recover from recent events has been exceeded, and compounding impacts of repeated events leave very limited residual response capacity. However, there is also limited systematic collection of information on loss and damage and related financial needs and policy responses. There are also significant barriers to access of support for impacted communities, and a need to raise awareness of available sources of support and mobilize resources and technical assistance to those impacted. It would be useful at future sessions of the technical dialogue to discuss moving from knowledge generation to implementation, document the wide array of sources of international funding for loss and damage and solutions for addressing gaps, barriers and challenges.

4. Means of implementation and support: Finance, technology and capacity-building

(please see paragraphs 176-237 and 306-333 for a full account of the proceedings on this matter)

403. TD1.1 highlighted that while there has been progress in mobilizing finance, as well as significant efforts to align financial flows with the goals of the Paris Agreement, significant finance and investment gaps and misaligned flows remain. However, the primary challenge identified by participants at TD1.1 was how to scale up global finance flows by an order of magnitude to USD trillions commensurate with delivering on the Paris Agreement goals.

404. Globally, there is, in principle, sufficient capital to finance the transitions required for the achievement of the Paris Agreement, yet current levels are multiple times below levels needed between 2020-2030 to limit warming to below 1.5°C or 2°C (IPCC, see round table 3 expert panel 3). A key knowledge gap remains in the comparability between methodologies for assessments of needs and the tracking of climate finance flows. This is compounded by information gaps in some regions and sectors, particularly with respect to adaptation.

405. While the OECD reported that climate finance from developed to developing countries has increased to 79.6bn in 2019, concerns were expressed that the goal to mobilise jointly USD 100 bn per year was not met in 2020. Information from bottom up needs assessments from developing country Parties highlight the need to in mobilizing additional climate finance to support efforts to pursue ambitious adaptation and mitigation pathways.

406. Discussions at TD1.2 can further consider the breadth of efforts needed to align financial flows consistent with pathways towards low greenhouse gas emissions and climate resilient development. TD1.2 would benefit from considering concrete information on how to better align financial flows across all countries and contexts. It will also be useful to continue assessing the adequacy and effectiveness of support in developing countries, as informed by their needs and priorities, across systems and sectors. We also encourage participants to come to TD1.2 with solutions on how to scale up adaptation finance to support efforts to balance the provision of finance between mitigation and adaptation in practice.

407. TD1.1 took stock of efforts on technology development and transfer, including international cooperation on innovation, and overall progress on innovation systems at the national and other levels.

408. The unit costs of some technologies have reduced by up to 80%, creating large opportunities including for sharing of benefits. Despite such reductions, barriers and challenges for other technology options, both for adaptation and mitigation, continue to exist particularly at the institutional and systemic levels. Inadequate technical and financial capacities, and insufficient regulatory and institutional framework are among other challenges faced by countries, particularly developing countries who have historically benefitted less from technological opportunities. Across different contexts and systems, lack of data to measure progress in technology development and transfer, particularly from developing countries, remains a key issue and necessitates improved monitoring and tracking of progress.

409. TD1.1 underscored that governments have a major role to play in international cooperation on innovation and creating enabling environments for national systems of innovation and technology transition. Several potential solutions for addressing gaps, barriers and challenges were highlighted by participants.

410. Building on the TD1.1 discussions on solutions, gaps and challenges regarding technology development and transfer, TD1.2 and future sessions could benefit from further considerations on actors can use various enablers and tools to overcome the challenges and promote stakeholder engagement within national systems of innovation and international cooperation on technology development and transfer.

411. TD1.1 considered collective progress in addressing capacity needs, the identification of capacity-building challenges, as well as strategies for capacity-building, and support that is available to and needed for enhanced capacity-building.

412. Capacity is foundational to all areas or climate action and topics of the TD. Some information is available on capacity needs by sector for both adaptation and mitigation. For adaptation, agriculture, infrastructure and water are a main focus of capacity building efforts. For mitigation, they mainly focus on energy, forestry and MRV. Indicative information is also available on the provision of capacity building support, although reporting systems are not harmonised.

413. Participants noted that institutional and systemic capacity building support is fundamentally important for enabling the implementation of the Paris Agreement by developing countries. Participants discussed how the global stocktake process with its focus on collective progress can focus attention on improving both the adequacy and effectiveness of capacity building support, as well as enhancing institutional and systemic capacity for implementation.

414. It would be useful at TD1.2 to engage further on how to enhance capacities for implementation, including by understanding key enablers of capacity building across contexts and sectors.

Appendix: Relevant information sources for TD1.1

Information source	Link
Relevant to preparations for TD	
Non-paper by SB chairs	https://unfccc.int/sites/default/files/resource/Non-paper%20on%20Preparing%20for%20GST1_0.pdf
Call for inputs for the GST1	https://unfccc.int/sites/default/files/resource/Call%20for%20inputs%20SB%20Chairs_GST_reminder_Feb23.pdf
Guiding questions for the technical assessment component of GST1	https://unfccc.int/sites/default/files/resource/Draft%20GST1_TA%20Guiding%20Questions.pdf
GST information portal containing inputs to GST1	https://unfccc.int/topics/global-stocktake/information-portal
Information note on TD1.1 of GST1	https://unfccc.int/sites/default/files/resource/GST_Technical_Dialogue_Information_Note.pdf
Some inputs received/prepared for TD	
Inputs to the technical assessment component of GST1	https://unfccc.int/topics/global-stocktake/information-portal
Synthesis report for the technical assessment component of the GST1 on greenhouse gas emissions (GHGs) by sources and removals by sinks and mitigation efforts undertaken by Parties	https://unfccc.int/documents/461466
Synthesis report on the state of adaptation efforts, experiences and priorities	https://unfccc.int/documents/470435
Synthesis report on the overall effect of Parties' NDCs and overall progress made by Parties towards the implementation of their NDCs	https://unfccc.int/sites/default/files/resource/GST_SR_23c_30Mar.pdf
Synthesis report on finance flows and means of implementation and support and mobilization and provision of support	https://unfccc.int/sites/default/files/resource/GST_SR_23d_MOI.pdf
Synthesis reports for the technical assessment by UNFCCC and constituted bodies and forums and other institutional arrangements serving the Paris Agreement	https://unfccc.int/topics/global-stocktake/events-and-inputs/unfccc-and-constituted-bodies-synthesis-reports-and-webinar-for-the-technical-assessment-component
Statements submitted during TD1.1 plenaries	
Written statements by Parties and NPS	https://unfccc.int/topics/global-stocktake/components-of-the-gst/technical-dialogues-of-the-first-global-stocktake/technical-dialogue-11-td11-of-the-first-global-stocktake
Roundtable 1 – Expert panel 1	
Presentation on key findings of the IPCC WGIII by Mr. Jim Skea, co-chair of IPCC WGIII and Imperial College of London	https://unfccc.int/sites/default/files/resource/20220611%20TD%20RD1%20Skea%20V2.pdf
Presentation focused on emissions and implementation gaps by Mr. Joeri Rogelj, IPCC WGI and Grantham Institute	https://unfccc.int/sites/default/files/resource/20220611%20TD%20RD1%20Rogelj%20-%20final%20-%20static.pdf
Roundtable 1 – Expert panel 2	
Presentation on the shares of global GHG emissions under national climate change legislations in 2010, 2015 and 2020 by region by Mr. Chukwumerije Okereke, Alex Ekwueme Federal University of Nigeria	https://unfccc.int/sites/default/files/resource/GST%20presentation%20Okereke.pdf
Presentation on just transitions and decent work creation for ambitious climate action, focusing on socio-economic impacts of climate action and	https://unfccc.int/sites/default/files/resource/Global%20Stocktake%20-%20Just%20Transition%20-%20Moustapha%20Kamal%20ILO.pdf

enabling and inclusive transitions by Mr. Kamal Moustapha, ILO	
Roundtable 1 – Expert panel 3	
Presentation on the key characteristics of sustainable and fair transition pathways to limit global warming by Mr. Matthew Gidden, IIASA	https://unfccc.int/sites/default/files/resource/gidden_sbsta_gst_rt3p1.pdf
Presentation on nature-based CDR in long-term strategies by Ms. María José Sanz Sánchez, Basque Centre for Climate Change	https://unfccc.int/sites/default/files/resource/Roundtable%201.3%20panel%201%20Maria%20Jose%20Sanz%2013_06_22.pdf
Roundtable 2 – Expert panel 1	
Presentation on the IPCC WGI contribution to AR6, focusing on quantifying climate impacts and projected risks by Mr. Gregory Flato, IPCC WGI and Environment Canada	https://unfccc.int/sites/default/files/resource/IPCC_WGI_CIDs_Flato_sm%20%281%29.pdf
IPCC WGI to AR6's Interactive Atlas	https://interactive-atlas.ipcc.ch/
Presentation focused on common climate and adaptation goals, drawing on the IPCC WGII by Mr. Hans-Otto Poertner, co-chair of IPCC WGII and Alfred Wegener Institute	https://unfccc.int/sites/default/files/resource/AR6_WGII_SBSTA_GST_Hans%20Otto%20Poertnerkrz.pdf
Roundtable 2 – Expert Panel 2	
Presentation on framing the GST: approaches and options by Mr. Anand Patwardhan, University of Maryland	https://unfccc.int/sites/default/files/resource/patwardhan_GST_TD_Bonn_June_2022.pdf
Presentation on national adaptation planning and focused on NAPs and other planning processes, especially in developing countries in Africa, LAC, Asia-Pacific and Eastern Europe by Ms. Anne Hammill, IISD	https://unfccc.int/sites/default/files/resource/AHammill_GST%20NAPs.pdf
Website of the NAP global network	https://trends.napglobalnetwork.org/
Roundtable 2 – Expert panel 3	
Presentation on adaptation and adaptation pathways, focusing on the current state of adaptation, enabling conditions and good practices for near-term adaptation, and the measurement of progress on adaptation by Ms. Diana Reckien, IPCC WGII and University of Twente	https://unfccc.int/sites/default/files/resource/Reckien_SBSTA-56_Adaptation_Final2.pdf
Successful adaptation versus maladaptation and structural problems from IPCC AR6 Ch17: 66	https://unfccc.int/sites/default/files/resource/Reckien_SBSTA-56_Adaptation_Final2.pdf
Presentation on a view on urbanizing adaptation systems and focused on the global state of adaptation action and support and future opportunities and challenges by Mr. Mark Pelling, IPCC WGII and King's College London	https://unfccc.int/sites/default/files/resource/Pelling%20final%201.pdf
Roundtable 3 – Expert panel 1	
Presentation on technology focusing on innovation, technology development and transfer based mainly on Chapter 16 of AR6 WG III, with reflections on the GST by Ms. Heleen de Coninck, Eindhoven University of Technology, and Ambuj Sagar, Indian Institute of Technology Delhi,	https://unfccc.int/sites/default/files/resource/SBSTA_GST_Technology_Heleen%20de%20Coninck%20and%20Ambuj%20Sagar_11%20June%202022%282%29.pdf
Roundtable 3 – Expert panel 2	
Presentation on capacity-building focusing on capacity-building in the context of enabling transitions and strengthening the response by Ms.	https://unfccc.int/sites/default/files/resource/Capacity_TD_Klinsky_and_Nago.pdf

Sonja Klinsky, Arizona State University and Ms. Minette Nago, University of Göttingen	
Roundtable 3 – Expert panel 3	
Presentation on finance, based mainly on findings from Chapter 15 of IPCC WG III on finance, noting that WG III was focused on mitigation and all financial information was included in that chapter by Ms. Silvia Kreibiehl, IPCC	https://unfccc.int/sites/default/files/resource/GST%20Silvie%20Kreibiehl%20%281%29.pdf
Presentation on finance and focused on the state of efforts of financing climate action by Ms. Charlene Watson, ODI,	https://unfccc.int/sites/default/files/resource/Watson_C_GST3_13th%20June%202022.pdf
Other potentially relevant information sources	
UNFCCC GST webpage	https://unfccc.int/topics/global-stocktake/global-stocktake
TD1.1 webpage	https://unfccc.int/topics/global-stocktake/components-of-the-gst/technical-dialogues-of-the-first-global-stocktake/technical-dialogue-11-td11-of-the-first-global-stocktake
GST events at Regional Climate Weeks	https://unfccc.int/topics/global-stocktake/global-stocktake-governance-and-facilitation/the-global-stocktake-at-regional-climate-weeks-2022