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**CHAPTER OUTLINES OF THE WORKING GROUP CONTRIBUTION TO THE IPCC SEVENTH ASSESSMENT REPORT (AR7)**

**Working Group II Contribution to the IPCC Seventh Assessment Report**

**Background information**

(Submitted by the Co-Chairs of Working Group II on behalf of the Working Group II Bureau)

# CHAPTER OUTLINES OF THE WORKING GROUP CONTRIBUTION TO THE IPCC SEVENTH ASSESSMENT REPORT (AR7)

## Working Group II Contribution to the IPCC Seventh Assessment Report

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## 1. Introduction

This document is provided by the Co-Chairs of Working Group II on behalf of the Working Group II Bureau for the information of delegates at the Thirteenth Session of Working Group II in order to describe the broad structure and rationale of the Working Group II contribution to the IPCC Seventh Assessment Report (WGII AR7) as outlined in WGII-13/Doc. 2. This document provides a report of the scoping process, including participant selection, as well as an overview of the scoping meeting specific to the WGII AR7.

## 2. Call for Nominations

The call to Focal Points of IPCC member Governments, Observer Organizations and the IPCC Bureau Members inviting the nomination of experts for the Scoping Meeting for the IPCC Seventh Assessment Report opened on 3 May 2024 and closed on 12 June 2024. Expertise for the nomination of scoping meeting experts was sought in the following areas:

### *Working Group II Areas of Expertise:*

- Impacts, losses and damages on, and vulnerability and risk for natural (e.g. land, freshwater, biodiversity and oceans), human (e.g. human safety, mobility and migration, health, economic sectors, poverty, livelihoods, and cultural heritage), and managed human-natural systems with implications for climate resilient development
- Evaluating climate change adaptation: Methods for monitoring, setting indicators, metrics and targets, measuring observed and projected policy effectiveness at multiple temporal and spatial scales
- Scenarios and assessments of integrated adaptation, mitigation and development policies at multiple governance levels (local to multi-national) accounting for gender, equity, justice and/or Indigenous Knowledge, and local knowledges
- Aggregation of information on impacts, vulnerability, adaptation and risks to settlements (rural, urban, cities, small islands), and infrastructure and systems (e.g. sanitation and hygiene, water, food, nutrition, economic and energy security, industry, health and well-being, mobility)
- Adaptation needs, options, opportunities, constraints, limits, enabling conditions, policy impacts and influencing factors including contributions from governance, finance, law, psychology and sociology
- Global dimension of adaptation responses: financial incentivization, responding to losses and damages, equity, justice, finance and governance, etc
- Socio-cultural, psychological, political and legal drivers of making and implementing decisions

### *Cross-cutting Areas of Expertise:*

- Integration of different forms of climate-related knowledge and data, including Indigenous Knowledge, local knowledge, and practice-based knowledge
- Regional (including terrestrial, ocean, and coastal) and sectoral climate information
- Carbon Dioxide Removal, Solar Radiation Modification and associated Earth System impacts and feedbacks
- Scenarios and pathways, including physical climate, impacts and adaptation, mitigation, development, feasibility and socio-cultural considerations (equity, ethics, finance)
- Co-benefits, avoided impacts, risks and co-costs of mitigation and adaptation, including: interactions and trade-offs, technological and financial challenges, options and implementation and low regret options

- Ethics and equity dimensions of climate change, sustainable development, gender, poverty eradication, livelihoods, health, and food security
- Societal responses to spatial and temporal dimensions of risks and benefits of climate change, including sociological, financial, cultural and communication aspects

*Regional Expertise:*

- Africa
- Europe
- Asia
- Australasia
- North America
- Central and South America
- Polar Regions
- Small Islands
- Ocean

2,393 nominations were received during the nomination period for the scoping of the three Working Group contributions to the Seventh Assessment Report including the 1994 Technical Guidelines for Assessing Climate Change Impacts and Adaptation. After removing duplicate nominations, the total number of nominations was 2,210. Working Group II received a total of 1,340 nominations, comprising 1,313 nominations and 27 cross-cutting nominations with other Working Groups.

Based on the citizenship of the 1,340 nominations, 38% of nominated experts were from developed countries while 62% were from developing countries and countries with economies in transition. Africa (29%) and Europe (28%) had the most nominations with the least nominations from South-West Pacific (8%) and South America (9%). 59% were male and 41% female. 17% had previous IPCC experience defined as a role as a Coordinating Lead Author, Lead Author or Review Editor in an IPCC Report, 25% had some IPCC experience defined as Contributing Author, Expert Reviewer, Chapter Scientist, Focal Point or Government Delegate, and 58% had no IPCC experience.

### **3. Participants Selection**

Members of the Working Group II Bureau screened the nominations and selected experts for the invitation and reserve lists for the scoping of the Working Group II contribution to the IPCC Seventh Assessment Report, including the update to the 1994 IPCC Technical Guidelines for Assessing Impacts and Adaptation (hereafter the IPCC Technical Guidelines or TGIA) with a subset of these contributing to the cross-cutting discussions occurring with WGI and WGIII. When selecting the scoping meeting participants, consideration was given to the criteria defined by the procedures for the preparation, review, acceptance adoption, approval and publication of IPCC reports: the scientific, technical and socio-economic expertise, including the range of views; geographical representation; a mixture of experts with and without previous experience in IPCC; gender balance; and the participation of experts with a background from relevant stakeholder and user groups, including governments.

The WGII Bureau was tasked with selecting 65 experts who would scope the WGII contribution to the AR7, including the update to the IPCC Technical Guidelines, and a subset of these would also contribute to the cross-cutting discussions that would occur with WGI and WGIII.

### **3a. Construction of the Long List**

Each WGII Bureau Member was asked to follow a 'ranking' process, focusing on the selection of a core set of participants for the scoping of the WGII contribution to the AR7, based on their own area of expertise, providing a regional perspective on nominees, and considering all criteria as stated in Appendix A of Principles Governing IPCC Work. Each WGII Bureau Member was asked to consider the nominations carefully and provide up to ten '1' rankings, which indicated a 'high priority', and up to fifteen '2' rankings, which indicated a 'secondary priority'. It should be noted that there was purposely no '3' or 'low priority' as the intention was not to produce a hierarchical ranking, but rather a focused identification of key individuals that would fill in the critical expertise areas for the WGII AR7 scoping meeting.

The ranking process applied has been previously used in selection processes to identify gaps and agreement across the selection undertaken by WG Bureau Members. In addition to the individual rankings, each Member also provided comments to give additional details not captured in the nomination process that would be useful to consider during the next stage of the selection process.

From the 1340 individuals in the WGII subset, 215 individuals received a '1' or '2' ranking by WGII Bureau Members. This formed the 'Long List'. The 'Long List' became the working pool of nominations for the next round.

### **3b. Construction of the Preliminary Short List**

215 nominees received a ranking of "1" or "2" by WGII Bureau members. A score was calculated for each WGII Bureau member selection by converting a rank of '1' to 2 points and a rank of '2' to 1 point and summing the total points received from the WGII Bureau Members' selections. Thus, the selections considered highest priority received the highest scores. From this step, 23 individuals received a 'score' of '3' or higher, and therefore made it to the "Preliminary Short List".

The remaining 192 candidates from the original Long List who did not make it to the Preliminary Short List were nonetheless maintained to support selections in response to gaps. Of those 192, ten had received two 2s and were nominated by more than one Bureau member, so they were elevated to the list.

The preliminary shortlist was returned to WGII Bureau members for another round of ranking with a view to filling gaps but also to suggest replacements where overlaps were identified. During the second round, Bureau members assigned five '1s' and five '2s' with a view to addressing balances and gaps.

### **3c. Construction of the Core List**

For the next phase of the selection process, the 23 highest rankings were used to define the first-pass core list of participants. To those 23 were added all those nominees who received a "1", or two "2s" by WGII Bureau members in the second round of ranking. These made up a total of 58 individuals called the "Core List". All those individuals who received a "2" in the second round of ranking were considered reserve.

Two WGII Bureau meetings were held in person in Sofia, Bulgaria, on the sidelines of the Sixty First Session of the IPCC meeting to refine the Final Core List. An additional 7 experts were identified bringing the list to 65. WGII Bureau Members refined the list to ensure appropriate coverage of the areas of expertise, broaden geographic representation and increase both gender balance and experts

with and without previous IPCC experience. A proposed final list of 65 core WGII experts was agreed, and 5 cross-cutting experts were identified as WGII cross-cutting experts on the Chair’s list. A further 17 experts were identified and proposed as WGII cross-cutting experts for the Chair’s list. The proposed final list was circulated among all WGII Bureau Members along with overview statistics of the experts.

### 3d. Construction of the Final List

The three Working Group lists were compiled and a cross-WG Co-Chair teleconference was held to address any overlaps and finalize the list. The final list was then circulated to the full IPCC Bureau for final checks by 30 August 2024. Based on the feedback received, the Co-Chairs and the Chair made final adjustments. Invitations were extended to the 240 selected experts by the IPCC Secretariat, followed up by a WGII specific invitation sent to the 65 WGII experts and 7 cross-cutting WGII experts on the Chair’s list on 18 September 2024. In response to 4 regrets received, 4 experts from the reserve list were invited, but two of them were unable to accept the invitation. Another two invitations were sent out as replacements from the reserve list, resulting in 78 invitations to experts issued in total.

The Final list consisted of 88 invitees (78 experts, 2 Co-Chairs and 8 WGII Bureau members) from 54 countries. An analysis of the final selection/invitation list with information on the geographic representation, gender balance, and other selection criteria is provided in Figures 1, 2, 3, 4 and 5 (below).

### 3e. Participants List

Of the 78 experts invited, 65 attended the WGII AR7 Scoping Meeting, together with 7 WGII Bureau Members and the two WGII Co-Chairs, giving a total of 74 participants who supported the scoping of the WGII contribution (Annex 3).

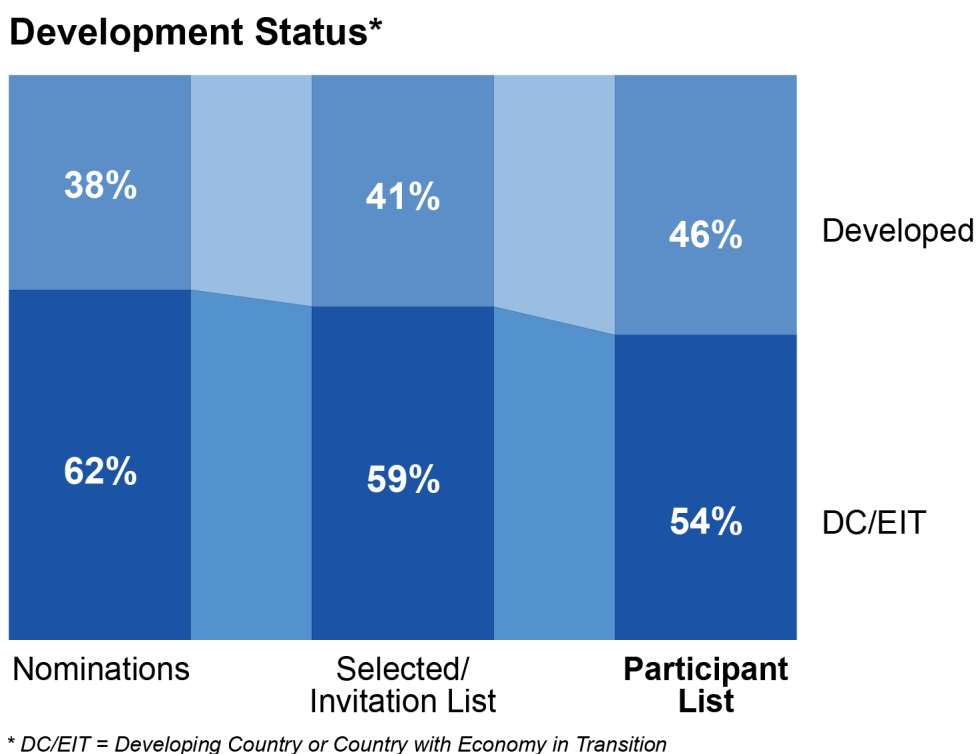


Figure 1: Balance in developing countries/countries with economies in transition compared with developed countries (based on citizenship only) in the full list, invited expert list and attendance list from the AR7 WGII Scoping Meeting.

## Region

Region	Nominations	Selected/ Invitation List	Participant List
South-West Pacific	8%	12%	14%
South America	9%	15%	12%
North America, Central America, Caribbean	12%	18%	16%
Europe	28%	23%	26%
Asia	14%	18%	20%
Africa	29%	14%	12%

Figure 2: Distribution across WMO regions (based on citizenship only) in the full list, invited expert list and attendance list from the AR7 WGII Scoping Meeting.

## Regional distribution of Scoping Meeting participants

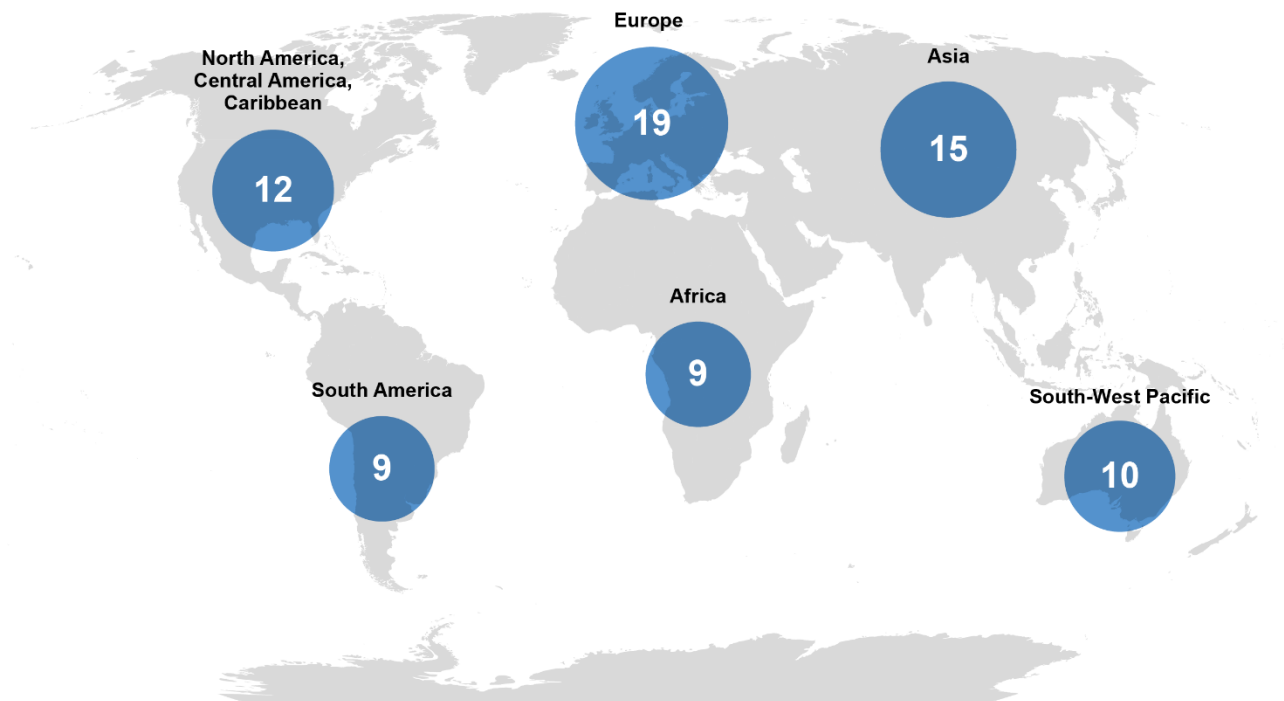


Figure 3: Regional distribution of WGII AR7 Scoping meeting participants.

## Gender

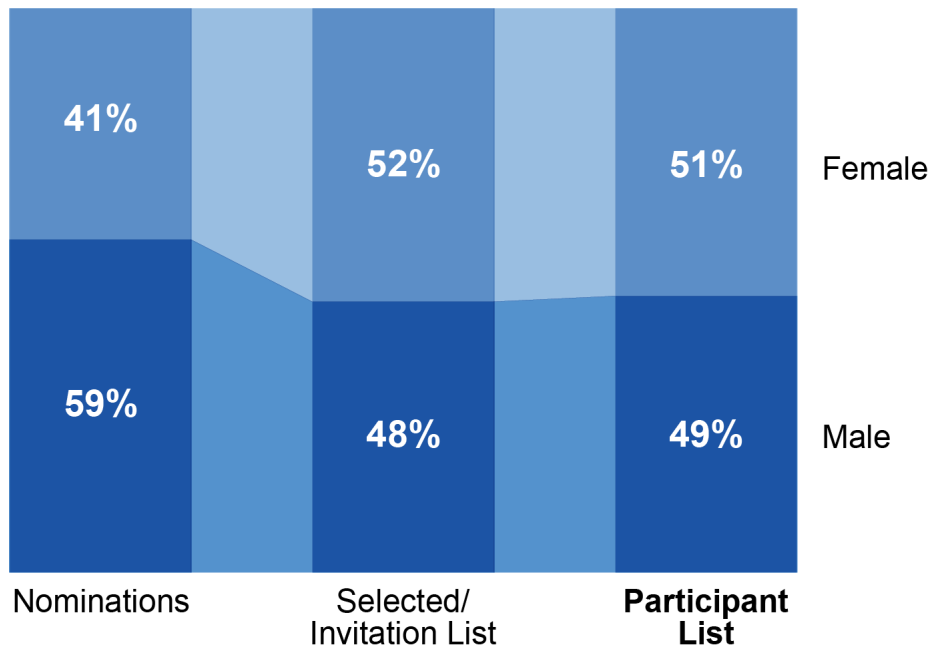
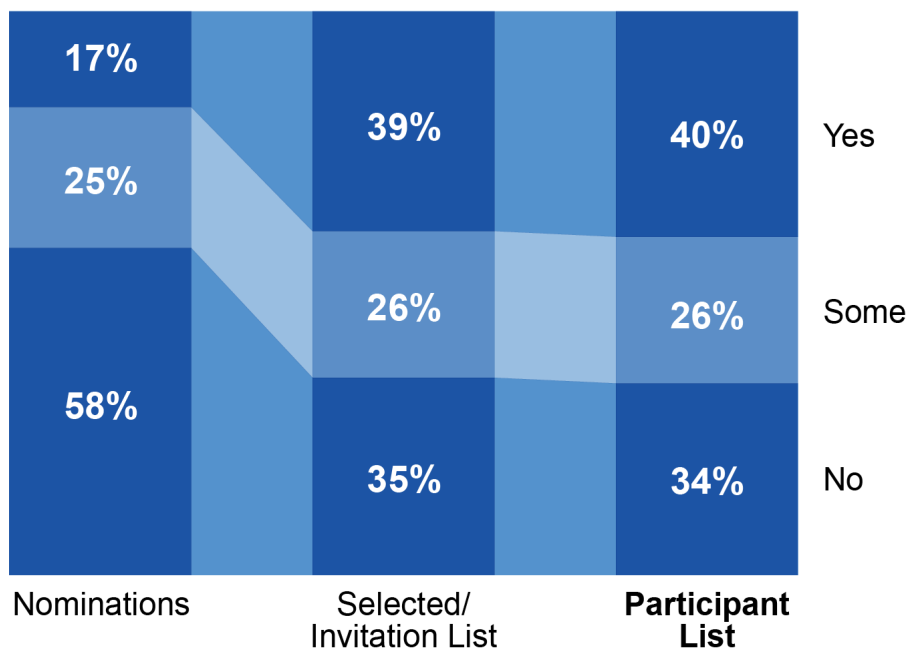


Figure 4: Gender balance in the full list, invited expert list and attendance list from the AR7 WGII Scoping Meeting

## IPCC Experience\*\*



\*\* Yes = had participated in an elected (Bureau Member) or selected (Coordinating Lead Author, Lead Author, Review Editor) role, Some = Contributing Author, Expert Reviewer, Chapter Scientist, Focal Point, Government Delegate, No = no previous experience in the IPCC.

Figure 5: IPCC experience in the full list, invited expert list and attendance list from the AR7 WGII Scoping Meeting



## 4. Vision Document

The IPCC Chair, Co-chairs and Vice-Chairs jointly developed a Vision Document for the AR7 scoping meeting. It contained sections on main AR7 ambitions, cross-Working Group topics, and Working Group specific issues. Working Group II Co-Chairs and Vice-Chairs contributed to all sections of the Vision Document, with particular emphasis on the cross-Working Group topics and issues relevant to Working Group II.

One of the elements of particular interest for WGII is the **implementation-oriented** nature of the assessment. Policy-relevant assessments for understanding climate impacts, adaptation, and vulnerability are intended to be relevant for the global UNFCCC policy framework, including the Global Goal on Adaptation and the UAE Framework for Global Climate Resilience, but simultaneously target a wide range of potential stakeholders at national and sub-national levels. This calls for an assessment that is both comprehensive and robust, while appreciative of the large variety of societal contexts that determine the effectiveness and appropriateness of policies.

It also calls for a deep understanding of the inter- and transdisciplinary nature of most decision-making contexts, which needs a focus on **cross-Working Group** alignment and an **inclusive approach** that embraces the practice of listening to different stakeholders to include a diversity of views and perspectives in the assessment. The WGII AR7 Vision is focused on exploring mechanisms for informal engagements and including academics as well as policymakers, practitioners and Indigenous Knowledge holders in the preparation of IPCC reports. These are expected to be of high relevance for policy design and implementation.

## 5. Pre-Meeting Activities

WGII conducted a series of activities as part of the AR7 pre-scoping phase to gather input and insights to engage with and include the input of all relevant stakeholders who would not be able to participate in the scoping meeting. Key activities included:

1. A WGII pre-scoping survey, specific to the WGII mandate
2. Cross-Working Group pre-scoping webinars involving WGII specific breakout groups (BOGs).
3. A WGII consultation meeting to gather feedback from former WGII Coordinating Lead Authors (CLAs), Lead Authors (LAs), and Bureau members of the AR6 cycle.

### 5a. WGII Pre-Scoping Survey

A WGII targeted survey was sent to non-selected WGII nominees, former WGII AR6 CLAs, LAs, Bureau members, National Focal Points, Observer organizations, and additional networks. A total of 721 written responses were received, with the geographical spread and breakdown of respondents shown in Figure 6 (below).

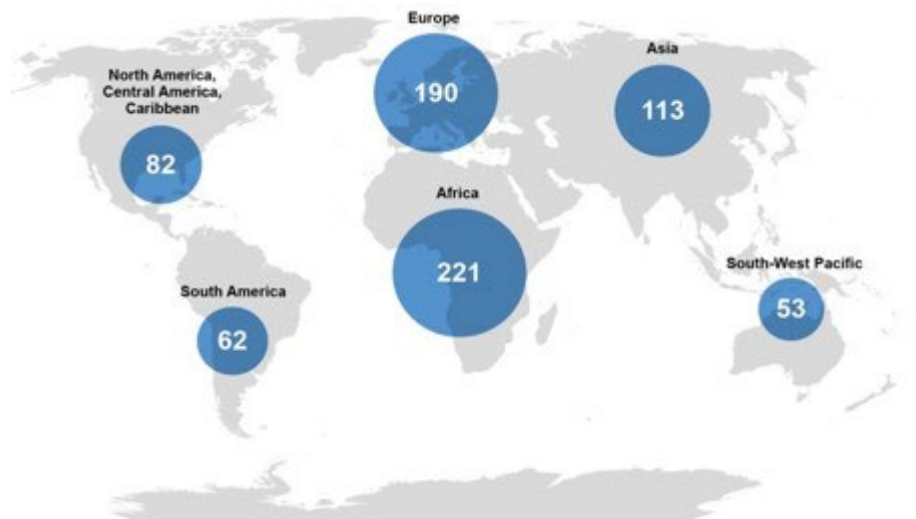


Figure 6: Regional distribution of respondents of the WGII Pre-scoping survey.

The WGII pre-scoping survey focused on four themes: climate change impacts, risk, vulnerability and exposure, climate change adaptation, and the IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptation (IPCC Technical Guidelines). It was sent out in October 2024 and remained open for three weeks, allowing respondents to choose and answer questions from one or more themes.

All respondents answered the common question on what the biggest challenge or barrier to climate action is. A same set of questions applied to the first three themes which focused on how IPCC reports are used in their professional environments, emerging topics and priorities, as well as key gaps that need to be addressed in AR7 cycle.

The IPCC Technical Guidelines had a dedicated set of questions which covered how an update could contribute to assessing climate impacts, prioritizing adaptation strategies, and tracking progress. The questions also asked which stakeholders would benefit from the guidelines and how, and whether the guidelines should support the Global Goal on Adaptation (GGA) and in what ways.

The WGII Technical Support Unit (TSU) compiled and synthesized the wealth of input received in the survey responses; however some emphasis and perhaps omissions would have inevitably occurred in the process of condensing such vast and rich material. The top five themes for each question were identified based on response frequency.

Table 1: Major themes and collated topics that surfaced from the WGII pre-scoping survey responses

Themes	Most frequently recurring topics & priorities
Climate Change Impacts	<p><b>Climate Justice &amp; Equity:</b> Vulnerable communities &amp; global representation</p> <p><b>Adaptation &amp; Resilience:</b> Strategies for resilience, ecosystem-based adaptation, effectiveness of adaptation measures, nature-based solutions and community adaptation.</p> <p><b>Losses and Damages:</b></p>

	<p>Compensation and technical &amp; financial support mechanisms</p> <p><b>Climate &amp; Health Nexus:</b> Healthcare systems resilience, mental health dimensions, public health impacts</p> <p><b>Biodiversity &amp; Ecosystem Services:</b> Interconnections between nature-based solutions, climate and biodiversity loss, effectiveness of ecosystem-based adaptation (EbA) strategies</p> <p><b>Regional and Localized Climate Impacts:</b> Localized climate models and impact assessments, vulnerabilities of specific regions and populations, regional focus areas and strategies</p>
Risk, Vulnerability and Exposure	<p><b>Losses and Damages, Vulnerability and Adaptive Capacity:</b> Compensation, irreversible damages, quantifying losses and damages, finance, compound and cascading risks differentiated vulnerabilities</p> <p><b>Climate-Induced Migration &amp; Security Risks:</b> Indigenous Knowledge and focus on vulnerable communities and regions, migration patterns and implications</p> <p><b>Localized Climate Data:</b> High-resolution, localized and granular impact assessments, and local scales</p> <p><b>Climate &amp; Health Nexus:</b> Healthcare systems resilience, mental health dimensions, public health impacts, direct and indirect climate impacts on health</p> <p><b>Emerging Technologies:</b> Artificial Intelligence, digitalization risks, data collection and knowledge transfer</p> <p><b>Risk Quantification &amp; Cost Analysis:</b> Economic valuation and cost of inaction, quantitative tools for losses and damages, financial mechanisms &amp; funding for adaptation, non-economic losses, cost-benefit of adaptation strategies, long-term cost of inaction</p>
Climate Change Adaptation	<p><b>Adaptation Strategies &amp; Effectiveness:</b> Standardization metrics, indicators, adaptation progress, long-term adaptation impacts</p> <p><b>Climate Justice &amp; Equity:</b> Vulnerable communities &amp; global representation</p> <p><b>Losses and Damages:</b> Compensation, irreversible damages, quantifying losses and damages, finance</p> <p><b>Transformative Adaptation</b></p> <p><b>Indigenous &amp; Local Knowledge:</b> Cross-cultural adaptation strategies, socioeconomic impacts of climate change, adaptation for marginalized communities</p> <p><b>Climate-Induced Migration &amp; Security Risks:</b> Indigenous Knowledge and focus on vulnerable communities and regions, migration patterns and implications</p>

## **5b. Cross-Working Group Pre-Scoping Webinars**

Three webinars across three time zones were held on October 30, 2024, and featured 670+ participants from 109 countries, including around 300 experts joining the WGII BOGs.

In WGII BOGs, moderators asked participants two questions about WGII AR7 main assessment, and two questions about the IPCC Guidelines for Assessing Climate Change Impacts and Adaptation. The answers were synthesized into main points and are presented below; however some emphasis and perhaps omissions would have inevitably occurred in the process of condensing such vast and rich material.

### **Main topics that have seen rapid development since the AR6:**

1. Nature-based solutions (NbS)
2. Maladaptation
3. Cascading risks and intersectionality
4. Integration of Indigenous Knowledge and local knowledge
5. Urban resilience and the role of infrastructure
6. Intersectionality (with gender, poverty, and equity)

### **Information needs that are critical to advance action and implementation:**

1. High-quality, accessible localized and regional data
2. Sustainable finance mechanisms for scaling up adaptation initiatives
3. Inclusion of marginalized voices such as indigenous and marginalized community perspectives for equitable and inclusive climate actions
4. Evidence-based inputs such as practical successes, failures, and "no-regret" adaptation
5. Strengthened governance frameworks at multiple levels
6. Cross-sectoral collaboration
7. Transformative approaches such as systemic and cross-disciplinary

### **Optimal structuring of the update to the IPCC Guidelines for Assessing Climate Change Impacts and Adaptation**

1. Action-oriented focus on practical solutions and clear metrics
2. Global and Regional Case studies with examples with measurable outcomes
3. Simplified communication through accessible language and visual aids
4. Community-driven by integrating localised focus and grassroots insights
5. SDG alignment for broader relevance

## **5c. WGII Pre-Scoping Meeting with Former WGII CLAs, LAs, REs and Bureau Members from the AR6 Cycle**

In addition to collecting their feedback through the survey, a consultation call was held with former WGII CLAs, LAs, REs and Bureau members from the AR6 cycle to collect responses on the topics listed in Table 2. The consultation call was joined by about 50 participants, and written feedback was collected from four participants who could not join the call.

Table 2: Synthesis of topics raised in the consultation call with former WGII CLAs, LAs, REs and Bureau members from the AR6 cycle; however some emphasis and perhaps omissions would have inevitably occurred in the process of condensing such vast and rich material.

<p><b>Optimal WGII report structure:</b></p> <ul style="list-style-type: none"> <li>▪ Retain regional chapters with sub-regional specificity, especially for large regions like Africa</li> <li>▪ Introduce solution-oriented chapters on systemic transitions (e.g.: food-energy-water nexus and transformative adaptation)</li> <li>▪ Use a matrix approach combining sectoral chapters with regional subsections to reduce duplication</li> <li>▪ Align regional groupings logically, such as consolidating Pacific Islands into an "Oceania" chapter</li> </ul>	<p><b>Addressing cross-cutting Topics</b></p> <ul style="list-style-type: none"> <li>▪ Align cross-cutting topics early in the scoping phase</li> <li>▪ Integrate themes like climate justice, biodiversity-health nexus, and systemic adaptation across chapters</li> <li>▪ Use Cross-Chapter Boxes (CCBs) or lead chapters for key themes</li> <li>▪ Develop digital tools like an interactive WGII Atlas for visualizing regional vulnerabilities</li> <li>▪ Create a web-based, searchable assessment report for improved accessibility</li> </ul>
<p><b>Coordination and Chapter Count</b></p> <ul style="list-style-type: none"> <li>▪ Ideal number of chapters: 15-20</li> <li>▪ Focus on concise, policy-relevant insights linked to the Summary for Policymakers (SPM)</li> <li>▪ Embed synthesis within sectoral and regional chapters instead of standalone synthesis chapters</li> </ul>	<p><b>Lessons from AR6</b></p> <ul style="list-style-type: none"> <li>▪ Retain flexibility to incorporate emerging issues</li> <li>▪ Use a modular outline with core sections and adaptable sub-sections</li> <li>▪ Adopt a dynamic structure to address evolving policy demands during the assessment cycle</li> <li>▪ Standardize chapter structure to cover observed impacts, projected risks, adaptation, and climate-resilient development</li> </ul>

## 6. Pre-Meeting Recorded Scene-Setting and Introductory Presentations

Videos from selected experts were prepared ahead of the Scoping Meeting. These videos ranged from introductions to the IPCC process as well as perspectives from stakeholders on themes that were relevant to the scoping meeting. In preparation of these videos, the WGII TSU identified partners that could "inspire or expand" the perspectives of scoping participants. The videos were shared with participants ahead of the scoping meeting to help them acclimate and engage with diverse topics relevant to the scoping meeting and to understand the scoping process. There was a total of seven videos prepared, on the following themes and objectives:

1. 'Co-Chairs' vision' presented by Working Group II Co-Chairs – This video allowed the Co-Chairs to verbalize their vision for the scoping meeting and reflection points for incoming experts
2. 'Introduction to the IPCC and explanation of the scoping process' presented by Working Group II Co-Chair Bart van den Hurk on behalf of the IPCC Chair and Working Group Co-Chairs – This video was aimed at introducing IPCC processes to experts who may be new to the IPCC and the scoping process
3. 'The search for vulnerability information' presented by the Consultative Group on International Agricultural Research (CGIAR) – This video shared the perspective of an organization working

on projects that uses data on impacts and vulnerability to generate information for decision-making

4. 'Digital tools for assessments' presented by Working Group I Co-Chair Robert Vautard and William Solecki from Urban Climate Change Research Network – This video shared insights from Atlas-creators to talk about the value that digital tools (e.g. atlases or docking stations) can support in the report
5. 'Scope of the Update of the 1994 Guidelines for Assessing Impacts & Adaptation' presented by the World Adaptation Science Program – This video shared perspectives from an organization engaged in the technical work of developing and supporting global and national adaptation indicators, aligned with the work of the Global Goal on Adaptation
6. 'Solutions for adaptation action' presented by the Chair of the UNFCCC Least Developed Countries' Expert Group – This video shared the adaptation needs of the most vulnerable and the impacts that are already occurring
7. 'The need to assess climate for financial decision making' presented by Geeke Feiter, Director of the Dutch Association of Insurers – This video shared the perspective of a financial institution and the financial sector's considerations when thinking about climate risks and opportunities

## **7. Scoping Meeting**

The scoping meeting for the AR7 was held in Kuala Lumpur, Malaysia, from 9 to 13 December 2024. The scoping meeting programme is provided in Annex 3 to this document.

The scoping meeting programme was carefully constructed to allow for initial discussions of topics across different Breakout Groups (BOGs), with the initial aim of identifying an inventory of possible structural solutions to approaches for an actionable assessment, common elements across chapters, how to treat sectors and regions in the report, and how these solutions can be applied to an outline. These BOGs were followed by increasingly focused BOGs to develop emerging structure options, and to propose by the end of the meeting draft chapter structures and outlines, including the number of chapters, titles and order, as well as a list of indicative bullets – not in any particular order – which need to be considered by authors under each chapter. Hence, the proposed outline for the WGII contribution to the AR7 was developed in a dynamic and iterative process over the course of the scoping meeting. Dedicated BOGs to develop the outline of the update of the IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptation were also held throughout the week.

### **7a. Interactive Session**

At the start of the meeting, Working Group II Technical Support Unit hosted an innovative interactive session designed to enhance participants' engagement and to stimulate creativity and empathy amongst participating experts. The session aimed to:

1. Facilitate an ice-breaking experience among experts
2. Inspire creative and empathetic thinking by encouraging exploration beyond purely scientific content
3. Establish ambitions for the meeting in an engaging and participatory manner

To achieve these objectives, the session incorporated a 'Hero's journey' narrative, where experts had to embark on a journey to reach the 'treasure': an ambitious report outline. This storytelling approach

was aimed at simulating a fictional scenario while engaging the audience of scientists and experts by providing a compelling framework to anchor the session's activities. Experts, divided into groups of ten, were immersed in a role-playing exercise where they assumed the personas of various stakeholders involved in climate action.

The groups undertook four distinct tasks, each designed to challenge their perspectives and simulate real-world decision-making processes. By stepping into the shoes of stakeholders, such as policymakers, community leaders, Indigenous communities and industry representatives, participants were encouraged to think holistically about the implications that their work in the scoping meeting would have on decision-making stakeholders.

Feedback from attendees was broadly positive, with many appreciating the creative format and its ability to inspire fresh ideas while fostering collaboration. The session achieved its objective of serving as ice-breaker, breaking down barriers, sparking innovative discussions, and setting a cooperative, ambitious and practice-oriented tone for the meeting.

## **7b. Plenary Sessions, Breakout Sessions and Stocktaking Sessions**

An open exchange of ideas and detailed discussions of possible options for the content and structure of the report took place during five successive Breakout group (BOG) sessions, each introduced by a plenary session, and followed by a stocktaking session of reporting and discussion. BOG sessions were designed to progressively distil down from an initial phase of brainstorming on structural solutions to address common elements across chapters, how to treat sectors and regions in the WGII report, and approaches for an actionable assessment (breakout session 1 and 2), to the identification of emerging chapter structures (breakout session 3), chapter titles and bullets of indicative content (breakout sessions 4 and 5).

### **Day 1**

After the morning Opening Plenary and the WGII interactive session, WGII participants self-allocated to four BOGs in breakout session 1 in the afternoon. The BOGs aimed to brainstorm on structural solutions that could respond to the following questions: (1) How should we approach the report for an actionable assessment? (2) What are common elements across chapters? and (3) How should we treat sectors, systems and regions in the report? The BOG topics can be found in Annex 3 to this document. The BOG co-facilitators (two WGII Bureau Members for each BOG) presented in a plenary stocktaking session the main outcomes of the discussion. The BOG on information on impacts, vulnerability and adaptation for action and planning brainstormed on solutions that could be part of an outline to fill data gaps, and include novel data and diverse knowledge systems. A second BOG looked at ideas to consistently assess progress in adaptation in the report, including structural solutions but also methodologies and frameworks. The third BOG looked at knowledge advances since the AR6 that might help to move from the concept of Climate Resilient Development (CRD) to making it practice-oriented, and more broadly how CRD could be embedded in the WGII AR7 structure or approach. The fourth BOG brainstormed potential objectives and organizing principles for an updated and revised IPCC Technical Guidelines.

## Day 2

Simultaneously to the morning cross-Working Group BOGs (see Annex 1), WGII held its second BOG on the IPCC Technical Guidelines, where participants discussed the kinds of information that could be included in the updated IPCC Technical Guidelines and structural implications for the outline of the Guidelines. The afternoon continued with WGII breakout session 2 in which five BOGs on sectors and systems discussed (1) what new sectoral information might be needed to support adaptation and climate resilient development, and (2) how to cluster sectors and systems and balance the need for regional chapters while still ensuring a concise structure for the report. The objective of this breakout session was for each group to identify and map – for their sector and/or system – the organizational/structural implications of supporting actionable output and regional differentiation. The topics for the five BOGs can be found in Annex 3 to this document. The BOG co-facilitators (two WGII Bureau Members per BOG) presented in a plenary stocktaking session the main outcomes of the discussion. There were strong calls in all the BOGs for the need for regional chapters, as well as calls for consideration of an atlas product. BOG participants considered how to cluster different sectors into chapters of the report.

The WGII Bureau members met in the evening to discuss a way forward and plan for the next day. Based on the discussions and brainstorming ideas that had been put forward in the BOGs on days 1 and 2, WGII Bureau agreed to present participants with two options: (1) an AR6 “refined” outline, challenging participants to consider how to improve this structure regarding action and implementation, and (2) an alternative, somewhat unconventional structure encompassing the ambition to have a concise structure (fewer chapters) with a strong focus on implementation and action. Neither option was to be considered a “proposed outline” but rather examples of what an AR outline could look like, to stimulate discussions in the next round of BOGs.

## Day 3

Participants reconvened in the morning of Day 3 for a short Plenary where the two outline options were presented to them. They were then randomly allocated to four BOGs in breakout session 3, with the tasks of discussing the pros and cons, benefits and risks of both structures, and with the objective to make a suggestion for a structure that all BOG participants could reach consensus on. The BOG co-facilitators (two WGII Bureau Members per BOG) presented in a plenary stocktaking session the main outcomes of the discussion. Three BOGs were able to reach consensus on an emerging structure, while the fourth BOG had productive discussions but was unable to reach consensus, particularly on how to include regional information in the report. Two of the other BOGs were able to agree to an emerging structure that combined the two options, starting from the AR6 “refined” outline with specific suggestions to change some aspects, keeping the same content but repackaging it, and adding regional content. All BOGs agreed that regional information needed to be strengthened in the AR7 outline structure.

The WGII Bureau met over lunch to discuss the proposed emerging structures from the 4 BOGs and see where consensus could be found moving forward. They agreed to work on a proposal that would consider all the views expressed during the BOGs, and include the consensus already reached by BOG participants.

Participants reconvened in an afternoon plenary where the Co-Chairs presented the proposed outline and sought agreement from the group to move forward on this basis. The outline presented built on the conciseness and convergence reached in the morning BOGs, and was geared toward implementation and action. It started with a framing chapter, followed by Global Chapters including



finance, and then Regional Chapters based on the AR6 regional chapter structure. The regional chapters were followed by the Thematic Chapters, for which a storyline focusing on context specific responses and options, means of implementation, sustainable development and CRD, and case studies was presented. A proposed storyline for the regional chapters was also presented, with an emphasis on a multi-dimensional assessment of risks, impacts and management. Policy and governance, equity and justice, diverse knowledge systems and cross-Working Group content ran throughout both the regional and thematic chapter storylines. The proposed structure included two annexes: a Digital Atlas and Linkage to the update of the IPCC Technical Guidelines.

Generally, there were very positive responses from the participants to the proposed outline. Many good points were raised by participants, including that adaptation needed to be included more systematically in the chapters, requests for a standalone finance chapter, for a chapter on adaptation progress, and a more holistic approach to adaptation benefits. Topics that several participants called for consideration in the outline included the addition of regional chapters (particularly Polar Regions), and the ranking of the thematic chapters. Broadly, the structure was acceptable to the group and could be used for subsequent discussions to flesh out bullet of content. The WGII Bureau met that evening to make tweaks to the outline in response to all the comments received, and provided a revised outline made accessible to the participants that same evening on PaperSmart. It was presented in Plenary the next morning.

The BOG for the IPCC Technical Guidelines also met that evening. A table showing BOG inputs organized alongside an emerging structure of the IPCC Technical Guidelines was shown, and a discussion on some of the elements of this guideline ensued, including the need to separate the processes of identifying and appraising options, and how to prioritize options. The group developed a set of questions that would be asked of the IPCC Technical Guidelines and these were sent to two of the participants who volunteered to categorize the questions, to be discussed at the next BOG.

#### **Day 4**

The revised outline was presented by the Co-Chairs in a short morning plenary session. The revised outline still comprised four main sections and the Annexes: A Framing Chapter, Global Assessment Chapters, Regional Assessment Chapters and Thematic Assessment Chapters. Many of the participants' comments from the previous day's plenary had been addressed in bullets points toward building narratives for the regional and thematic assessment chapters. The adaptation chapters in the Global Assessment section were split into two, and a standalone finance chapter was proposed. The Regional Chapter grouping still followed the AR6 chapter structure. The Group agreed to move forward on the basis of the revised outline, and split into three BOGs in breakout session 4 with the task of defining bullets per chapter that would give clarity on the scope of the chapter, on the available literature and on the intended messages of the chapters. One BOG was tasked to look at the regional and thematic assessment chapters together in order to avoid overlaps and build a narrative that would connect both regions and themes together.

Before lunch, the BOG co-facilitators (two or three WGII Bureau Members per BOG) presented in a plenary stocktaking session the main outcomes of the BOGs. Progress was made on the framing bullets, on the global assessment chapters on adaptation, vulnerability, and losses and damages. Participants in the regional and thematic BOG agreed that both should treat the whole cycle of assessment ranging from risk assessment to future options, with mirroring narratives in both. The BOG then split into two groups to flesh out content under the regional and thematic chapters separately.

The afternoon continued with the same BOGs plus a BOG on IPCC Technical Guidelines. The Framing, Global Assessment, Regional Assessment and Thematic Assessment chapters continued fleshing out bullets of content, also considering implications for the Atlas.

The IPCC Technical Guidelines BOG continued its work with participants delving into sections of the IPCC Technical Guidelines in which they would expect to find answers to the previous day's questions. Three categorizations of the questions were presented and a discussion was held on the similarities, patterns and form of the outlines presented. Elements of these three outlines were then put in a new structure. There was discussion over a category of items that the group coalesced around calling 'supports' and finally 'enablers', which highlighted a few 'must-haves' for successful adaptation. A rough outline was produced and groups populated it with remaining elements.

In the late afternoon, the BOG co-facilitators presented in a plenary stocktaking session the main outcomes of the BOGs and progress that was made in fleshing out the bullets of content. The WGII Bureau met in the evening to consider the wealth of content developed by the BOGs, and attempt to respond appropriately to the breadth of views expressed by participants throughout the meeting by working through the compiled outline and streamlining it to remove overlaps, keeping impetus for action, and balancing the need for high level bullets and key words to guide the authors without overwhelming them with detail. The WGII Bureau was able to converge on an outline (titles and indicative bullets) including twenty chapters, three annexes and the outline of the IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptation that was presented at the final day Plenary.

## **Day 5**

The following outline was presented at the start of the final plenary:

### OUTLINE OF THE WORKING GROUP II CONTRIBUTION TO THE IPCC SEVENTH ASSESSMENT REPORT

Summary for Policymakers

Technical Summary

Chapter 1: Point of departure, framing and key concepts

#### Global Assessment Chapters

Chapter 2: Vulnerabilities, impacts and risks

Chapter 3: Current adaptation progress, effectiveness and adequacy

Chapter 4: Adaptation options and conditions for accelerating action

Chapter 5: Responses to losses and damages

Chapter 6: Finance

#### Regional Assessment Chapters

Common Bullets to all Regional Assessment Chapters

Chapter 7: Africa

Chapter 8: Asia

Chapter 9: Australasia

Chapter 10: Central and South America

Chapter 11: Europe

Chapter 12: North America

Chapter 13: Small Islands

#### Thematic Assessment Chapters

Common bullets to all thematic assessment chapters

Chapter 14: Terrestrial and freshwater biodiversity, ecosystems and their services

Chapter 15: Ocean and coastal biodiversity, ecosystems and their services

Chapter 16: Water

Chapter 17: Agriculture, food, fiber and fisheries

Chapter 18: Energy, industry, infrastructure and human settlements

Chapter 19: Health and well-being

Chapter 20: Poverty, livelihoods, mobility and fragility

Annex I: Atlas

Annex II: Linkage to TGIA: Overview of impacts and adaptation guidelines

Annex III: Glossary

#### OUTLINE OF THE IPCC TECHNICAL GUIDELINES FOR ASSESSING CLIMATE CHANGE IMPACTS AND ADAPTATION

Section 1: Introduction

Section 2: Adaptation in practice

Section 3: Technical Guidelines

Section 4: Enablers

After participants provided extensive oral feedback on the proposed outline, the group split into six huddles to address issues related to selection of regions, thematic content of health, poverty, finance and energy chapters, and on the structure of the IPCC Technical Guidelines. Huddles were facilitated by WGII Bureau members, to address all the comments directly in track changes in the proposed outline. Two WGII Vice Chairs were also tasked with making track change suggestions in the proposed outline to address other comments not covered by the six huddle topics.

The WGII Bureau met over lunch to look through the feedback from the huddles. It was apparent that high convergence and a lot of work had been achieved. The revised outline was posted on PaperSmart and the afternoon plenary resumed its work based on that revised version. The group worked through the outline chapter by chapter considering the edits from the huddles. Titles and indicative bullets were edited live on-screen. Discussions ensued until consensus was reached for each chapter title, the related set of indicative bullets and chapter ordering. This consensus version is included in Boxes 1 and 2 in this document. The Boxes also include an indication of page counts per chapter, which were added after the scoping meeting by the WGII Bureau.

## **Box 1: WGII Contribution to the AR7 Proposed Outline**

**Title: Climate Change 202X: Impacts, Adaptation and Vulnerability [Total indicative page count = 820 pages<sup>1</sup>]**

Summary for Policymakers [15 Pages]

Technical Summary [40 pages]

Chapter 1: Point of departure, framing and key concepts [30 pages]

Global Assessment Chapters [Total indicative page count = 185]

Chapter 2: Vulnerabilities, impacts and risks [45 pages]

Chapter 3: Current adaptation progress, effectiveness and adequacy [40 pages]

Chapter 4: Adaptation options and conditions for accelerating action [30 pages]

Chapter 5: Responses to losses and damages [35 pages]

Chapter 6: Finance [35 pages]

Regional Assessment Chapters [Total indicative page count = 235]

Chapter 7: Africa [40 pages]

Chapter 8: Asia [40 pages]

Chapter 9: Australasia [30 pages]

Chapter 10: Central and South America [40 pages]

Chapter 11: Europe [30 pages]

Chapter 12: North America [30 pages]

Chapter 13: Small Islands [25 pages]

Thematic Assessment Chapters [Total indicative page count = 315]

Chapter 14: Terrestrial, freshwater and cryospheric biodiversity, ecosystems and their services [45 pages]

Chapter 15: Ocean, coastal and cryospheric biodiversity, ecosystems and their services [45 pages]

Chapter 16: Water [45 pages]

Chapter 17: Agriculture, food, fibre and fisheries [45 pages]

Chapter 18: Energy, industry, infrastructure and human settlements [45 pages]

Chapter 19: Health and well-being [45 pages]

Chapter 20: Poverty, livelihoods, mobility and fragility [45 pages]

Annex I: Atlas

Annex II: Linkage to TGIA: Overview of technical guidelines on impacts and adaptation

Annex III: Glossary

Annex IV: Acronyms

Annex V: List of Contributors

Annex VI: List of Reviewers

<sup>1</sup> Page count indication refers to plain text count, excluding figures and tables

## **Box 2: Update to the 1994 IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptation Proposed Outline**

**[Total indicative page count = 170 pages<sup>2</sup>]**

Section 1: Introduction [Total indicative page count = 10]

Section 2: Adaptation in practice [Total indicative page count = 25]

Section 3: Technical Guidelines [Total indicative page count = 85]

Section 4: Enablers [Total indicative page count = 50]

### **7c. Annotated Proposed Outline of Chapters from the WGII Scoping Meeting**

The process to define the chapters and indicative bullets in the outline of the Working Group II contribution to the AR7 is designed to support an implementation-oriented, inclusive and inter/transdisciplinary emphasis in various ways. The overarching narrative of the proposed chapter structure, summarized in Figure 7, reflects these ambitions.

As a result of the scoping process, the narrative of the outline embraces the multi-level nature of both climate change impacts and responses to these impacts. A **global perspective** is used as a starting point of the narrative, where climate pathways are governed by processes operating at the global scale. Also, assessment of risks, adaptation status and options, and responses to losses and damages cannot be considered without a global perspective on drivers or risks and action. Many aspects of climate finance for the WGII domain are also embedded in global scale systems and processes.

Assessments of current conditions and future developments that determine the risk profile and actions that can make a difference require simultaneous coverage of multiple perspectives. At the **regional scale** spatial differentiation of said drivers and action options is acknowledged, while differentiation across **sectors and systems** is necessary to highlight specific dependencies, processes and decision contexts. A close interaction between author teams from the regional and thematic chapter clusters is needed to ensure the report delivers actionable information for a wide range of action holders operating in different environments while avoiding inconsistencies and duplication. This interaction is facilitated by replicating common bullet points between the regional and thematic chapters. In addition, the development of a WGII interactive atlas product helps the evaluation of (time- and space-varying) risk and impact drivers and solution options.

The update of the **IPCC Technical Guidelines on Assessing Climate Change Impacts and Adaptation** is a distinct component of the WGII outline narrative. It is intended as a resource to assist adaptation practitioners in their assessment and planning strategies, which provides a tangible contribution to the action-oriented ambitions.

The WGII outline is developed with the notion that climate impacts and responses to these do not happen in isolation. **Alignment with WGI** is necessary to perform a consistent assessment of the climate-related risks and losses and damage and their main drivers. **Alignment with WGIII** is required for a robust and comprehensive assessment of a context-specific portfolio of climate policy options, synergies and trade-offs, and potential side-effects or co-benefits. Suggestions for cross-Working

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<sup>2</sup> Page count indication refers to plain text count, excluding figures and tables

Group alignments have been included in the annotated outline, and are summarized in Annex 1 to this document (Cross-working group themes and their implementation in the WGII outline).

## The bigger picture of the report

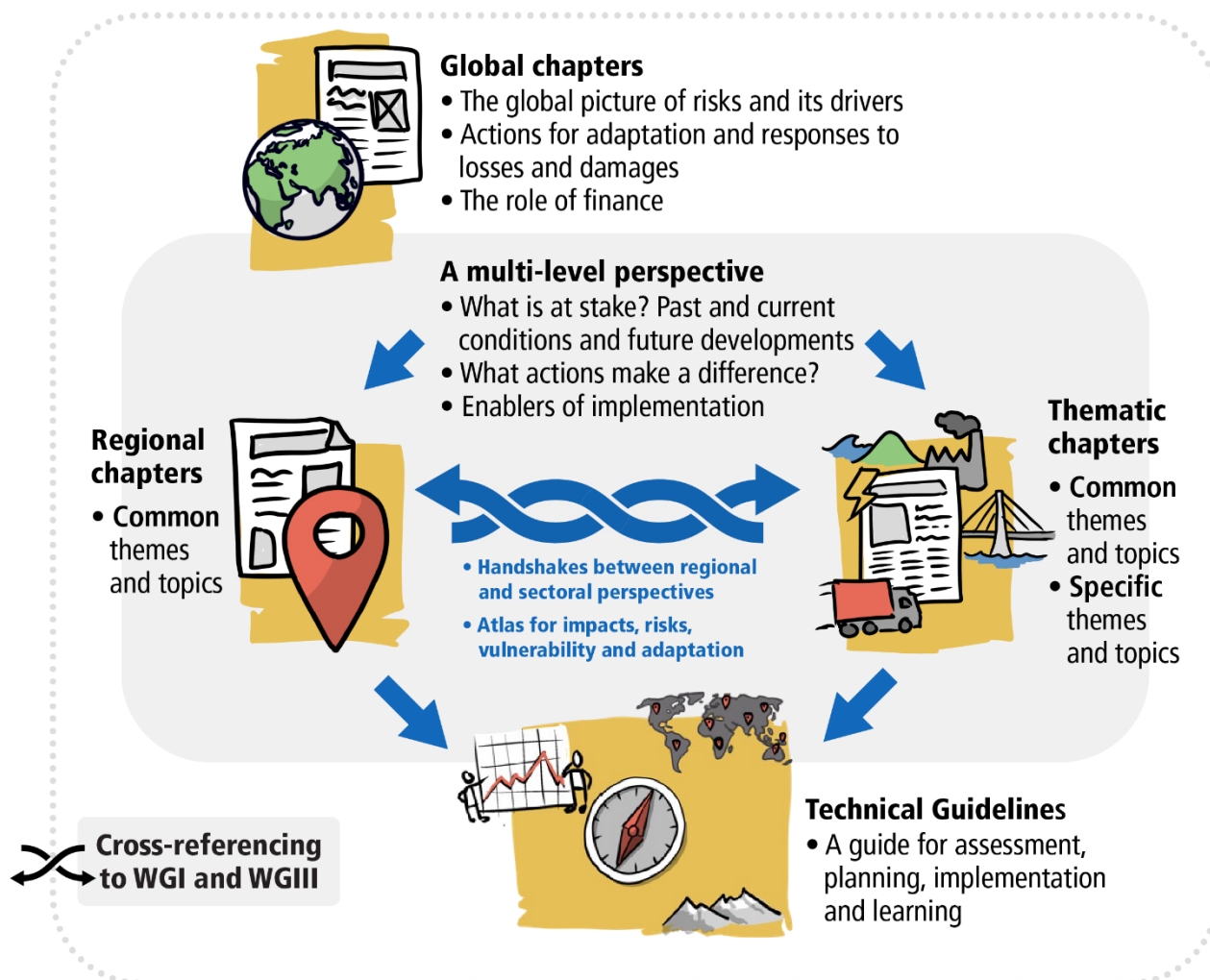


Figure 7: Infographic of the narrative of the WGII contribution to the AR7

### Chapter 1: Point of departure, framing and key concepts

- Facing accelerating climate change and adapting to compounding threats in a poly-crisis world
- Setting the stage: evolving climate policy and knowledge landscapes in a changing world
- Key concepts such as adaptation, sustainable development, climate resilient development, losses and damages, responses to losses and damages, equity and justice
- Introducing Global, Regional and Thematic Assessments
- Updating the Technical Guidelines Assessing Climate Change Impacts and Adaptation
- From assessment to effective implementation: prioritizing and enabling climate action

This chapter serves as the point of departure for the WGII report. It sets the tone for the report as one that empowers action and provides an action-oriented assessment in world where climate impacts, urbanization, resource exploitation, and societal perceptions, trust and dynamics are rapidly changing. It introduces key concepts and contains the main WGII report narrative.

The first bullet emphasizes the urgency for scaling up climate mitigation and adaptation action by highlighting the evolving nature of climate impacts and vulnerabilities, including complex, cascading and interconnected impacts. The bullet makes the connection with AR6 and the evolution of the policy and scientific landscape of adaptation. It asks what is at stake in a post-AR6 world for the planet, people and livelihoods. Given a diversity of scenarios for climate and socio-economic development, it explores the framing of impact, risks, vulnerabilities and available and potential solutions under varied scenarios, including overshoot. While climate impacts have accelerated and are taking place in a world with concurrent unfolding of non-climatic global trends, including biodiversity loss, overall unsustainable consumption of natural resources, land and ecosystem degradation, rapid urbanisation, human demographic shifts, and social and economic inequalities (referred to as “poly-crisis”), new opportunities, solutions and resources have emerged to address these, which call for the inclusion of diverse knowledges and experiences.

The second bullet focuses on the international institutional and knowledge context, focusing on key findings and new issues that have emerged since AR6 including from the AR7 Special Report on Climate Change and Cities. The assessment will include, among other aspects, the evolving UNFCCC (e.g. the Global Goal on Adaptation, National Adaptation Plans (NAPs), the New Collective Quantified Goal, and losses and damages) and evidence landscape, technological changes, diverse knowledge systems (e.g. Indigenous and local knowledge, new ways of collecting and assessing knowledge, physical sciences, social sciences, legal contexts).

The third bullet focuses on key concepts that have implications for the rest of the report. Apart from the concepts listed in the bullet, other potential concepts to be considered include behaviour change, biodiversity and conservation, differentiation practice, rural and institutional dimensional aspects, key risks and vulnerability, compounding and cascading impacts and risks, levels of adaptation such as incremental and transformative adaptation, maladaptation and maladaptive practices, temperature overshoot and non-overshoot pathways, climate finance related to adaptation, sufficiency, resilience and systems thinking. Authors should also consider clear definitions of these concepts in the IPCC AR7 Glossary.

The fourth bullet explains the framing approach in this report and provides an overview on past progress and knowledge gaps in the use of global, thematic and regional assessments. Reference to the Annexes of the report, including the Atlas, will also be included.

The fifth bullet introduces the update and revision of the 1994 Technical Guidelines that will be published as a separate volume of the WGII contribution to AR7. It briefly provides the purpose of for the revision of the IPCC Technical Guidelines and explains the rationale behind their revision. It describes how the updated and revised IPCC Technical Guidelines can be read and used alongside the main report, highlighting its use for adaptation planning, scanning of methodologies and tools for measuring climate change impact and adaptation progress, and tackling the barriers throughout the process: scoping and goal-setting; impact, vulnerability and risk assessment; planning, implementation; and monitoring, evaluation and learning.

The sixth bullet calls for an assessment of how scientific evidence supports climate action. This assessment will include the identification and evaluation of multi-level and multi-scale enablers and

barriers to action, including issues of decision making under uncertainty and competing priorities, enablers such as technology, finance, behaviour, as well as their co-benefits and synergies.

## **Global Assessment Chapters**

### **Chapter 2: Vulnerabilities, impacts and risks**

- Multiple dimensions of vulnerability across temporal and spatial scales
- Synthesis of observed and projected impacts, including economic and non-economic losses and damages, building on both slow onset and extreme Climatic-Impact Drivers, including detection and attribution
- Key risks including complex, compound, cascading, residual risks, and risks under a range of climate and development scenarios, including overshoot and different adaptation pathways
- Risks from responses
- Reversible and irreversible impacts and risks under a range of climate and development scenarios, including overshoot and different adaptation pathways
- Reasons for Concern across scales
- Lessons from other approaches to risk assessment across scales

This chapter explores vulnerabilities, observed impacts and future risks under a range of climate, development and adaptation pathways. It will build on the IPCC's long-standing assessment of Reasons for Concern (RfCs), but also further articulate recent concepts introduced in the AR6 reports (cascading/multi-sectoral risks, risk from response options, among others). The focus of this chapter is a global level vulnerability, impact and risk assessment, with specific regions and sectors documented in subsequent chapters. Climate risk assessment involves feedback across physical, natural and human systems. Impacts may be economic, social and biophysical, reversible and irreversible. Considering the full range of these complex dynamics will enable a more comprehensive and nuanced assessment of costs and avoided impacts from action.

The first bullet summarizes factors that increase vulnerability to climate change. It provides insights into factors and path dependencies that could amplify risks and influence adaptive capacity. This may include pre-existing or historical vulnerabilities, such as those related to colonialism or cost of capital and debt. The intersection of economic, social or demographic characteristics, such as gender and age, should also be highlighted. Recent advances in quantitative and qualitative vulnerability assessments should be explored.

The second bullet highlights new findings on observed impacts and responses, including detection and attribution. It should explore differentiated, compound and cascading impacts, provide improved quantification of the economic costs of climate impacts, and evaluate the ability to manage the current impacts of climate variability and change. This bullet will document economic and non-economic impacts (e.g. those related to biodiversity loss, culture, identity, and livelihoods etc) at the global level by synthesising information from the regional and sectoral scales. It will address both slow onset and extreme events. As residual risks remain even after adaptation and risk management, this bullet also includes an assessment of current losses and damages.



The third bullet is a global synthesis integrating information from the regional and thematic chapters on key risks associated with a range of possible future climates and development pathways. The risk assessment should explore feedbacks, cascades, non-linear behaviour and the potential for surprises (e.g. high impact or ‘worst case’ outcomes) as well as risks from responses such as changes in policy, technology and socio-economic cascading impacts. This bullet summarizes the projected magnitude of future key risks, and how they vary with the level of climate change and development. The assessment of scenarios should include feasibility of underlying assumptions and representativity of diverse climate and development contexts. Of interest are the quantification of scenario-dependent risks and impacts (including the notion of avoided risks and impacts for low warming levels). Alignment with the contributions of the other Working Groups to AR7 is recommended. The authors may wish to consider updating the definition of key risks used in the IPCC WGII AR6 report.

The fourth bullet explores risks from adaptation and mitigation responses to climate change, that may change the distributions of vulnerability or exposure to future shocks, including potential maladaptive practices. In AR6 the risk framing was extended to not only consider risk from climate change impacts but also risks arising from mitigation and adaptation responses. This bullet provides an opportunity to explore unintended side-effects of responses across sectors including food production, biodiversity, and livelihoods. Also, it should assess the implications of Solar Radiation Management for regional and temporal distribution of climate impacts and risks, and the implications of overshoot scenarios for anticipation of future adaptation levels and emergence of risks associated with measures leading to negative emissions and reducing warming levels, such as Carbon Dioxide Removal and land-based or marine carbon sequestration.

The fifth bullet addresses recent scientific literature on reversible and irreversible climate change impacts and risks, limits to adaptation and unmanageable risks, and possible risks during temporary temperature overshoot. It will also broadly explore trajectories of impacts and risks under different adaptation, development and climate change pathways.

The sixth bullet calls for revisiting the “Reasons for Concern” and “Burning Embers” framework used in the IPCC WG2 reports, based on new literature published since AR6. The authors should build on risk assessments and burning embers developed in past reports, which were standardized and compiled after AR6. They may wish to build on advances in risk assessment methodology in the AR6 cycle and in subsequent academic literature.

The seventh bullet considers lessons in risk assessment and management from other fields or approaches and their applicability to climate change.

### **Chapter 3: Current adaptation progress, effectiveness and adequacy**

- Adaptation progress, gaps, limits and barriers
- Indicators and metrics to measure adaptation against goals
- Adequacy and effectiveness of support for adaptation and risk management
- Adaptation costs, trade-offs, benefits and co-benefits
- Evidence of effectiveness and adequacy of state and non-state actions at various scales

Chapter 3 examines the progress, effectiveness and adequacy of current adaptation efforts in addressing climate change, with a focus on assessing the degree to which measures are integrated into policymaking and financing, their effectiveness in achieving impactful adaptation responses and

the costs, benefits and limits of different adaptation options. The overall intention is to establish what we have learnt from climate change adaptations implemented to date, and to extend the AR6 assessment, particularly in the areas of non-state contributions to adaptation to climate risks and locally-led adaptation.

The first bullet explores the progress of adaptation efforts, identifying gaps, limitations and barriers that hinder their effectiveness. It highlights distributive consequences, equity and justice concerns, drawing on regional and thematic chapters that also address large-scale changes. The discussion includes key topics such as human mobility, transboundary adaptation and adaptation to complex risks. Behaviour and public acceptance of risks are also to be considered as key drivers, enablers or barriers. This section synthesizes outcomes from regional and thematic chapter analyses in this Assessment, providing insights into both successes and failures in climate adaptation and the overall costs and benefits of adaptation action, as well as soft and hard limits to adaptation. Furthermore, the first bullet also calls to provide evidence to date of transformational adaptations and the pace and scale of adaptation. Utilization of diverse sources of literature, including independent evaluations of adaptation programs, is encouraged to provide robust evidence. Critical drivers and enablers of adaptation, such as political will, institutional arrangements, technology, and finance, should be identified.

The second bullet assesses indicators and metrics used to date to assess adaptation progress. This can address feedback loops, learning processes and scaling in adaptation efforts. The section will also assess the effectiveness of adaptation monitoring and evaluation to date.

The third bullet addresses the adequacy and effectiveness of support for adaptation and risk management, encompassing broader concepts that extend beyond financial mechanisms discussed in Chapter 6. This can include policy, business, non-governmental, informational, educational and other support for adaptation.

The fourth bullet examines what we have learnt to date about the costs, trade-offs, benefits and co-benefits associated with adaptation efforts. This includes an analysis of the relationships of climate change adaptation with sustainable development, analysis of cases of insufficient adaptation or maladaptation, disaster risk reduction, and the equity and justice implications of climate change adaptation. The interplay between these factors is considered essential for understanding the broader impacts of adaptation strategies.

The fifth bullet evaluates the effectiveness and adequacy of actions taken by state and non-state actors to adapt to climate risks at various scales and sectors, including closing the adaptation gaps for business and value chains. Evidence is presented to demonstrate the effectiveness of national and sectoral adaptation policies, as well as market-driven approaches. The effectiveness of locally-led adaptation initiatives, including their scalability and contribution to reducing vulnerability and risks, is also assessed. This section highlights the roles of Indigenous Knowledge and Local Knowledge, emphasizing the importance in enhancing agency and empowering key stakeholders.

#### **Chapter 4: Adaptation options and conditions for accelerating action**

- Effectiveness and feasibility of adaptation options considering current barriers, preconditions, path dependencies, and a range of climate and development scenarios and/or different time scales

- Approaches for adaptive and continuous monitoring, evaluation, and learning to design better policies, options and actions, and to enhance implementation
- Drivers, enablers and conditions for accelerated adaptation action, including means of implementation
- Ways of adaptation decision making and planning under uncertainty and constraining conditions
- Enhancing agency and capacity of stakeholders and empowering Indigenous Knowledge and Local Knowledge holders
- Approaches to manage risks arising from adaptation, and addressing synergies and trade-offs with Disaster Risk Reduction, mitigation and sustainable development

Chapter 4 examines prospective adaptation options and conditions for accelerating action, taking present day adaptation status as a point of departure. in Chapter 3 up to the present point. This chapter includes the relationship between disaster risk reduction and adaptation, exploring how evidence from various aspects can be leveraged to scale up policies and expand the evidence base for learning. It offers a forward-looking assessment of systems and sectors, emphasizing the implementation of adaptation options, including strategies for risk management, learning, development and adaptation progress. Additionally, it addresses regional relevance by identifying socioeconomic conditions and sectoral challenges to adaptation.

The first bullet explores the likely effectiveness and feasibility of adaptation options for projected climate and related changes, considering current and emerging barriers, pre-conditions, path dependencies, and various types of climate and development scenarios across different time scales. It includes discussions on both just adaptation and transformative adaptation.

In the second bullet, the chapter establishes approaches for adaptive management and continuous monitoring, evaluation and learning. These approaches should aim to inform the design of better policies, enhance implementation and enhance future options and actions.

The third bullet addresses drivers, enablers and conditions for accelerated and effective adaptation action, including means of implementation. Key factors such as political will and public acceptability, capacities, cooperation and competition, finance, behavioural aspects, economic appraisal, worldviews, innovation, governance, regulation and standards, legislation and legal processes, and cross-level processes are examined. The bullet includes the enablers and conditions for just adaptation, advances in assessing costs, benefits and effectivity of adaptation and incremental versus transformative adaptation.

The fourth bullet examines ways of adaptation decision making and planning under uncertainty and constraining conditions (e.g. robust adaptation etc.). It provides evidence of different policy and political decision-making styles, including cross-level coordination.

The fifth bullet evaluates ways to enhance the agency and capacity of stakeholders and how to better empower Indigenous Knowledge and Local Knowledge holders to engage in the whole adaptation cycle across different levels.

The sixth bullet evaluates approaches to managing risks arising from adaptation and other consequences. It explores synergies and trade-offs with disaster risk reduction, mitigation and sustainable development to ensure coherent and integrated strategies.

## Chapter 5: Responses to losses and damages

- Types of responses by diversity of actors at various scales and their interactions
- Policies, institutional arrangements and legal aspects for responding to losses and damages at various scales
- Drivers of decision-making including values, perceptions, differential power and influence, behaviour, incentives and capacities
- Approaches of categorizations and metrics to assess losses and damages
- Existing and potential responses to losses and damages including effectiveness and feasibility under a range of climate and development scenarios including overshoot and adaptation pathways
- Needs, gaps, barriers and enablers of responses to losses and damages

Chapter 5 focuses on the critical area of responses to losses and damages, emphasizing actionable insights for decision-makers across scales. Building on previous assessments, this chapter aims to provide a comprehensive analysis of existing and potential responses, their effectiveness, and the barriers to implementation. By examining policies, institutional arrangements, decision-making drivers, and metrics, this chapter will bridge knowledge gaps and offer pathways to enhance resilience in the face of increasing climate risks. The chapter intends to inspire action and equip stakeholders with evidence-based strategies to address losses and damages in diverse contexts.

The first bullet will categorize and analyse the spectrum of responses to losses and damages undertaken by various actors, including governments, communities, households and individuals, displaced persons, private sector, and international organizations. It will explore the interactions and synergies among local, national, and global scales, highlighting how multi-level governance and coordination can enhance the effectiveness of responses. The inclusion of diverse actors acknowledges the complexity of losses and damages and the necessity of collaborative efforts.

The second bullet will delve into the policies and institutional frameworks shaping losses and damages responses, examining their design, implementation, and efficacy. It will also address legal dimensions, such as international agreements, local policies, and frameworks like the Santiago Network. This bullet highlights the importance of assessing governance structures to ensure justice and equity in losses and damages responses.

Focusing on the socio-political dimensions of losses and damages responses, the third bullet will explore how values, perceptions, and power dynamics influence decision-making processes. It will also consider the role of incentives, capacities, and behavioural factors in shaping responses. This approach puts an emphasis on understanding the nuanced drivers behind decision-making to foster more inclusive and effective responses.

The fourth bullet will propose methodologies for categorizing and measuring losses and damages, addressing the need for standardized metrics to evaluate both economic and non-economic losses, including other approaches to categorizing losses and damages beyond economic or non-economic. By offering a typology of approaches, this section will enable more consistent assessments across contexts, a need identified as critical during the scoping meeting discussions.

The fifth bullet will evaluate current and proposed losses and damages responses, assessing their feasibility and effectiveness across various climate and development scenarios. It will consider how adaptation pathways, including those in temperature overshoot scenarios, present the magnitude and characteristics of losses and damages across different climate change and development scenarios. It also underscores the importance of integrating feasibility and effectiveness analyses to guide decision-makers in adopting scalable responses to losses and damages.

The last bullet will identify critical needs, existing gaps, barriers to implementation, and enablers that facilitate effective losses and damages responses. It will draw on lessons from past and ongoing initiatives to offer actionable recommendations. Highlighting these aspects aligns with the AR7's objective to support governments and other stakeholders in overcoming challenges and leveraging implementation insights for more resilient systems.

## **Chapter 6: Finance**

- Background considerations, including broader macroeconomic context, international financial architecture, and reforms, geopolitics, other international commitments, barriers and enablers to finance
- Climate finance for adaptation – overview of financing needs, current flows, instruments and gaps, effectiveness and access, and methodologies for tracking finance flows
- Climate finance for responses to losses and damages – overview of financing needs, current finance flows, instruments and gaps, effectiveness and access, and methodologies for tracking finance flows
- Public and private investments for climate action: finance flows at domestic and international levels
- Equitable financial systems and schemes including those related to financial stability, sustainability and financial risk management
- Approaches to accelerate finance flows, including the diversity of instruments, schemes and approaches, and their appropriateness
- Consistency of finance flows with a pathway towards climate resilient development

Chapter 6 addresses the critical role of finance in enabling climate action, with a focus on adaptation, losses and damages, and pathways towards climate resilient development (CRD). Recognizing the complexity and diversity of financial systems, this chapter explores the role of finance, including the broader macroeconomic and geopolitical contexts, types of finance and financing mechanisms, financial adequacy, access and effectiveness of current financial flows, innovation for financing and the innovative approaches needed to scale up climate finance and effective financial risk management. It aims to provide policymakers, stakeholders, and financial institutions with actionable insights to overcome barriers and leverage enablers for equitable and sustainable financial systems. Authors should also review and align work with Working Group III's material on finance.

The first bullet sets the stage by analysing the structural and systemic factors shaping climate finance and financial risk management. It examines how global macroeconomic trends, international financial architecture, and geopolitical dynamics influence the availability and accessibility of finance for climate adaptation action and distribution of financial risks. It addresses systemic inequities, barriers

like high costs of capital, and enablers such as governance reforms and innovative financial products and financial risk management.

The second bullet provides a comprehensive assessment of adaptation finance, detailing the scale of needs, costs of inaction, existing gaps, and the effectiveness of financial flows. It evaluates methodologies for tracking these flows, emphasizing transparency and accountability. It assesses the disproportionate allocation of resources between adaptation and mitigation, stressing the importance of equity and justice in adaptation finance. It also considers financial risk management as an adaptation instrument.

The third bullet provides a comprehensive assessment of finance for responding to losses and damages. It examines current flows, the emerging needs and innovative instruments required to respond to losses and damages financing, including complementarity of other sources of finance, funds and mechanisms. It underscores the urgency of developing methodologies to track financing for losses and damages and addressing the barriers to its accessibility.

The fourth bullet analyses the interplay between public and private finance, focusing on the roles of domestic and international actors. It evaluates the effectiveness of different financing mechanisms in mobilizing resources for adaptation and responding to losses and damages and highlights the need for collaboration between sectors. It calls for a clear distinction between climate finance and broader investments in climate adaptation action.

The fifth bullet explores options for equitable financial systems that address issues of stability, sustainability, and risk. It includes mechanisms like insurance, social protection schemes, forecast based finance and innovative financial instruments. It emphasizes the importance of ensuring equity and justice in financial systems to support vulnerable populations and critical sectors and systems.

The sixth bullet reviews strategies to scale up and accelerate climate finance, including innovative instruments and schemes tailored to different contexts. It assesses the appropriateness of economic instruments and policy packages including incentives, subsidies, market-based instruments, green bonds, risk sharing mechanisms and their interactions with regulatory instruments, including flexibility and innovation in financing mechanisms.

The last bullet examines how financial flows align with climate resilient development pathways, drawing on Article 2.1(c) of the Paris Agreement. It evaluates the coherence of finance with sustainable development goals and climate action priorities ensuring this alignment is critical to achieving long-term climate resilience.

## **Regional Assessment Chapters**

### **Common Bullets to all Regional Assessment Chapters**

- Consider regional setting, including intra-regional variabilities, areas of special concerns, such as hotspots and geographies, socio-political contexts and the thematic assessment chapters
- Multiple dimensions of vulnerability across temporal and spatial scales
- Observed and projected impacts, including economic and non-economic losses and damages, building on both slow onset and extreme Climatic-Impact Drivers

- Key risks including complex, compound, cascading, transboundary, residual risks, and risks under a range of climate and development scenarios, including overshoot and different adaptation pathways
- Adaptation progress, gaps, limits and barriers
- Context-specific adaptation options and responses to losses and damages, means of implementation, limits to action, costs and benefits, effectiveness and feasibility of different options
- Barriers and enablers to climate action, including finance, capacity building, education, technology development and transfer
- Perception, beliefs, values, behavioural aspects and cultural practices of adaptation, including locally led adaptation and community-based responses
- Distributional nature of effects, including consideration of human rights, equity and justice, Indigenous Peoples, gender, disability, informality and intergenerational justice
- Policies, governance, legislation and institutions critical to planning and implementation, including considerations of political ecology and political economy
- Role of diverse knowledge systems including Indigenous Knowledge, Local Knowledge and experiential learning
- Linkages with sustainable development and climate resilient development, including co-benefits, synergies, trade-offs and opportunities for innovation and transformation
- Regional, transboundary and local case studies, such as polar, dryland and mountain regions

These chapters assess impacts, adaptation and vulnerability relevant to specific geographical regions listed in the chapters. The regional focused assessment in this section complements chapters in the global and thematic sections. Author teams need to coordinate to ensure alignment and minimise redundancies.

The first common bullet point makes an explicit reference to both intra-regional variability and regions of special concern. Representation of intra-regional variability of biophysical, and socio-economic characteristics is necessary to assess meaningful drivers of risk, impacts and vulnerability for human societies and ecosystems, and to assess adaptation options and their effectiveness. Cross-regional areas of concern, such as the Arctic, high mountain and dryland regions were indicated during the scoping meeting as particular regions that merit consideration for a cross-chapter box.

The second common bullet makes consideration of spatial and temporal variability explicit for the vulnerability assessment across regions.

The third common bullet calls to complement the assessment of climatic -impact-drivers or related hazard information assessed in the WGI contribution to AR7 with non-climatic drivers that influence impacts and losses and damages, as well as their responses. The existence of regions and sectors with observed high impacts should be emphasized, as well as the variability of impacts and losses and damages within regions and sectors.

The fourth common bullet elaborates on key risks and scenarios and how these interact. The assessment of key risks needs to extend into the domain of complex, cascading, compounding and transboundary drivers, impacts and adaptation options. Their dependence on global climate conditions needs to take crossing the global warming thresholds from the Paris Agreement into account, as well as scenarios that embark on a temporary temperature overshoot, irreversible changes, different levels of societal development and different adaptation pathways.

The assessment of adaptation characteristics is addressed in the fifth common bullet and takes historical adaptation progress as a point of departure. Tracking adaptation progress via monitoring, evaluation and learning is crucial. Regional differentiation of adaptation gaps, limits, barriers and enablers are to be considered, and should address incremental and transformative adaptation, continuity of adaptation policy cycles, maladaptation and maladaptive practices, ecosystem-based adaptation, the special adaptation needs of vulnerable groups and Indigenous Peoples, and the role of participatory approaches.

In the sixth common bullet the effectiveness and feasibility of current and potential future adaptation options and responses to losses and damages is explored. These include adaptation feasibility that addresses incremental and transformative adaptation, maladaptation and maladaptive practices, ecosystem-based adaptation and other aspects of adaptation described in the previous bullet point. Besides adaptation feasibility, which was addressed extensively in AR6, the adequacy of both short-term and long-term response options, for different future warming and socio-economic scenarios, is of high interest, as is information on costs of action or inaction.

The seventh common bullet calls for a broad scan of barriers and enabling conditions for climate adaptation action. Regionally specific elements of the means of implementation (finance, technology transfer, capacity building and development) should be addressed.

The eighth common bullet complements this scan with attention for psychological and sociological processes affecting perception of risk and urgency and corresponding behaviour, and their linkages with values, social acceptability, organized obstruction and cultural practices. Inspiration on adaptation practices



should also be retrieved from applications of locally led adaptation and community-based responses. Linkages between coverage of behavioural aspects in WGIII can be considered.

The ninth common bullet focuses on the uneven distribution of impacts of climate change, adaptation and responses to losses and damages over societal groups and global regions, and highlights the importance of equity, justice and human rights across these regions. It particularly refers to gender aspects, the position of Indigenous Peoples, and distributional effects over groups such as of people with disability, informal citizens and young generations with a large exposure to future conditions.

The tenth common bullet addresses the role of political and legal institutions in economic and societal change, and the ecosystem of political processes, governance arrangements and authorities (labelled as “political ecology”). The embedding of climate adaptation into this ecosystem is an important component of the assessment of adaptation practices, their effectiveness, and their dependence on enabling conditions and barriers.

The eleventh common bullet highlights the importance of inclusion of a diverse range of knowledge systems. Experience-based knowledge, Indigenous Knowledge and Local Knowledge should complement the well-known scientific knowledge and practices, and this is to be promoted by the consideration of a diverse range of literature (including grey literature) and evidence bases.

The twelfth common bullet calls for an assessment of the alignment of climate adaptation with sustainable development and low-emission and climate resilient development. Climate resilient development focuses on the need to ensure this development is reinforcing climate resilience. Alignment of climate adaptation with sustainable development and low emission and climate resilient development requires a thorough assessment of synergies, trade-offs and co-benefits at multiple time scales, including trade-offs and synergies with low-emission policies assessed in WGIII. It also explores the potential of innovation and transformation to contribute to sustainable and climate resilient development.

Finally, authors are invited to include a range of case studies in the thirteenth common bullet, thereby covering local as well as regional or transboundary case studies, and studies focusing on specific geographical domains such as polar regions, mountain areas or dryland regions.

## **Chapter 7: Africa**

## **Chapter 8: Asia**

## Chapter 9: Australasia

## Chapter 10: Central and South America

## Chapter 11: Europe

## Chapter 12: North America

## Chapter 13: Small Islands

### Thematic Assessment Chapters

#### **Common bullets to all thematic assessment chapters**

- Observed and projected impacts, including economic and non-economic losses and damages, building on both slow onset and extreme Climatic-Impact Drivers
- Multiple dimensions of vulnerability across temporal and spatial scales
- Key risks including complex, compound, cascading, transboundary, residual risks, and risks under a range of climate and development scenarios, including overshoot and different adaptation pathways
- Perceptions, beliefs, values, behavioural aspects and cultural practices of adaptation, including locally led adaptation and community-based responses
- Context-specific adaptation options and responses to losses and damages, means of implementation, including barriers, gaps, enablers and limits to action, and costs and benefits, effectiveness and feasibility of different options
- Distributional nature of effects including consideration of human rights, equity and justice, Indigenous Peoples, gender, disability, informality and intergenerational justice
- Policies, governance, legislation and institutions critical to planning and implementation, including considerations of political ecology and political economy
- Role of diverse knowledge systems including Indigenous Knowledge and Local Knowledge
- Linkages with sustainable development and climate resilient development, including co-benefits, synergies, trade-offs, and opportunities for innovation and transformation

- Case studies of implementation

As indicated in the outline annotations for the cluster of regional chapters, both spatial and sectoral characteristics of adaptation action are applicable in this sectoral assessment. This calls for a multi-perspective approach to the assessment of climate impacts, risks, vulnerabilities, losses and damages, and adaptation. Alignment between the structure of the regional and thematic chapter clusters is achieved by mirroring most of the common bullet points applicable to all chapters in each of these clusters, while avoiding repetitions and redundancies in the assessment. For the thematic chapters, additional bullets specific to the theme of interest should be added per chapter.

The multi-perspective approach to the assessment should include a trans-sectoral element, where impacts, losses and damages and adaptation responses apply to multiple sectors concentrated within a region and/or connected in a network. The treatment of this trans-sectoral element can be adopted within regional chapters, cross-chapter boxes, or in dedicated case studies.

The first common bullet is described as the third common bullet of the cluster of regional chapters.

The second common bullet is described as the second common bullet of the cluster of regional chapters.

The third common bullet is described as the fourth common bullet of the cluster of regional chapters.

The fourth common bullet is described as the eighth common bullet of the cluster of regional chapters.

The fifth common bullet is described as the sixth common bullet of the cluster of regional chapters.

The fifth common bullet is described as the ninth common bullet of the cluster of regional chapters.

The seventh common bullet is described as the tenth common bullet of the cluster of regional chapters.

The eighth common bullet is described as the eleventh common bullet of the cluster of regional chapters.

The ninth common bullet is described as the twelfth common bullet of the cluster of regional chapters.

Finally, authors are invited to include a range of implementation case studies in the tenth common bullet, thereby focusing on context-specific drivers of adaptation options and action responses. The collection of case studies should speak to a wide range of potential action holders and include the role of action networks.

#### **Chapter 14: Terrestrial, freshwater and cryospheric biodiversity, ecosystems and their services**

- Considering distinct geographies and biomes, including cryosphere, polar, forests, grasslands, mountains, deserts and drylands
- Vulnerability and resilience of biodiversity, ecosystem structure and functions, under a range of plausible futures including climate extremes, emergence of novel communities, and the implication for their services
- Emerging threats and management of risk to critical biodiversity, ecosystems, rare species and related cultural heritage
- Enablers, limits and barriers to natural adaptation

This chapter outlines key considerations for assessing the impacts of climate change on terrestrial ecosystems, emphasizing the importance of geographic and ecological diversity, as well as human-nature interactions. Ecosystems should be understood in their broader term of inclusion of people-nature interactions especially of traditional use of land by Indigenous Peoples and pastoralists. The chapter explores the vulnerabilities and resilience of ecosystems, the emergence of novel communities, and implications for ecosystem services under various climate scenarios. Attention is also given to rare biodiversity, cultural heritage, and the prospects for both natural and human-facilitated adaptation, with a focus on the role of Indigenous Knowledge.

The intent of the first bullet is to emphasize that the distinct geographies and subcategories of biomes should be considered when assessing the impacts of climate change on terrestrial ecosystems. These should expand beyond the broad scale latitudinal climate zoning of terrestrial lands or a generic forest/non forest vegetation classification, for instance, distinguishing needle-leaved/broad-leaved/dry/moist forest types, or moist/dry/mountain grassland. Similarly, distinct geographic entities such as the cryosphere (including Polar regions), high mountains and deserts should also be considered, and their respective biomes be assessed in a systematic manner.

The second bullet will address the vulnerability and resilience of species or ecosystems and their functions from observed changes, including those attributed to climate change. It will consider a range of plausible climate scenarios and futures while assessing increasing vulnerability of ecosystems. It will also assess the possible emergence of novel plant/animal communities and ecosystems under a changing climate, the evidence for alternative stable states and irreversible changes to ecosystems. Finally, it will assess the implications of climate change across biogeographical regions on a variety of ecosystem services such as hydrological regulation, carbon sequestration, coastal protection, and provision of goods and services for people's livelihoods.

The third bullet considers the natural or human-related drivers of critical changes to biodiversity and ecosystems, including overexploitation. It assesses the emerging climate change threats to critical biological entities, including severe drought, floods and wildfires, and their combined effect with direct anthropogenic actions. The assessment of wildfire threat in terrestrial ecosystems should be

upgraded relative to earlier assessments. Risks to cultural heritage including sacred geomorphological sites such as mountains and rivers, sacred forests, and sacred species of plants and animals, as well as management of these risks should be considered. This requires consultation of Indigenous Knowledge systems in documentation of cultural heritage sites.

The fourth bullet addresses prospects for natural adaptation of biodiversity and ecosystems to climate change relative to other means such as active human-induced action for adaptation. This will also assess the enablers to natural adaptation through means such as landscape or regional scale conservation, as well as limits and barriers to adaptation from governance systems, policies, structural inequities, lack of financial, technical and knowledge resources, colonial legacies, transboundary impacts and risks, and socio-economic realities and developmental needs. The authors are encouraged to pay particular attention to Indigenous Knowledge systems and practices in enabling natural adaptation and barriers to these in current day policies and governance of natural lands.

## **Chapter 15: Ocean, coastal and cryospheric biodiversity, ecosystems and their services**

- Vulnerability and resilience of biodiversity, ecosystem structure and functions, under a range of plausible futures including climate extremes, emergence of novel communities, and the implication for their services
- Emerging threats and management of risk to critical biodiversity, ecosystems, rare species and related cultural heritage
- Enablers, limits and barriers to natural adaptation

Ocean, coastal and cryospheric ecosystems include the entire range of systems including estuaries, deltas, lagoons, saltmarshes, mangroves, seagrass beds, coral reefs, polar regions, and open oceans. Ecosystems should be understood in their broader term of inclusion of people-nature interactions especially of traditional use of coastal regions and oceans by Indigenous Peoples and other communities such as fisherfolk.

The first bullet will address the vulnerability and resilience of species or ecosystems and their functions from observed changes, including those attributed to climate change. It will consider a range of plausible climate scenarios and futures while assessing increasing vulnerability of ecosystems. It will also assess the possible emergence of new biological communities and ecosystems under a changing climate, and irreversible changes to ecosystems. Finally, it will assess the implications of climate change on a variety of ecosystem services such as hydrological regulation, carbon sequestration, coastal protection, sea level rise and provision of goods and services for people's livelihoods.

The second bullet will update AR6 assessments of emerging climate-driven threats and risks related to relevant ecosystems, especially rare or critical ones. Aspects of risk management and governance of critical or rare species and ecosystems may include, for instance, the additional impacts of other activities such as deep-sea mining.

The third bullet points to the need for specific treatment of natural adaptation of coastal and oceanic biodiversity and ecosystems relative to other means such as active human-induced action for adaptation. This will also assess the enablers to natural adaptation through means such as seascape or regional scale conservation, as well as limits and barriers to such adaptation from governance systems, policies, structural inequities, lack of financial, technical and knowledge resources, colonial

legacies, transboundary issues and socio-economic realities and developmental needs. The authors are encouraged to pay particular attention to Indigenous Knowledge systems and practices in enabling natural adaptation and barriers to these, including cultural sites, in current day policies and governance of coastal regions.

## **Chapter 16: Water**

- Water security addressing the issues of too little, too much, and polluted water in the context of climate change to meet the needs of people, food production and ecosystems
- Water use and budgeting including virtual water, water footprints, water-related nexus
- Transboundary and national and subnational water management including non-economic and cultural values of water
- Risks from response options, including water cooperation and competition

This chapter examines the impacts of climate change on water availability and quality, and how present and future adaptation efforts can vary in effectiveness in managing water across sectors. It emphasises the multifaceted value of water for human and natural life.

The first bullet will define water security to address water as a vital element for humans and ecosystems under a rapidly changing climate. This includes the physical domains (e.g. surface water, ground water, cryosphere), requirements (e.g. quantity and quality), as well as ecosystems, and health.

The second bullet stresses the need to account for different water sources and uses in and across sectors, and determine balances (budgeting) at different scales including the national level, considering not only human needs (e.g., irrigation of agriculture, food production, sanitation, industry) but also biodiversity and ecosystems. For this, the concept of water footprints is relevant. The bullet calls to a systemic approach in which many nexuses are considered, e.g., water-energy-food-health-ecosystems-carbon. When considering adaptation options for the water sector, attention was paid to associated risks and to the use of ecosystem-based adaptation.

The third bullet highlights transboundary, national and subnational water management, and non-economic and cultural values of water. The spatial diversity of climatic conditions and the role of state boundaries is emphasized. The reliance of agricultural (and other) water uses on local rainfall, and rivers flowing across jurisdictions calls for multi-scale water management practices and adaptation options. The value of water to human well-being extends beyond its role in supporting life-sustaining functions. Authors are called to consider case studies and/or cross-chapter boxes on specific geographies (e.g., mountains, semiarid regions, Small Islands Developing States, etc.).

The final bullet focuses on the risks associated with response options that raise unintended risks or could lead to emerging conflicts. The potential of taking into account equity, justice and participatory practices is to be addressed.

## **Chapter 17: Agriculture, food, fibre and fisheries**

- Adaptation options for food supply chains and food, nutrition and livelihood security, considering affordability, dietary diversity, accessibility, agency and sustainability
- Competition for land and ocean use in the context of adaptation and mitigation
- Livelihood security, risks to cultural heritage and adaptation options for key vulnerable groups such as smallholder farmers, pastoralists and artisanal fishing communities
- Transboundary impacts and responses, including fisheries and aquaculture, and impacts and responses in areas beyond national jurisdiction
- Impacts of climate change on trade and trade implications for adaptation and mitigation

This chapter addresses the agriculture and food system as a whole and assesses climate change impacts on this system. It calls for an emphasis on whole-system analysis in order to capture complex, cascading, multi-actor impacts and action potential. It also stresses the need to provide insights in uneven distributions of impacts and response options over all actors and affected natural systems.

The first bullet aims at assessing adaptation options for food provision that considers nutrition and livelihood security for different social groups. It also considers affordability, dietary diversity, accessibility, agency and sustainability.

The second bullet stresses the synergies and trade-offs between adaptation and mitigation in the agriculture, fisheries, and other food production systems. It considers the potential competition for land and maritime resources between mitigation activities (such as sequestration and carbon capture and storage) and activities that enable climate-resilient food production. As a note to the authors, dealing with the synergies and trade-offs between adaptation and mitigation may require a cross-Working Group approach.

The third bullet addresses adaptation options that take into account livelihood security, in particular (but not exclusively) that of vulnerable groups such as smallholder farmers, pastoralists and artisanal fishing communities. It also includes options to safeguard livelihoods with cultural heritage that serves local economies, and communities.

The fourth bullet calls for an assessment of impacts and responses within and beyond national jurisdictions for food and fibre production, for example those pertaining to fisheries and aquaculture.

The fifth bullet addresses the impacts of climate change on the trade, distribution and value chains of agricultural and food inputs and products and its potential consequences for food security, including processed agricultural products and fibre. Impact-drivers include slow-onset events but also consider the increasing frequency of extreme events that may damage supply, transport and distribution chains.

## **Chapter 18: Energy, industry, infrastructure and human settlements**

- Supply chain risk, business risk, cascading impacts, path dependencies and infrastructure lock-in, risks of failure of infrastructure systems and risks to cultural heritage

- Adapting infrastructure, industry, energy systems and human settlements to reduce risk and build response capacity at multiple levels
- Developing and utilizing climate resilient infrastructure to build adaptive capacity and support sustainable development at multiple levels
- Solutions including new technologies, methods of construction, materials and innovations, green and grey and natural infrastructure, social and behavioural change, considering mitigation and just transition goals
- Relevant updates to the Special Report on Climate Change and Cities

Energy systems, industrial processes, critical infrastructure and human settlements are fundamental to modern society, yet they face growing challenges due to climate change as well as some opportunities. These systems are intertwined, with disruptions in one potentially cascading into others, such as the tourism sector, impact on livelihoods, economic stability and cultural heritage. This chapter addresses these interconnected risks, explores a broad range of adaptive strategies and identifies how these can be integrated with enhancing adaptive capacity so as to contribute to sustainable development across scales.

The first bullet investigates the vulnerabilities and interdependencies that expose energy, industrial, infrastructure systems and human settlements to climate risks including compound and cascading risk as well as to opportunities. It examines supply chain disruptions caused by climate impact drivers such as extreme weather events, the cascading effects of system failures and the structural challenges of path dependencies and infrastructure lock-in, which limit adaptive flexibility. It assesses physical impacts, risks and potential opportunities for businesses in relevant sectors. By analysing these various dynamics, identification of potential constraints in global systems arising from both long-term climate changes as well as extreme events requires a comprehensive holistic approach. Assessments of cultural heritage need to include tangible and intangible climate change impacts, including symbolic losses that communities may face.

Effective responses often require coordination across systems and scales to reduce vulnerabilities and enhance adaptation. The second bullet highlights adaptation measures tailored to various contexts, from urban centres to rural communities, focusing on infrastructure, industrial systems, and energy networks. It discusses technological, ecological and economic dimensions of strategies for addressing risks like energy insecurity, industrial disruptions, business risk and the exposure of human settlements to climate extremes. Adaptation strategies for human settlements include building housing and urban systems suited to the changing environment including planning, design, materials and operation. This section includes informal settlements and rural-urban linkages.

Long-term investments in climate-adapted infrastructure are essential for safeguarding development and adaptive capacity. The third bullet focuses on how adapted infrastructure systems contribute to maintaining and building adaptive capacity of multiple societal sectors. It examines the co-benefits of investment in adaptation, including reduced vulnerability to climate hazards and support for SDGs and net-zero goals while ensuring that the investments benefit vulnerable populations and regions. Special attention is given to the role of infrastructure in addressing inequities, promoting local development and fostering global resilience.

The fourth bullet explores innovative approaches to addressing climate risks, focusing on the integration of new technologies, materials and hybrid infrastructure solutions (combining grey, green and blue infrastructure) while ensuring private sector roles (such as in providing insurance). Modular



and circular construction techniques, nature-based adaptation and behavioural changes are among the more transformative strategies discussed. Technological innovation includes emerging solutions for energy efficiency and structural adaptation. The section includes integrating equity and justice into climate adaptation and mitigation. This bullet also emphasizes the need to balance adaptation goals with emission-reduction within a just transition framework, ensuring that the changes are socially and economically inclusive. Alignment with the WGIII contribution to AR7 may be desirable.

The last bullet clarifies that new evidence on climate change impacts and adaptation developed following the IPCC Special Report on Climate Change and Cities will be integrated to guide future decision-making. Cities, as focal points of energy consumption, industrial activity and human settlement, are uniquely vulnerable to climate impacts but also serve as potential innovation hubs. This section addresses the specific challenges faced by urban areas, while exploring solutions tailored to urban contexts. It also underscores the importance of scaling urban solutions and integrating these insights into broader regional sustainable development strategies.

## **Chapter 19: Health and well-being**

- Observed impacts and projected risks to health and well-being due to multi-scale climate changes, extremes, compound and cascading events
- Intersectionality of drivers of vulnerability and exposure to climate hazards within populations and communities
- Adapting health systems, and health prevention and promotion activities to reduce risk and build capacity at multiple levels
- Nexus between climate change, health and wellbeing, and other health determining sectors
- Innovative and collaborative partnerships involving private sector and others

This chapter assesses the impacts and projected risks of climate change for health and well-being to populations and communities, with consideration of drivers of vulnerability (and the intersection and interaction of drivers across and among populations and communities), adaptation challenges and actions that are relevant to this sector.

The first bullet assesses observed climate impacts and projected risks for human health and well-being at different global warming levels, with a focus on multi-scale climate change features and their impacts and exposures. This includes temperature extremes, extreme weather and weather-related events (e.g., wildfires, drought, extreme precipitation and flooding, sand and dust storms), slow-onset events and compound and cascading events. The assessment also addresses non-communicable and emerging and reemerging infectious diseases (including health risks related to changing dynamics of climate suitability and disease transmission), water-borne and food-borne diseases; mental health and wellbeing (including social and cultural dimensions as they relate to health), air quality; water quality, quantity and security; and nutrition and food security.

The second bullet assesses the intersectionality of drivers of vulnerability and exposure to climate hazards across and among populations and communities. Drivers of vulnerability to be assessed include social, economic, environmental and cultural (including income, education, access to nutrition, structural inequities, migration and displacement, changing social and population structures), biological and genetic determinants of health and exposures such as geographic regions (e.g., coastal areas).

The third bullet assesses the adaptation of health systems to climate change as well as health prevention and promotion activities to reduce risk and build adaptive capacity, such as knowledge, financial and other resources. The bullet assesses adaptation options for health systems, including capacity building efforts (e.g., climate education for health workers); management, planning and policy (e.g., universal health coverage, strengthening health systems, science-based health policy); practice and behaviour (e.g., the use of new digital technologies); early warning and observation systems; knowledge and information (e.g., citizen-based science approaches, community-led initiatives), and investments needed to adapt the health sector to climate change. The bullet also assesses available reporting of adaptation effectiveness, the co-benefits of adaptation and mitigation efforts in the health sector (including economic, social and environmental benefits), as well as health co-benefits of adaptation and mitigation efforts in health-determining sectors (e.g., transportation, energy, industry, agriculture). Finally, the bullet addresses barriers, including limited data, health-related disinformation, mistrust of science, limited political commitment and hard and soft limits to adaptation.

The fourth bullet assesses the nexus, including synergies, trade-offs and co-benefits between climate change, health and wellbeing, and other health-determining factors.

The final bullet assesses innovative and collaborative partnerships involving the private sector and others in building health system resilience. This includes business models adapting to the needs of communities, and financing including novel models of health financing.

## **Chapter 20: Poverty, livelihoods, mobility and fragility**

- Livelihood options, households with low-income and social deprivations in rural and urban contexts, Indigenous Peoples, informal settlements, contexts of fragility, displaced, mobile and immobile populations
- Interaction of climate change and development with poverty, vulnerability and livelihoods
- Human mobility in the context of climate change, including internal and cross boundary
- Risks and adaptation in fragile contexts, and in contexts of social unrest and armed conflict
- Integrating adaptation and resilience into efforts towards poverty eradication, livelihood enhancement, formal and informal social protection mechanisms
- Differentiated capabilities and responsibilities, and asymmetric access to information, finance and decision-making fora

This chapter assesses the effects of climate change impacts, losses and damages, and responses to these on livelihoods and people living under fragile and marginalized conditions. It is acknowledged that climate change impacts and losses and damages disproportionately affect vulnerable people and has the potential to increase inequality in capacity to adjust or respond to changing climate conditions, extremes and losses and damages. An assessment of the evidence on the disproportionality of impacts is needed, including on the relationship between climate change and mobility and human trafficking, and on the enablers and barriers to restore inequalities.

The first bullet provides an inventory of communities and conditions that should be considered in this chapter. Such communities and conditions may include traditional livelihoods relying critically on

environmental resources; classes of labourers such as farmers, fishermen and outdoor workers; Indigenous Peoples; inhabitants of informal urban settlements, and others. Conditions that contribute to disproportionate impacts and risks include material and non-material poverty and social exclusion; fragility and conflict; inability to escape high-risk areas, and others.

The second bullet highlights the combined impact of climate change and development stage on resilience of vulnerable communities and assessment of efforts towards poverty eradication, livelihood enhancement and vulnerability reduction.

The third bullet addresses multiple modalities of human mobility in relation to climate change as well as other compounding factors, such as conflict, changing demography, rural-urban migration. It should also address migration and human mobility as both a response to losses and damages, and as a means of adaptation, such as managed displacement of population from high-risk areas.

The fourth bullet points at the relevance of the intersection of fragility, climate change and adaptive capacity. Fragility and conflict increase people's vulnerability and exposure to climate hazards. At the same time, climate hazards can exacerbate needs and constitute a challenge to stability. Adaptation finance fails to reach people and countries facing fragility or conflict. Global efforts to build climate resilience remain insufficiently tailored to the specific needs and challenges of people, communities and countries threatened or affected by fragility or conflict. Authors are invited to assess adaptation finance and solutions specific to fragile contexts and conflict regions.

The fifth bullet calls for the assessment of the integration of adaptation and resilience measures into broader poverty eradication, livelihood improvement and social protection efforts. Adaptive capacity of marginalized communities should be considered, including the existence of social safety nets, inclusive governance and adequate housing. In addition, the importance of demand-oriented adaptation options (such as sufficiency measures), perception of adaptation and injustice, and transformative adaptation strategies are highlighted.

The sixth bullet emphasizes the role of differentiated capabilities, access and responsibilities on designing adequate measures increasing resilience of communities and livelihoods. This includes assessing access to infrastructure, information, decision-making, finance and markets. Changing trade patterns can be a driver of both stability and instability of communities. Assessment of measures addressing access to adaptation finance, decentralized and informal governance structures focusing on adaptation strategies, and potential contribution of innovation and transformative change are highlighted.

## **Annex I: Atlas**

- Context-specific mapping of hazards, vulnerability, exposure, impacts, risks, adaptation, and responses to losses and damages

WGII will produce a digital atlas that allows a systematic display of relevant and context-specific spatial and temporal information. The WGII digital atlas will build on the WGI updated version of the AR6 Interactive Atlas, comprising downscaling and projection layers, design and infrastructure. The technical implementation may be coordinated with WGI, but its content will be developed by authors participating in the workflow of the WGII Assessment Report.

Data layers to be considered in the WGII atlas include vulnerability, exposure, impacts, risks, adaptation, and losses and damages and their responses. Additional data layers of interest are people displacement, and future projections of all fields are explicitly desirable. Display of inter- and intra-

regional variability in patterns of exposure, vulnerability, adaptation etc. should be facilitated where possible and following a harmonized approach. It has been suggested that the digital atlas could serve as a means of organizing the case studies included in the report.

## **Annex II: Linkage to TGIA: Overview of Technical Guidelines on Impacts and Adaptation**

This section provides a reference to the IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptation (TGIA) that is mentioned in Chapter 1 as a part of the Working Group II contribution to the Seventh Assessment Report. It will provide an assessment of existing guidelines and evaluation frameworks in the area of climate impact and adaptation. It provides a cross-referencing between the Assessment Report and the sections of the IPCC Technical Guidelines, acknowledging its target audiences. In addition, it can serve as a repository of assessments of information, literature or concepts that are included in the TGIA update but for which a full assessment is not considered to be part of that Guideline document.

## **Annex IV: Acronyms**

## **Annex V: List of Contributors**

## **Annex VI: List of Reviewers**

## **7d. Annotated Proposed Outline of the Update to the 1994 IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptation**

### **Section 1: Introduction**

- Rationale for updating the Technical Guidelines
- Framing and purpose for the Technical Guidelines

Section 1 sets out the major changes in relation to climate change risks and adaptation since the launch of the IPCC Technical Guidelines that generate the need for an update and revision. It provides the organizing principles and objectives for the revision of the Guidelines, taking into consideration existing relevant guidance and methodologies for assessing climate change impacts, vulnerabilities, and risks, and measuring progress in adaptation to better empower action.

The first bullet presents the background on the major transformations since 1994 in the adaptation landscape. It positions the update and revision of the IPCC Technical Guidelines within a context of urgent, growing and already-occurring climate risk. The bullet summarizes the institutionalization of global and national adaptation action, including the rise of National Adaptation Plans (NAPs) and nationally determined contributions (NDCs). Linkages to adaptation action at the subnational scale are highlighted, such as the emergence of locally-led adaptation approaches, and to the increasing importance and potential of regional, transboundary, global and multilevel governance in adaptation. The bullet will reference the emergence of **key global frameworks** such as Agenda 2030 and Sustainable Development Goals (SDGs); the Sendai Framework for Disaster Risk Reduction (SFDRR); and the coming into force of the Paris Agreement and relevant UNFCCC work programmes such as the Global Goal on Adaptation and the Global Stocktake. This section acknowledges the need to highlight multiple knowledge systems, co-development and non-linear approaches in assessing and implementing impacts, vulnerabilities, risks and adaptation. The need to move from a single hazard approach to one that accounts for complex, compounding, and cascading risks is to be included.

The second bullet articulates the main purpose of the IPCC Technical Guidelines as primarily servicing national decision-makers and practitioners, at the same time recognizing the important role the Guidelines play in guiding and signalling other users and groups. The section should articulate the need to follow a principles-based, systems approach to adaptation action, learning and risk management. A systems-management approach operates across human-environmental systems, scales and themes, recognizing the need for an adaptation cycle that is continuous and iterative. The bullet recognizes the necessity to consider novel and cascading risks, impact chains and novel methods of representation of information such as storytelling approaches. The bullet highlights adaptive management approaches that allow users to treat adaptation as a long-term, continuous process while responding to shorter- to medium-term needs. There is a recognition that approaches that privilege comprehensive, heavy data-collection may be demanding on many countries, and alternative approaches to these should be assessed.

## **Section 2: Adaptation in practice**

- Key principles and concepts for the Technical Guidelines, such as effective and adequate adaptation; equity and justice; co-development, flexibility and adaptive planning; systems thinking and consideration of planning as a systems approach; synergies and trade-offs
- Considering multiple levels of governance and levels of assessment and adaptation action
- Adaptation in relation to societal development needs and values, and adaptation as both a stand-alone and continuous, mainstreamed activity

Section 2 focuses on the core principles behind the IPCC Technical Guidelines, embedding adaptation practice in societal targets and context-specific development goals and visions. The section delves into the different scales at which adaptation decision-making takes place – global, national and subnational – and the multiple levels of governance. The section suggests possible uses of the Technical Guidelines at these levels – from project-based risk-screening, to supporting resource mobilization and driving investment in adaptation, to supporting countries to assess progress on adaptation against GGA targets. The section reiterates the need for the Technical Guidelines to support, drive and empower action. The section lays out what the Technical Guidelines can (and cannot) do – for example, offering entry points and organizing principles for sectors to take action without providing detailed, sector-specific guidance or defining goals and targets. Although adaptation concerns all of society, the Technical Guidelines will focus especially on practitioners of adaptation and decision-makers at the national level.

The first bullet details the key principles underpinning adaptation planning, starting with the desired outcomes of adaptation, such as to reduce vulnerability, manage climate risks and opportunities and increase adaptive capacity while ensuring equity and justice. It describes values underpinning adaptation practice, such as co-development and effective and adequate adaptation. The value of systems approaches for understanding causation, risks, impacts and adaptation will be demonstrated. Principles for adaptation planning such as flexibility and continuous, iterative and adaptive management will be highlighted. Also, implications of transformative adaptation versus incremental approaches will be presented, and linked to their potential to minimize undesired outcomes and avoid maladaptive practices. The bullet will address the need for less data-heavy approaches – acknowledging that many risk assessment approaches may have high demands on technical capacity and data – and explore practicable approaches. Also, assessment of qualitative data (including socioeconomic and cultural data that are critical for assessing risk perception) is emphasized.

The second bullet addresses multi-level governance, multiple levels of action, as well as the different scales of planning and implementation – global, national and subnational scales. It addresses how skill and capacity levels are differentiated across the different scales of action. The bullet stresses the need for adaptation planning to consider linkages between the scales of governance in terms of alignment of goals, visions and action; how to ensure adequate levels of resourcing for action across these levels; and how to ensure continuous learning by monitoring, evaluation and learning processes across scales. The bullet also provides guidance on addressing teleconnected and multi-sectorial risks.

The third bullet recognizes that climate change adaptation is not practiced in a vacuum, but in close relation to development needs and ambitions articulated by broader national and community-level goals. It calls for exploring options for pathways and approaches to mainstream adaptation in other policy domains aimed at societal well-being, while addressing the trade-offs and co-benefits between adaptation and other development goals. It acknowledges implications of different levels of uncertainty of the assessment of these co-benefits and trade-offs to achieve effective and adequate adaptation.

### Section 3: Technical Guidelines

- **Scoping and goal setting** (analysis of current risk management capacities; and analysis of impact of adaptation measures on equity and justice outcomes; identification of risk distribution and risk tolerance across communities, regions and time scales; assessment of sectoral and development policies, data and knowledge sources, resources, enablers and barriers; identifying and addressing information gaps)
- **Impact, vulnerability and risk assessment** (analysis of climate impacts, including economic and non-economic losses and damages; assessment of climate risks, considering climatic and non-climatic risk drivers; identification of new and emerging risks; analysis of tolerance of residual risk; demand for adaptation; assessing uncertainty)
- **Planning** (identifying entry points for adaptation; participatory and inclusive planning processes; mainstreaming adaptation in existing policies, regulations and practices; costs and benefits, and budgeting of adaptation; identifying, appraising and prioritising adaptation options using criteria such as effectiveness, adequacy, feasibility, equity, human rights, synergies and trade-offs; iterative planning)
- **Implementation** (identifying roles, responsibilities and accountability mechanisms; identifying and mobilizing resources; development of workflow and institutional collaboration mechanisms; development of communication channels with relevant stakeholders)
- **Monitoring, evaluation and learning** (definition of impact and adaptation metrics and indicators to monitor and track progress, uptake and performance; systematic tracking of lessons and feedback from implementation for continuous learning and adaptive management; ex-post evaluations including equity and justice outcomes)

Section 3 sets out the five stages of the Technical Guidelines. The latter three stages correspond to the dimensional targets of the Global Goal on Adaptation (GGA). The choice of these stages foreground the need for a framework that is globally recognizable, supports standardized reporting and that is familiar to policymakers already developing and implementing adaptation plans. The concept of co-development in all stages of planning has been recognized as a novel and important element for ensuring that actions are contextually- and locally-relevant and owned and led by communities.

The first bullet points to achieving an understanding of the overall context within which climate change impacts to systems and communities occur, and the resources and knowledge available in these contexts to address these. The context includes the wider development and societal goals and aspirations, especially outcomes of equity and justice. Description of goals for adaptation addresses both the current situation – where we are now – and the intended direction of development – where we want to go. The scoping stage seeks to understand which groups bears or will bear climate change risks and impacts, examines the degree of tolerance of climate and other adjacent risks, and the distribution of such risks amongst communities and across geographical and temporal horizons. A policy scan is needed to identify the purpose for adaptation at the national level and for each affected sector or system. Gaps in information and action (for example quantitative and socio-economic data; local data; data on hazards; impacts of climate impacts on development, losses and damages, information on compound risks, trade-offs, and other analyses from existing NAPs) are identified and an assessment of the knowledge available to address these is made. This stage encourages distinguishing between static baseline information and information that needs to be regularly updated for planning and monitoring.

The second bullet provides guidelines for assessing and measuring current climate impacts, vulnerabilities and risks, including economic and non-economic losses and damages. It emphasizes the assessment of these elements at different temporal, spatial and sectoral scales. This stage identifies emerging risks, including risks that are cascading, compounding and transboundary. It also assesses the demand for adaptation, affected by the tolerance of systems and people to risk posed by either action or inaction, and the uncertainty underpinning these. This will also lead to the identification of residual risk (depending on the level of and limits to adaptation). The assessment should not only address past and current impacts, but also future and predicted impacts and losses and damages and their implications for equity and justice outcomes, especially amongst vulnerable and marginalized communities.

The third bullet extends the scope of the formulation of plans for adaptation beyond a project-centered approach (solely based on the appraisal and prioritization of adaptation options), to that of co-development of plans and the mainstreaming of adaptation into existing policies, regulations and practices. The bullet recognizes the importance of climate budgeting, and addresses the need recognized by countries to analyse the cost and benefits of adaptation actions, including their non-monetary (social, environmental and cultural) aspects. A recommendation was made to address the analysis of each of the seven thematic targets of the GGA. The iterative and continuous process of planning needs to be emphasized, including adaptive planning informed by monitoring, evaluation and learning. This stage clarifies that such continuous planning may take place as part of a systems approach across all levels, anchored by principles of co-development, equity, justice and human rights. Co-development should occur within the development of adaptation solutions and options within such plans.

The fourth bullet is intended to support implementation of adaptation measures, and accelerate this implementation where necessary. It includes an assessment of enablers and barriers to implementation of adaptation measures, such as resources, data, different sources of knowledge and also current sectoral and development policies. Implementation of adaptation is not to be considered to be an ad-hoc activity (for instance a response to disaster or emergencies) but requires continuity. This stage emphasizes the importance of identifying roles and responsibilities for different stages of planning and implementing action at various scales and establishing accountability mechanisms.

The fifth bullet addresses the monitoring, evaluation and learning (MEL) processes of adaptation planning and describes the contexts and purpose for MEL. It describes the existing global, national

and subnational and project-level metrics and indicators for measuring impact and analysing adaptation effectiveness, and how to apply and use these indicators and metrics for tracking progress in implementation. The bullet recognizes that special effort needs to be made to harvest, process and use lessons from the multitude of ex-post evaluations of adaptation projects, and to ensure that these are linked with goals and monitoring initiatives at different scales, towards a programmatic approach. The guidance in this section will enable planners to make linkages and cross-check adaptation progress with societal targets and values, including equity and justice outcomes.

#### **Section 4: Enablers**

- Systematic exploration of methodologies and tools for assessing impacts, risks, vulnerabilities and adaptation, including adaptation options, prioritization and costing
- Co-development principles and practices (stakeholder engagement; locally-led approaches; gender-responsive and rights-based approaches; mutual learning with marginalized communities, Indigenous Peoples, non-governmental organizations, and technical and scientific communities; communication and outreach)
- Services and data to support adaptation planning (climate information services; geophysical, environmental and socioeconomic information)
- Financing adaptation and mobilising resources for managing adaptation programs, and identification of funding mechanisms
- Policy, legal and regulatory enablers (frameworks to accelerate implementation of adaptation; identifying approaches for integrating adaptation into national and sectoral policies, laws and regulations; frameworks for adaptive management)

This section addresses enabling instruments or conditions that are critical for supporting successful, effective and adequate adaptation. It delves into the practicalities of planning and implementation, including tools and methodologies, the application of co-development in practice, data and required services, issues around mobilising resources and finance for adaptation, and the policy and regulatory frameworks that govern adaptation implementation. Including guidance of these enabling instruments or conditions is considered to be of added value to existing guidance products. Topics raised in this section also provide guidance on how to apply the planning stages at different levels, the capacity that is needed to enact this planning in accordance with articulated principles, and how to mobilize stakeholders in the process. They recognize the challenges and barriers for adaptation management that often arise and persist dependent on developmental contexts in different countries and entities. These challenges are addressed in a practical manner and in accordance with a country's overall vision for sustainable development, taking into account differentiated risks and impacts, cultural practices and power dynamics that affect climate adaptation progress of a community, nation or region.

The first bullet examines methodologies and tools for assessing impacts, risks, vulnerabilities and progress in adaptation. While methodologies for assessment of impacts have improved with different tools available for varying assessment approaches, there is an acknowledged lack of methodologies, tools and expertise that directly meet the needs of communities looking to implement adaptation under specific conditions and contexts. Also, tools for monitoring of adaptation progress, and the analysis of implementation risks, trade-offs and synergies are underdeveloped. It focuses on actor-specific solutions that match the diversity of needs in all adaptation stages.

The second bullet operates from a point of departure that co-development should underpin all stages of the adaptation planning process, presented as an alternative to previous, more linear approaches



to adaptation. Co-development approaches begin with asking who adaptation is for and the intended outcomes, and assign roles and responsibilities for taking appropriate action. Such approaches include locally-led adaptation, gender-responsive actions, rights-based approaches and engagement, and mutual learning with stakeholders and communities. The bullet also addresses the capacity development that is needed to support communities to co-develop adaptation plans. Communication and outreach, and the capacities that enable these, contribute to the continuous and iterative nature of co-development of principles and actions.

The third bullet addresses the data needs and services in support of assessment of impact, risk, vulnerability and adaptation. These include climate information services; development and selection of scenarios; downscaled data; geophysical and environmental information; and information related to socioeconomic, demographic and cultural characteristics of places and communities at the relevant scales. Issues related to mobilizing resources to build necessary data systems, coordination roadblocks with respect to data and information sharing and capacity gaps shall be addressed.

The fourth bullet delves into enablers for financing and mobilizing resources for the entire adaptation process. An emphasis is placed on the financial resources needed for managing adaptation programs effectively, including the preparatory phases of planning, including community planning and monitoring, evaluation and learning (MEL) processes. Funding is also needed to conduct further and continuous resource mobilization, in tandem with budgeting for adaptation.

The fifth bullet explores how institutional and regulatory frameworks enable effective support and accelerate adaptation, and reduction and prevention of climate-related losses and damages. Circling back to the overall vision and principles underpinning the Technical Guidelines, this bullet focuses on addressing the challenges to mainstreaming adaptation; to taking more programmatic and systematic approaches to the adaptation planning cycle; to supporting skills and capacity development at all relevant scales and levels for all stages of the planning process. The bullet addresses varying approaches and pathways to adaptation and the policy and regulatory responses available to pursue these pathways. Linkages between scales of adaptation practice, reporting and MEL – at subnational, national and global scale – as well as with governance of transboundary impacts, should be addressed in this section. Guidance on how policy can integrate adaptation practice – which is often sector-led, locally extant and standalone – in a continuous and iterative policy cycle should be addressed here.

## **ANNEX 1: Cross-WG Themes and Their Implementation in the WGII Outline**

During the scoping meeting, several themes cutting across the Working Groups were discussed in dedicated to cross-Working Group Breakout Groups (xWG BOGs) on Days 2 and 3 of the scoping meeting, with the intent to ensure consistency and coherence in the Working Group outlines. The Day 2 xWG BOGs were structured around 9 themes identified in advance of the scoping meeting, drawing on several inputs and sources, listed in the Chairs document “Scoping of the AR7”.

Additional cross-Working Group topics were identified during the scoping meeting, resulting in three additional BOGs, that were added to the program of the second xWG BOG session on Day 3 (see Annex 3: Scoping Meeting Programme for the themes discussed). The xWG BOGs were organised jointly by the three Working Groups. Scoping meeting participants from each of the three Working Groups could choose which BOG to attend. In addition, parallel to the xWG BOG sessions, dedicated BOGs were organized for the Update of the IPCC Technical Guidelines (TGIA). Every TGIA BOG was attended by scoping experts from both WGI and WGII.

At the conclusion of each session, BOG co-facilitators reported back to a cross-Working Group Plenary on the suggested outcomes. The proposed content was communicated to all WGII scoping participants, who considered whether and how to incorporate this content into the proposed WGII outline.

In the proposed WGII outline, the results of these xWG BOGs have been incorporated in various ways:

- As suggested in the xWG BOGs on Finance (1.2, 2.2), both WGII and WGIII included a chapter on finance in their outlines
- Attention to issues of equity and justice are included in various chapters and bullet points, inspired by discussions in the corresponding xWG BOG (1.1)
- The xWG BOGs on overshoot (1.5, 2.5), Solar Radiation Management (1.9, 2.9), scenarios (1.7, 2.7) and Climate Resilient Development (2.6) served as input into the WGII outline (see below)
- Consecutive WGII BOGs leading to the chapters on Risks, Losses and Damages and each of the thematic chapters took onboard topics raised in corresponding xWG BOGs on Health and well-being (1.3, 2.3), Losses and damages (1.4, 2.4), Biodiversity (2.1), Risk approaches (1.6) and Sectors and systems (1.8)
- Discussions on cross-Working Group alignment of the Atlas Annex were facilitated by the xWG BOG on risk and regionalization (1.6).

For several topics, further cross-Working Group coordination and discussion will be needed by authors and Bureau Members throughout the writing process. Topics raised in the proposed WGII outline where this applies include:

- The assessment of regional impact and risk patterns, mentioned in the common bullets for the regional chapters, where alignment with the WGI assessment of climatic impact-drivers is required
- The assessment of risks and impacts at the global scale to a range of drivers related to anthropogenic activities in Chapter 2, referring to its reliance on global emission and warming scenarios, including temperature overshoot and human activities that change the distribution of risks and vulnerability over time, between regions and across population groups

- An assessment of the feasibility and representativity of scenarios in Chapters 2 and 4, calling for exploration of a range of types of climate and development scenarios
- Risk from mitigation response options such as Carbon Dioxide Removal or Solar Radiation Management on communities
- Direct impacts of increases in GHG emissions on terrestrial and oceanic biomes and systems, such as changes in biomass, species diversity, and ecosystem structure and function, as they relate to potential impacts on resource availability, ecosystems services and livelihoods
- The assessment of the behavioural aspects of climate action, mentioned in the common bullets for both the regional and thematic chapters, where alignment with behavioural topics assessed in WGIII is suggested
- The assessment of sustainable and climate resilient development progress and potential, mentioned in the common bullets for both the regional and thematic chapters, where alignment with low-carbon policies in WGIII is suggested
- The alignment or lack thereof of adaptation finance with mitigation financing, in terms of its adequacy, access and complementarity. The design of climate finance products such as forecast-based financing and the mechanisms for complementary finance warrant a closer cross-working group examination with WGIII
- Assessments of changes to hydrological regimes (assessed by WGI), for their effects on water availability and water-dependent activities such as agriculture, industry and settlement, and the limits and opportunities they pose for adaptation options
- Assessments of risks and responses in the agricultural sector, where competition (trade-offs) with land-based mitigation measures (assessed by WGIII) may emerge
- The assessment of the balance, trade-offs and co-benefits between adaptation goals with emission-reduction within a just transition framework mentioned in the Energy/Infrastructure chapter, where alignment with WGIII is suggested
- The design of the WGII Atlas, where consistency with the structure of the thematic layers and technical design of the WGI Atlas is desirable

## ANNEX 2: WGII Contribution to the AR7 Scoping Meeting Participants List

Last Name	First Name	Citizenship	Affiliation	Country	Source(s) of Nomination
ABRAHAM	Edo	United Kingdom	Delft University of Technology	Netherlands	United Kingdom, Netherlands and Malaysia
ALDUNCE	Paulina	Chile	University of Chile	Chile	Chile
AMWATA	Dorothy	Kenya	Murang'a University of Technology	Kenya	Bureau Member
ANDRIJEVIC	Marina	Croatia	International Institute for Applied Systems Analysis	Austria	Croatia
AWOLALA	David	Nigeria	African Group of Negotiators Experts Support	Kenya	Nigeria
BALABANOVA	Snezhanka	Bulgaria	National Institute of Meteorology and Hydrology	Bulgaria	Bulgaria
BARROW	Amadou	Gambia	University of The Gambia	United States of America	Gambia
BIESBROEK	Robbert	Netherlands	Wageningen University and Research	Netherlands	Netherlands
BOWEN	Kathryn	Australia	University of Melbourne	Australia	Australia
BROWDER	Greg	United States of America	World Bank	United States of America	United States of America
CASTELLANOS	Edwin	Guatemala	Ministry of Environment	Guatemala	Guatemala
CHEUNG	William	Canada	The University of British Columbia	Canada	Canada
CHOW	Winston	Singapore	IPCC WGII Co-Chair	Singapore	
CHU	Eric	United States of America	California Council on Science and Technology	United States of America	United States of America
DELLA CROCE	Raffaele	Italy	Imperial College University	United Kingdom	United Kingdom
DENTON	Fatima	Gambia	IPCC WGII Vice-Chair	Gambia	
EKOUNGOULOU	Romeo	Congo	Marien Ngouabi University	Congo	Bureau Member
GAFREJ	Raoudha	Tunisia	Tunis El Manar University	Tunisia	Tunisia
GALLARDO	Laura	Chile	IPCC WGII Vice-Chair	Chile	
GAO	Qingzhu	China	Chinese Academy of Agricultural Science	China	China
GARSCHAGEN	Matthias	Germany	Ludwig Maximilian University of Munich	Germany	Germany

GENTLE	Popular	Nepal	Office of the Prime Minister and Council of Ministers	Nepal	Nepal
HORSBURGH	Kevin	United Kingdom	Green Climate Fund	Republic of Korea	Green Climate Fund
HOWDEN	Mark	Australia	IPCC WGII Vice-Chair	Australia	
HUSSAIN	Abid	Pakistan	International Centre for Integrated Mountain Development	Nepal	International Centre for Integrated Mountain Development
INSAROV	Gregory	Russian Federation	Russian Academy of Sciences	Russian Federation	Russian Federation
ISLAM	Sheikh	Bangladesh	Institute of Remote Sensing and Geographic Information Systems	Bangladesh	Bangladesh
KARAMUSHKA	Viktor	Ukraine	National University of Kyiv-Mohyla Academy	Ukraine	Ukraine
KAYA	Hassan	South Africa	University of Kwazulu-Natal	South Africa	Bureau member
KURIHARA	Haruko	Japan	University of the Ryukyus	Japan	Japan
KURUPPU	Natasha	Australia	Asian Development Bank	Philippines	Australia
LE COZANNET	Gonéri	France	Bureau de Recherches Géologiques et Minières	France	France
LEMOS	Maria Fernanda	Brazil	Pontifícia Universidade Católica do Rio de Janeiro	Brazil	Brazil
LIWENGA	Emma	United Republic of Tanzania	Vice President's Office	United Republic of Tanzania	United Republic of Tanzania
MÄKINEN	Kirsi	Finland	Ministry of Agriculture and Forestry	Finland	Finland
MARTÍNEZ	Alejandra G.	Peru	Geophysics Institute	Peru	Peru
MARTYR	Rosanne	Saint Lucia	Climate Analytics	Germany	Saint Lucia
MENDEZ	Carlos	Venezuela	IPCC WGII Vice-Chair	Venezuela	
MONTAÑA	Elma Carmen	Argentina	Instituto de Ciencias Humanas, Sociales y Ambientales and Universidad Nacional de Cuyo	Argentina	Argentina
MORAGA SARIEGA	Pilar	Chile	University of Chile	Chile	Chile, Bureau member

MORGERA	Elisa	Italy	UN Special Rapporteur on Climate Change and Human Rights	United Kingdom	The Office of the UN High Commissioner for Human Rights
MORI	Nobuhito	Japan	Kyoto Univeristy	Japan	Japan
MUKHERJI	Aditi	India	Consultative Group on International Agricultural Research	Kenya	Consultative Group on International Agricultural Research
MURRAY	Una	Ireland	University of Galway	Ireland	Ireland
NALAU	Johanna	Australia	Griffith University	Australia	Australia
ORTIZ	Andrea Monica D.	Philippines	University of Concepción	Chile	Philippines
PARK	Jinhan	Republic of Korea	Korea Environment Institute	Republic of Korea	Republic of Korea
PARSONS	Meg	New Zealand	The University of Auckland	New Zealand	New Zealand
PATWARDHAN	Anand	India	University of Maryland, College Park	United States of America	India
PICHS MADRUGA	Ramon	Cuba	IPCC Vice-Chair	Cuba	IPCC Vice Chair
PINHO	Patricia	Brazil	Amazon Environmental Research Institute	Brazil	Brazil
QUENTA HERRERA	Estefania	Bolivia	Universidad Mayor de San Andrés.	Bolivia	Inter-American Institute for Global Change Research
ROBERTS	John Timmons	United States of America	Brown University	United States of America	United States of America
ROBERTSON	Michai	Antigua and Barbuda	Overseas Development Institute	United Kingdom	Overseas Development Institute
ROBINSON	Stacy-Ann	Jamaica	Colby College	United States of America	Jamaica
ROSQVIST	Gunhild Ninis	Sweden	Stockholm University	Sweden	Arctic Monitoring and Assessment Programme
RUMBAITIS DEL RIO	Cristina	United States of America	UN Foundation	United Kingdom	UN Foundation
SCHNITTER	Rebekka	Canada	British Columbia Ministry of Health	Canada	Bureau Member
SCHOEMAN	David	Australia	University of the Sunshine Coast	Australia	Australia
SHARMA	Sindra	New Zealand	Climate Action Network	New Zealand	Climate Action Network
STEG	Linda	Netherlands	University of Groningen	Netherlands	Netherlands
STRIESSNIG	Erich	Austria	University of Vienna	Austria	Austria

SUKUMAR	Raman	India	IPCC WGII Vice-Chair	India	
SUPRATID	Seree	Thailand	Rangsit University	Thailand	Thailand
SWAMINATHAN	Soumya	India	M. S. Swaminathan Research Foundation	India	Indian Institute for Human Settlements
TAN	Hongjian	China	Ministry of Natural Resources	China	China
THOMAS	Adele	Bahamas	IPCC WGII Vice-Chair	Bahamas	
VAN DEN HURK	Bart	Netherlands	IPCC WGII Co-Chair	Netherlands	
WACHIRARATTAN AKORNKUL	Romchat	Thailand	Office of the UN High Commissioner for Human Rights	Thailand	The Office of the UN High Commissioner for Human Rights
WEBER	Elke	United States of America	Princeton University	United States of America	United States of America
WREFORD	Anita	New Zealand	Lincoln University	New Zealand	New Zealand
ZEBISCH	Marc	Germany	Eurac Research	Italy	Italy
ZHU	Wenjun	Singapore	Nanyang Technological University	Singapore	Singapore
ZOMMERS	Zinta	Latvia	IPCC WGII Vice-Chair	Latvia	
	Luckson	Zimbabwe	University of Cape Town	South Africa	Zimbabwe and International Development Research Centre

### IPCC Working Group II Technical Support Unit Members

Last Name	First Name	Affiliation	Country	Citizenship
ALIKADIĆ	Azra	IPCC Working Group II Technical Support Unit	Netherlands	Bosnia and Herzegovina
BALDER	Thijs	IPCC Working Group II Technical Support Unit	Netherlands	Netherlands
BANGAR	Yugdeep	IPCC Working Group II Technical Support Unit	Netherlands	India
CHUA	Xin Rong	IPCC Working Group II Technical Support Unit	Singapore	Singapore
EL WATTAR	Sherine	IPCC Working Group II Technical Support Unit	Netherlands	Egypt
GUPTA	Mukesh	IPCC Working Group II Technical Support Unit	Singapore	India
LEPRINCE-RINGUET	Noémie	IPCC Working Group II Technical Support Unit	France	France
OKEM	Andrew Emmanuel	IPCC Working Group II Technical Support Unit	Netherlands	Nigeria
SAHARI	Wahab	IPCC Working Group II Technical Support Unit	Singapore	Singapore
THIAN	Samantha	IPCC Working Group II Technical Support Unit	Singapore	Singapore

TIGNOR	Melinda	IPCC Working Group II Technical Support Unit	Netherlands	United States of America
WONG	Theresa	IPCC Working Group II Technical Support Unit	Singapore	Singapore
WOO	Qiyun	IPCC Working Group II Technical Support Unit	Singapore	Singapore



## ANNEX 3: WGII Contribution to the AR7 Scoping Meeting Programme

### Scoping Meeting for the IPCC Seventh Assessment Report (AR7)

Kuala Lumpur, Malaysia

9-13 December 2024

#### WORKING GROUP II PROGRAMME

##### Day 0: Sunday, 8 December 2024

14:00–17:00 AR7 Scoping Meeting Registration (Pre-function area, 10th floor)

19:30–20:30 WGII Bureau Meeting (Ballroom B)

##### Day 1: Monday, 9 December 2024

07:30 Cross Working Group Co-Chair Breakfast

08:00 AR7 Scoping Meeting Registration (Pre-function area, 10th floor)

#### OPENING SESSION (Ballroom A) | Moderator: Abdalah Mokssit

##### 09:00 Opening Remarks

- **Welcoming Remarks**, Abdalah Mokssit, IPCC Secretary
- **Introductory Remarks**, Jim Skea, Chair of IPCC
- **Introductory Remarks**, Ko Barrett, Deputy Secretary-General of the World Meteorological Organization (WMO)
- **Introductory Remarks**, Jian Liu, Director of the Early Warning and Assessment Division, United Nations Environment Programme (UNEP)
- **Officiating Remarks**, Dr. Hartini binti Mohd Nasir, Undersecretary, Ministry of Natural Resources and Environmental Sustainability, Malaysia

#### CLOSED SESSION (Ballroom A) | Moderators: Diana Ürge-Vorsatz & Ladislaus Chang'a

##### 09:30 Seventh Assessment Report Vision

- **IPCC Code of Conduct**, Ermira Fida, Deputy Secretary of the IPCC
- **Chair's Perspective / Synthesis Report (SYR)**, Jim Skea
- **Cross-cutting Introduction**, WG Co-Chairs

10:30 Coffee Break

#### FULL PLENARY SESSION (Ballroom A) | Moderators: Diana Ürge-Vorsatz & Ladislaus Chang'a

##### 11:00 Working Group Introductions and Cross-Cutting Themes

- **WGI**, Robert Vautard, Xiaoye Zhang
- **WGII**, Bart van den Hurk, Winston Chow
- **WGIII**, Katherine Calvin, Joy Jacqueline Pereira
- **Cross-Cutting Themes**, WG Co-Chairs
- **Q&A**
- **Meeting Logistics**, David Dokken

12:45 Group Photo (All Scoping Participants)

13:00 Cross-Working Group Co-Chair Meeting (*Makan Kitchen, 11th floor*)

13:00 Lunch Break (*Makan Kitchen, 11th floor*)

#### WORKING GROUP (WG) PLENARIES / BREAKOUT GROUPS (BOGS)

## WGII Plenary 1 (Ballroom A)

### 14:30 Welcome and Introduction

- **Welcome Remarks**, Bart van den Hurk & Winston Chow
- **Inclusivity**, Carlos Méndez & Adelle Thomas
- **WGII Co-Chairs' Scene-setting and Vision for AR7**, Bart van den Hurk & Winston Chow

### 14:55 Interactive Session | Moderator: Bart van den Hurk

### 15:55 Introduction to the 4 Upcoming BOGs

- **Themes and Objectives**, Bart van den Hurk & Winston Chow

### 16:10 Clarification Questions and Discussion

### 16:30 Coffee Break

*After WGII Plenary Session I, the discussions that will take place in WGII BOG Session I are intended to provide elements of responses to the following three questions related to the Vision paper on aspirations for an action-oriented, concise AR7: (1) How should we approach the report for an actionable assessment? (2) What common elements should sectoral chapters have? And (3) How should we treat sectors, systems and regions? To that end, participants will split into 4 BOGs on:*

- 1. Information on impacts, vulnerability and adaptation for action and planning*
- 2. Achieving actionable solutions for adaptation*
- 3. Enabling factors for climate-resilient development*
- 4. IPCC Technical Guidelines for Assessing Climate Impacts & Adaptation*

*Each BOG will start with a problem statement, followed by two rounds of discussions: 1. identifying and inventory of possible solutions to the problem statement and 2. looking at how these can be applied to the outline, offering structural solutions to the identified challenges. Each BOG will have a set of specific questions and activities to help guide the discussions towards outputs, laying the groundwork for the week ahead.*

## WGII BOG Session 1

16:30	<b>WGII BOG 1A</b> (Rafflesia)	<b>WGII BOG 1B</b> (Acacia)	<b>WGII BOG 1C</b> (Peony)	<b>WGII BOG 1D</b> (Lillies)
	Information on impacts, vulnerability and adaptation for action and planning Co-facilitators: Bart van den Hurk and Laura Gallardo	Achieving actionable solutions for adaptation Co-facilitators: Sukumar Raman and Zinta Zommers	Enabling factors for climate-resilient development Co-facilitators: Carlos Méndez and Fatima Denton	IPCC Technical Guidelines for Assessing Impacts & Adaptation Co-facilitators: Mark Howden and Adelle Thomas

## WGII Report Back Session 1 (Ballroom A) | Winston Chow

18:00 BOG report backs and discussion (Ballroom A)

18:30 **Welcome Reception** (10th floor)

20:00 WGII Bureau Meeting (Peony)

## Day 2: Tuesday, 10 December 2024

07:30	Cross Working Group Co-Chair Breakfast
<b>CROSS-WORKING GROUP (xWG) BREAKOUT GROUP (BOG) SESSION 1</b>	
<i>In parallel to a series of cross-Working Group BOGs, a WGII BOG on the IPCC Technical Guidelines on Impacts and Adaptation (TGIA) will also be held on the morning of DAY2. Building on the discussions and the draft concept note produced in the previous day's TGIA BOG, this BOG will discuss the purpose, scope, target audiences, structure, and expertise needed for the updated guidelines. The objective of the BOG will be to develop the structure of the TGIA with a high-level outline.</i>	
9:00	<b>xWG BOG1.1: Equity and justice</b> (Pine)   Fatima Denton & Eduardo Calvo <b>xWG BOG1.2: Finance</b> (Willow)   Carlos Méndez & Gervais Itsoua Madzous <b>xWG BOG1.3: Health and well-being</b> (Lotus)   Sherilee Harper & Ramon Pichs-Madruga <b>xWG BOG1.4: Losses and damages</b> (Ixora)   Aïda Diongue-Niang & Adelle Thomas <b>xWG BOG1.5: Overshoot</b> (Maple)   Sonia Seneviratne & Oliver Geden <b>xWG BOG1.6: Risk approaches and regionalization</b> (Ballroom A)   Edvin Aldrian & Zinta Zommers <b>xWG BOG1.7: Scenarios</b> (Ballroom B)   Maheshwar Rupakheti, Sukumar Raman & Jan Fuglestvedt <b>xWG BOG1.8: Sectors and systems</b> (Hibiscus)   Laura Gallardo & Siir Kilkis <b>xWG BOG1.9: Solar Radiation Modification</b> (Mahogany)   Ines Camilloni & Malak Al Nory
9:00	<b>WGII BOG: IPCC Technical Guidelines on Impacts and Adaptation (TGIA)</b> (Peony)   Mark Howden & Bart van den Hurk
10:30	Coffee Break
11:00	<b>CROSS-WORKING GROUP (xWG) BREAKOUT GROUP (BOG) SESSION 1 CONTINUED</b>
11:00	<b>WGII BOG ON TGIA CONTINUED</b>
<b>FULL PLENARY SESSION</b> (Ballroom A)   Moderators: Diana Ürge-Vorsatz & Ramón Pichs-Madruga	
12:00	Report backs from the cross-cutting BOGs
13:00	Cross-Working Group Co-Chair Meeting (Makan Kitchen, 11th floor)
13:00	Lunch (Makan Kitchen, 11th floor)
<b>WORKING GROUP (WG) MEETINGS / SYNTHESIS REPORT (SYR) MEETING</b>	
14:30	<b>WGII Plenary 2</b> (Ballroom A)   Bart van den Hurk & Winston Chow
<i>After the WGII Plenary 2, WGII BOG Session 2 will focus on sectors and systems and discuss:</i> <i>1. what new information is needed from these sectors to support adaptation and climate resilient development, and 2. discuss how to cluster sectors and systems and balance the need for regional chapters while still ensuring a concise structure for the report. The objective of this BOG session will be for each group to identify and map – for their sector and/or system – the organizational/structural implications of supporting actionable output and regional differentiation. For this purpose, participants will split into 5 BOGs on:</i> <ol style="list-style-type: none"><li><i>1. Water, agriculture, food, and health</i></li><li><i>2. Security, peace and human mobility</i></li><li><i>3. Energy, infrastructure, transport, industry, settlements and spatial planning</i></li><li><i>4. Ecosystems, biodiversity and cultural heritage</i></li></ol>	

## 5. Poverty, livelihoods and development

### WGII BOG Session 2

15:00	<b>BOG 2A</b> (Ballroom A) Water, agriculture, and food Co-facilitators: Winston Chow & Laura Gallardo	<b>BOG 2B</b> (Rafflesia) Health Co-facilitators: Carlos Méndez & Bart van den Hurk	<b>BOG 2C</b> (Peony) Energy, infrastructure, transport, industry, settlements and spatial planning Co-facilitators: Mark Howden	<b>BOG 2D</b> (Lillies) Ecosystems, biodiversity and cultural heritage Co-facilitators: Sukumar Raman & Adelle Thomas	<b>BOG 2E</b> (Acacia) Security, peace and human mobility and Poverty, livelihoods and development Co-facilitators: Fatima Denton & Zinta Zommers
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Coffee (with snacks) available from 16:15 to 17:00

### WGII Report back Session 2 (Ballroom A) | Winston Chow & Bart van den Hurk

17:00 BOG report backs and proposals structuring sectors and systems in a way that:  
- supports actionable output in the AR7  
- supports regional differentiation

18:00 WGII Bureau Meeting (Ballroom A)

18:30 Evening High Tea

19:30 **WGII Social Event**, Singapore High Commission [bus departs at 07:00]

## Day 3: Wednesday, 11 December 2024

07:30 Cross Working Group Co-Chair Breakfast

### WORKING GROUP (WG) MEETINGS

#### WGII Plenary 3 (Ballroom A) | Bart van den Hurk & Winston Chow

9:00 **Emerging Structure Options**, WGII Bureau

*After WGII Plenary 3 when the WGII Bureau presents emerging structure options participants break into WGII BOG Session 3. Each BOG is assigned the task to discuss the emerging structure options and return a proposed structure (number of chapters and their working titles). Breakout groups will report back at 11:15.*

### 09:30 WGII BOG Session 3

<b>WGII BOG 3A</b> (Rafflesia) Co-facilitators: Fatima Denton and Sukumar Raman	<b>WGII BOG 3B</b> (Acacia) Co-facilitators: and Zinta Zommers and Winston Chow	<b>WGII BOG 3C</b> (Peony) Co-facilitators: Carlos Méndez and Adelle Thomas	<b>WGII BOG 3D</b> (Lillies) Co-facilitators: Mark Howden and Laura Gallardo
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Coffee (and snacks) available from 10:15–11:00

11:15 **WGII Report back Session 3** (Ballroom A) | Bart van den Hurk & Winston Chow

Report backs from the BOGs

### CROSS-WORKING GROUP (xWG) BREAKOUT GROUP (BOG) SESSION 2

12:00 **xWG BOG2.1: Biodiversity** (Lotus) | Edvin Aldrian & Zinta Zommer

	<b>xWG BOG2.2: Finance</b> (Willow)   Carlos Méndez & Gervais Itsoua Madzous
	<b>xWG BOG2.3: Health / Sectors &amp; Systems</b> (Hibiscus)   Sherilee Harper, Laura Gallardo & Siir Kilkis
	<b>xWG BOG2.4: Losses and damages</b> (Ixora)   Aïda Diongue-Niang & Adelle Thomas
	<b>xWG BOG2.5: Overshoot</b> (Maple)   Sonia Seneviratne & Oliver Geden
	<b>xWG BOG2.6: Societal Development/Climate Resilient Development</b> (Ballroom A)   Fatima Denton
	<b>xWG BOG2.7: Scenarios</b> (Ballroom B)   Maheshwar Rupakheti, Sukumar Raman & Jan Fuglestedt
	<b>xWG BOG2.8: Tipping Points</b> (Pine)   Mark Howden & Ladislaus Chang'a
	<b>xWG BOG2.9: Solar Radiation Modification</b> (Mahogany)   Ines Camilloni & Malak Al Nory
13:00	Working Group II Bureau Meeting to refine the structure based on the BOG proposals (Peony)
13:00	Lunch (Makan Kitchen, 11th floor)
14:30	<b>CROSS-WORKING GROUP (xWG) BREAKOUT GROUP (BOG) SESSION 2 CONTINUED</b>
	<b>FULL PLENARY SESSION</b> (Ballroom A)   Moderators: Ramón Pichs-Madruga & Ladislaus Chang'a
15:30	Report backs from the Cross-Working Group BOGs
16:30	Coffee Break
	<b>WORKING GROUP (WG) MEETINGS / SYNTHESIS REPORT (SYR) MEETING</b>
	<b>WGII Plenary Session 4</b> (Ballroom A)   Winston Chow & Bart van den Hurk
17:00	Agreement on the structure
18:30	Evening High Tea
	<b>Evening Sessions</b>
20:00	WGII Bureau Meeting (Peony)
20:00	WGII TGIA BOG (Rafflesia)

#### Day 4: Thursday, 12 December 2024

07:30	Cross Working Group Co-Chair Breakfast
	<b>WORKING GROUP (WG) MEETINGS / SYNTHESIS REPORT (SYR) MEETING</b>
	<b>WGII Plenary 5</b> (Ballroom A)   Winston Chow & Bart van den Hurk
9:00	Presentation of Revised Proposed Structure
	<i>After agreeing on the chapter structure, Breakout Group Session 4 and 5 undertake the task of addressing the outlines per chapter, guided by the question "Please provide an indicative outline for each identified chapter. Cross-cutting aspects may be indicated whenever relevant." For this, participants will break up in chapter groups that each will discuss the potential structure of specific chapters, utilising multiple sources of inputs across multiple sessions and allowing changing the group composition between BOGs to promote cross-fertilisation of ideas. The output of these BOG sessions will be to flesh out the chapters into indicative bullets. While BOG sessions 4 and 5 have the same purpose and objectives, they are interspersed with report back sessions 4 and 5 for chapter groups to have an opportunity to talk to each other, identify gaps and overlaps, and adjust their chapter content if required.</i>

<b>WGII BOG Session 4</b>			
9:30 Participants split into chapter groups to flesh bullets			
<b>WGII BOG 4A</b> <b><i>Framing Chapter</i></b> (Rafflesia) Co-facilitators: Fatima Denton, Laura Gallardo and Winston Chow	<b>WGII BOG 4B</b> <b><i>Global Chapters, including implications for Atlas</i></b> (Peony) Co-facilitators: Adelle Thomas, Zinta Zommers and Mark Howden	<b>WGII BOG 4C</b> <b><i>Regional Chapters, Thematic Chapters, and implications for Atlas</i></b> (Ballroom A) Co-facilitators: Sukumar Raman, Carlos Méndez and Bart van den Hurk	
Coffee (and snacks) available from 10:15-11:00			
11:00 WGII BOG Session 4 Continued			
12:00 <b>WGII Report Back Session 4</b> (Ballroom A)   Bart van den Hurk and Winston Chow			
Report backs from the BOGs			
13:00 Inclusivity Discussion with IPCC Vice-Chairs (Pine)			
13:00 Lunch (Makan Kitchen, 11th floor)			
<b>WORKING GROUP (WG) MEETINGS</b>			
14:30 <b>WGII BOGs Session 5</b>			
<b>WGII BOG 5A</b> <b><i>Framing Chapter</i></b> (Rafflesia) Co-facilitators: Fatima Denton, Laura Gallardo and Winston Chow	<b>WGII BOG 5B</b> <b><i>Global Chapters, including implications for Atlas</i></b> (Peony) Co-facilitators: Adelle Thomas, Zinta Zommers, and Mark Howden	<b>WGII BOG 5C</b> <b><i>Regional Chapters and implications for Atlas</i></b> (Frangipani) Co-facilitators: Carlos Méndez  <b><i>Thematic Chapters, including implications for Atlas</i></b> (Ballroom A) Co-facilitator: Sukumar Raman	<b>WGII BOG 5D</b> <b><i>TGIA</i></b> (Acacia) Co-facilitators: Bart van den Hurk
Coffee (and snacks) available 16:15-17:00			
17:15 <b>WGII Report Back Session 5</b> (Ballroom A)   Winston Chow and Bart van den Hurk			
Report backs from the BOGs			
<b>FULL PLENARY SESSION [TBC]</b> (Ballroom A)   Moderators: Diana Üрге-Vorsatz & Ladislaus Chang'a			
18:00 Working Group Status [TBC]			
18:30 Evening High Tea			
19:30 WGII Bureau Meeting (Peony)			

## Day 5: Friday, 13 December 2024

07:30	Cross Working Group Co-Chair Breakfast					
<b>WORKING GROUP (WG) MEETINGS / SYNTHESIS REPORT (SYR) MEETING</b>						
<b>WGII Plenary 6</b> (Ballroom A)   Bart van den Hurk & Winston Chow						
9:00	Agree in plenary to the outline and bullet points, Winston Chow & Bart van den Hurk					
10:45	Coffee Break					
<b>WGII Huddles</b> (Ballroom A)						
11:00	<b>Huddle on Regions</b>   Winston Chow	<b>Huddle on Health</b>   Sukumar Raman	<b>Huddle on Poverty</b>   Zinta Zommers	<b>Huddle on Finance</b>   Adelle Thomas	<b>Huddle on Energy</b>   Mark Howden	<b>Huddle on TGIA</b>   Bart van den Hurk
13:00	WGII Bureau meeting (Peony)					
13:00	Lunch (Makan Kitchen, 11th floor)					
<b>WORKING GROUP (WG) MEETINGS CONTINUED</b>						
14:30	WGII Plenary 5 continued					
Coffee (and snacks) available 16:15-17:00						
17:00	WGII Plenary 5 continued					
<b>CLOSING FULL PLENARY SESSION</b> (Ballroom A)   Moderators: Diana Üрге-Vorsatz & Ramón Pichs-Madruga						
20:00	<b>Sharing of Agreed Outlines</b> <ul style="list-style-type: none"><li>- <b>WGI</b></li><li>- <b>WGII</b></li><li>- <b>WGIII</b></li><li>- <b>Sharing of Outcomes</b></li><li>- <b>SYR</b></li></ul>					
21:00	End of Scoping Meeting					

## **ANNEX 4: WGII Contribution to the AR7 Scoping Meeting Proposed Outline of Chapters**

### **OUTLINE OF THE WORKING GROUP II CONTRIBUTION TO THE IPCC SEVENTH ASSESSMENT REPORT**

**Title: Climate Change 202X: Impacts, Adaptation and Vulnerability**

**Summary for Policymakers**

**Technical Summary**

#### **Chapter 1: Point of departure, framing and key concepts**

- Facing accelerating climate change and adapting to compounding threats in a poly-crisis world
- Setting the stage: evolving climate policy and knowledge landscapes in a changing world
- Key concepts such as adaptation, sustainable development, climate resilient development, losses and damages, responses to losses and damages, equity and justice
- Introducing Global, Regional and Thematic Assessments
- Updating the Technical Guidelines on Assessing Climate Change Impacts and Adaptation
- From assessment to effective implementation: prioritizing and enabling climate action

#### **Global Assessment Chapters**

#### **Chapter 2: Vulnerabilities, impacts and risks**

- Multiple dimensions of vulnerability across temporal and spatial scales
- Synthesis of observed and projected impacts, including economic and non-economic losses and damages, building on both slow onset and extreme Climatic-Impact Drivers, including detection and attribution
- Key risks including complex, compound, cascading, residual risks, and risks under a range of climate and development scenarios, including overshoot and different adaptation pathways
- Risks from responses
- Reversible and irreversible impacts and risks under a range of climate and development scenarios, including overshoot and different adaptation pathways
- Reasons for Concern across scales
- Lessons from other approaches to risk assessment across scales

#### **Chapter 3: Current adaptation progress, effectiveness and adequacy**

- Adaptation progress, gaps, limits and barriers



- Indicators and metrics to measure adaptation against goals
- Adequacy and effectiveness of support for adaptation and risk management
- Adaptation costs, trade-offs, benefits and co-benefits
- Evidence of effectiveness and adequacy of state and non-state actions at various scales

#### **Chapter 4: Adaptation options and conditions for accelerating action**

- Effectiveness and feasibility of adaptation options considering current barriers, preconditions, path dependencies, and a range of climate and development scenarios and/or different time scales
- Approaches for adaptive and continuous monitoring, evaluation, and learning to design better policies, options and actions, and to enhance implementation
- Drivers, enablers and conditions for accelerated adaptation action, including means of implementation
- Ways of adaptation decision making and planning under uncertainty and constraining conditions
- Enhancing agency and capacity of stakeholders and empowering Indigenous Knowledge and Local Knowledge holders
- Approaches to manage risks arising from adaptation, and addressing synergies and trade-offs with Disaster Risk Reduction, mitigation and sustainable development

#### **Chapter 5: Responses to losses and damages**

- Types of responses by diversity of actors at various scales and their interactions
- Policies, institutional arrangements and legal aspects for responding to losses and damages at various scales
- Drivers of decision-making including values, perceptions, differential power and influence, behaviour, incentives and capacities
- Approaches of categorizations and metrics to assess losses and damages
- Existing and potential responses to losses and damages including effectiveness and feasibility under a range of climate and development scenarios including overshoot and adaptation pathways
- Needs, gaps, barriers and enablers in responses to losses and damages

#### **Chapter 6: Finance**

- Background considerations, including broader macroeconomic context, international financial architecture, and reforms, geopolitics, other international commitments, barriers and enablers to finance

- Climate finance for adaptation – overview of financing needs, current flows, instruments and gaps, effectiveness and access, and methodologies for tracking finance flows
- Climate finance for responses to losses and damages – overview of financing needs, current finance flows, instruments and gaps, effectiveness and access, and methodologies for tracking finance flows
- Public and private investments for climate action: finance flows at domestic and international levels
- Equitable financial systems and schemes including those related to financial stability, sustainability and financial risk management
- Approaches to accelerate finance flows, including the diversity of instruments, schemes and approaches, and their appropriateness
- Consistency of finance flows with a pathway towards climate resilient development

## **Regional Assessment Chapters**

### **Common Bullets to all Regional Assessment Chapters**

- Consider regional setting, including intra-regional variabilities, areas of special concerns, such as hotspots and geographies, socio-political contexts and the thematic assessment chapters
- Multiple dimensions of vulnerability across temporal and spatial scales
- Observed and projected impacts, including economic and non-economic losses and damages, building on both slow onset and extreme Climatic-Impact Drivers
- Key risks including complex, compound, cascading, transboundary, residual risks, and risks under a range of climate and development scenarios, including overshoot and different adaptation pathways
- Adaptation progress, gaps, limits and barriers
- Context-specific adaptation options and responses to losses and damages, means of implementation, limits to action, costs and benefits, effectiveness and feasibility of different options
- Barriers and enablers to climate action, including finance, capacity building, education, technology development and transfer
- Perception, beliefs, values, behavioural aspects and cultural practices of adaptation, including locally led adaptation and community-based responses

- Distributional nature of effects, including consideration of human rights, equity and justice, Indigenous Peoples, gender, disability, informality and intergenerational justice
- Policies, governance, legislation and institutions critical to planning and implementation, including considerations of political ecology and political economy
- Role of diverse knowledge systems including Indigenous Knowledge, Local Knowledge and experiential learning
- Linkages with sustainable development and climate resilient development, including co-benefits, synergies, trade-offs and opportunities for innovation and transformation
- Regional, transboundary and local case studies, such as polar, dryland and mountain regions

#### **Chapter 7: Africa**

#### **Chapter 8: Asia**

#### **Chapter 9: Australasia**

#### **Chapter 10: Central and South America**

#### **Chapter 11: Europe**

#### **Chapter 12: North America**

#### **Chapter 13: Small Islands**

#### **Thematic Assessment Chapters**

##### **Common bullets to all thematic assessment chapters**

- Observed and projected impacts, including economic and non-economic losses and damages, building on both slow onset and extreme Climatic-Impact Drivers
- Multiple dimensions of vulnerability across temporal and spatial scales

- Key risks including complex, compound, cascading, transboundary, residual risks, and risks under a range of climate and development scenarios, including overshoot and different adaptation pathways
- Perceptions, beliefs, values, behavioural aspects and cultural practices of adaptation, including locally led adaptation and community-based responses
- Context-specific adaptation options and responses to losses and damages, means of implementation, including barriers, gaps, enablers and limits to action, and costs and benefits, effectiveness and feasibility of different options
- Distributional nature of effects including consideration of human rights, equity and justice, Indigenous Peoples, gender, disability, informality and intergenerational justice
- Policies, governance, legislation and institutions critical to planning and implementation, including considerations of political ecology and political economy
- Role of diverse knowledge systems including Indigenous Knowledge and Local Knowledge
- Linkages with sustainable development and climate resilient development, including co-benefits, synergies, trade-offs, and opportunities for innovation and transformation
- Case studies of implementation

#### **Chapter 14: Terrestrial, freshwater and cryospheric biodiversity, ecosystems and their services**

- Considering distinct geographies and biomes, including cryosphere, polar, forests, grasslands, mountains, deserts and drylands
- Vulnerability and resilience of biodiversity, ecosystem structure and functions, under a range of plausible futures including climate extremes, emergence of novel communities, and the implication for their services
- Emerging threats and management of risk to critical biodiversity, ecosystems, rare species and related cultural heritage
- Enablers, limits and barriers to natural adaptation

#### **Chapter 15: Ocean, coastal and cryospheric biodiversity, ecosystems and their services**

- Vulnerability and resilience of biodiversity, ecosystem structure and functions, under a range of plausible futures including climate extremes, emergence of novel communities, and the implication for their services

- Emerging threats and management of risk to critical biodiversity, ecosystems, rare species and related cultural heritage
- Enablers, limits and barriers to natural adaptation

### **Chapter 16: Water**

- Water security addressing the issues of too little, too much, and polluted water in the context of climate change to meet the needs of people, food production and ecosystems
- Water use and budgeting including virtual water, water footprints, water-related nexus
- Transboundary and national and subnational water management including non-economic and cultural values of water
- Risks from response options, including water cooperation and competition

### **Chapter 17: Agriculture, food, fibre and fisheries**

- Adaptation options for food supply chains and food, nutrition and livelihood security, considering affordability, dietary diversity, accessibility, agency and sustainability
- Competition for land and ocean use in the context of adaptation and mitigation
- Livelihood security, risks to cultural heritage and adaptation options for key vulnerable groups such as smallholder farmers, pastoralists and artisanal fishing communities
- Transboundary impacts and responses, including fisheries and aquaculture, and impacts and responses in areas beyond national jurisdiction
- Impacts of climate change on trade and trade implications for adaptation and mitigation

### **Chapter 18: Energy, industry, infrastructure and human settlements**

- Supply chain risk, business risk, cascading impacts, path dependencies and infrastructure lock-in, risks of failure of infrastructure systems and risks to cultural heritage
- Adapting infrastructure, industry, energy systems and human settlements to reduce risk and build response capacity at multiple levels
- Developing and utilizing climate resilient infrastructure to build adaptive capacity and support sustainable development at multiple levels
- Solutions including new technologies, methods of construction, materials and innovations, green and grey and natural infrastructure, social and behavioural change, considering mitigation and just transition goals
- Relevant updates to Special Report on Climate Change and Cities

### **Chapter 19: Health and well-being**

- Observed impacts and projected risks to health and well-being due to multi-scale climate changes, extremes, compound and cascading events

- Intersectionality of drivers of vulnerability and exposure to climate hazards within populations and communities
- Adapting health systems, and health prevention and promotion activities to reduce risk and build capacity at multiple levels
- Nexus between climate change, health and wellbeing, and other health determining sectors
- Innovative and collaborative partnerships involving private sector and others

## **Chapter 20: Poverty, livelihoods, mobility and fragility**

- Livelihood options, households with low-income and social deprivations in rural and urban contexts, Indigenous Peoples, informal settlements, contexts of fragility, displaced, mobile and immobile populations
- Interaction of climate change and development with poverty, vulnerability and livelihoods
- Human mobility in the context of climate change, including internal and cross boundary
- Risks and adaptation in fragile contexts, and in contexts of social unrest and armed conflict
- Integrating adaptation and resilience into efforts towards poverty eradication, livelihood enhancement, formal and informal social protection mechanisms
- Differentiated capabilities and responsibilities, and asymmetric access to information, finance and decision-making fora

## **Annex I: Atlas**

- Context-specific mapping of hazards, vulnerability, exposure, impacts, risks, adaptation, and responses to losses and damages

## **Annex II: Linkage to TGIA: Overview of Technical Guidelines on Impacts and Adaptation**

## **Annex III: Glossary**

## **Annex IV: Acronyms**

## **Annex V: List of Contributors**

## **Annex VI: List of Reviewers**

# OUTLINE OF THE UPDATE TO THE 1994 IPCC TECHNICAL GUIDELINES FOR ASSESSING CLIMATE CHANGE IMPACTS AND ADAPTATIONS

## Section 1: Introduction

- Rationale for updating the Technical Guidelines
- Framing and purpose for the Technical Guidelines

## Section 2: Adaptation in practice

- Key principles and concepts for the Technical Guidelines, such as effective and adequate adaptation; equity and justice; co-development, flexibility and adaptive planning; systems thinking and consideration of planning as a systems approach; synergies and trade-offs
- Considering multiple levels of governance and levels of assessment and adaptation action
- Adaptation in relation to societal development needs and values, and adaptation as both a stand-alone and continuous, mainstreamed activity

## Section 3: Technical Guidelines

- **Scoping and goal setting** (analysis of current risk management capacities; and analysis of impact of adaptation measures on equity and justice outcomes; identification of risk distribution and risk tolerance across communities, regions and time scales; assessment of sectoral and development policies, data and knowledge sources, resources, enablers and barriers; identifying and addressing information gaps)
- **Impact, vulnerability and risk assessment** (analysis of climate impacts, including economic and non-economic losses and damages; assessment of climate risks, considering climatic and non-climatic risk drivers; identification of new and emerging risks; analysis of tolerance of residual risk; demand for adaptation; assessing uncertainty)
- **Planning** (identifying entry points for adaptation; participatory and inclusive planning processes; mainstreaming adaptation in existing policies, regulations and practices; costs and benefits, and budgeting of adaptation; identifying, appraising and prioritising adaptation options using criteria such as effectiveness, adequacy, feasibility, equity, human rights, synergies and trade-offs; iterative planning)
- **Implementation** (identifying roles, responsibilities and accountability mechanisms; identifying and mobilizing resources; development of workflow and institutional collaboration mechanisms; development of communication channels with relevant stakeholders)
- **Monitoring, evaluation and learning** (definition of impact and adaptation metrics and indicators to monitor and track progress, uptake and performance; systematic tracking of lessons and feedback from implementation for continuous learning and adaptive management; ex-post evaluations including equity and justice outcomes)

## Section 4: Enablers

- Systematic exploration of methodologies and tools for assessing impacts, risks, vulnerabilities and adaptation, including adaptation options, prioritization and costing
- Co-development principles and practices (stakeholder engagement; locally-led approaches; gender-responsive and rights-based approaches; mutual learning with marginalized

communities, Indigenous Peoples, non-governmental organizations, and technical and scientific communities; communication and outreach)

- Services and data to support adaptation planning (climate information services; geophysical, environmental and socioeconomic information)
- Financing adaptation and mobilising resources for managing adaptation programs, and identification of funding mechanisms
- Policy, legal and regulatory enablers (frameworks to accelerate implementation of adaptation; identifying approaches for integrating adaptation into national and sectoral policies, laws and regulations; frameworks for adaptive management)