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

Working Group III Contribution to the IPCC Seventh Assessment Report

Background information

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

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1 Introduction

The proposed outline for the WGIII contribution to the AR7 was prepared during the five-day AR7 Scoping Meeting in Kuala Lumpur, Malaysia (9 to 13 December 2024). This Information Document describes: the call for nominations of experts; the selection of participants; and pre-scoping activities designed to inform the Scoping Meeting. It also explains the rationale behind the outline and provides an annotation of the proposed chapters. A set of Annexes cover: the selection process for participants in the Scoping Meeting; a list of WGIII participants; the agenda for the WGIII portion of the scoping meeting; the proposed chapter outline; and themes cutting across Working Groups (WGs) that were discussed at the Scoping Meeting.

2 Call for Nominations

A call for nominations for experts to attend the Scoping Meeting was issued to governments, observer organizations, and IPCC bureau members on 3 May 2024. Governments were requested to submit their nominations via their focal points by 12 June 2024.

Participants contributing to the scoping of the WGIII Report were required to have a broad understanding of climate change and related issues, and collectively to have expertise in the following areas:

- **Expertise WGIII-1:** Mitigation responses in energy, industry, transport, buildings, agriculture, forestry, land use and waste; energy systems planning (including energy storage, demand side management, energy supply technologies, etc.).
- **Expertise WGIII-2:** Cross-sectoral mitigation options covering land, coastal and ocean systems, including sector coupling, Carbon Dioxide Removal, Carbon Capture and Storage, Carbon Capture and Utilization, etc.
- **Expertise WGIII-3:** Emission trends (consumption patterns, human behavior and emissions trends, including economic, sociological and cultural aspects).
- **Expertise WGIII-4:** Scenarios and transitions at the global, national, regional and local scales.
- **Expertise WGIII-5:** Governance (policies, institutions, agreements and instruments) at the international, national and subnational levels, including just transitions of sectors and systems.
- **Expertise WGIII-6:** Mitigation and sustainable development (capacity building; technology innovation, transfer and adoption; related enabling conditions; international cooperation).
- **Expertise WGIII-7:** Economic and financial aspects of mitigation options.

In addition, the following areas of expertise cutting across WGs were identified as relevant:

- 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/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.

3 Participant Selection

The process of selecting participants for the AR7 Scoping Meeting was conducted jointly by the WGI, WGII and WGIII Bureaux. The process followed IPCC principles and procedures and was agreed upon by WGIII Bureau Members. WGIII aimed to identify 60 invitees for its own scoping activities, with a total invite list of 240 participants (including Bureau Members) across all three WGs and the Synthesis Report. The Technical Support Units (TSUs) facilitated a process whereby Bureaux Members identified suitable invitees, ensuring an appropriate balance based on the following criteria:

- Scientific, technical and socioeconomic expertise, including the range of views;
- Geographical representation;
- Mixture of experts with and without previous experience in IPCC;
- Gender balance; and
- Experts with a background from relevant stakeholder and user groups, including governments.

2210 nominations were received for participation in the AR7 Scoping Meeting. Of these, 1007 nominees indicated that they had expertise relevant for WGIII. 68 participants were selected (60 for WGIII only, 8 for SYR/WGIII). Of the selected participants, 41% were female and 59% were male. 49% of invitees were from developed countries and 51% from developing countries or countries with economies in transition.

The selection process adopted by WGIII was as follows. Following an initial round of voting by Bureau Members, a list of proposed participants was developed by the WGIII. The Bureau then revised and added to this initial list. A final list of participants was agreed to by the WGIII Bureau and forwarded to the IPCC Secretariat on 16 September 2024.

The selection process and the profile of invited participants are described in more detail in Annex I and Annex II.

4 Pre-Scoping Activities

Due to the large number of nominations, many well-qualified experts could not be invited to the AR7 Scoping Meeting. Therefore, in the lead-up to the December Scoping Meeting, the WGIII Bureau organized several pre-scoping activities in order to broaden the inclusion of perspectives and inform the scoping dialogue. These activities were summarized in the *Vision Document for the AR7 Scoping Meeting* (hereafter referred to as the *AR7 Vision Document*), which was provided to scoping meeting participants in advance of the scoping meeting. In addition to pre-scoping activities, the WGIII contribution to the *AR7 Vision Document* covered: Reflections on AR6; and Elements for the WGIII AR7 report.

On October 30th, 2024, WGIII participated in three pre-scoping webinars with IPCC focal points and experts who were nominated for, but not selected to participate in, the December scoping meeting. Over 670 participants from 109 countries registered to attend the webinars. Of those, 70 experts, representing 34 countries by citizenship, attended the webinars' WGIII breakout groups (BOGs). In these BOGs, WGIII Co-Chairs presented a Slido poll that asked participants for their perspectives on two questions: (1) "What are important WGIII themes to be covered in the Seventh Assessment Report?"; and (2) "How should the AR7 WGIII Assessment Report be structured?" The results of these polls, detailed in WGIII's contribution to the *AR7 Vision Document*, were presented to scoping meeting participants during the opening WGIII plenary and the first WGIII BOG.

In addition to these pre-scoping webinars, the WGIII Bureau also hosted two consultations with coordinating lead authors (CLAs) of WGIII's contribution to AR6. The Bureau posed four questions to these CLAs, soliciting feedback on chapter structure and content in AR6, cross chapter and cross-Working Group coordination, major guiding questions for specific chapters, and advice for the

scoping meeting. These conversations were summarized for scoping meeting participants via the *AR7 Vision Document*.

WGIII also participated in several side events at COP29 in Baku in November 2024. These events focused on regionalization and granularity of information in IPCC reports, reviewed WGIII's contribution to AR6 along with its advancements, highlighted knowledge gaps identified in AR6, and explored ways to enhance policy and economic assessment in AR7. A full discussion of these events can be found in WGIII's contribution to the *AR7 Vision Document*.

5 Scoping Meeting

The Scoping Meeting was held in Kuala Lumpur, Malaysia, from 9 to 13 December 2024. The WGIII contribution to AR7 was scoped in a series of breakout groups and plenaries that started on the afternoon of Day 1 and concluded on the afternoon of Day 5. The agenda for the WGIII Session is provided in Annex III.

Participants were invited to discuss all aspects of the scope, outline, and content of the report. A predefined structure for the report was purposely not provided to the participants. Instead, a facilitated process was used which allowed an outline to emerge during the course of the meeting through a series of structured discussions (see Figures 1 and 2).

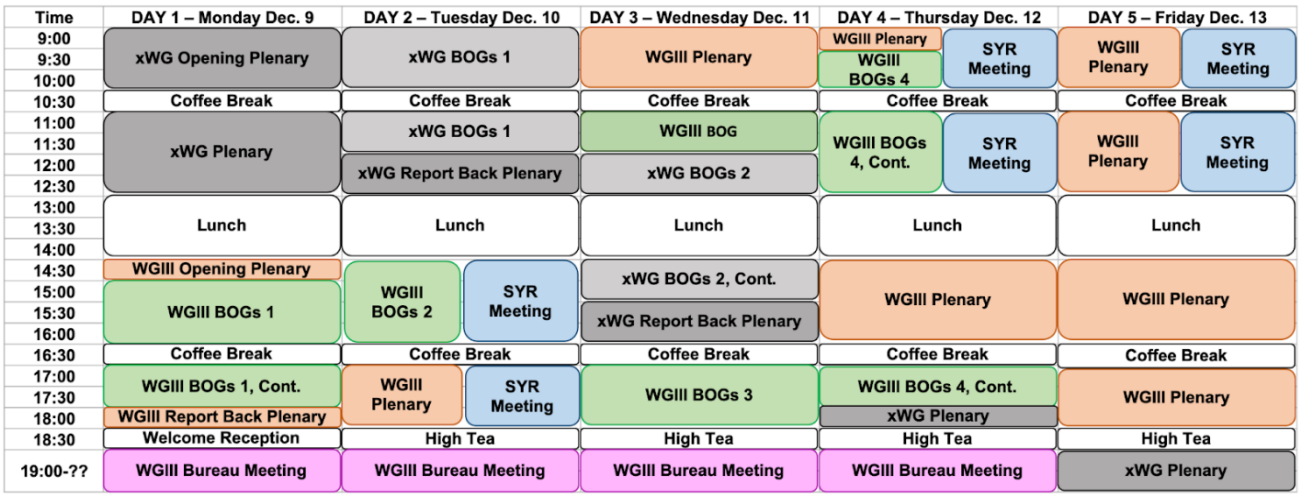

Figure 1 – Overview of WGIII Scoping Meeting Agenda

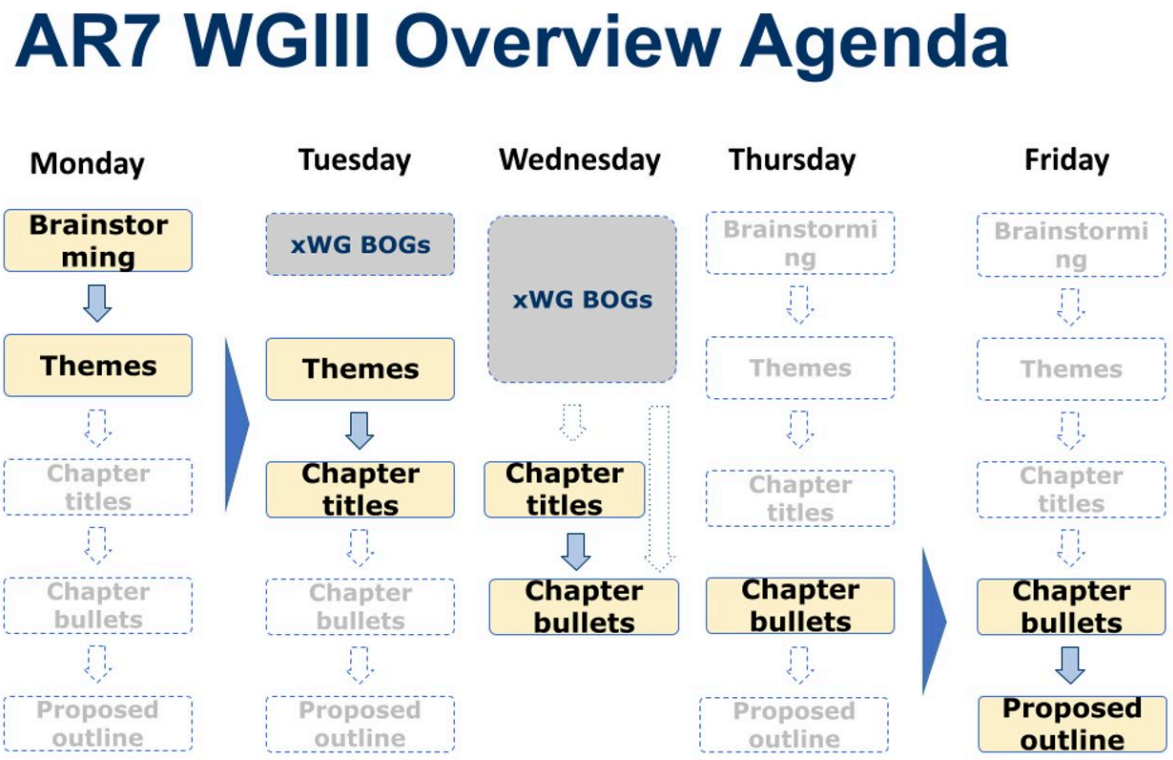

Figure 2 – Overview of WGIII Scoping Process

In the Day 1 BOGs, participants were asked: "What are 8 - 12 themes that must be covered in WGIII?" From that discussion, the WGIII Bureau identified eight topics/themes based on participant input as important to cover in the WGIII report. Those topics/themes included:

- Status and past trends in emissions drivers;
- Different futures (including scenarios and pathways);
- Equity;
- Integration, trade-offs, and synergies with adaptation and other sustainable development objectives;
- Enablers (finance, capacity building, technology);
- Costs and barriers;
- Policies and governance; and
- Sectors, systems and their integration.

Discussions on Day 2 focused on how to treat each of those topics/themes in the WGIII outline. In those discussions, participants identified a proposed treatment (e.g., separate chapter, embedded in other chapters, or both). In addition, participants elaborated on, refined, and clustered the topics/themes (e.g., the BOG on "sectors, systems and their integration" identified potential sector/system chapters). With this information, the WGIII Bureau identified an initial list of chapters and presented it to the WGIII participants on Day 3 (brackets indicate a higher degree of provisionality):

- Introduction and framing
- Past and current emissions and their drivers
- National and global futures
- Enablers and constraints/barriers
- National policy and international efforts
- [Demand services]
- Energy [supply including energy access][systems]
- Industry and industrial processes [and Carbon Capture Utilization and Storage (CCUS)]
- Transport
- Buildings

- AFOLU/Land
- Systems / Integration across sectors and scales
- [Ocean]
- [Carbon Dioxide Removal (CDR) [and CCUS]]

With the initial list of chapters, a few questions remained, in particular:

- Should “futures” be a single chapter covering both national and global futures or two separate chapters?
- Should there be separate chapters on demand, oceans, and/or carbon dioxide removal? Or should this content be integrated into other chapters?

In each case, participants were asked to continue developing the indicative bullets for the chapter(s). Discussions on the above questions were held on Day 4 and Day 5. Considerations and outcomes were as follows:

- *National and global futures*: Participants agreed that a chapter or chapters on futures was needed in the WGIII report. However, there were initially differences of opinion as to whether it should be a single chapter covering both national and global futures or two separate chapters (e.g., one on national and one on global). Participants suggesting a single chapter noted that combining national and global futures would be more policy relevant (i.e., policy implementation happens at the national level but is informed by global pathways) and would broaden the author pool. Participants suggesting two chapters expressed concern about the size of the chapter and the resources needed to cover the indicative bullets. Discussions continued through Day 5 on the number and scope of the chapter(s). These discussions also included alternative ways of dividing this chapter given a broad recognition of the need to integrate national and global futures and sustainable development. At the conclusion of Day 5, the decision was made to keep this as a single chapter, though some concerns remained about the size of the chapter. To address these concerns, the WGIII Bureau intends to allocate a larger page limit, more authors, and additional support from the TSU/Bureau than for other chapters to accommodate its larger scope. In addition, there are links to this chapter in several other chapters (including Chapter 4 on *Development, mitigation, and sustainability*), and in what depth each chapter covers national and global futures is left to the authors to determine.
- *Demand and services*: In the development of the initial list of chapters, the question emerged as to whether demand and services needed its own chapter or if the content should be embedded throughout the sectoral chapters. Arguments for embedding focused on the need to assess sectoral demand in order to understand sectoral transitions. Arguments for separating focused on the distinction between demand-side and supply-side measures, articulating that supply-side content should be embedded within sectoral chapters while a separate chapter should discuss human and social aspects of demand. In the end, it was decided to retain demand and services as a separate chapter and to include relevant content within the sectoral chapters as needed.
- *The Ocean*: Ocean-based options were recognized by participants as important to cover in the WGIII report. There were initially differences of opinion as to whether these should be covered in a separate chapter or embedded in the other sector and systems chapters. Participants suggesting a separate chapter noted the difference in governance between ocean and land systems, as well as the cross-cutting nature of ocean-based options. They also suggested that policymakers will be looking to find all ocean content in one place. Participants suggesting embedding in other chapters noted that the ocean-based options would also need to be addressed in those chapters, but that ocean mitigation (human intervention) is limited in comparison to activities on land. Moreover, they noted that there will not be a separate land chapter and that many of the mitigation activities that would be covered are not intrinsic to the Ocean themselves (e.g. renewable energy, transport). In the end, it was decided that ocean-based options should be embedded in other chapters. In addition, the need for both a cross-chapter box and cross-Working Group box was noted in order to integrate content within WGIII and across all Working Groups, respectively.
- *Carbon dioxide removal*: There was a discussion throughout the week on whether to include a separate chapter on CDR. Arguments for a separate chapter noted the growing body of

literature on CDR, the fact that not all CDR approaches fit into the sector and system structure, and that the Task Force on National Greenhouse Gas Inventories (TFI) was proposing an additional Volume in the outline for the *2027 Methodology Report on Carbon Dioxide Removal Technologies, Carbon Capture, Utilization and Storage*. Moreover, some participants noted that CDR is providing a distinct service (i.e., carbon removal). Arguments against a separate chapter noted that CDR was not a "sector" or "system" but might be interpreted as such in a list of sector and system chapters, that there would be overlap with other chapters (in particular AFOLU), and having CDR as a separate chapter might be misinterpreted by readers as overemphasizing its role in mitigation and/or downplaying its risks. In the end, it was decided to keep CDR as a separate chapter but to choose a title that (1) clearly distinguished CDR from the other sector & systems chapters, and (2) clearly indicated the intent to provide a comprehensive and balanced assessment. Moreover, it was decided that CCS and CCU would be addressed in the energy and industry chapters, since both are not CDR strategies

In addition, the initial list of chapters did not include a chapter focused on sustainability or sustainable development. Several participants articulated a need for such a chapter. It was initially proposed as a final, concluding chapter for the report. However, in the final Day 5 discussions, the chapter was moved towards the beginning of the report given its links to the chapter on national and global futures. Finally, while the initial list of chapters did not include a separate chapter on finance, a finance chapter was added on Thursday evening in response to recommendations from the xWG BOG (see Annex V).

6 Proposed WGIII Outline

6.1 Outline Overview

This section summarises the overall architecture of the proposed outline and provides some rationale for the order of chapters. Section 6.2 provides an annotation of individual chapters.

Chapter 1 will introduce the report and describe what is covered and not covered in subsequent chapters. It will also provide a framing of the overarching concepts and key policy-relevant issues for the report. Chapter 2 will assess historical and current anthropogenic emissions and anthropogenic emissions trends. It will also provide an *ex post* assessment of what policy, actions, and governance at different scales have worked and not worked in terms of impacting emissions and the drivers of emissions. It is retrospective in nature and will not include projections of future emissions. Chapter 3 will take a broad view of national and global futures in the context of sustainable development, describing, assessing, and evaluating both qualitative and quantitative scenarios and emissions pathways, with linkages to the sectoral chapters. The chapter will take an inclusive approach for the incorporation of and assessment of a diverse range of methodologies, models, databases, and development tools for scenarios and emissions pathways. This chapter is followed by Chapter 4, *Development, mitigation, sustainability,* because of the interconnected nature of national and global futures and sustainable development. It also comes early in the report to reflect the importance of sustainable development as a framing concept throughout the WGIII contribution to AR7.

Chapters 5 - 7 will all focus on factors that facilitate and/or constrain mitigation. There are three separate chapters to indicate the importance of their treatment in AR7. Chapter 5 (*Enablers and barriers*) will be an integrative assessment of the multiple enablers, barriers, and constraints, while Chapter 6 and Chapter 7 will focus on policies and governance and finance, respectively. It is envisaged that these chapters will intersect on content, but the importance of barriers and enablers requires thorough coverage. Chapters 5 - 7 will also serve as foundations for the discussion of enablers and barriers in the specific sectors and systems chapters.

The majority of the outline consists of the set of sectors and systems chapters (Chapter 8 - 13). Each of these chapters will focus on assessing options that provide services (e.g., heating, cooling, light, cooking, industrial end uses, transport, mobility, food and fiber) while reducing emissions or enhancing removals. Each sectoral/systems chapter will include a set of common elements, including, *inter alia*, links to Chapter 6 on policy analysis and evaluation, links to Chapter 2 on drivers and current trends in emissions and removals, mitigation measures and potentials, links to Chapter 3 on national and global futures, links to Chapter 4 on sustainable development and mitigation-adaptation interlinkages, and links to Chapter 7 on finance. Chapter 8, *Services and demand*, is distinct from the other chapters, which largely focus on supply-side measures, to highlight the importance of demand-side measures. Chapter 14 will bookend the sectors and systems chapters and will assess cross-sectoral issues and integration across systems, including energy, transport, buildings, and industry, with an emphasis on electrification.

The last chapter of the report, Chapter 15, is distinct from Chapters 8 - 13. Given the emerging literature on CDR since AR6 and the fact that not all CDR approaches fit into the previous sectors and systems structure (e.g., marine CDR), it was decided that CDR should be given a standalone chapter. The title, *Potentials, limits, and risks of Carbon Dioxide Removal (CDR*), reflects the intent to have a comprehensive and balanced assessment.

While knowledge gaps are discussed as common elements for Chapters 8 - 13, all chapters of the report will need to examine knowledge gaps and assess uncertainty.

6.2 Annotation of proposed chapters

Chapter 1 will have two main elements: an introduction and a framing. The introduction will describe what the report chapters and sections will contain, as well as what is not going to be covered in the report. The framing will provide overarching concepts and key policy-relevant issues for the report, including equity (both within and between countries), just transition, and differentiation of mitigation responses given the context of development, regional specificities, and considerations of Indigenous Knowledges. Sustainable development will be a key framing concept, including and going beyond a consideration of Sustainable Development Goals and examining synergies and tradeoffs between mitigation action and other national and regional development priorities. The chapter will include a framing of key concepts and definitions of scenarios and pathways, both qualitative and quantitative, with links to Chapter 3 on global and national futures, as well as WGI and WGII scenarios. The chapter will highlight past performance and achievements in mitigation, including what has worked in different contexts and regions, with links to Chapter 2 and Chapter 6. It will include an assessment of how innovation (including social innovation), technology, capacity building, mitigation finance, governance, and climate policy have evolved over time. There will also be an examination of the role of ecosystems (both land and ocean) and biodiversity in mitigation. Chapter 1 will discuss the social and socioeconomic impacts of climate mitigation policy and action. Furthermore, the interaction between adaptation strategies and mitigation will be discussed, and, as appropriate, other Cross-Working Group linkages.

Chapter 2 will assess historical and current anthropogenic emissions and their trends on an annual and cumulative basis, globally, and disaggregated by region, sector, gas (GHG and non-GHG), as well as aerosols, using a variety of different indicators, definitions, and scales, for example, per capita, per GDP, territorial, consumption-based, warming contribution, and income decile. This assessment of past and current emissions will include estimates of uncertainty, consistency with national inventories (for example, in line with the recommendations from the *IPCC Expert Meeting on Reconciling Anthropogenic Land Use Emissions*), and relationship to remaining carbon budgets. This chapter will need coordination on the use of datasets and the assessments in the WGI report. The chapter will include an assessment of emissions associated with existing and planned long-lived infrastructure. The trends in anthropogenic drivers will include a broad set of drivers, beyond GDP and population. Specific drivers discussed included: technology (costs, finance, research, development and innovation); activity; fuels, primary and final energy, energy efficiency, share of renewables; human and social capacity; socioeconomics; services; lifestyle, consumption, production, behavior, perceptions about climate change; sufficiency; land use; urbanization; and

trade. Chapter 2 will also include an *ex post* assessment of what policies, actions, and governance at different scales (global, regional, national, and local) have worked and not worked in terms of impacting emissions and the drivers of emissions, and why. This will require strong coordination with Chapter 6.

Chapter 3, *National and global futures in the context of sustainable development and climate change*, will take a broad view of national and global futures, describing, assessing, and evaluating scenarios and emissions pathways, both qualitative and quantitative. Chapter 3 is broader than Chapter 4, integrating several dimensions of futures, while Chapter 4 is a deeper dive on sustainability. The chapter will take a broad approach for the incorporation and assessment of methodologies, models, databases, and development tools for scenarios and emissions pathways. It will assess the justice and equity assumptions and implications of emissions scenarios. It will evaluate the consistency of the land-use emissions definitions in emissions scenarios with national inventories (in line with the recommendations from the *IPCC Expert Meeting on Reconciling Anthropogenic Land Use Emissions*). The chapter will examine both the implications of mitigation for development and sustainable development pathways, related to well-being, employment, poverty, and sustainability, including the Rio Conventions on biodiversity, desertification, and climate change and how those development and sustainable development pathways affect mitigation. Chapter 3 will assess a broad range of socioeconomic and development futures and will assess their underlying assumptions and outcomes, paying particular attention to feasibility across various dimensions, including geophysical, environmental-ecological, technological, economic, socio-cultural, and institutional. The chapter will examine systems transition under different futures. Discussions included fossil fuel transitions and clean cooking, though it was noted that the coverage could be broader. The chapter will explore the economics of global and national mitigation and development pathways using different economic approaches, assessing mitigation costs and benefits, investment needs (including for infrastructure), employment effects, co-benefits, and spillover effects. The chapter will include an assessment of the impacts of climate change on mitigation pathways and strategies and synergies and tradeoffs between mitigation and adaptation, for example, in investment. The robustness of mitigation strategies and pathways under uncertainty, including uncertainty in the climate response, will be discussed. Chapter 3 will assess current policies, Nationally Determined Contributions (NDCs), other national policies, and the consistency between various national and global futures, in the context of the UNFCCC and the Paris Agreement; discussions included mention of ambition (e.g., 1.5°C pathways), equity, and sustainable development. Furthermore, it will assess opportunities to accelerate national climate action from current policies in the context of equity and justice. The chapter will explore the relationships between global climate targets and mitigation action and the relationship of gross emissions reductions, residual emissions, and gross carbon dioxide removal under different global futures, including but not limited to scenarios of overshoot. Throughout the chapter, the relationship(s) between equity, justice, and mitigation across and within countries and generations will be assessed. Chapter 3 will require close coordination with Chapter 4 on addressing the intersection of content on sustainable development.

Chapter 4, *Development, mitigation, sustainability*, comes early in the report to reflect the importance of sustainable development as a framing concept throughout the WGIII contribution to AR7. The chapter will use sustainable development, including and going beyond Sustainable Development Goals, as an integrative perspective for mitigation, including tradeoffs and synergies. It will assess the distributional consequences of mitigation options and strategies across different countries and groups. It will explore the political economy dimensions, co-benefits, and livelihood impacts of transitions related to mitigation. It will address the climate change mitigation response capacities and enabling conditions in the context of sustainable development, including technology, finance, and cooperation for sustainable development. Going beyond the treatment of sustainable development in AR6, the chapter will have a focus on equity and justice, especially just transitions and elaborating them at sectoral, national, regional, and global levels. The chapter will address the social and socioeconomic dimensions of climate mitigation and sufficiency. It will assess climate change mitigation responses in the context of multi-objective policies across scales, such as economic development and prosperity, poverty eradication, improving living standards, etc. The chapter will examine interlinkages, conflicts, and synergies between mitigation, adaptation, and

other sustainable development objectives, and implications of climate change mitigation responses on biodiversity and ecosystems (both land and ocean), conservation, and restoration. Attention will be paid to ocean-based mitigation in the context of sustainable development and the blue economy, including synergies with global food and nutritional security. Uncertainties and knowledge needs related to mitigation responses and sustainable development will be highlighted. Chapter 4 will explore socioeconomic pathways in the context of sustainable development, with strong linkages to Chapter 3 on global and national futures. The authors of both chapters will coordinate closely to determine exactly how to divide content, with some content covered in both chapters to ensure a comprehensive assessment. Overall, as a framing concept, sustainable development will be an integrative component in all chapters of the WGIII report.

Chapter 5, *Enablers and barriers*, will be an integrative assessment of the multiple enablers, barriers, and constraints for mitigation, including cost, capacity, environment and natural resources, finance, social, technology, and trade, considering a variety of approaches and circumstances, scale, and time dynamics. The impact of barriers and enablers on the feasibility of mitigation in different contexts will be a point of emphasis. Economic development as an enabler and constraint for mitigation will be examined. Capacity will encompass many dimensions, including technological, institutional, economic, and human capacity. The chapter will include an examination of the role of finance, investment, policies and governance, coordinating with Chapters 6 and 7. The chapter will consider how the distributional impacts of mitigation, both costs and benefits, and inequality and inequity within and across countries enable and constrain mitigation. Social enablers and barriers, including public perception and support, lifestyles and behavior, communication, information and disinformation, engagement, education, health and well-being, will be assessed in the chapter. Attention will be paid to the role of labor, including supply, organization, wellbeing, skills, and just transition. The environmental and natural resources enablers and barriers for mitigation discussion included land, water, natural resources, minerals, and climate services. Indigenous Knowledge systems, rights, and governance as enablers of mitigation will be explored. The political economy dimensions of mitigation will be considered, including public preferences and the role of interest groups and political institutions. The role of peace, security/insecurity, and conflict resolution as enablers and barriers to mitigation action will be included in the chapter. Other barriers and enablers include international relations and cooperation, trade, and supply chains. Chapter 5 will require close coordination with the authors of Chapter 6, Chapter 7, and the sectoral chapters (Chapters 8 - 13), but it is expected that there will be common elements on key enablers and barriers between the chapters.

Chapter 6, *Policies and governance at national, international, and subnational levels*, will cover policies and governance, including institutions and legal frameworks, for climate change mitigation. While policies will also be covered in detail in sectoral chapters, Chapter 6 will provide an overarching and cross-sectoral framing of the role of policies and governance. The chapter will discuss the alignment of policies and governance with development pathways, equity, justice, distribution, and integration with adaptation and sustainable development. It will examine approaches to policy and institutional design, including development-led and economy-wide approaches, the development of sectoral transition policies, and the role of international cooperation, taking into account political economy dimensions. The chapter will assess the multiple objectives (both climate and non-climate), tradeoffs, and co-benefits of mitigation policies. The chapter will (with links to Chapter 2) provide a framework for and review of *ex-post* policy analysis and governance and will synthesize the *ex-post* analysis of the sectoral mitigation policies in Chapters 8 - 13. Chapter 6 will provide insights on mitigation policy innovation, learning, and diffusion. The chapter will also include a discussion of corporate climate action including financial institutions, standards, labelling, and effectiveness. The role of non-state actors will be highlighted at different levels, including civil society, labor, informal economy, media, social, gender, and youth movements, and the intersection of non-state actors with Indigenous Peoples and local communities. Chapter 6 will assess policy packages for mitigation, both within and across sectors, including issues of coordination and consistency, sequencing, and approaches for ratcheting up ambition and action. Legal frameworks for mitigation and development related to climate mitigation will be discussed. The role of international climate and non-climate cooperation and agreements, including on trade, biodiversity, and marine governance, in mitigation outcomes will be evaluated.

Governance of emerging approaches for net-negative emissions and solar radiation modification will also be addressed.

Chapter 7, *Finance*, will focus on the role of finance in climate mitigation strategies, programmes, and policies. The content from this chapter drew from the output of the xWG BOG on Finance (see Annex V). While finance will be discussed as an enabler and barrier in Chapter 5 and the sectoral chapters, the importance of broader finance issues was determined to warrant a standalone chapter. As a departure from AR6, Chapter 7 will focus more on finance solutions. The chapter will examine how to scale mitigation finance to meet current and future finance needs. It will explore finance innovations, including schemes and instruments, such as green bonds, green credits, and green taxonomies, relying on case studies. It will explore types of finance and financing mechanisms from public, bilateral, multilateral, and private sources, including blended finance and market-based instruments (such as carbon markets). The chapter will address the adequacy of finance and issues of access (equity and justice), inclusion, and effectiveness of finance, considering finance at different scales (including national, sub-national, regional, and global). An important element of this chapter will be an *ex-post* assessment of mitigation finance outcomes. The chapter will assess public and private financial flows to support mitigation, including those to, from, and between developed and developing countries, tracking them by sources, sectors, levels of governance, channels, regions, countries, and instruments and comparing them to the total volume of global capital. The chapter will address current finance and finance needs for innovation to support national and sectoral transitions related to mitigation. Chapter 7 will examine structural finance issues, such as the cost of capital, debt, and the availability of debt instruments that are impacted by climate change and in turn affect progress on mitigation. The chapter will discuss enabling environments for finance and the role of governance of finance, including regulation and coordination of finance actors. Transition risks in the financial sector from a transition to a lower GHG emission economy will be examined. The role of gender and the implications of mitigation finance on Indigenous Peoples and local communities will be considered.

All the sectoral chapters (8 - 13) will include a number of common elements. The chapters will highlight key findings from AR6, as well as, where appropriate, the Special Report on Climate Change and Cities. Each chapter will include *ex post* policy assessment and evaluation in terms of mitigation outcomes, and an assessment of drivers and current trends in anthropogenic GHG emissions and (where appropriate) removals. Mitigation measures, potentials, and futures will be assessed in the context of sustainable development, justice, equity, health and wellbeing, and global warming levels. An important consideration is not only mitigation potential, but also feasibility of mitigation measures. The sectoral chapters will examine national and global futures, with strong linkages to Chapter 3. A common theme throughout will be the relationship of mitigation actions and measures to sustainable development and adaptation, including risks, co-benefits, synergies, tradeoffs, and spill-over effects, as appropriate. Mitigation finance will be addressed in a standalone chapter (Chapter 7), as well as each sectoral chapter, where a range of instruments (market and non-market) and actors (non-state and state, across different levels of government) will be examined. Knowledge gaps will be highlighted in each chapter, and all the chapters will draw on case studies where available and appropriate.

Chapter 8, *Services and demand*, will focus on human needs, aspirations, inclusive well-being, development, and the social aspects of climate change mitigation. The chapter will include a consideration of services and demands from both the land and the Ocean, including tourism. It will address issues around demand, equity, and access to services, such as nutrition, shelter, and mobility, across regions and social groups, including the informal sector. The chapter will concentrate on demand-side mitigation options, comparing their costs with other emission reductions options. It will assess the potential of different service provisioning demand-side options (e.g., active mobility, shared services) including at a system scale. The chapter will explore drivers of demand-side changes, including social drivers of behavioral change, such as lifestyles, culture, value systems, psychology, communications, education, Indigenous Knowledge systems, capacity building, social trust, sufficiency, and governance, as well as other drivers, such as access to digitalization, new technologies, new business models, and infrastructure. The chapter will consider empirical evidence of the speed of diffusion of social innovations, including business models,

behavioral, community based, and institutional innovations. The importance of policy and governance, and the roles of state and non-state actors for faster diffusion of demand-side solutions will be addressed. Chapter 8 will assess the feasibility and co-benefits of demand-side options, and cross-sectoral implications, tradeoffs, and synergies, including for adaptation, health, energy security, inclusive development, resources and ecosystems, and materials. This chapter will require coordination with Chapter 4 (*Development, mitigation, sustainability*), Chapters 9 - 13 (the sector and systems chapters), and Chapter 14 (*Integration and interactions across sectors and systems*).

Chapter 9, *Energy systems*, will assess all aspects of energy systems, including energy production, conversion, transmission, and distribution. Chapter 9 will report recent trends and drivers of GHG and non-GHG emissions from energy systems, with links to national and global futures (Chapter 3). The chapter will examine non-technology and technology options for mitigation, including but not limited to land-based and ocean-based renewables, nuclear, biomass energy, geothermal, carbon capture and storage, waste-to-energy, and energy efficiency. This will include their abatement potentials, costs, and environmental implications. The chapter will explore energy access for household and productive use, both in terms of final energy and useful energy, for off-grid and grid-based approaches, including issues related to potential, security, affordability, sustainability, and adequacy. The role of grid, distributed, and off-grid infrastructure in energy systems will be examined. The chapter will assess how to navigate the energy transition, including transitioning to modern energy sources and transitioning from unabated fossil fuels to electrification and clean energy carriers, across sectors, with a consideration of load balancing and storage, demand-side management, and smart energy systems. A key consideration in the chapter will be the role of energy governance, political economy, and lock in effects (including energy markets and supply chains). Chapter 9 will explore material and resource needs, such as from land-based and deep-sea mining, and constraints, including those of critical minerals. An assessment of renewable and synthetic energy carriers, such as hydrogen, ammonia, methanol, biogas, and other sustainable fuels (e.g., sustainable aviation fuels) will be included, noting developments since AR6. The chapter will assess fugitive emissions and methane mitigation options across the energy system. The chapter will assess the role of and need for capacity building and capacities with respect to technology transfer and assimilation. Important consideration for all mitigation options and strategies discussed in the chapter will be the implications for equity, justice, just transitions, health, and distributional impacts. The chapter will require strong links and integration with Chapter 7 (*Finance*), Chapter 8 (*Services and demand),* Chapter 10 (*Industry*), Chapter 11 (*Transport and mobility services and systems*), and Chapter 12 (*Buildings and human settlements*) on electrification and other issues.

Chapter 10, *Industry*, will focus on industrial sector mitigation strategies and options, with an emphasis on impacts on society, well-being, and inclusive development. The chapter will examine the current and future demand for industrial products to meet end-use services and human needs. The chapter will report recent trends in, current levels of, and drivers of GHG emissions from industry. The chapter will discuss material end-use demand, material efficiency, consumption patterns, circularity, and waste; CCU and CCS; and critical minerals and deep-sea mining. Chapter 10 will assess sector mitigation options, their costs and co-benefits at different scales of production and subsectors of industry, including energy efficiency, clean fuel switching, alternative feedstocks; process changes, such as electrification and use of hydrogen; and carbon management. The chapter will discuss the role of access to technology, infrastructure, capacity, governance, institutions, laws, and other enablers and barriers in delivering mitigation. It will assess mitigation options and strategies in industry and their impacts on and interactions with local communities and Indigenous Peoples. The chapter will include an examination of policies to drive mitigation and co-benefits in the context of sustainable development, equity, and justice. It will include an examination of the international aspects and trade considerations of mitigation. The chapter will require strong links and integration with other sectoral and systems chapters, including Chapter 8 (*Services and demand*), Chapter 9 (*Energy systems*), and Chapter 11 (*Transport and mobility services and systems*).

Chapter 11, *Transport and mobility services and systems*, will assess transport and mobility services across all passenger (motorized and non-motorized) and freight modes, including road, rail,

micromobility, aviation, shipping, maritime, and other water-based transport, with particular attention to socioeconomic and geographic context and circumstances. The chapter will emphasize mobility access, affordability, and equity aspects. Chapter 11 will include an analysis of the role of spatial (land use) planning, infrastructure, and supply chains for mobility and energy carriers, including critical minerals, in transport and mobility. A focus will be on mitigation options and strategies for passenger and freight transport that lead to zero emissions transport, including all Avoid, Shift, Improve options and the role of social and technological innovation, highlighting developments, including emerging technologies, since AR6. The costs and mitigation potentials of mobility and transport options will be assessed. The interactions of transport and mobility with adaptation, disaster risk and resilience will be discussed, and synergies and tradeoffs with sustainable development, including environment and health, will be evaluated. The chapter will assess transport and mobility-specific policies and policy packages, laws, multi-level governance, financing, and enabling conditions. The chapter will require strong links and integration with other sectoral and systems chapters, including Chapter 8 (*Services and demand*), Chapter 9 (*Energy systems*), Chapter 10 (*Industry*), and Chapter 12 (*Buildings and human settlements*).

Chapter 12, *Buildings and human settlements*, will focus on buildings and human settlements in both urban and rural areas and the services they provide to people, such as comfort, health, nutrition, illumination, and communication. The chapter will discuss new developments concerning mitigation since AR6. Chapter 12 will report recent trends and drivers of GHG emissions from buildings and human settlements. The chapter will examine sectoral mitigation targets, with a link to national and global futures (Chapter 3). It will explore mitigation options and strategies for buildings and human settlements, including but not limited to spatial planning and land use, design and construction, technologies, and behavior. It will include an assessment of options to reduce embodied emissions of materials, including the use of biomaterials and material efficiency. The interactions of buildings and human settlements with adaptation, disaster risk, and resilience will be discussed, including synergies and tradeoffs with sustainable development, the environment, and health. The chapter will assess the distributional impacts of mitigation options and strategies for buildings and human settlements across different urban, rural, and regional contexts and informal settlements, social vulnerabilities, and land use types. A broad set of barriers and opportunities for mitigation will be examined, such as technological, physical, financial, institutional, cultural, legal, etc. Chapter 12 will report on the costs and mitigation potential of both direct and embodied emissions of materials. The chapter will assess sector-specific policies and policy packages, laws, multi-level governance, financing, and enabling conditions. The chapter will include systemic interactions, such as those related to infrastructure, cross-sectoral benefits, and the circular economy, with insights from life cycle assessment and material flow analysis. The chapter will require strong links and integration with other sectoral and systems chapters, including Chapter 8 (*Services and demand)*, Chapter 9 (*Energy systems*), and Chapter 11 (*Transport and mobility services and systems*), as well as the Special Report on Climate Change and Cities.

Chapter 13, *Agriculture, Forestry and Other Land Use (AFOLU)*, will assess mitigation measures (both GHG emissions and removals) and potentials in the context of sustainable development and global warming levels, considering equity and justice, gender, costs, cost of inaction, risks, feasibility, regions, tradeoffs, and synergies. It will report recent trends and drivers of GHG emissions from AFOLU, using, for example, consolidated national/regional data on emission factors, forest parameters, and livestock production systems from under-represented regions, including recent data on fragile ecosystems. It will compare and reconcile land use emissions from models with national inventories, including the effects of increasing background GHG fluxes on total and net GHG fluxes from land. With strong links to Chapter 3 on global and national futures, the chapter will assess the scale of land mitigation measures in future mitigation pathways, including alternative demand scenarios, and in particular, their impacts on gross and net land-use change across different ecosystems, as well as their social and environmental context. The chapter will cover the effects of climate impacts on socio-ecological systems, their responses, and consequences for mitigation potentials and scenarios. Chapter 13 will consider the role of Indigenous Peoples and local communities in co-designing and implementing mitigation measures. The chapter will evaluate and integrate economic (market and non-market), social, technological, and policy responses and their efficacy for delivering mitigation and multiple outcomes and services, including agricultural

production across different scales and typologies and biodiversity, water, food security, social well-being, human health, and adaptation in a landscape context. It will consider how the AFOLU sector is treated in the NDCs under the Paris Agreement and interactions with other relevant UN conventions and other relevant international instruments. Chapter 13 will examine tradeoffs and synergies of measures with sustainable development (including and going beyond Sustainable Development Goals) at regional and subregional levels, including the food and water nexus and resource efficiency issues for low, intermediate, and high input agricultural and forest systems. The chapter will have strong links with Chapter 14 (*Integration and interactions across sectors and systems*).

Chapter 14, *Integration and interactions across sectors and systems*, will go beyond cross sectoral perspectives and will assess the mitigation effects of system integration, including energy, transport, buildings, and industry, with an emphasis on electrification. It will cover the role of infrastructure used by multiple sectors to enable net-zero emission economies. Incorporating key findings from the Special Report on Climate Change and Cities, it will examine the role of urban systems in mitigation. The chapter will explore the role of materials, circularity, and waste in mitigation. It will examine options for energy system integration, such as power-to-heat, power-to-transport, power-to-water, power-to-fuels, and energy storage to enable mitigation strategies and outcomes. The chapter will address issues and interactions within the water-energy-food-ecosystem-climate change nexus, taking into account competition for finite resources in land, coastal, and ocean ecosystems, with particular attention to food systems and the bioeconomy. The costs and mitigation potential of options individually, as well as integrative mitigation strategies and options, will be evaluated. The chapter will explore policies, policy packages, and enabling conditions for system integration and cross-sector synergies, including sequencing considerations around policies and enablers. The role of digitalization and communication technologies in system integration will be highlighted.

Chapter 15, *Potentials, limits, and risks of Carbon Dioxide Removal (CDR)*, will discuss both the opportunities and risks for different removal approaches. It will assess the technical and economic potential, sustainability limits, equity and justice implications, risks, costs, and uncertainties of different removal approaches, including novel approaches, CDR approaches primarily assessed in other chapters, and marine carbon dioxide removal. It will (in coordination with Chapter 3) explore the minimum levels of residual emissions achievable in different national and global climate development futures. The chapter will assess the effectiveness of CDR approaches before, during, and after a period of temperature overshoot and examine the role of CDR in net-zero and net-negative GHG emissions. The chapter will explore co-benefits, synergies, tradeoffs, and adverse effects of different CDR approaches on land, the Ocean, biodiversity and ecosystems, energy, materials, and food. Feasibility will be assessed across geophysical, environmental-ecological, technological, economic, institutional, and sociocultural dimensions, reflecting different regional and sub-regional contexts and scales. The chapter will assess risks related to permanence, durability, and reversibility of CDR approaches at different scales, including the current status and limits of Monitoring, Reporting and Verification (MRV) approaches. The chapter will consider the role of policies, governance, and market and non-market financing for the research,development, and implementation of CDR approaches. It will highlight interactions with sustainable development, adaptation, and with other mitigation options. It will examine the role of technology transfer and capacity building for the development of novel CDR approaches. This chapter will require close coordination with other chapters, including Chapter 3 and Chapter 4, and especially with Chapter 13, where terrestrial CDR methods will primarily be assessed.

Annex I: Report on selection process

Overview

Participants to the AR7 Scoping Meeting were selected following a process consistent with the IPCC policies and procedures. The selection process was undertaken by IPCC Bureau Members.

The objective of the selection process was to select 60 experts for WGIII, considering all criteria as stated in Appendix A of the Principles Governing IPCC Work:

"*In selecting scoping meeting participants, consideration should be given to the following criteria: scientific, technical and socio-economic expertise, including the range of views; geographical representation; a mixture of experts with and without previous experience in IPCC; gender balance; experts with a background from relevant stakeholder and user groups, including governments.*"

Nominations for 2,210 experts were received. Of these,1,007 nominated experts indicated having expertise relevant for WGIII. Citizens of developing countries or economies in transition represented 59% of these nominees, while 41% of nominees were from developed countries. Women represented 35% of nominees, men represented 65%, and people identifying as another gender or declining to report gender represented <0.2%. Observer organisations nominated 10% of the experts, whilst government focal points nominated the remaining 90%. See Figures 3 - 7 below for a graphical representation of some of these statistics.

Summary of selection process

The total list of nominations was divided into three lists – one for each Working Group (WG) – according to the indicated areas of expertise of the participants. Each WG took the lead for their respective list, and then consolidated the lists to fill gaps and address overlaps.

The expert selection process occurred in three stages.

Stage 1 - Initial Nominations Review and Priority Rankings
In Stage 1, all WGIII Bureau members identified 10 priority selections and 10 secondary selections, focusing on respective expertise domains and considering all criteria stated in Appendix A of the Principles Governing IPCC Work. For each set of selections, WGIII Bureau members were asked to identify 5 experts from within and 5 from outside their WMO Region, with 5 from developed countries and 5 from developing countries/economies in transition. This stage was intended to facilitate the process of selecting amongst hundreds of experts and identify areas of initial agreement.

Stage 2 - Pre-Selection
In Stage 2, the WGIII Bureau started from the list of experts who received more than 1 priority ranking in Stage 1 and iteratively added experts to fill gaps in expertise, ensuring appropriate balance across the criteria in the IPCC Principles and considering intra-regional balance. While additions initially focused on those experts who were identified in Stage 1, the full list of experts was available as needed. The WGIII Bureau made several rounds of selections by consensus in order to select the 60 experts. The list was periodically revisited to address imbalances within and across regions, as well as expertise overlaps and gaps.

Stage 3 - Final Lists
In Stage 3, the WGIII Co-Chairs shared the draft list of WGIII experts with the other WG Co-Chairs and the Chair to identify overlaps between the WG and SYR lists of experts. Where overlaps occurred, decisions were made as to how to adjust and fill any gaps. After coordination with the Chair and Co-Chairs, the list was finalized and provided to the Secretariat on 16 September 2024, after which point the Secretariat sent out invitations on 17 September 2024. After receiving two

regrets, the WGIII Bureau selected replacements and conveyed the final list to the Secretariat on 15 October 2024.

Invited participant list

60 experts were invited on behalf of the WGIII Bureau to attend the AR7 Scoping Meeting. In addition, 8 of the 22 participants invited to the SYR session of the AR7 Scoping Meeting participated in WGIII activities during the week. Two invited participants were unable to attend due to late-breaking circumstances.

Of all experts invited to participate in the WGIII scoping process, 41% of invitees were female, and 59% were male (Figure 3). 82% of invitees had previous IPCC experience, including some IPCC experience, while 18% were new to the IPCC (Figure 4). 51% were from developing countries and countries with economies in transition, and 49% were from developed countries (Figure 5). Representation across WMO regions is illustrated in Figure 6. 45 nationalities (by citizenship) were represented by experts invited to participate in the WGIII Scoping process (Table 1). The full list of WGIII invitees is provided in Annex II. Figure 7 illustrates the expertise distribution of experts invited to participate in the WGIII scoping process.

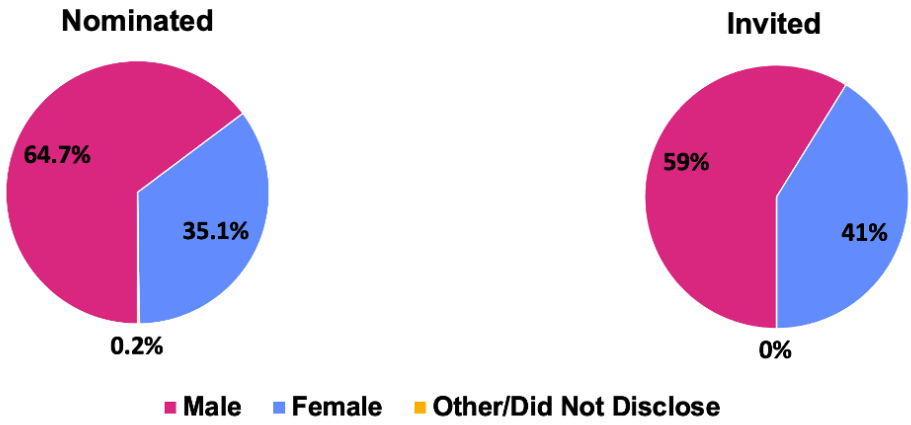

Figure 3 – Gender of Nominated and Invited WGIII Scoping Experts

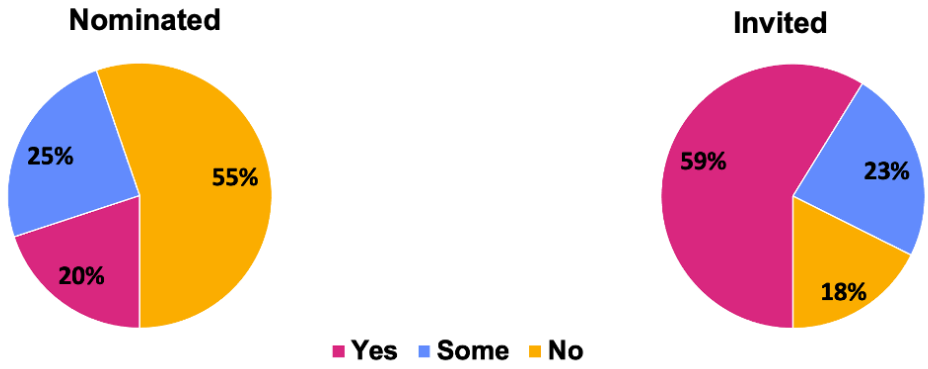

Figure 4 – Prior IPCC Experience of Nominated and Invited WGIII Scoping Experts

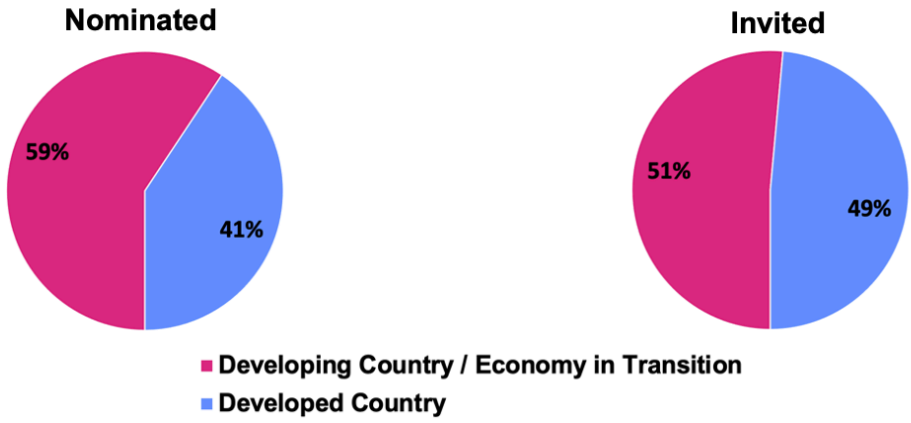

Figure 5 – Development Status of Nominated and Invited WGIII Scoping Experts' Country of Citizenship

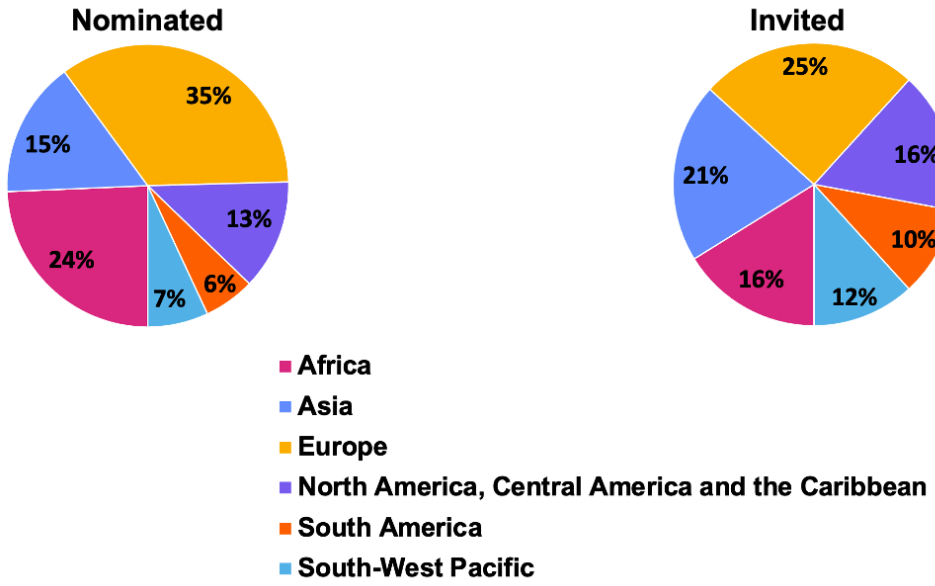

Figure 6 – WMO Region of Nominated and Invited WGIII Scoping Experts' Country of Citizenship

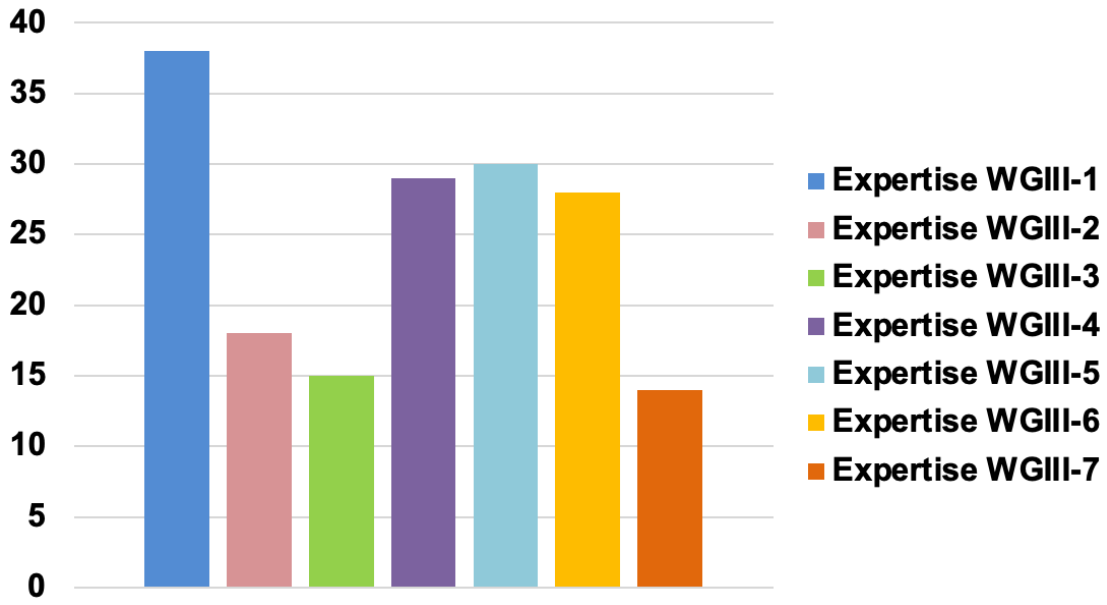

Figure 7 – Expertise Represented by Invited WGIII Scoping Participants. See Section 2 above for expertise definitions.

Table 1 – Citizenship of Nominated and Invited WGIII Scoping Participants

Country	Nominated Citizenship Count	Invited Citizenship Count
Algeria	9	1
Antigua and Barbuda	3	0
Argentina	13	1
Australia	30	4
Austria	8	0
Bangladesh	7	1
Belarus	1	1
Belgium	8	1
Benin	8	0
Bhutan	2	0
Bolivia	4	0
Botswana	6	0
Brazil	12	2
Brunei Darussalam	1	0
Bulgaria	4	0
Burkina Faso	2	0
Cambodia	2	0
Cameroon	6	0

Table 1 – Citizenship of Nominated and Invited WGIII Scoping Participants		
Country	**Nominated Citizenship Count**	**Invited Citizenship Count**
Canada	14	3
Central African Republic	1	0
Chad	1	0
Chile	14	1
China	45	2
Colombia	9	0
Comoros	1	0
Congo	4	1
Cote d'Ivoire	1	0
Croatia	2	1
Cuba	1	0
Czech Republic	2	0
Democratic Republic of the Congo	3	0
Denmark	6	0
Dominican Republic	2	0
Egypt	12	1
Estonia	3	0
Eswatini	2	0
Ethiopia	3	1
Finland	5	0
France	14	1
Gabon	3	0
Gambia	1	0
Germany	49	2
Ghana	9	0
Greece	4	1
Guatemala	5	0
Hungary	2	0
India	41	3
Indonesia	8	1
Iran	4	0

Table 1 – Citizenship of Nominated and Invited WGIII Scoping Participants		
Country	**Nominated Citizenship Count**	**Invited Citizenship Count**
Iraq	2	0
Ireland	10	0
Italy	21	1
Jamaica	3	0
Japan	14	4
Jordan	1	0
Kenya	25	1
Kyrgyzstan	3	0
Latvia	1	0
Lebanon	1	0
Lesotho	3	0
Liberia	2	0
Lithuania	4	1
Madagascar	6	0
Malawi	5	0
Malaysia	17	1
Maldives	2	0
Mali	2	1
Mauritania	2	0
Mauritius	11	0
Mexico	22	1
Mongolia	2	0
Montenegro	1	0
Morocco	3	0
Mozambique	4	0
Myanmar	1	0
Namibia	2	0
Nepal	8	1
Netherlands	20	2
New Zealand	1	0
Niger	2	0

Table 1 – Citizenship of Nominated and Invited WGIII Scoping Participants		
Country	**Nominated Citizenship Count**	**Invited Citizenship Count**
Nigeria	18	1
Norway	10	2
Pakistan	3	0
Panama	1	0
Papua New Guinea	1	0
Peru	2	2
Philippines	5	1
Poland	4	0
Portugal	4	1
Republic of Korea	13	1
Romania	1	0
Russian Federation	3	0
Rwanda	1	0
Saint Lucia	1	0
Saudi Arabia	4	1
Senegal	23	0
Singapore	7	1
Somalia	4	0
South Africa	9	1
Spain	22	0
Sri Lanka	5	0
Sudan	3	1
Suriname	1	0
Sweden	7	0
Switzerland	6	0
Syrian Arab Republic	1	1
Tajikistan	2	0
Togo	4	0
Tunisia	2	0
Türkiye	53	1
Turkmenistan	1	0

Table 1 – Citizenship of Nominated and Invited WGIII Scoping Participants		
Country	**Nominated Citizenship Count**	**Invited Citizenship Count**
Uganda	3	1
Ukraine	9	0
United Kingdom (of Great Britain and Northern Ireland)	58	2
United Republic of Tanzania	17	0
United States of America	75	7
Venezuela	4	1
Zambia	9	0
Zimbabwe	13	1

Annex II: Invited scoping meeting experts

Last Name	First Name	Country of Citizenship	Country of Residence	Affiliation
AGEVI	Humphrey	Kenya	Kenya	Africa Research and Impact Network
ALDUBYAN	Mohammad	Saudi Arabia	Saudi Arabia	King Abdullah Petroleum Studies and Research Center
ALFARO VALENZUELA	Marta Andrea Del Carmen	Chile	New Zealand	AgResearch Ltd
ALP	Emre	Türkiye	Türkiye	Environmental Engineering Department, Middle East Technical University (METU)
BABIKER	Mustafa	Sudan	Saudi Arabia	Saudi Aramco
BATAILLE	Christopher	Canada	Canada	Simon Fraser University / Columbia University Center on Global Energy Policy
BOSETTI	Valentina	Italy	Italy	Bocconi University and EuroMediterranean Center on Climate Change
BUCK	Holly	United States of America	United States of America	University at Buffalo
BUSTAMANTE	Mercedes	Brazil	Brazil	University of Brasília
CASTRO-NUNEZ	Augusto Carlos	Peru	Colombia	International Center for Tropical Agriculture
CHEN	Luwei	Singapore	Singapore	Institute of Sustainability for Chemicals, Energy and Environment, A*STAR
CHERP	Aleh	Belarus	Sweden	Lund University
COHEN	Brett	South Africa	South Africa	University of Cape Town
DHAKAL	Shobhakar	Nepal	Thailand	Asian Institute of Technology
DIEMUODEKE	Endurance Ogheneruona	Nigeria	Nigeria	University of Port Harcourt
DUIĆ	Neven	Croatia	Croatia	University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture
FLACHSLAND	Christian	Germany	Germany	Hertie School Centre for Sustainability
GIDDEN	Matthew	United States of America	Austria	International Institute of Applied Systems Analysis
HEJAZI	Mohamad	Syrian Arab Republic	Saudi Arabia	KAPSARC
HERRERA	Francisco	Venezuela	Venezuela	Venezuelan Institute for Scientific Research
IFO	Suspense Averti	Congo	Congo	Universite Marien NGOUABI

Last Name	First Name	Country of Citizenship	Country of Residence	Affiliation
IIYAMA	Miyuki	Japan	Japan	Japan International Research Center for Agricultural Sciences
IVANOVA BONCHEVA	Antonina	Mexico	Mexico	Universidad Autónoma de Baja California Sur
JOTZO	Frank	Australia	Australia	Australian National University
JUPESTA	Joni	Indonesia	Indonesia	IPB University
KAHHAT	Ramzy	Peru	Peru	Pontificia Universidad Católica del Perú
KANITKAR	Tejal	India	India	National Institute of Advanced Studies, Bengaluru, India
KARIM	Md Saiful	Australia	Australia	Queensland University of Technology
LAMB	William	United Kingdom (of Great Britain and Northern Ireland)	Germany	Mercator Research Institute on Global Commons and Climate Change (MCC Berlin)
LECOCQ	Franck	France	France	CIRED - AgroParisTech
LEE	David	United Kingdom (of Great Britain and Northern Ireland)	United Kingdom	Manchester Metropolitan University
LI	Mojie	China	China	Chinese Academy of Fiscal Sciences
LWASA	Shuaib	Uganda	Netherlands	International Institute of Social Studies of Erasmus University
MAYFIELD	Erin	United States of America	United States of America	Dartmouth College
MORITA	Kanako	Japan	Japan	Keio University
MULUGETTA	Yacob	Ethiopia	United Kingdom	University College London (UCL)
NEMET	Gregory	United States of America	United States of America	University of Wisconsin
NGARIZE	Sekai	Zimbabwe	Zimbabwe	Alinea International
ODARNO	Lily	United States of America	United States of America	Clean Air Task Force
OH	Chaewoon	Republic of Korea	Republic of Korea	National Institute of Green Technology
PATHAK	Minal	India	India	Ahmedabad University
PATT	Anthony	United States of America	Switzerland	ETH Zürich
PEEL	Jacqueline	Australia	Australia	The University of Melbourne
PERKINS	Patricia E.	Canada	Canada	York University

Last Name	First Name	Country of Citizenship	Country of Residence	Affiliation
PETERS	Glen	Norway	Norway	CICERO Center for International Climate Research
PORTUGAL-PEREIRA	Joana	Portugal	Brazil	Federal University of Rio de Janeiro
RAHMAN	Syed	Bangladesh	Saudi Arabia	King Fahd University of Petroleum & Minerals
REISINGER	Andy	Germany	New Zealand	Independent consultant
ROE	Stephanie	Philippines	United States of America	World Wildlife Fund
ROGELJ	Joeri	Belgium	United Kingdom	Imperial College London
ROY	Joyashree	India	Thailand	Asian Institute of Technology, Thailand, Jadavpur University, India and IIT Guwahati, India
SAHEB	Yamina	Algeria	France	Office Français des Conjonctures Economiques (Sciences Po - Paris)
SCHAEFFER	Roberto	Brazil	Brazil	Universidade Federal do Rio de Janeiro
SOKONA	Youba	Mali	Mali	Academie des Sciences du Mali
SUGIYAMA	Masahiro	Japan	Japan	University of Tokyo, Institute for Future Initiatives
SUMAILA	Rashid	Canada	Canada	The University of British Columbia
TAN	Xianchun	China	China	Institute of Science and Development, Chinese Academy of Sciences
TANTAWI	Samir	Egypt	Egypt	Senior Climate Change Consultant
TESKE	Sven	Australia	Australia	University of Technology Sydney (UTS)
TOMOKO	Hasegawa	Japan	Japan	Ritsumeikan University
TRUTNEVYTE	Evelina	Lithuania	Switzerland	University of Geneva, Switzerland
TSANI	Stella	Greece	Greece	Global Young Academy / National and Kapodistrian University of Athens- Greece
VAN RUIJVEN	Bastiaan	Netherlands	Austria	International Institute for Applied Systems Analysis (IIASA)
VAN VUUREN	Detlef	Netherlands	Netherlands	PBL Netherlands Environmental Assessment Agency / UU
VIJAYANATHAN	Jeyanny	Malaysia	Malaysia	Forest Research Institute Malaysia/ Intergovernmental Technical Panel on Soils
VILARIÑO	Maria Virginia	Argentina	Argentina	Argentinean Business Council for Sustainable Development

Last Name	First Name	Country of Citizenship	Country of Residence	Affiliation
VOIGT	Christina	Norway	Norway	University of Oslo
ZHOU	Nan	United States of America	United States of America	Lawrence Berkeley National Laboratory

Annex III: Scoping meeting programme

Day 1: Monday, 9 December 2024
08:00 AR7 Scoping Meeting Registration
09:00 Opening Remarks
09:30 Seventh Assessment Report Vision from IPCC Chair
10:30 Break
11:00 Working Group Introductions and Cross-Cutting Themes; Meeting Logistics
12:45 Group Photo
13:00 Lunch
14:30 Working Group III: Opening Plenary, Introductions, Plan for Scoping Meeting, Q&A
15:00 Working Group III: Breakout Group (BOG) 1 – Identifying Themes
16:30 Break
17:00 WGIII BOG 1 (cont.)
18:00 Report Back from BOG 1
18:30 Welcome Reception
20:30 WGIII Bureau Meeting

DAY 2: Tuesday, 10 December 2024
09:00 xWG BOGs
10:30 Break
11:00 xWG BOGs (cont.)
12:00 Report Back from xWG BOGs
13:00 xWG Co-Chair Meeting
13:00 Lunch
14:30 WGIII BOG 2 Organizing Themes
16:30 Break
17:00 WGIII Plenary: Report Back from WGIII BOG 2, Open Discussion
18:30 Evening High Tea
20:00 WGIII Bureau Meeting

DAY 3: Wednesday, 11 December 2024
09:00 WGIII Plenary: Discuss chapter options
10:30 Break
11:00 WGIII Plenary (cont.)
12:00 xWG BOGs Session 2
13:00 Lunch
14:30 xWG BOGs (cont.)
15:30 xWG Plenary: Report Back from xWG BOGs
16:30 Break
17:00 WGIII BOG3: Indicative Bullets
18:30 Evening High Tea
20:00 WGIII Bureau Meeting

DAY 4: Thursday, 12 December 2024
09:00 WGIII Plenary: Presentation of current chapter bullets
10:00 WGIII BOG4: Refining Bullets
10:30 Break
11:00 WGIII BOGs 4 (cont.)
13:00 Lunch
14:30 WGIII Plenary
16:30 Break
17:00 WGIII BOGs 4 (cont.)
18:00 xWG Plenary
18:30 Evening High Tea
20:00 WGIII Bureau Meeting

DAY 5: Friday, 13 December 2024
09:00 WGIII Plenary: Finalization of outline
10:30 Break
11:00 WGIII Plenary: Finalization of outline (cont.)
13:00 Lunch
14:30 WGIII Plenary: Finalization of outline (cont.)
16:30 Break
17:00 WGIII Plenary: Finalization of outline (cont.)
18:30 Evening High Tea
19:00: xWG Plenary: Summary of WG Outlines

Annex IV: Proposed chapter outline

Summary for Policymakers
Technical Summary

Chapter 1: Introduction and framing

- Introduction to WGIII report chapters and sections (and what is not going to be covered in the WGIII report)
- Framing providing overarching concepts and key policy-relevant issues of the mitigation of climate change including equity within and between countries, just transition in its broader sense, differentiation in the context of development, regionalization, and considerations of Indigenous knowledges
- Sustainable development (not limited to SDGs), national and regional priorities, and their synergies and trade-offs as a framing concept
- Framing, key concepts, and definitions of scenarios and pathways, including qualitative and quantitative scenarios
- Highlighting past performance and achievements in implementation of climate change mitigation and evolution of innovation (including social innovation), technology, capacity building, mitigation finance, governance, and climate policy
- Role of the ocean, ecosystems, and biodiversity in mitigation
- Social and socio-economic impacts of climate mitigation policy and action
- Adaptation interlinkages to mitigation
- Cross-Working Group linkages, as appropriate

Chapter 2: Past and current emissions and their drivers

- Assessment of historical emissions and emissions trends on an annual and cumulative basis (global, by region, sector, GHG, non-GHG, etc., using different indicators and definitions, at different scales), including estimates of uncertainty, and consistency with national inventories, and relationship to remaining carbon budgets
- Emissions associated with existing and planned long-lived infrastructure
- Trends in drivers, including a broad set of drivers, at different scales
- Policy, actions, and governance at different scales (global, regional, national, and local), including ex-post analysis of impacts on emissions and drivers

Chapter 3: National and global futures in the context of sustainable development and climate change

- Assessment of methodologies, models, databases, development tools for scenarios and emissions pathways, methods for assessing emissions scenarios (including justice and equity assumptions and implications), and consistency of land-use emissions definitions with national inventories
- Implications of mitigation for development pathways, such as well-being, employment, poverty, and sustainability, including the Rio Conventions
- Assessment of how development pathways and sustainable development pathways consider and affect mitigation, including implications of Rio Conventions, meeting SDGs, and beyond
- Assessment of a broad range of futures for socioeconomic development, scenarios, and their underlying assumptions and outcomes, including assessments of feasibility (geophysical, environmental-ecological, technological, economic, socio-cultural, and institutional)
- Assessment of systems transitions under different futures
- Economics of global and national mitigation and development pathways, including mitigation costs and benefits, investment needs, employment effects, co-benefits, and spillover effects
- Climate change impacts on mitigation strategies; synergies and tradeoffs between mitigation and adaptation
- Assessment of current policies, NDCs, long-term targets, other national policies and scenarios, and consistency between national and global futures, in the context of the UNFCCC and the Paris Agreement

- Opportunities to accelerate national climate action from current policies in the context of equity and justice
- Relationship between global climate targets and mitigation action, including overshoot, relationship between gross emissions reductions, residual emissions, and negative emissions
- Relationship(s) between equity, justice, and mitigation across and within countries and generations
- Robustness of mitigation strategies and pathways under uncertainty

Chapter 4: Development, mitigation, sustainability

- Sustainable development including and beyond SDGs as an integrative perspective for climate change responses (synergies and tradeoffs)
- Distributional consequences, across groups and countries
- Losers and winners: political economy of, co-benefits, and livelihood impacts of transitions related to mitigation
- Climate change mitigation response capacities and enabling conditions, including technology, finance, and cooperation for sustainable development
- Equity and justice (with a focus on just transitions and unpacking that at sectoral, national, regional, and global levels)
- Social and socioeconomic dimensions of climate mitigation and sufficiency
- Climate change mitigation responses in the context of multi-objective policies across scales (economic development and prosperity, poverty eradication, improving living standards, etc.)
- Mitigation-adaptation interlinkages and other sustainable development objectives, including potential synergies and conflicts
- Uncertainties and knowledge needs
- Implications of climate change mitigation responses on biodiversity and ecosystems, conservation, and restoration
- Ocean-based mitigation in the context of sustainable development and blue economy including synergies with global food and nutritional security
- Pathways in the context of sustainable development, including links to Chapter 3

Chapter 5: Enablers and barriers

- Feasibility of mitigation in different contexts and under multiple barriers and enablers
- Development as enabler of mitigation
- Capacity for mitigation, including technological, institutional, economic, and human capacity
- Technology, including access, cost, infrastructure, innovation, and speed of and disparity in adoption
- Finance, investment, policies and governance
- Distribution of benefits, costs, and impacts of mitigation
- Inequality and inequity within and across countries
- Social enablers, barriers, and impacts of mitigation, including public perception and support, lifestyles and behavior, communication, information, engagement, education, health and well-being
- Labor as enabler and barrier to mitigation, including supply, organization, wellbeing, skills, just transition
- Environmental and natural resources enablers and barriers for mitigation at national, international, and subnational levels, including land, water, natural resources, minerals, and climate services
- Indigenous rights, governance, and knowledge systems
- Political economy of mitigation including public preferences, interest groups, and political institutions
- International relations and cooperation, trade, and supply chains
- Peace, security, and conflict

Chapter 6: Policies and governance at national, international, and subnational levels

- Alignment of policies and governance with development pathways, equity, justice, distribution and integration with adaptation and sustainable development

- Approaches to policy and institutional design, including development-led approaches, economy-wide approaches, sectoral transition policies and international cooperation, taking into account political economy dimensions
- Multiple objectives, tradeoffs and co-benefits with climate and non-climate objectives
- Approaches, indicators, and methods for ex-post policy and governance evaluation
- Ex-post policy and governance evaluation, including synthesis of sector analysis
- Policy innovation, learning, and diffusion
- Corporate climate action including financial institutions, standards, labelling, and effectiveness
- Other non-state actors' roles at different levels, including civil society, labor and informal economy, media, social, gender and youth movements; intersection with Indigenous Peoples and local communities
- Policy packages, including coordination and consistency, sequencing and approaches for ratcheting up ambition and action
- Subnational mitigation policies and action
- Legal frameworks and litigation for climate action
- International climate and non-climate cooperation and agreements, including trade, biodiversity, and marine governance
- Governance of net-negative emissions and solar radiation modification

Chapter 7: Finance

- Scaling finance to meet current and future finance needs
- Innovation for financing, including schemes, instruments (e.g., green bonds, green credits, green taxonomies), and case studies of successful innovations
- Types of finance and financing mechanisms: public, private, bilateral, multilateral, blended finance, market-based instruments (including carbon markets)
- Financial adequacy, access (equity and justice), inclusion, and effectiveness, considering finance at different scales (including national, regional, and global)
- Financial flows (including to developing countries), tracking by sources, sectors and levels of governance, channels, regions, countries, and instruments
- Finance for innovation and for national and sectoral transitions
- Cost of capital, debt, and debt instruments
- Enabling environments for finance
- Governance of finance, including regulation and coordination of finance actors
- Transition risks in the financial sector
- Ex-post analysis of mitigation finance
- Gender, Indigenous Peoples and local communities climate finance

Common elements across Chapters 8-13

- Key findings from the Sixth Assessment Report (AR6) and the Special Report on Climate Change and Cities
- Ex-post policy analysis and evaluation
- Drivers and current trends in emissions and removals, as appropriate
- Mitigation measures and potentials and futures in the context of sustainable development, justice, equity, and global warming levels
- Feasibility and social acceptance
- Links to national and global futures
- Links to sustainable development and adaptation, including risks, co-benefits, synergies, tradeoffs, and spill-over effects, as appropriate
- Links to Indigenous Peoples and local communities
- Sector implications and interactions between relevant UN Conventions and other relevant international instruments
- Finance (e.g., market and non-market instruments, state and non-state actors)
- Knowledge gaps
- Case studies, as appropriate

Chapter 8: Services and demand

- Human needs, aspirations, inclusive well-being, and development
- Demand, equity, and access to services (e.g., nutrition, shelter, mobility) across regions and social groups including the informal sector
- Demand-side mitigation potential of different service provisioning options (e.g., active mobility, shared services) including at system scale
- Mitigation costs of demand-side options for comparison with other emission reductions options
- Social drivers of behavioral change, such as lifestyles, culture, value systems, psychology, communications, education, Indigenous knowledge systems, capacity building, social trust, and governance
- Other drivers of change, e.g., access to digitalization, new technologies, new business models, and infrastructure
- Empirical evidence of the speed for diffusion of social innovations, including business model, behavioral, community based, and institutional innovations
- Policy, governance, and the roles of state and non-state actors for faster diffusion of demand-side solutions
- Synergies and co-benefits, including cross-sectoral implications for adaptation, health, energy security, inclusive development, and materials
- Feasibility dimensions of demand-side solutions, including synergies and tradeoffs with sectors and with sustainable development dimensions
- Services and demands related to oceans

Chapter 9: Energy systems

- Trends, historical, current and future
- Options and technologies for mitigation
- Abatement potentials, costs, and implications
- Energy access for household and productive use, including distributed approach potential, security, affordability, sustainability, and adequacy
- Energy system infrastructure, including distributed and off-grid energy systems
- Navigating transitions from unabated fossil fuels to electrification and clean energy carriers across sectors, load balancing and storage, demand-side management, and smart energy systems
- Energy governance, political economy, and lock in effects (including energy markets and supply chains)
- Material and resource needs and constraints
- Capacity building and capacities (technology transfer and assimilation)
- Renewable and synthetic energy carriers
- Equity, justice, just transitions, and distributional impacts
- Fugitive emissions and methane mitigation

Chapter 10: Industry

- Industry, society, well-being and inclusive development
- Current and future demand for industrial products to meet end-use services
- Current level of emissions by industries
- Material end-use demand, material efficiency, consumption patterns, circularity, waste; CCU and CCS; critical minerals, deep sea mining
- Sector mitigation options (e.g., energy efficiency, clean fuel switching, feedstocks; process changes, such as electrification and hydrogen; carbon management), costs, and co-benefits
- Access to technology, infrastructure, and capacity
- Governance, institutions, laws, and barriers
- Impacts on and interactions with local communities and Indigenous Peoples
- Policies to drive mitigation and co-benefits in a context of sustainable development, equity, and justice
- International aspects and trade

Chapter 11: Transport and mobility services and systems

- Socioeconomic, geographic-related context circumstances

- Mobility access, affordability, and equity
- Spatial planning, infrastructure, and supply chains for mobility and energy carriers (passenger and freight; road, rail, micromobility, aviation, maritime, and other water-based)
- Mitigation options and strategies for passenger and freight transport (including Avoid, Shift, Improve options and social and technological innovation) towards zero emissions transport
- Costs and mitigation potentials of different options
- Interaction with adaptation, disaster risk and resilience, synergies and tradeoffs with sustainable development, including environment and health
- Sector-specific policies and policy packages, laws, multi-level governance, financing, and enabling conditions

Chapter 12: Buildings and human settlements

- Framing the scope and new developments
- Emission trends and drivers
- Services (including comfort, nutrition, illumination, communication)
- Scenarios and links with targets (including sectoral targets)
- Mitigation options and strategies for buildings and human settlements (e.g., spatial planning and land use, design and construction, technologies, behavior)
- Embodied emissions reduction, including biomaterials and material efficiency
- Interaction with adaptation, disaster risk and resilience, synergies and tradeoffs with sustainable development
- Distribution impacts under different urban, rural, and regional specificities/informal settlements, social vulnerability, and land use
- Barriers and opportunities (technological, physical, financial, institutional, cultural, legal, etc.)
- Costs and mitigation potential both in direct and embodied emissions
- Sector-specific policies and policy packages, governance, financing, and enabling conditions
- Infrastructure, systemic interactions, cross-sectoral benefits, circular economy, insights from life cycle assessment and material flow analysis

Chapter 13: AFOLU

- Mitigation measures (emissions and removals) and potentials in the context of sustainable development and global warming levels (including equity and justice, costs, cost of inaction, risks, feasibility, regions, tradeoffs, and synergies)
- Use of consolidated national/regional data on emission factors, forest parameters, and livestock production systems from under-represented regions, including recent data on fragile ecosystems
- Future mitigation pathways, including alternative demand scenarios, that assess the scale of land mitigation measures, impacts on gross and net land-use change across different ecosystems, and social and environmental
- Effects of climate impacts on socio-ecological systems, responses, and consequences for mitigation potentials and scenarios
- Consideration of the role of Indigenous Peoples and local communities in codesigning and implementing mitigation measures
- Evaluation and integration of economic (market and non-market), social, technological, and policy responses and their efficacy for delivering mitigation and multiple outcomes (including scales and typologies of production systems, biodiversity, water, food security, social well-being, and human health, and adaptation in a landscape context)
- Consideration of how the AFOLU sector is treated in the NDCs under the Paris Agreement and interactions with other relevant UN Conventions and other relevant international instruments
- Comparing and reconciling land use emissions with national inventories (including the effects of increasing background fluxes on total and net GHG flux from AFOLU)
- Tradeoffs and synergies of measures with sustainable development (beyond SDGs) at regional and subregional levels (including food and water nexus and efficiency and validation for low, intermediate, and high inputs in agricultural and forest systems)
- Systems integration related to AFOLU, including linkages to Chapter 14

Chapter 14: Integration and interactions across sectors and systems

- System integration, including energy, transport, buildings, and industry (in particular electrification)
- Infrastructure used by multiple sectors for enabling net-zero economies
- The role of urban systems in mitigation
- Materials, circularity, and waste
- Energy system integration (power-to-heat, power-to-transport, power-to-water, power-to-fuels, energy storage)
- Water-energy-food-ecosystem-climate change nexus, food systems, bioeconomy
- Costs and potentials, including the effects of integration
- Policies and enabling conditions for system integration and cross-sector synergies, including sequencing considerations
- Digitalization and communication for enabling system integration and interaction

Chapter 15: Potentials, limits, and risks of Carbon Dioxide Removal (CDR)

- Minimum levels of residual emissions achievable in different climate sustainable development futures
- Effectiveness of CDR approaches before, during, and after a period of temperature overshoot
- The role of CDR strategies in net-zero and net-negative futures
- Technical and economic potential, sustainability limits, equity implications and costs of different CDR approaches, including approaches in other chapters and marine carbon dioxide removal
- Non-CO_2 GHG removal approaches
- Co-benefits, synergies, tradeoffs and, adverse effects of different CDR approaches on land, biodiversity and ecosystems, energy, materials, food, and oceans
- Feasibility assessment of CDR approaches (including geophysical, environmental-ecological, technological, economic, institutional and sociocultural) reflecting different regional and sub-regional contexts and scales
- Risks related to permanence, durability and reversibility of CDR approaches at different scales
- Assessment of current status and limits of MRV approaches
- Policies and governance, market, non-market and financing for research and development and implementation of CDR approaches
- Interactions with sustainable development, adaptation, and other mitigation options
- Technology transfer and capacity building for novel CDR approaches

Annex: Glossary

Annex V: Themes cutting across Working Groups

Several themes cut across different WGs. These topics were discussed during the scoping meeting to ensure consistency and coherence in the WG outlines. For several topics, further coordination and discussion will be needed by authors and Bureau Members throughout the writing process.

These themes were initially identified by the WG Bureaux, prior to the AR7 Scoping Meeting, based on several inputs and sources (see the *AR7 Vision Document)*:

- The survey sent to government focal points before P-60 in view of collecting ideas for Special Report topics;
- Discussions with the panel during P-60 and P-61 (including submitted proposals for special reports);
- Pre-scoping activities, including surveys, webinars and discussions with scientist organizations, AR6 authors, experts nominated to the scoping meeting, and international organizations;
- Internal IPCC Bureau discussions and brainstorming; and
- AR6 knowledge gaps.

During the AR7 Scoping Meeting, two sessions (Day 2 morning and Day 3 mid-day) were dedicated to cross-Working Group Breakout Groups (xWG BOGs). The nine Day 2 xWG BOG themes that were identified in advance of the scoping meeting included:

- equity and justice;
- finance;
- health and well-being;
- (information for) losses and damages;
- overshoot;
- risk assessment approaches and regionalisation;
- scenarios;
- sectors and systems; and
- solar radiation modification

Additional xWG topics were identified during the scoping meeting resulting in three additional BOGs, focusing on the following themes: biodiversity; tipping points and large-scale singular events; and societal development, including climate resilient development.

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

The xWG BOGs were organised jointly by the three WGs. However, only those with outcomes relevant for the WGIII outline are described below, including a description of where these methods and themes are located in the proposed WGIII outline. Themes are listed in alphabetical order. There were three xWG BOGs – Societal Development and Climate Resilient Development, Tipping Points, and (Information for) losses and damages that did not directly impact the WGIII outline.

Biodiversity & Ecosystems

“Biodiversity and Ecosystems” was a topic identified as needing cross-Working Group coordination by participants at the scoping meeting. A cross-Working Group BOG was formed where participants discussed important biodiversity and ecosystems topics and elements. The BOG’s suggested outcome was to have common narratives in framing chapters and coordinated content across Working Groups.

In the final WGIII outline, the content is reflected in Chapters 1, 4, 6, 13, 14, and 15. Bullets within these chapters reflect content on: the role of the ocean, ecosystems, and biodiversity in mitigation; the implications of climate change mitigation responses on biodiversity and ecosystems,

conservation, and restoration; and international climate and non-climate cooperation and agreements, including on trade, biodiversity, and marine governance.

Equity and Justice

The *AR7 Vision Document* identified "Equity and Justice" as a topic requiring cross-Working Group discussion at the Scoping Meeting. The following rationale was written in the *Vision Document* and provided to scoping meeting participants in a scene-setting presentation given by co-facilitators of the BOG:

- AR6 and previous IPCC reports addressed equity and justice to varying degrees.
- AR6 WGII and WGIII highlight equity and justice as entry points to their SPM, but equity implications are only assessed in a few chapters and were largely missing in the outlines.
- A discussion on the best way to treat equity and justice dimensions in AR7 is needed to ensure these topics are appropriately reflected in the outlines.

The suggested outcome from the BOG was that equity and justice should be present in a framing chapter and in coordinated content across working groups in most chapters. In the final WGIII outline, the xWG BOG content is reflected in Chapters 1, 3 - 13, and 15. Bullets within these chapters reflect content on: just transitions, intergenerational equity, and the role of Indigenous knowledge, while also addressing equity and justice implications in emissions pathways and scenarios.

Finance

The *AR7 Vision Document* further identified "Finance" as a topic requiring cross-Working Group discussion at the Scoping Meeting. The following rationale was written in the *Vision Document* and provided to scoping meeting participants in a scene-setting presentation given by co-facilitators of the BOG:

- Finance is a critical enabler for accelerated climate adaptation and mitigation.
- AR6 WGII assessed finance in the context of risk management in adaptation options and WGIII in a dedicated chapter on investments and financing.
- Discussion can lead to coherent coverage of climate finance in AR7 and facilitate later integration in the SYR.

Participants in the xWG BOG recommended that both WGII and WGIII should have separate finance chapters. Given this discussion, the WGIII participants chose to have a separate chapter on Finance in the WGIII report, as is proposed in the WGII report. The proposed bullets from the cross-Working Group BOG served as a starting point for WGIII discussions, and many were ultimately adapted and included in the final proposed outline. Among the content adopted was the need to scale and innovate climate finance to meet current and future needs, focusing on diverse mechanisms such as public, private, multilateral, and market-based instruments.

Health and well-being

The *AR7 Vision Document* also identified "Health and Wellbeing" as a topic requiring cross-Working Group discussion at the Scoping Meeting. The following rationale was written in the *Vision Document* and provided to scoping meeting participants in a scene-setting presentation given by co-facilitators of the BOG:

- Climate change is impacting human health and well-being.
- Many mitigation options can have benefits for health and well-being.
- Assessment of health was scattered across the AR6 report.
- Early coordination could ensure a robust, accessible and comprehensive assessment.

In the final WGIII outline, content on health and well-being is reflected explicitly in Chapters 5, 8, 10, 11, and 13. Bullets within these chapters reflect content on health and well-being in the context of social dimensions of mitigation, emphasizing enablers, barriers, and impacts such as public perception, education, and behavior. Health was also discussed as a common element for Chapters 8-13 in the context of assessing mitigation measures, potentials, and futures.

Overshoot

The AR7 *Vision Document* also identified "Overshoot" as a topic requiring cross-Working Group discussion at the Scoping Meeting. The following rationale was written in the *Vision Document* and provided to scoping meeting participants in a scene-setting presentation given by co-facilitators of the BOG:

- All three WGs addressed overshoot in AR6 but, constrained by what was available in the literature, each took a different approach, including differences in the level and duration of overshoot. More literature has emerged since AR6.
- Given the highly interdisciplinary nature of this topic (Earth System response, impacts, irreversibility, technologies, finance), xWG coordination is needed.

During the BOG, there was no consensus from participants as to whether there should be xWG coordinated content or xWG aligned chapters. In the final WGIII outline, the content suggested by the xWG BOG is reflected in Chapters 3, 6, and 15. Bullets within these chapters reflect content on the relationship between global climate targets and mitigation action, as well as the effectiveness of CDR approaches before, during, and after a period of temperature overshoot.

Risk Assessment Approaches & Regionalization

The *AR7 Vision Document* further identified "Risk Assessment Approaches and Regionalization" as a topic requiring cross-Working Group discussion at the Scoping Meeting. The following rationale was written in the *Vision Document* and provided to scoping meeting participants in a scene-setting presentation given by co-facilitators of the BOG:

- AR6 Reports from both WGI and WGII achieved considerable progress in the alignment of granularities and causal chains of information for risk assessment.
- However, there is a large potential for further coordination across WGs.
- Presentation of risk information in a common structure across WGs, and/or in an online Atlas requires xWG coordination.

In the final WGIII outline, information on risk and regionalization is reflected in Chapter 1 and in common bullet points for Chapters 8 - 13. The relevant content in these chapters covers the role of risk assessment approaches and regionalization in framing climate change mitigation as well as spill-over effects.

Scenarios

The *AR7 Vision Document* also identified "Scenarios" as a topic requiring cross-Working Group discussion at the Scoping Meeting. The following rationale was written in the *Vision Document* and provided to scoping meeting participants in a scene-setting presentation given by co-facilitators of the BOG:

- In AR6, all three WGs assessed scenario-based information, though in different ways.
- Since AR6, many challenges and opportunities have been identified with respect to the IPCC scenario-assessment.
- A xWG discussion on the approach to scenarios in AR7, including how to ensure consistency and coherence, accounting for current and a wide range of plausible future trends, would enable a holistic assessment.

The xWG BOG recommended coordinated content across Working Groups, which is reflected in Chapters 1, 3, 12, and 13. Bullets within these chapters reflect content on framing and defining scenarios and pathways, as well as evaluating methodologies, models, and tools for developing scenarios that consider diverse futures. Moreover, scenarios is one of the common elements for all the sectoral/systems chapters (Chapters 8 - 13) (i.e. "links to national and global futures").

Sectors and systems

The *AR7 Vision Document* also identified "Sectors and Systems" as a topic requiring cross-Working Group discussion at the Scoping Meeting. The following rationale was written in the *Vision*

Document and provided to scoping meeting participants in a scene-setting presentation given by co-facilitators of the BOG:

- Sectors and systems have been used as an organizing principle in many IPCC reports, by Working Groups and TFI.
- In AR6, the SR1.5 used a systems transition approach, WGII had chapters on specific human-natural systems, WGIII on sectors, and the SYR used systems to integrate content.
- Early coordination across WGs on sectors and systems could facilitate later integration and a comprehensive and policy relevant assessment.

At the conclusion of the BOG, the suggested outcome was to coordinate discussion of content within specific sector chapters. The content is reflected in common bullets for Chapters 8 - 13 and specific bullets in Chapters 8 and 9. These bullets reflect links between sectors, systems, and sustainable development; the feasibility of policy solutions; and energy systems.

Solar Radiation Modification

The *AR7 Vision Document* also identified “Solar Radiation Modification” as a topic requiring cross-Working Group discussion at the Scoping Meeting. The following rationale was written in the *Vision Document* and provided to scoping meeting participants in a scene-setting presentation given by co-facilitators of the BOG:

- AR6 identified a range of challenges and knowledge gaps concerning SRM.
- Since AR6, scientific literature, public interest and investment in SRM have grown substantially.
- Assessing the global and regional consequences of a large-scale SRM deployment would need to consider biophysical, economic, political, institutional, ethical and equity dimensions, warranting a xWG discussion and approach.

The xWG BOG recommended specific topics to be addressed in specific WGs. For WGIII, the suggested content is reflected in Chapter 6. Specifically, this chapter contains a bullet that includes the governance of solar radiation modification.