

**FIFTY-SECOND SESSION OF THE IPCC**  
**Paris, France, 24 – 28 February 2020**

IPCC-LII/INF. 12  
(4.II.2020)  
Agenda Item: 5  
ENGLISH ONLY

**SIXTH ASSESSMENT REPORT SYNTHESIS REPORT OUTLINE**

**Report of the Scoping Meeting for the IPCC Sixth Assessment Report Synthesis Report**  
**(Singapore 21 – 23 October 2019)**

(Prepared by the Chair of the IPCC)

(Submitted by the Secretary of the IPCC)

## **SIXTH ASSESSMENT REPORT SYNTHESIS REPORT OUTLINE**

### **Report of the Scoping Meeting for the IPCC Sixth Assessment Report Synthesis Report (Singapore 21 – 23 October 2019)**

#### **TABLE OF CONTENTS**

- 1. Background 1**
- 2. Preface 2**
- 3. Preparation for the Scoping Meeting for AR6 SYR 2**
- 4. Scoping Meeting 3**
- 5. Annotated outline of sections 8**
- 6. Schedule and next steps 12**
- 7. Annexes 13**

#### **1. Background**

The Panel at its 41<sup>st</sup> Session held in Nairobi, Kenya from 24 to 27 February 2015 agreed that it would continue to prepare comprehensive assessment reports every five to seven years and that the scoping of the Synthesis Report – SYR - as well as attention to cross-cutting issues should start at an early stage (IPCC-XLI/4).

Consistent with decision IPCC/XLI-4, broad elements of the Sixth Assessment Report Synthesis Report – AR6 SYR - were developed during the AR6 Scoping Meeting held in Addis Ababa, Ethiopia from 1 to 5 May 2017. The Panel at its 46th Session held in Montreal, Canada, from 6 to 10 September 2017 took note of these.

A dedicated Scoping meeting for the AR6 Synthesis Report was held in Singapore from 21 to 23 October 2019, the outcome of which is included in the AR6 SYR Scoping document submitted to the 52<sup>nd</sup> session of the Panel.

The proposed outline for the AR6 SYR as presented in IPCC-LII/Doc. 10 is explained in more detail in the present information document which is intended to inform the deliberations during the 52<sup>nd</sup> Session of the Panel as well as serve as guidance to the SYR core writing team, and to the authors of the AR6 Working Group reports.

#### **2. Preface**

The Chair and the Secretary of the IPCC would like to express their gratitude to the Government of Singapore, in particular, his Excellency Masagos Zulkifli, Minister for the Environment and Water Resources, for the excellent hosting of the AR6 SYR Scoping meeting in Singapore from 21 to 23 October 2019. They also would like to express their gratitude to the members of the IPCC Bureau, the Scientific Steering Committee, the scoping experts, and the TSU staff of the Working Groups for contribution to producing the proposed SYR outline. The product of this Scoping Meeting (the Scoping Document – IPCC-LII/Doc. 10), together with this meeting report, will provide guidance to the future work of the AR6 SYR writing team.

### **3. Preparation for the Scoping Meeting for AR6 SYR**

The Chair of the IPCC established a Scientific Steering Committee (SSC) to undertake the preparations for the scoping of the SYR per the terms of reference for the SSC in March 2019 (Annex 12). The SSC consisted of:

Mr. Hoesung Lee (IPCC Chair)  
Ms. Thelma Krug (IPCC Vice-Chair)  
Mr. Youba Sokona (IPCC Vice-Chair)  
Ms. Ko Barrett (IPCC Vice-Chair)  
Mr. Panmao Zhai (Co-Chair of WG I)  
Ms. Valérie Masson-Delmotte (Co-Chair of WG I)  
Ms. Debra Roberts (Co-Chair of WG II)  
Mr. Hans-Otto Pörtner (Co-Chair of WG II)  
Mr. Priyadarshi Shukla (Co-Chair of WG III)  
Mr. Jim Skea (Co-Chair of WG III)  
Mr. Eduardo Calvo Buendia (Co-Chair of TFI)  
Mr. Kiyoto Tanabe (Co-Chair of TFI)  
Ms. Fatima Driouech (Vice-Chair of WG I)  
Mr. Jan Fuglestad (Vice-Chair of WG I)  
Mr. Roberto Sánchez Rodríguez (Vice-Chair of WG II)  
Mr. Mark Howden (Vice-Chair of WG II)  
Mr. Amjad Abdulla (Vice-Chair of WG III)  
Mr. Ramón Pichs-Madruga (Vice-Chair of WG III)

#### **3.1 Scoping nominations and participant selection**

Following the IPCC principles and procedures related to scoping meetings, the IPCC Secretariat sent the invitation to Government Focal Points, observer organizations, and Bureau members on 30 April 2019 to nominate experts for the AR6 Synthesis Report scoping meeting. By the deadline of 2 June 2019, the IPCC Secretariat received 549 nominations. Of these, 48% were from developing countries and countries with economies in transition, and 33% were female (Annex 7).

Following the IPCC principles and procedures on the participant selection, the Chair consulted with the WG Co-Chairs and finalized a list of eighty participants. The IPCC Secretariat sent the invitation letter on 12 August 2019. The Chair and the WG Co-Chairs had further consultations to find a few replacements, but twelve of the invitees could not be present. Seventy from the invited experts took part in the scoping meeting (Annex 8). Of these, 50% were from developing countries and countries with economies in transition, and 41% were female. Bureau members and staff of the Technical Support Units also participated in the scoping meeting.

#### **3.2 Pre-scoping questionnaires**

To inform the scoping the AR6 SYR, the IPCC Secretariat sent a questionnaire which the Chair designed with the inputs of the SSC to Governments and Observer Organizations on 10 June 2019 soliciting input on the following:

- Comments on the overall scope and proposed five broad elements underpinning the outline of the AR6 SYR which were noted by the IPCC 46<sup>th</sup> Session 2017 attached here as Annex 2.
- Policy-relevant issues for the AR6 SYR not covered by the five elements mentioned above.
- Overarching conceptual framework relevant to guide the AR6 SYR.
- Consideration of issues addressed by other global assessments such as IPBES, GEO/UNE.
- Expected use of AR6 SYR by government.

A separate, more detailed questionnaire was sent to the AR5 SYR core writing team members and AR6 authors, including the authors of the three special reports.

A total of eighteen responses were received from governments and observer organizations: fourteen from government focal points and four from observer organizations (Annex 9). A total of 129 authors responded to the questionnaire (Annex 10). The summary and analysis of the responses were part of the documents to the AR6 SYR Scoping meeting.

#### **4. Scoping Meeting**

The scoping meeting for the SYR was held in Singapore from 21 to 23 October 2019 (See Annex 11 for the agenda of the meeting.) The meeting documents included: the Chair's Vision Paper on the AR6 Synthesis Report; IPCC Procedures for the preparation, review, adoption, and approval of the Synthesis Report; Compilation of responses from governments and observer organizations; Analysis of government and observer organization responses with key issues identified; Summary analysis of responses from the AR5 and AR6 authors; Document submitted by the Secretary of the IPCC to the 46<sup>th</sup> Session of the IPCC for the discussions on the scoping of the AR6, Outlines for the three IPCC Working Group Contributions to the AR6; Summary from the workshop session "Use of Scenarios in IPCC's Sixth Assessment Cycle"; and a document submitted by the Chair of the IPCC to the 56<sup>th</sup> Session of the IPCC Bureau for the discussion on the Synthesis Report.

The 3-days program was designed to facilitate the exploration of issues, identification of themes, and development of structures to produce an outline for the synthesis report with section titles and indicative bullets. The meeting opened with scene-setting presentations, after which brainstorming BOGs started. The scoping process was bottom-up and iterative through consecutive rounds of breakout groups (BOG) with plenary sessions taking stock of progress and guiding BOGs to follow. The SSC facilitated the iterative process, analyzing the outcome of BOGs and planning for subsequent BOGs and plenary.

##### **4.1 Opening of the meeting and scene-setting presentations**

The Chair of the IPCC opened the meeting, after which the Secretary of the IPCC and Singapore Minister for the Environment and Water Resources delivered their opening statements.

The Chair then presented the vision paper (Annex 1). The Chair highlighted the emissions reduction deficit showing the differences between pathways to reach net-zero emissions and the reality and noted that climate action is the action for now and the near term and that the AR6 SYR should be able to address based on science this divergence between scientific understanding and realities of climate action. With an overview of the structure of synthesis reports over the past cycles, he noted that for AR6 SYR to be relevant to policy leaders and societies, it should: connect climate concerns to immediate economic-societal concerns and options; link climate action to opportunities for innovation and development; incentivize stakeholders to support climate action, and; approach climate risks from the perspective of the private and public sector decision frameworks where perception of climate risks is weighed against other extant and contingent development challenges and opportunities. He emphasized that the AR6 SYR should provide an integrative understanding of climate, economy, environment, and society. It should be policy relevant but policy neutral, synthesizing and integrating materials contained in the IPCC 6<sup>th</sup> cycle Assessment Reports and the three Special Reports.



The IPCC Deputy Secretary, Kerstin Stendahl, informed the participants of the procedures and process relevant to the AR6 SYR. She informed participants that a draft outline of the AR6 SYR and, other outcomes of the scoping meeting would be submitted to the IPCC 52<sup>nd</sup> Session for its decision on whether to produce a synthesis report and agree on its scope, outline, and the work plan. She stated if the IPCC 52<sup>nd</sup> Session approves the outline of the AR6 SYR, the IPCC Chair will form a synthesis writing team whose composition is agreed by the Bureau after nominations by the IPCC Chair in consultation with the WG Co-Chairs. The writing team will prepare a draft longer report (30-50 pages) and an SPM (5-10 pages) for simultaneous expert/government review. The revised draft of the longer report and its SPM will be submitted to governments eight weeks before the IPCC Session for its consideration of approval and acceptance.

Jan Fuglestad, WG I Vice-chair, presented key issues from governments' and authors' responses to the pre-scoping questionnaire for AR6 SYR (Annexes 9 and 10).

In responding to the survey, governments emphasized that SYR will be essential for the global stocktake (GST), and that new knowledge since AR5 should be emphasized (Annex 9). Regarding what was not covered by the five elements, issues such as international cooperation and governance, migration, loss and damage and impacts on financial stability were flagged, as well as the importance of considering low probability/high impact events. Treatment of SRM and CDR, as well as related governance issues were also pointed out. Regarding a conceptual framework, the responses pointed to the Paris Agreement, the gap between actions and ambitions, links to SDGs and other environmental goals, as well as solutions and timing of actions. The potential role of scenarios, the risk framework and the need to address cross WG issues, were also included in responses.

Authors' responses to the survey had a broad set of concrete suggestions for report structure (Annex 10). Several additional elements were suggested, such as feasibility assessments, climate justice, vulnerable areas, focus on finer spatial and temporal scales. Relevant emerging knowledge pointed out by authors were related to topics such as urbanization, SDGs and regional development pathways, inequality, justice, security, poverty, health, nature-based solutions, attribution of extreme events, and rapid changes in the cryosphere. The authors had suggestions for conceptual framework in addition to those from governments.

Florin Vladu, UNFCCC Secretariat, provided perspectives of UNFCCC for AR6 SYR (Annex 3). He elaborated on how the Paris Agreement strengthened the case for deploying low-carbon energy sources, given the need to limit warming well below 2°C, ideally at 1.5°C. The Paris Agreement mechanism of increasing ambition over time relies upon the interaction of four components: NDCs updated every 5 years, enhanced transparency framework, IPCC assessment, and Global Stocktake.

Five thematic areas of GST modalities that could benefit from input from the SYR were presented: mitigation with overall effects of NDCs; adaptation efforts and support; finance flows and financial support, technology and capacity building; consequences of response measures and issues associated with loss and damage; and fairness consideration. He emphasized the importance of providing scientific knowledge to support Parties to implement the Paris Agreement, developing the narrative and highlighting new findings, and identifying specific topics that should be synthesized, such as carbon dioxide removal, tracking progress on adaptation, and progress towards peaking and CO<sub>2</sub> neutrality. He underlined that collective progress will be considered from the perspective of what has been done (backward looking), based on information reported by Parties and from IPCC

and other sources as well as from what is intended to be done (forward looking) based on communicated information by Parties that could also be assessed by IPCC. Finally, he stressed the need for developing compelling narratives that are connected to the concerns of policy makers and help keep the UNFCCC process responsive to real work realities.

WG I Co-Chairs, Valerie Masson-Delmotte and Panmao Zhai, presented SR15 and WG I perspectives towards SYR, and ongoing coordination activities across WGs (Annex 4). They highlighted the integration achieved within SR15, for instance through improved formalization of the assessment method and the development of storylines for different warming levels, as well as challenges which were encountered (for instance, how/where to address adaptation and regional information in the SR15 SPM). They introduced the vision underpinning the new WGI outline. Based on perspectives of users and dialogues with WGI authors, the proposed structures for WGI TS and SPM were introduced, including considerations of new opportunities for narratives and storylines. Examples of topics for integration across WG towards SYR were given. Finally, WGI co-chairs introduced ongoing coordination activities across WG on scenarios, risk, regions, and the AR6 cross-WG glossary.

WGII Co-Chairs, Hans-O. Poertner and Debra Roberts, provided an overview of the WGII themes from the three Special Reports and the WGII contribution to the Sixth Assessment Report (Annex 5). These cover impacts and risks across sectors and regions, the resulting reasons for concern and action, and adaptation pathways effective in reducing risks. The feasibility of these adaptation pathways, their limits, interactions with mitigation, and the enabling conditions (in particular governance context and societal and technological transformations), are crucial to define climate resilient development pathways. The WGII AR6 thus focuses on risks and their development over time, on adaptation and sustainability for vulnerable systems and on sustainable development integrating adaptation and mitigation efforts, at a global and regional level. New in the WGII AR6 are the seven integrative cross-chapter papers, some of which could provide topical highlights for the SYR, updates from the Special Reports, and be complemented by WGI and WGIII aspects. Key focal topics from WGII to strengthen the SYR narrative when integrated with information from WGI and WGIII, include the role of urban areas and cities as hotspots of adaptation and mitigation efforts and tradeoffs, as well as the role of biodiversity and natural ecosystems and their services including carbon stocks as core elements in sustainable land and ocean management and as a link between adaptation and mitigation. The synthetic integration of information from across the three WG contributions supports addressing a range of policy-relevant issues, for example defining mitigation targets which allow adaptation to be successful, considering synergies and tradeoffs between adaptation and mitigation measures in both the near-term and long-term. Climate impacts, risks (including risks arising from adaptation and mitigation approaches) and solutions have regional specificities, considering climatic zones, biogeographies and societal/cultural characteristics. This highlights the need to integrate regional climate information (WGI), knowledge on impacts and risks (WGII) and on regional adaptation/ mitigation capacities and efforts (WGII and III). Integrating WGI and WGIII findings with WGII information will support the assessment of enabling conditions, feasibilities, governance context, and options for adaptation pathways and their effectiveness in a mitigation context, considering adaptation gaps, limits, residual risks and identifying solution options. It will also facilitate the assessment of the interaction of adaptation and mitigation with a view on climate resilient, sustainable development.

WG III Co-Chairs, PR Shukla, and Jim Skea reported on findings from SR Land and plans for the WG III report (Annex 6).

The SR Land found that land is a critical resource for food, water, health, and wellbeing, but climate change is adding to growing human pressure. Coordinated climate action can simultaneously improve land, food security, and nutrition, and help to end hunger; and better land management can play its part in tackling climate change. Land-related responses option had been classified into the type of response (focused land management, value chain management, risk management); the technical mitigation potential; and the impact on land competition. Many response options provide multiple benefits but the impact of those that increase land competition for land depends on the scale of deployment and how they are managed.

The elements of the WG III report were explained: the establishment of sustainable development as a key framing concept; emission trends, drivers and pathways in the past and on different future timescales; a chapter orienting mitigation to human needs; sectoral chapters; and cross-cutting chapters addressing policies and institutions, international cooperation, finance, and technology. Drivers. The report will conclude with a chapter on accelerating transition in the context of sustainable development. The many cross-cutting elements of the report include scenarios, costs and potentials, and the feasibility of transition at the system level.

WG III anticipate strong linkages with the other Working Groups focusing on scenarios/illustrative pathways, temperature metrics; climate sensitivity; CO<sub>2</sub> and non-CO<sub>2</sub> emissions, and land-related emissions and sinks; SRM; mitigation-adaptation synergies; finance issues under the Paris Agreement; cities; and ecosystem service/biodiversity implications of large-scale land-based mitigation. Work has already begun on the WG III SPM and a provisional draft was shared with participants.

## **4.2 Evolution of themes and structure**

The scoping meeting consisted of multiple rounds of break-out groups and plenary to identify issues, themes, content and structure. This bottom-up process was employed to take maximum advantage of input from scoping meeting participants in order to produce a draft outline with indicative bullets as a final output. The first round break-out group was to brainstorm topics, defining first sets of themes and content. In-depth deliberations followed in the subsequent break-out groups to distill key themes, identify the potential structure, and develop section titles and draft outlines. The outcome of each break-out group was reported back to plenary, and the SSC considered the work of all break-out groups and extracted key elements for input to the next rounds of break-out groups and plenary.

### **DAY 1: Brainstorming**

The objective of BOG I was to brainstorm topics, group into themes, identify linkages and begin to piece together a narrative. BOG I had nine subgroups, and each group was to report back to plenary using two slides covering emerging themes and linkages that begin to form a narrative. Each group had two Bureau members as facilitators and a rapporteur from among diverse membership.

The nine groups of BOG I reported to plenary a wide range of issues and themes, with the following themes featured prominently: the need for holistic framing; understanding of urgency; options space, consequences and risks, enablers and barriers; societal transformation issues; attention to diverse dimensions of risks; interaction and integration of adaptation and mitigation strategies;

relevance for global stocktake and clear communication; and regional consideration and incorporating indigenous knowledge.

The SSC evaluated the outcome of BOG I to find a framework most appropriate to the AR6 SYR. It proposed clustering important themes around three different time frames, i.e., present, near-term and long-term, as a potentially promising way to address policymakers' needs to make decisions in a scientifically robust manner.

## **DAY 2: Grouping themes into narratives and sections**

Following the SSC guidance, IPCC Vice-Chairs, Youba Sokona, and Thelma Krug invited scoping participants to subsequent rounds of break-out groups to list themes across timeframes and develop a narrative with important themes listed under each timeframe. BOG II was to cluster important themes in three-time frames, conceptualizing the narrative. BOG II was to report back to plenary on the results as well as themes independent of one timeframe. BOG II consisted of six subgroups with each subgroup facilitated by two Bureau members and one rapporteur.

The stocktaking session revealed a remarkable degree of convergence among BOG II subgroups in the construct of a narrative. Most of them began with the recognition of the current challenges, considered the long-term consequences, and then action required now and the near-term for solutions. Many highlighted that action today will lock-in further future outcomes and that the long-term future is a function of near-term action. The SSC convened to review the BOG II outcome and plan for the next break-out group.

Building on the outcome of BOG II, the plenary formed BOG III consisting of three subgroups to cover sections of the introduction (where we are now), the long-term, and the near-term. Each section was divided into two smaller groups to capture the diversity of perspectives. BOG III was to deliver a section title and 5-7 bullets per section with the anticipation of 10-pages limit per section of the SYR.

The stocktaking plenary brought together draft titles and outlines from BOG III and discussed among others near- and long-term connections, section order, and a range of title options. The SSC reviewed the BOG III outcome as well as plenary discussions and consolidated them into a summary with section title options and indicative bullets for consideration for BOG IV.

## **DAY 3: Outline section titles and bullets**

The plenary provided to participants the SSC-prepared summary structure (Annex 13), formed BOG IV consisting of three groups covering the sections of introduction and current status, long-term and near-term, and tasked BOG IV with refinement and completion. The BOG IV groups were facilitated by the IPCC Vice-Chairs and three SSC members.

The outcomes of the BOG IV were directly discussed in plenary (Annex 14). The overall structure of the SYR was to inform policymakers of the state of knowledge related to recent trends and long-term projection, the consequences of inaction, and then options for near-term action. The plenary agreed on the section titles, indicative bullets of content from BOG IV, and invited the SSC to capture the topics of the final plenary discussions to inform the Panel through the annotated outline as provided below.

## 5. Annotated outline of sections from the scoping meeting

The draft SYR report outline consists of an introduction and three main sections that are arranged by timeframes. The first section, 'Current status and trends', covers the historical and present period, including in a broader context where relevant (e.g. paleoclimate). The second section, 'Long term climate and development futures', addresses projected futures up to 2100 and beyond. The final section is 'Near term action in a changing climate', considering current international policy timeframes, and the time interval between present and 2030-2050, and taking into account the different definitions of time scales used by the WGs.<sup>1</sup>

This reporting structure, substantially different to what was adopted for AR5 SYR, was supported to have a more holistic framing that integrates across the Working Groups, building on the experience of the three Special Reports of AR6.

This framing better enables the report to cover different aspects of climate change, including timescales of climate variability and climate system feedbacks in response to past, present and future anthropogenic forcings.

Scoping meeting participants emphasized that the narrative is expected to consider wellbeing in the context of people, ecosystems and biodiversity, and sustainable development throughout, including indigenous peoples and knowledge systems and gender.

This structure also anticipates that physical science, adaptation and mitigation knowledge will be integrated within each section. The report should consider the options space across time frames, consequences and risks, enablers and barriers, including regional and local considerations.

The SYR will include a short front matter section and a Summary for Policymakers. The section titles and indicative bullets of content are listed below, accompanied by additional information reflecting participants' discussions. The page limit of each section reflects the SSC guidance provided to BOG III, and the plenary did not discuss the page length. This document attempts to capture all remarks in the text below that describe the draft outline, which was agreed in principle by all participants together with a record of all remarks made during the final plenary.

---

<sup>1</sup> The timescales defined by WGI to present projected climate information are: near-term (2021-2040), mid-term (2041-2060) and long-term (2081- 2100). Near term in WGIII is 2030-2050.

## **Section 1: Introduction (1/2 page)**

- Context
- Setting the stage for the report

A short introduction to the report of roughly half an IPCC page will briefly set out the wider context of the Synthesis Report, both in terms of the assessment undertaken as part of the AR6 and the policy and stakeholder landscape that the assessment informs.

The Synthesis Report is based on new advances in science that have been assessed as part of the AR6 and will highlight new and relevant findings including updates since the AR5. The AR6 assessment is the most integrated across multiple lines of evidence and disciplines than ever before.

Some key contextual aspects include the treatment of climate change in the context of sustainable development, the current international policy context (e.g., the SDGs, the Paris Agreement, and the Sendai framework), the role of indigenous and local knowledge, climate justice and equity, and the context of wellbeing<sup>2</sup> and human health as overarching policy aspirations. This report will also consider how to best inform private and commercial sectors and the diverse stakeholder landscape of the AR6.

The introduction will set the stage for the report and articulate why the report is structured as it is, in terms of three timescales, and the ordering from current, to the long term, finishing with the near term.

## **Section 2: Current Status and Trends (10 pages)**

- Socio-economic development, changing climate, differentiated risks, and climate policy.
- CO<sub>2</sub> emissions by sources and removals by sinks, non-CO<sub>2</sub> forcings, including short-lived climate forcings.
- Socio-economic and technological drivers of emissions.
- Regional/global changes in the climate system, their causes and committed changes.
- Impacts on human, natural and managed systems and sectoral and regional risks and vulnerability.
- Status of adaptation and mitigation efforts and implications for sustainable development.

This section covers historical and emerging trends, as well as the current status of social and economic development and the changing climate. The first bullet addresses current socio-economic conditions within the wider socio-political context including institutions/governance/political structure. The intention is that people and society will be a key lens of the section to understand ‘where we are now’ and ‘how we got here’.

The second bullet focuses on greenhouse gas emission trends, including non-CO<sub>2</sub> gases and Short-Lived Climate Forcers (SLCFs), considering both sources and sinks.

The third bullet focuses on the wider socio-economic and technological drivers of emissions, considering wellbeing, development, and inequality.

---

<sup>2</sup> wellbeing in the context of people, ecosystems, and biodiversity

The fourth bullet addresses how the climate system has changed, both globally and on a regional and sub-regional scale. This section will include an attribution assessment of these changes, including extreme events and hotspots. The underlying context may go beyond the historical period, e.g. paleoclimate.

The fifth bullet focuses on how climate change has already affected human, natural and managed systems and experienced impacts. This will include key sectoral and regional aspects for the assessment of vulnerability and risk<sup>2</sup> and the interplay with equity.

The sixth and final bullet covers the current status of adaptation and mitigation efforts, their effectiveness (including indicators to monitor results) and the implications for sustainable development. This will assess past and present solutions, progress with mitigation and adaptation, and climate action to achieve SDGs. Current adaptation and mitigation policies, including the NDCs, are included.

### **Section 3: Long term Climate and Development Futures (10 pages)**

- Climate change at different global warming levels, rate of change, and dependency on forcing characteristics.
- Global and regional risks for natural and human systems, and dependence on socio-economic development.
- Adaptation: options and limits, dependence on socio-economic development.
- Mitigation pathways, carbon budgets, net-zero emissions, dependence on socio-economic development, and risks and co-benefits from mitigation.
- Interactions between adaptation, mitigation and development, including economics, equity, ethical and governance dimensions.
- Deep uncertainty, tipping points, irreversibility, compound events, high-impact events, and societal and technological disruptions.
- Near-term and long-term interactions, overshoot, CDR, SRM, and adaptation.

This section will assess plausible futures projected under a wide range of climate change scenarios to 2100 and beyond, for example, to 2300, where relevant. This section also includes long term climate policies and how their implementation impacts on the climate system, climate change impacts and adaptation. This includes the long-term response to climate change framed in the context of intergenerational justice and equity.

The first bullet addresses future climate change, feedbacks, as a function of different levels of warming, including temporal evolution of warming, and development pathways. Storylines and case studies can be used as qualitative accounts that can incorporate quantitative elements, including the interplay of processes and pathway-dependent characteristics, on the unfolding of past events or of plausible future events or pathways.

The second bullet addresses global and regional risks and its drivers for natural as well as human systems which include managed systems, hotspots and the interplay with socio-economic development and characteristics of mitigation pathways.

The third bullet focuses on adaptation options and limits considering different levels of warming, regionally differentiated contexts, and the interplay with socio-economic development.

---

<sup>2</sup> Representation of risk here reflects the confluence of hazard, exposure and vulnerability.

The fourth bullet focuses on scenarios of different mitigation pathways, addressing remaining carbon budgets, net-zero emissions (including meaning and feasibility), interplay with socio-economic development, including sustainable development, and the risks and co-benefits from mitigation.

The fifth bullet covers interactions, including synergies and tradeoffs, between adaptation and mitigation response options and development. This considers economics, equity, ethical and governance dimensions, in the context of sustainable development. This bullet addresses trade-offs and synergies, including costs, associated with adaptation and mitigation options in the context of ethics and justice.

The sixth bullet addresses deep uncertainty, tipping points, irreversibility, compound events, high-impact events, and societal and technological disruptions, including beyond 2100, where relevant.

The seventh and final bullet considers the relationship between long term implications resulting from choices and actions (or inactions) made in the near-term (addressed in the next section), for example, related to costs and how enabling conditions in the near-term will affect long-term adaptation needs and capacity. This section considers overshoot pathways, the role of carbon dioxide removal (CDR) and solar radiation management (SRM), and their associated and interacting risks.

#### **Section 4: Near Term Action in a Changing Climate (10 pages)**

- Near-term climate change and variability, vulnerability, exposure and risks for natural, managed and human systems, across scales.
- Near term development pathways consistent with limiting warming to different levels and enhancing adaptation.
- Path dependency, lock-in, and implications of delayed action in a changing climate, including irreversibility.
- Diverse response options across and within sectors and scales, including policies, co-benefits/synergies and trade-offs (adaptation, risk management, mitigation).
- Strengthening and initiating system transitions, including for adaptation and mitigation, in the context of sustainable development, poverty eradication and equity; just transitions.
- Enabling conditions including finance, institutions, capacity, governance, international cooperation, technological innovation and technology transfer, behaviour change.

This section will assess climate change and response options over the 2030 and 2050 timeframe in the context of climate change and variability, environmental/ecosystem and socio-economic aspects, linking both current climate options and long term implications<sup>3</sup>.

The first bullet addresses the drivers of climate change and risk in the near term, including the role of internal variability. This includes regional and sectoral impacts and adaptation, including distributional issues, and implications in the context of sustainable development. This bullet addresses global, regional and sub-regional scales, including climate change hotspots and regional approaches to development.

The second bullet addresses near-term development pathways and choices in terms of both mitigation of emissions, including SLCFs, vulnerability, and the implementation of adaptation strategies to increase climate resilience. The material is intended to include a link from the near- to

---

<sup>3</sup> Where reference is made to long term implications the intention is to highlight a link back to Topic 3..



the long-term, i.e., consistency of near-term actions with long-term outcomes and goals. This includes NDCs and policy or technology-driven or natural emissions 'surprises'.

The third bullet addresses path dependency, lock-in and implications of delayed action/in-action in a changing climate, including adaptation limits, irreversibility and implications, including on the long-term. This includes implementation gaps in mitigation and adaptation.

The fourth bullet addresses near-term response options and policies, including decision-making processes and policy instruments, across and within sectors and scales and different capacities. This includes the interplay with risk management and implications related to timing. This bullet addresses synergies, co-benefits and trade-offs of response options with socio-economic and environmental/ecological consequences, sustainable development and the SDGs, including long-term implications.

The fifth bullet focuses on strengthening and initiating system transitions, including adaptation and mitigation, in the context of sustainable development, poverty eradication, equity and just transitions. The assessment of feasibility includes the assessment of enablers, barriers, costs and efficacy, across multiple dimensions (economic, technological, institutional, socio-cultural, environmental/ecological, geophysical).

The sixth and final bullet looks at enabling conditions including finance, institutions, capacity, multi-level governance, technology, innovation, and behaviour change. Policy portfolios are addressed in the context of enabling conditions.

### **Other general comments on the SYR report**

Various topics related to the preparation of the SYR were discussed by participants during the meeting that were not specifically noted as part of the indicative bullets but still could be considered.

For example, developing cross-cutting boxes on topics such as nature-based solutions, biodiversity, urban, indigenous knowledge, and gender aspects. It was recommended that definitions build on the AR6 cross-WG Glossary and that Frequently Asked Questions could be drafted for each section to enhance the accessibility of the report.

Figures that are accessible to a broad audience and are traceable are encouraged. Work that is underway as part of the preparation of the WG reports, overseen by TG-Data, on the treatment of data aspects, including transparency, accessibility and curation of data and underlying scripts, should be extended to the SYR.

## **6. Schedule and next steps**

The Principles governing IPCC work, Annex A, stipulate that the IPCC Chair will lead the SYR Core Writing Team (CWT) whose composition is agreed by the Bureau after nominations by the IPCC Chair in consultation with the Working Group Co-Chairs.

The provisional schedule (tbc) is as follows:

- Approval of SYR Scoping Outcome, IPCC-52, 24-28 February 2020
  - The nomination of CWT after IPCC-52 SYR Scoping approval
  - Selection of CWT, 16 March – 26 April 2020
  - CWT 1, 1 - 3 September 2020
  - CWT 2, 15 - 18 March 2021
  - CWT 3, 26 - 29 July 2021
  - Government and Expert Review (FOD), 23 August - 17 October 2021
  - CWT 4 25 - 31 October 2021 Government and observer organizations' consideration of the final draft SYR, 17 January - 13 March 2022
  - CWT 5, 1 - 2 May 2022
  - Approval/Adoption Plenary for AR6 SYR, 4 - 10 May 2022
- 

Annex 1: Chair's vision paper

Annex 2: The broad elements underpinning the AR6 SYR

Annex 3: UNFCCC perspective

Annex 4: WGI perspective

Annex 5: WGII perspective

Annex 6: WGIII perspective

Annex 7: Nominations and participant selection

Annex 8: List of participants

Annex 9: Summary of responses from governments and observers to the pre-scoping questionnaire

Annex 10: Summary of responses from authors to the pre-scoping questionnaire

Annex 11: Scoping meeting agenda

Annex 12: TOR of SSC

Annex 13: BOG III outcome structure

Annex 14: BOG IV outcome

**ipcc**  
INTERGOVERNMENTAL PANEL ON climate change

**AR6 Synthesis Report Scoping Meeting  
Singapore, 21 – 23 October 2019**

AR6/SYR-SCOP/Doc. 2, Rev. 1  
(18.X.2019)  
ENGLISH ONLY

**CHAIR'S VISION PAPER ON THE AR6 SYNTHESIS REPORT**

(Submitted by the Chair of the IPCC)

**IPCC Secretariat**

c/o WMO • 7bis, Avenue de la Paix • C.P. 2300 • 1211 Geneva 2 • Switzerland  
telephone : +41 (0) 22 730 8208 / 54 / 84 • fax : +41 (0) 22 730 8025 / 13 • email : IPCC-Sec@wmo.int • [www.ipcc.ch](http://www.ipcc.ch)



**AR6 SYR Scoping Meeting**

**CHAIR'S VISION PAPER**

(Submitted by the IPCC Chair)

## **1. Preamble**

The Chair's vision paper aims to elucidate the purpose of the Intergovernmental Panel on Climate Change Sixth Assessment Synthesis Report (IPCC AR6 SYR). It aims to provide context to the participants of the scoping meeting of the AR6 SYR as they develop an outline for a climate action relevant AR6 SYR. The AR6 SYR should be not only a valued-added document for policymakers, providing the best available knowledge, like all previous SYRs, but also a more useful document for policy leaders around the globe.

Currently there is a disconnect between scientific understanding and realities of climate action and the SYR should be able to address this divergence. Addressing this divergence is the most effective contribution the SYR can make to inform the policy leaders around the world.

This vision paper provides a brief overview of the previous SYRs to understand their overarching objective and draw insight for the AR6 SYR. Then it addresses the challenges for the new SYR.

## **2. SYR Evolution from the first to the fifth**

The AR6 SYR will build on the cumulative experience and practices followed for production of previous SYRs from the First Assessment Report to the Fifth.

- First Assessment Report (FAR) SYR: a 10-page synthesis was drafted by the IPCC Chair, which in the course of the adoption became on “Overview.”
- Second Assessment Report (SAR) SYR: synthesized scientific technical information relevant to interpreting Article 2 of the UNFCCC.
- Third Assessment Report (TAR) SYR: addressed a set of nine questions adopted by the Panel.
- Fourth Assessment Report (AR4) SYR: was structured around a set of five policy relevant topics: observed changes in climate change and the effects, causes of change, projected climate change and its impacts, adaptation and mitigation, and long-term perspectives.
- Fifth Assessment Report (AR5) SYR: also was structured around four policy relevant topics; observed change and their causes; future changes, risks and impacts; future pathways for adaptation, mitigation and sustainable development; and adaptation and mitigation.

From the FAR Overview to the AR5 SYR, the greatest progression of understanding was in certainty of attribution. Indeed, while the FAR Overview (1992) stated that “The unequivocal detection of the enhanced greenhouse effect from observations is not likely for a decade or more”; by 2014, the AR5 SYR stated that “Human influence on the climate system is clear”. The FAR Overview identified emerging thoughts on economic and social aspects of climate change, recognizing that most socioeconomic impacts and consequences will be “major” and “considerable” despite the uncertainties. The SAR SYR took a closer look at climate change decision frameworks, evaluating no-regret and low-cost options, as well as equity and social concerns related to climate change. The TAR SYR evaluated the linkages from socio-economic activities, to emissions, to climate change and its impacts. The AR4 SYR was able to evaluate these linkages in reverse by examining possible development pathways and global emissions constraints. Recognizing that climate change would affect all systems, the AR5 SYR focused on how climate change overlaps with and mainstreams into development issues and sustainability. It was able to deliver the message that; the scientific case for urgent action on climate change is clearer than ever; we have very little time before the window of opportunity to stay within 2°C closes, but we still have that opportunity and the choice is in our hands.

The five previous assessment reports have provided crucial scientific support for international climate change negotiations:

- First report (1990) supported negotiation of the United Nations Framework Convention on Climate Change (UNFCCC) (1992)
- Second report (1996) supported negotiation of the Kyoto Protocol to the UNFCCC (1997)
- Third report (2001) may have facilitated entry into force the Kyoto Protocol to the UNFCCC (2005)
- Fourth report (2007) supported the 15<sup>th</sup> meeting of the Conference of the Parties to the UNFCCC (COP15) in Copenhagen (2009)
- Fifth report (2014) supported negotiations of the Paris Agreement (2015)

Specifically, the AR5 SYR informed the review of the 2°C objective, which led Parties to adopt the Paris Agreement, whose objective, among others, is to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C”.

The AR6 SYR likewise is expected to contribute to the international climate change negotiations by providing scientific information to support the first global stocktake under the Paris Agreement. The AR6 SYR will be released in April 2022 in time for the global

stocktake scheduled for 2023. The AR6 SYR will be meaningful to this process if it can facilitate immediate action for a net zero CO<sub>2</sub> economy which we know from the recent Special Report on 1.5°C warming is necessary to meet the Paris Agreement objective.

### **3. Framing of AR6 SYR**

Section 4.6.1 of Annex A to the Principles Governing IPCC Work: Procedures for the preparation, review, acceptance, adoption, approval and publication of IPCC Reports specifies that the SYR will synthesize and integrate materials contained within the ARs and SRs and should be written in a non-technical style suitable for policymakers and address a broad range of policy-relevant but policy-neutral questions approved by the Panel. It also stipulates that the SYR be composed of two sections: (i) a Summary for Policymakers (SPM) (5-10 pages) and (ii) a longer report (30-50 pages).

Based on the above and the context of the AR6 SYR in global climate ambitions, I would like to emphasize that:

- The SYR's audience goes beyond the scientific community and it is intended to help the leaders of governments including cities, businesses, industry and civil society take immediate actions and launch climate-resilient development pathways. Regional climate information is particularly relevant for many decision makers.
- For the AR6 SYR to be relevant to the policy leaders, it should connect climate concerns to immediate economic-societal concerns and options, link climate threats to opportunities for innovation and development, and incentivize stakeholders to support climate action.
- The AR6 SYR should raise the ambition of its aim from the traditional climate-centric risk understanding to a wider, inclusive risk-opportunity consideration. This is in line with the findings of the AR5 and the recent special reports on the 1.5°C, land, and ocean/cryosphere that highlighted the importance of holistic consideration of climate challenges. This includes opportunities for synergies between climate action and biodiversity preservation, conservation and sustainable use of land and oceans, informed by scientific assessments, including IPBES and GEO.

Further, we will build on the foundations laid by the AR5 SYR which established that climate-resilient pathways and sustainable development can be mutually supportive and that effective implementation depends on cross-sectoral cooperative action at all scales, through integrated responses that link adaptation, mitigation and other societal objectives. It is therefore crucial that, based on the underlying AR6 WG reports, the AR6 SYR adopt a comprehensive framing approach to meet the information needs relevant to implementing the broader global development agenda, into which the climate agenda fully fits.

This of course will be based upon the best state of scientific knowledge related to understanding observed global and regional climate change and impacts, near and long-term projected climate changes and risks, including adaptation potential, limits, and residual risks, irreversibility, as well as physically plausible events associated with deep uncertainty but with potential large-scale risks.

Since COP21 and the Paris Agreement, there have been increasing calls for responsible investment that incorporates environmental, social and governance (ESG) factors into investment decisions to better manage risks and generate sustainable long-term returns. It will be important that AR6 SYR contextualize knowledge and actions and facilitate wider acceptance and practical implementation of the ESG concept, based on scientific evidence. Such a contribution from the IPCC is in line with the UNGA Resolution 43 whereby the General Assembly endorsed the establishment of the IPCC. The resolution states that the IPCC is established to provide assessment of “the potential environmental and socio-economic impact of climate change and realistic response strategies”. Inclusion of the term “realistic” necessarily requires the rigorous treatment of economic and social aspects of different response strategies.

Such a framing also gives credence to the integration of the risk framework with the solution-focused, problem-solving framework, which will be the overarching framing of the AR6 and its SYR. This would require approaching climate risks in the context of the full spectrum of the risk profile that societies and ecosystems face, including economic, social and ecological risks of climate change, the risk profiles of new technologies and investor and societal rankings of these risks; risks and uncertainties that are most relevant to climate policy; and the choice of decision making processes in the private and public sectors where perception of climate risks weighs against other extant and contingent development challenges and opportunities. Hence, the scoping of the AR6 SYR should strive to craft a narrative that ensures integrative understanding of climate, economy, environment, society and sustainable development, as well as their regional differences, for a rapid transition to resilient societies and to a global economy with a net zero CO<sub>2</sub> emissions and concurrent deep reductions in emissions of non- CO<sub>2</sub> forcers and managed pressure on land.

The task of the AR6 SYR Scoping Meeting is to develop a detailed outline of the AR6 SYR that effectively informs its policy audiences, meets the needs of the global stocktake, and is supported by evidence in the Working Group reports.

As a starting point, the broad elements underpinning the SYR were agreed at the AR6 Scoping Meeting in Addis Ababa in May 2017 and subsequently reported to the 46<sup>th</sup> Session of the IPCC in Montreal 2017. The agreed elements are:

- The Global Stocktake
- Interaction among emissions, climate, risks and development pathways
- Economic and social costs and benefit of mitigation and adaptation in the context of development pathways



- Adaptation and mitigation actions in the context of sustainable development
- Finance and means of support

The specificity of the global stocktake was not known at the time when the above five elements were identified. At COP24 (2018) Parties adopted a decision that elaborates how the global stocktake is to be conducted. It specifies that the global stocktake will consider collective information on:

- (a) The state of greenhouse gas emissions by sources and removals by sinks and mitigation efforts undertaken by Parties;
- (b) The overall effect of their nationally determined contributions and overall progress made by Parties towards the implementation of their nationally determined contributions;
- (c) The state of adaptation efforts, support, experience and priorities;
- (d) The finance flows, and means of implementation and support and mobilization and provision of support;
- (e) Efforts to enhance understanding, action and support, on a cooperative and facilitative basis, related to averting, minimizing and addressing loss and damage associated with the adverse effects of climate change;
- (f) Barriers and challenges, including finance, technology and capacity-building gaps faced by developing countries;
- (g) Good practices, experience and potential opportunities to enhance international cooperation on mitigation and adaptation and to increase support;
- (h) Fairness consideration, including equity, as communicated by Parties in their nationally determined contributions.

The COP decision does not specify the time period to which the information should relate. Since global stocktakes are to occur on a five year cycle, one would expect that information up to 2030 or 2050 is likely to be in high demand. The information identified by the COP decision includes most of the material covered by the five elements.

Working from the five broad elements underpinning the SYR that the Addis Ababa meeting identified and the 46<sup>th</sup> Session of the IPCC noted, as well as other cross-cutting aspects facilitating integration across Special Reports and WG Reports, this Scoping meeting is expected to prepare a robust and comprehensive outline for the AR6 SYR based on the underlying IPCC Working Group Reports and the AR6 Special Reports with broad policy-relevant topics, and subtopics, for the Panel to approve. The comprehensive outline will be treated as guidance for the SYR Core Writing Team (CWT), who will have the flexibility to modify subtopics after informing the Panel and providing justifications for the changes.

#### **4. Procedure after Scoping**

At its 41th Session, (Nairobi, Kenya, 24-27 February 2015), the Panel decided (Decision IPCC/XLI-4) that all parts of an IPCC Assessment Report should be released within about one year but no more than eighteen months, with a staggering between the WG reports

allowing for information presented by one WG to be adequately reflected by the other WGs and the SYR.

At the 43<sup>rd</sup> Session of the IPCC (Nairobi, Kenya, 11-13 April 2016) the Panel decided to consider the approval of the Synthesis Report of the Sixth Assessment Report as soon as possible in 2022 (Decision IPCC/XLIII-7, paragraph 7).

The outcome of the scoping meeting for the AR6 SYR will be presented to the 52<sup>nd</sup> Session of the IPCC in 2020 for its approval after which the SYR CWT will be installed for the task of drafting the SYR. As in the past, a total of five meetings of CWT will be held over the period of two years during which WG reports progress for completion with WG I approval planned in April 2021, WG III in July 2021, and WG II in October 2021. The AR6 SYR will be completed with approval in April 2022; hence, all elements of the AR6 will be available for consideration by the Global Stocktake in 2023.

With this in mind, it is important to ensure a two-way flow between the design of the SYR and the contents of the WG reports and the Special Reports. Coordination across WGs that is currently taking place over the risk framework, scenarios and storylines, and regional climate information, as well as initial options that are under development for the structure of summary for policymakers of WG Reports would facilitate the design of the SYR. However, there is scope for continuing refinement of the contents and elaboration of subjects across the Working Group Reports. A robust and comprehensive outline of the AR6 SYR would be crucial for facilitating an effective and efficient two-way flow between the SYR and the WG Reports.

## Annex 2 - Broad Elements Underpinning the Outline of the SYR

Broad elements identified for consideration at the 46<sup>th</sup> Session of the IPCC and the Second Scoping Meeting of the Synthesis Report follow.

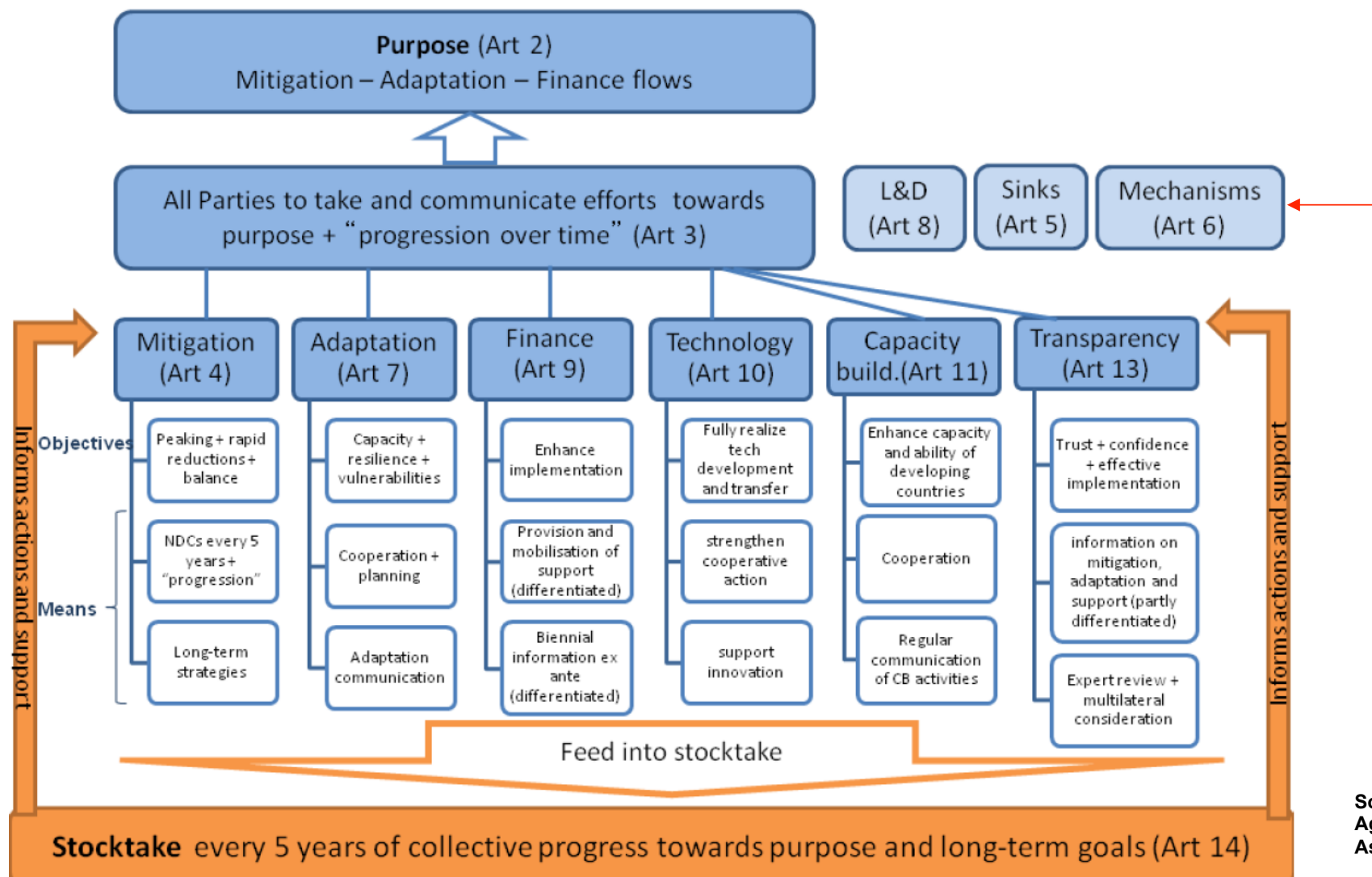
1. **Global Stocktake:** assessing scientific information relevant to the state and trends of the climate system, observed impacts, and human fingerprint; and scientific information relevant for tracking progress towards achieving the purpose of the Paris Agreement and its long-term goals, which could include mitigation and adaptation; and the finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.
2. **Interaction among emissions, climate, risks and development pathways:** characteristics of mitigation pathways; remaining carbon budget consistent with longterm temperature limits, including 1.5 °C and 2 °C; non-CO<sub>2</sub> and short-lived climate forcers; emissions and climate scenarios and development pathways; climate impacts and risks arising from climate change and extremes at various spatial and temporal scales; including the near-term; long-term changes and commitment, including relative sea-level rise; abrupt changes; rate of change and how it varies through time; irreducible uncertainties at local and regional scales; distributed aggregated risks, depending on different mitigation levels and development pathways; implication of delayed action.
3. **Economic and social costs and benefits of mitigation and adaptation in the context of development pathways:** including avoided impacts, synergies, cobenefits and tradeoffs with sustainable development, including relevant SDGs; limits to adaptation; residual impacts and risks; implications of delayed action.
4. **Adaptation and mitigation actions in the context of sustainable development:** assessing current and emerging mitigation and adaptation options, opportunities for technological and social transformation; strengthening resilience; investment and infrastructure planning for long-term climate resilient development; regional (including urban and rural areas); sectoral and actor-specific perspectives; institutions, policies and governance; enabling innovation and transitions at various scales; linking innovation and technology transfer and diffusion to emissions reduction and adaptation outcomes.
5. **Finance and means of support:** consistent with a pathway towards low greenhouse gas emissions and climate resilient development, including technology development, diffusion and transfer.

# Scoping of the Synthesis Report of AR6: View from the UNFCCC

Dr. Florin Vladu, UNFCCC Secretariat  
Singapore, 21 October 2019



## What is the structure of the Paris Agreement and what are relevant entry points for nuclear power?

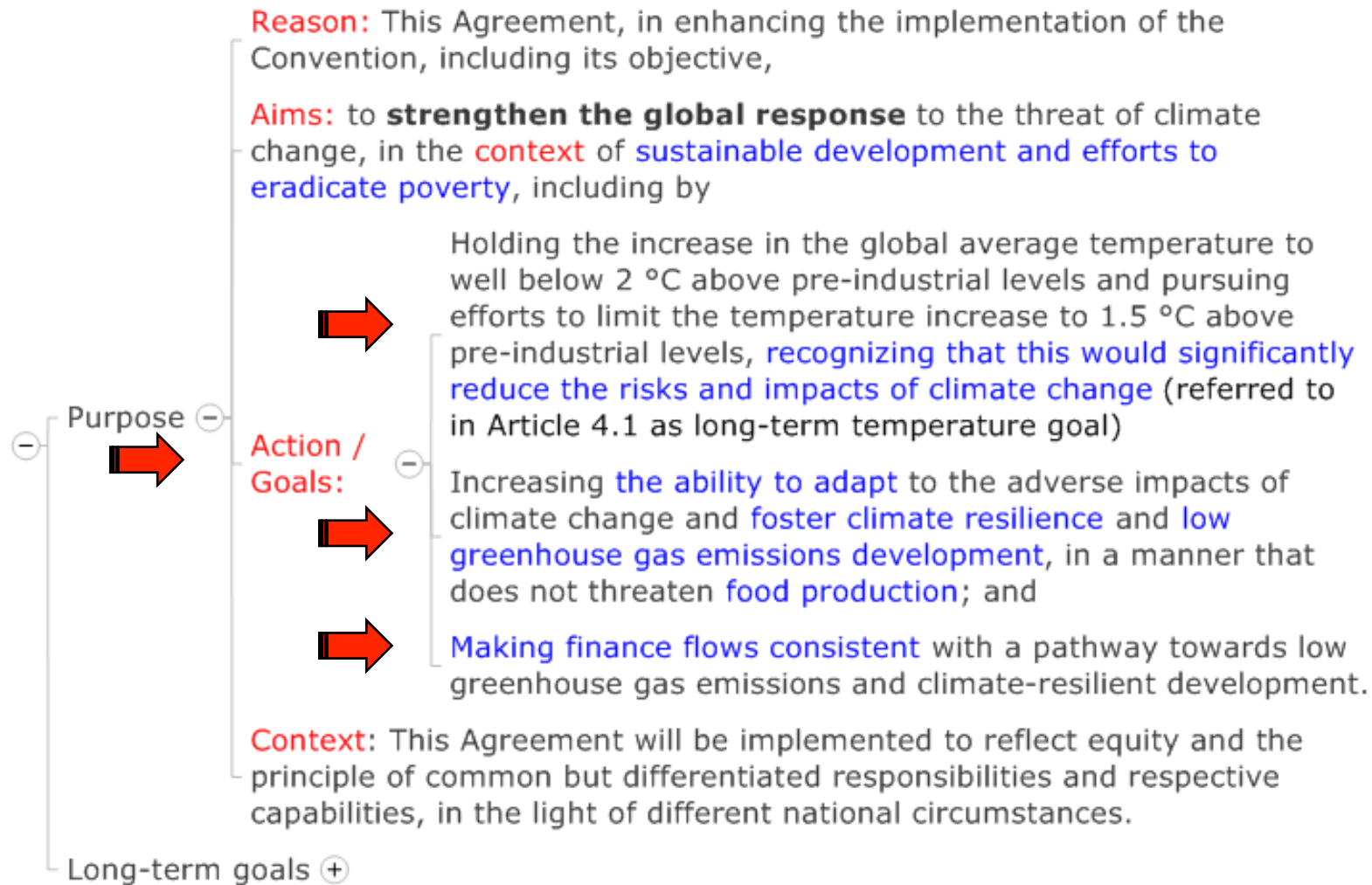


Source - The Paris Agreement: Analysis, Assessment and Outlook

## How did the Paris Agreement strengthened the case for deploying low-carbon energy sources?



Purpose and  
long-term  
goals



- We have a limited CO<sub>2</sub> budget for stabilizing global temperature rise at 1.5°C. To stay within this budget, we must:
  - Reduce emissions **45 per cent by 2030**
  - Achieve **climate neutrality by 2050**
  - Get on a sustainable socio-economic development pathway
- To achieve these, the IPCC indicates the **need for rapid and far-reaching transitions in energy**, land, urban and infrastructure (including transport and buildings), and industrial systems using all available options
- These **systems transitions are unprecedented in terms of scale**, but not necessarily in terms of speed, and imply deep emissions reductions in all sectors, a wide portfolio of mitigation options and a significant upscaling of investments in those options
- The systems transitions include the **widespread adoption of new and possibly disruptive technologies and practices and enhanced climate-driven innovation**. These imply enhanced technological innovation capabilities... and both national innovation policies and international cooperation

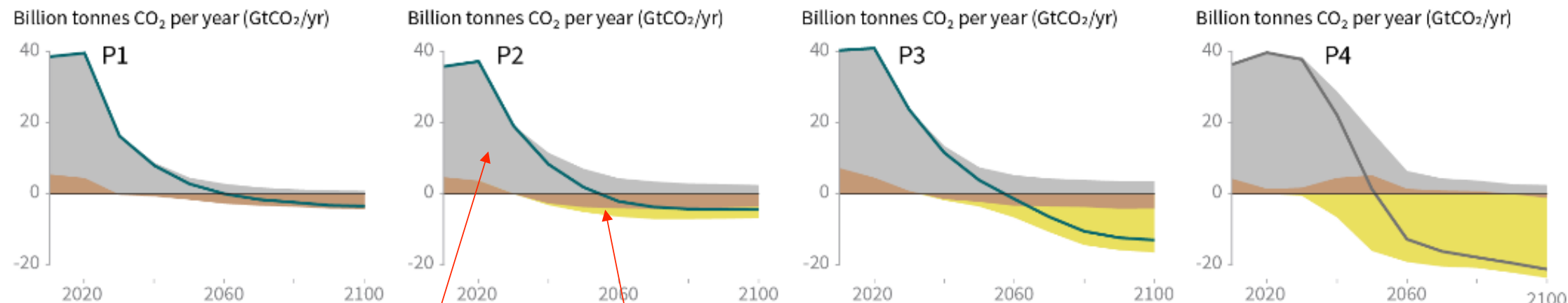


- The large majority of **modelling studies could not construct pathways characterized by lack of international cooperation**, inequality and poverty that were able to limit global warming to 1.5°C.
- **International cooperation is a critical enabler for developing countries and vulnerable regions to strengthen their action for the implementation of 1.5°C-consistent climate responses**, including through **enhancing access to finance and technology and enhancing domestic capacities**, taking into account national and local circumstances and needs



## Breakdown of contributions to global net CO<sub>2</sub> emissions in four illustrative model pathways

● Fossil fuel and industry ● AFOLU ● BECCS



**P1:** A scenario in which social, business and technological innovations result in lower energy demand up to 2050 while living standards rise, especially in the global South. A downsized energy system enables rapid decarbonization of energy supply. Afforestation is the only CDR option considered; neither fossil fuels with CCS nor BECCS are used.

**P2:** A scenario with a broad focus on sustainability including energy intensity, human development, economic convergence and international cooperation, as well as shifts towards sustainable and healthy consumption patterns, low-carbon technology innovation, and well-managed land systems with limited societal acceptability for BECCS.

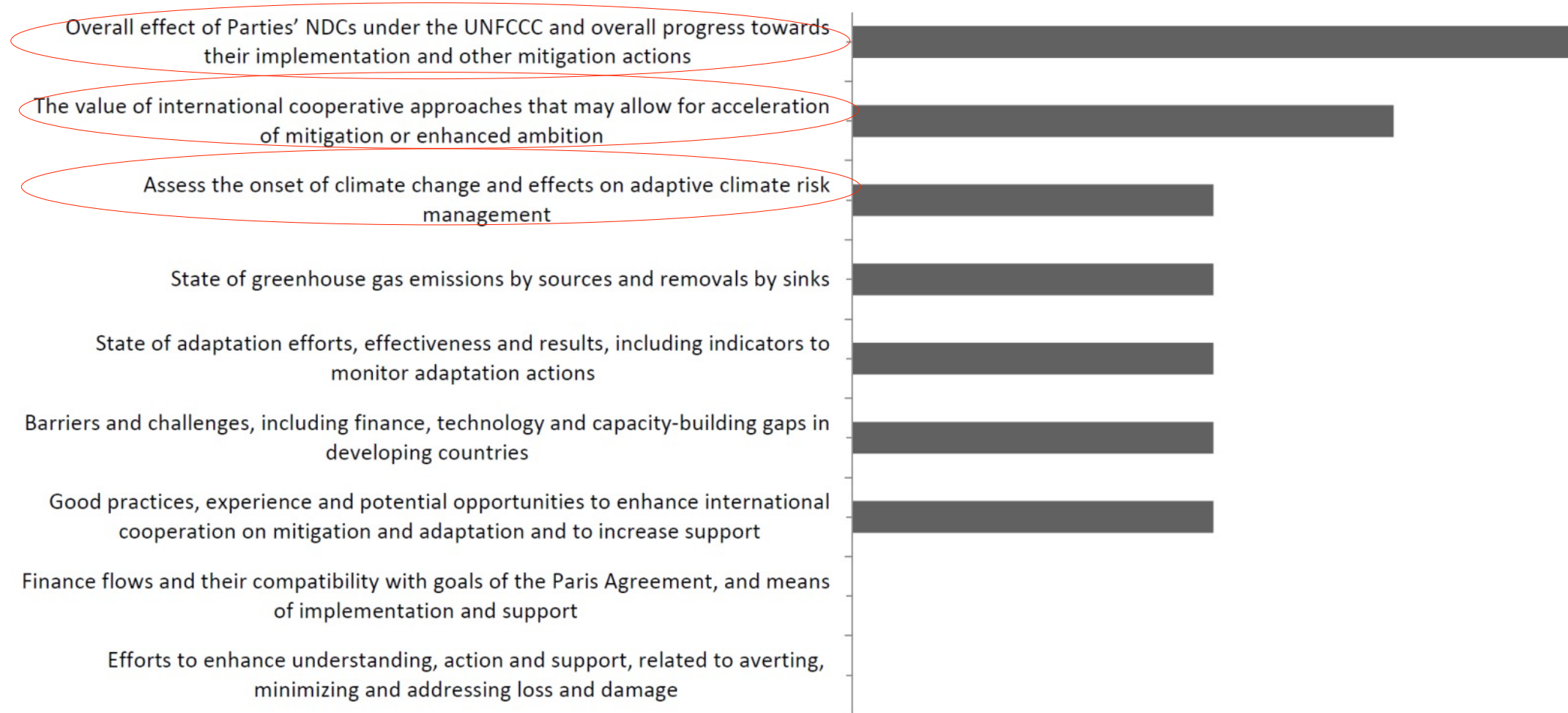
**P3:** A middle-of-the-road scenario in which societal as well as technological development follows historical patterns. Emissions reductions are mainly achieved by changing the way in which energy and products are produced, and to a lesser degree by reductions in demand.

**P4:** A resource- and energy-intensive scenario in which economic growth and globalization lead to widespread adoption of greenhouse-gas-intensive lifestyles, including high demand for transportation fuels and livestock products. Emissions reductions are mainly achieved through technological means, making strong use of CDR through the deployment of BECCS.

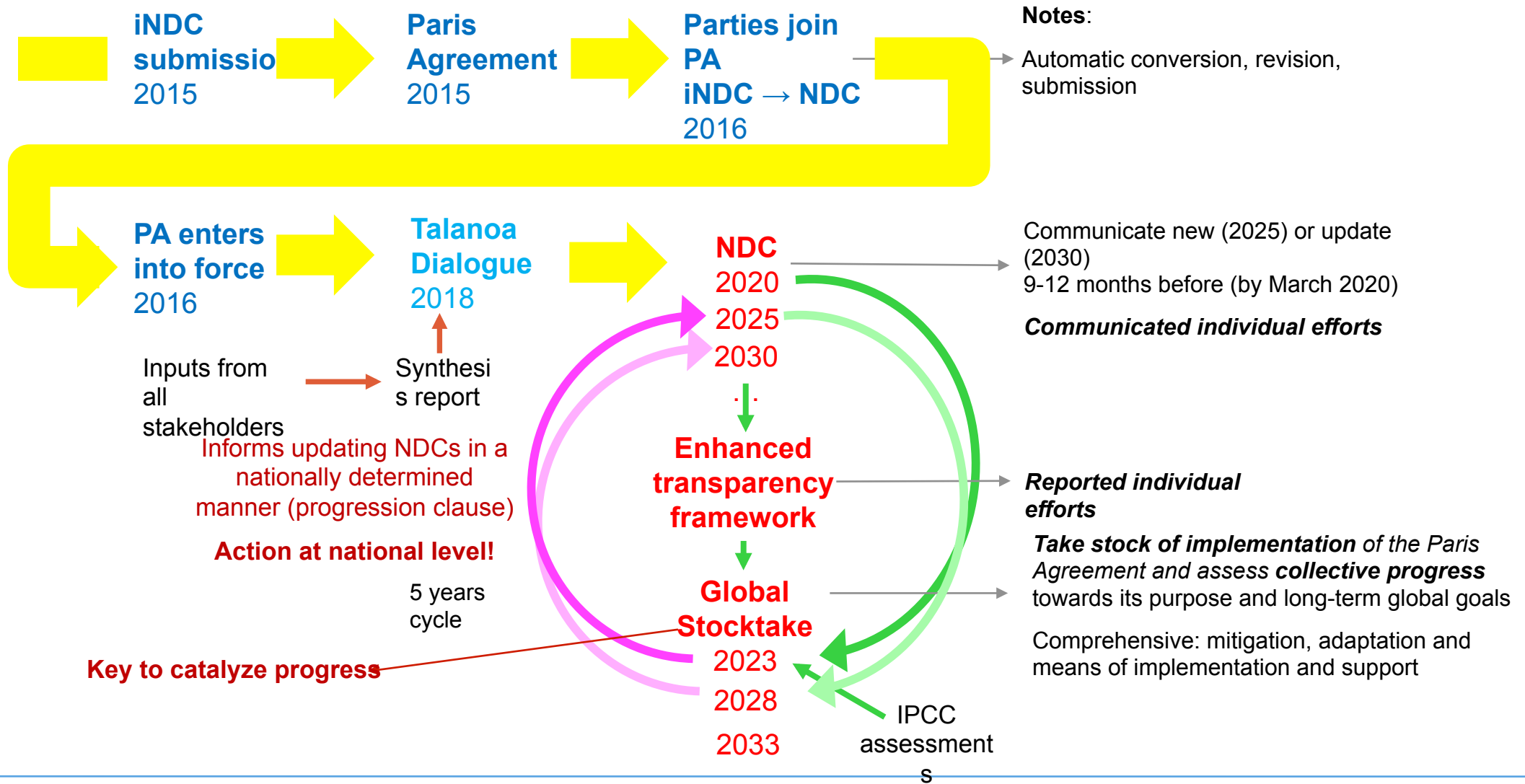


Avoiding GHG emissions... but this is not enough

## What are the key issues identified by governments and observer organizations (INF.4)



## How we will increase ambition over time under the Paris Agreement?





COP24-KATOWICE 2018  
UNITED NATIONS CLIMATE CHANGE CONFERENCE

## Mitigation

- Overall effect of NDCs
- State of GHG emissions and removals and mitigation efforts undertaken by Parties

## Adaptation

- State of adaptation efforts, support, experiences and priorities

## Finance flows and means of Implementation and support:

- Finance flows and financial support
- Technology
- Capacity-Building

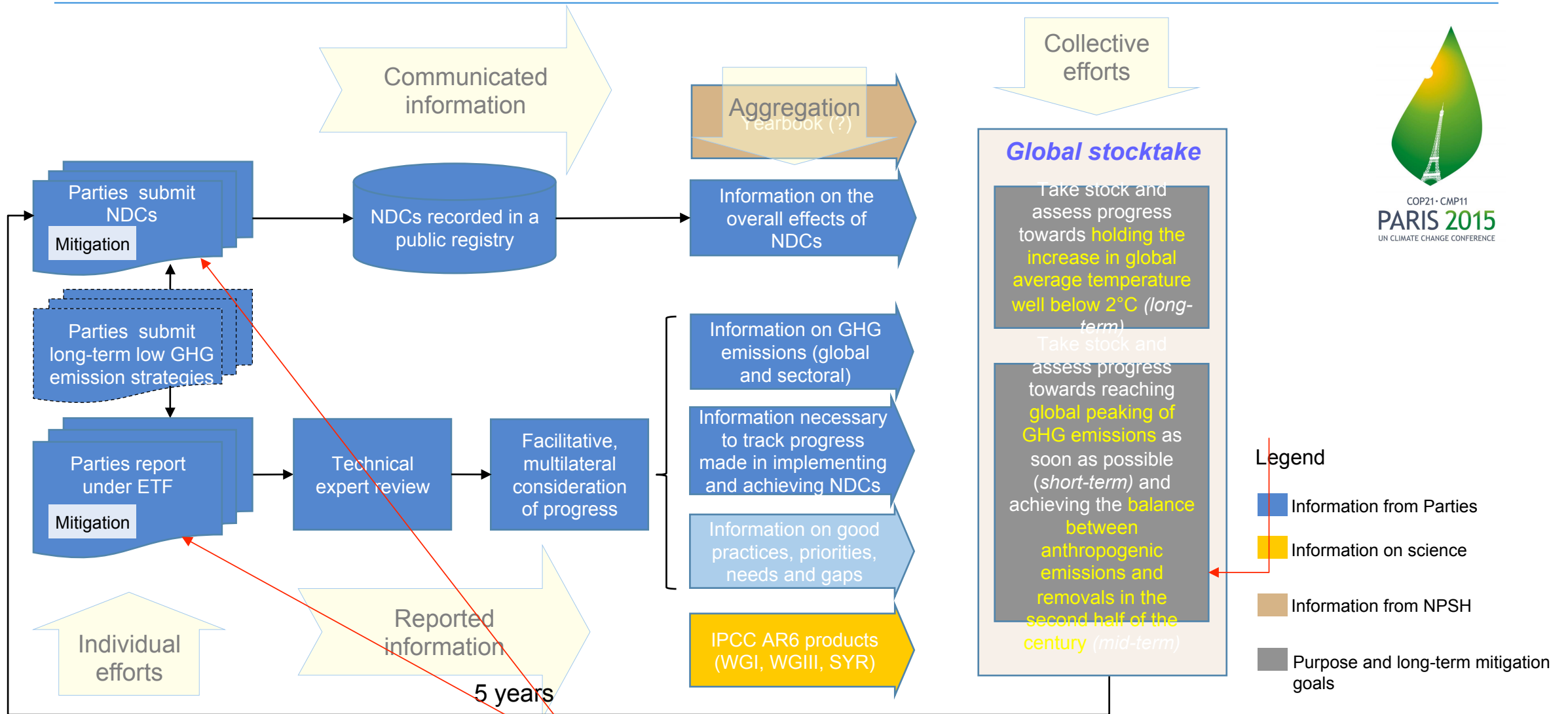
## Efforts on:

- Social and economic consequences of response measures (under mitigation)
- Adverting, minimizing and addressing loss and damage (under adaptation?)

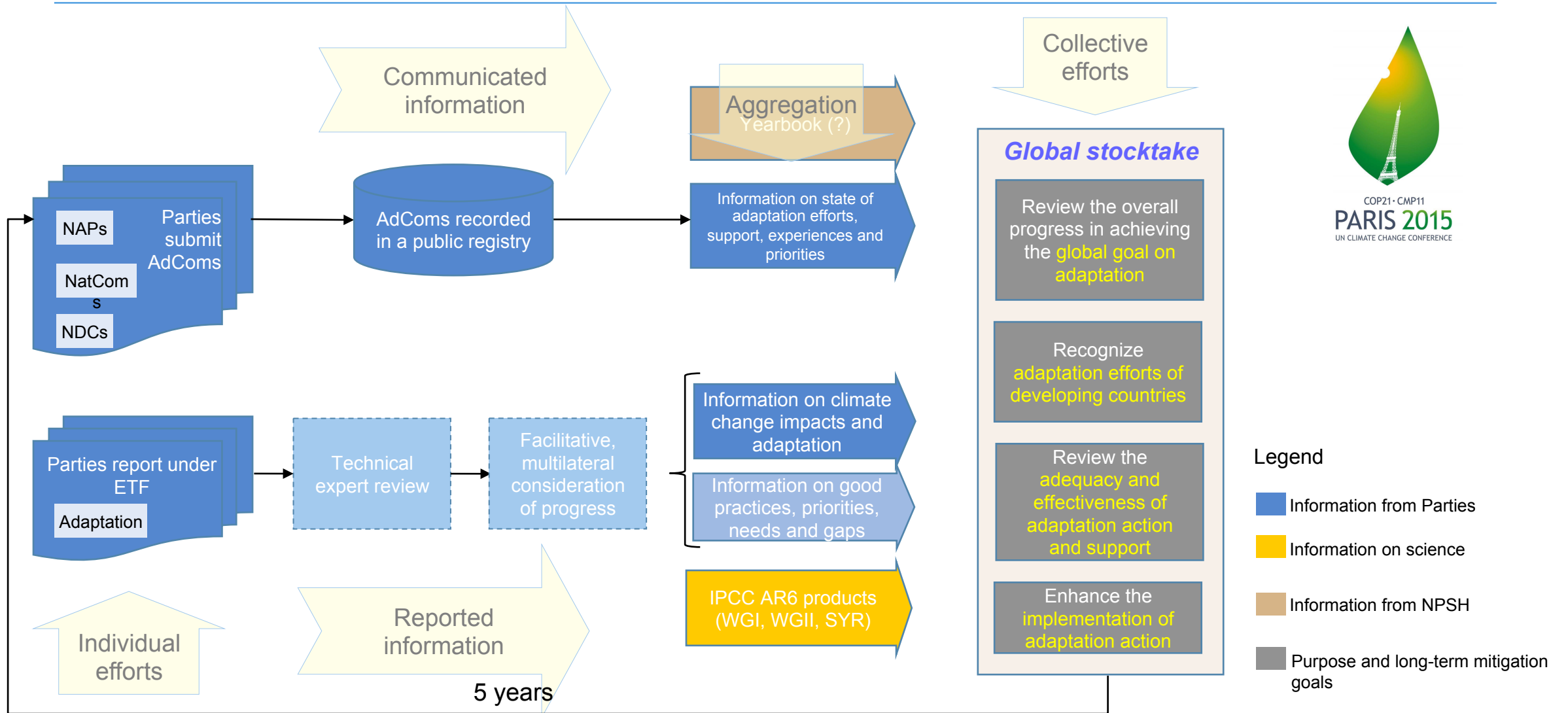
## Inputs on equity

- Fairness consideration including equity as communicated by Parties in their NDCs

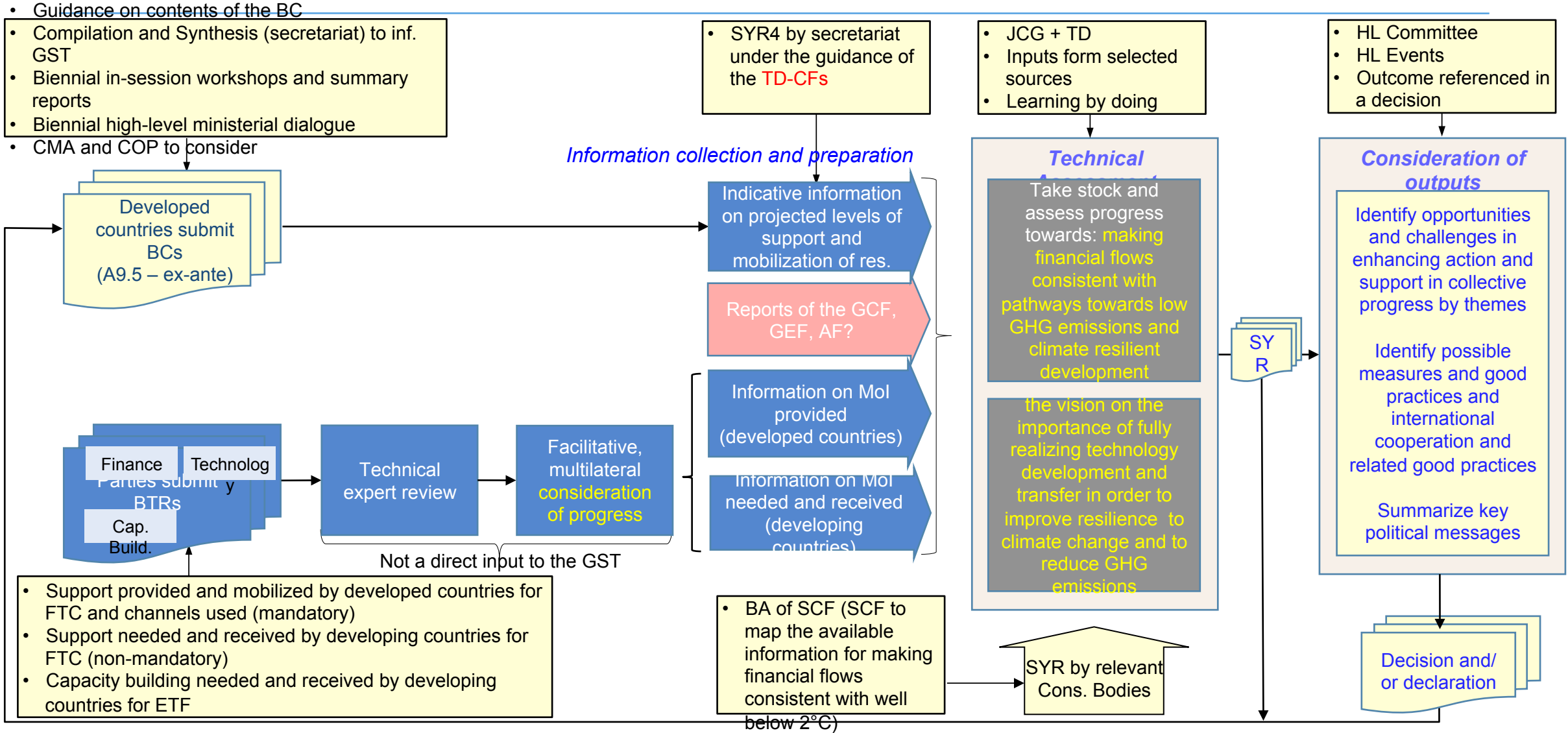
## What are the areas of areas of international cooperation for implementing the Paris Agreement?



Support countries with **developing** and **implementing** their NDCs and LEDs and with reporting under the ETF



## Katowice guidance on finance flows and means of implementation and support relevant for the GST



Legend

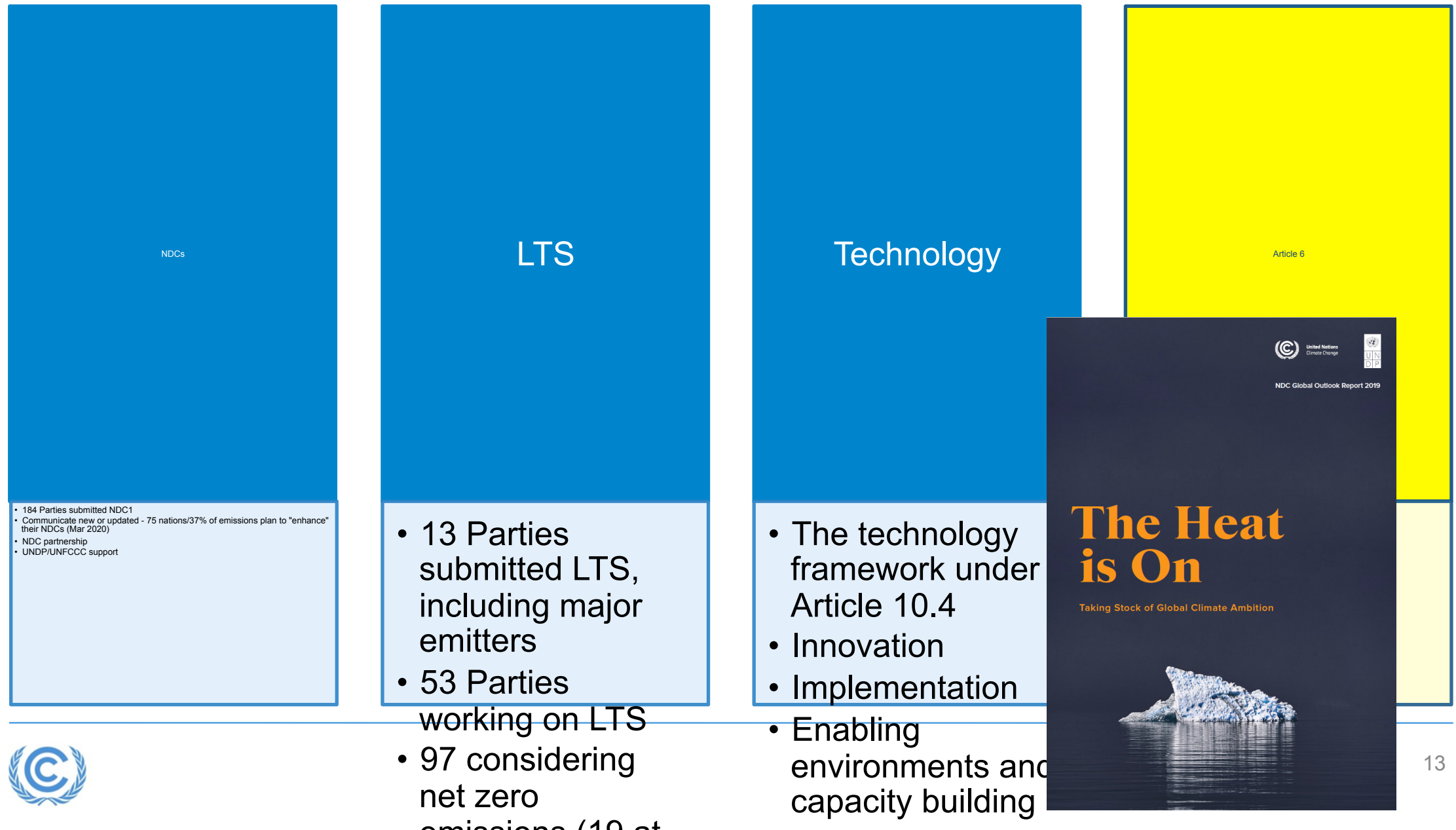
- Information from Parties
- Guidance from Katowice
- Purpose and long-term mitigation goals
- Information from the financial mechanism

SCF, TEC, PCCB, AC





## What are the mechanisms and partnerships for international cooperation for implementing the Paris Agreement?





## Performance distribution approach

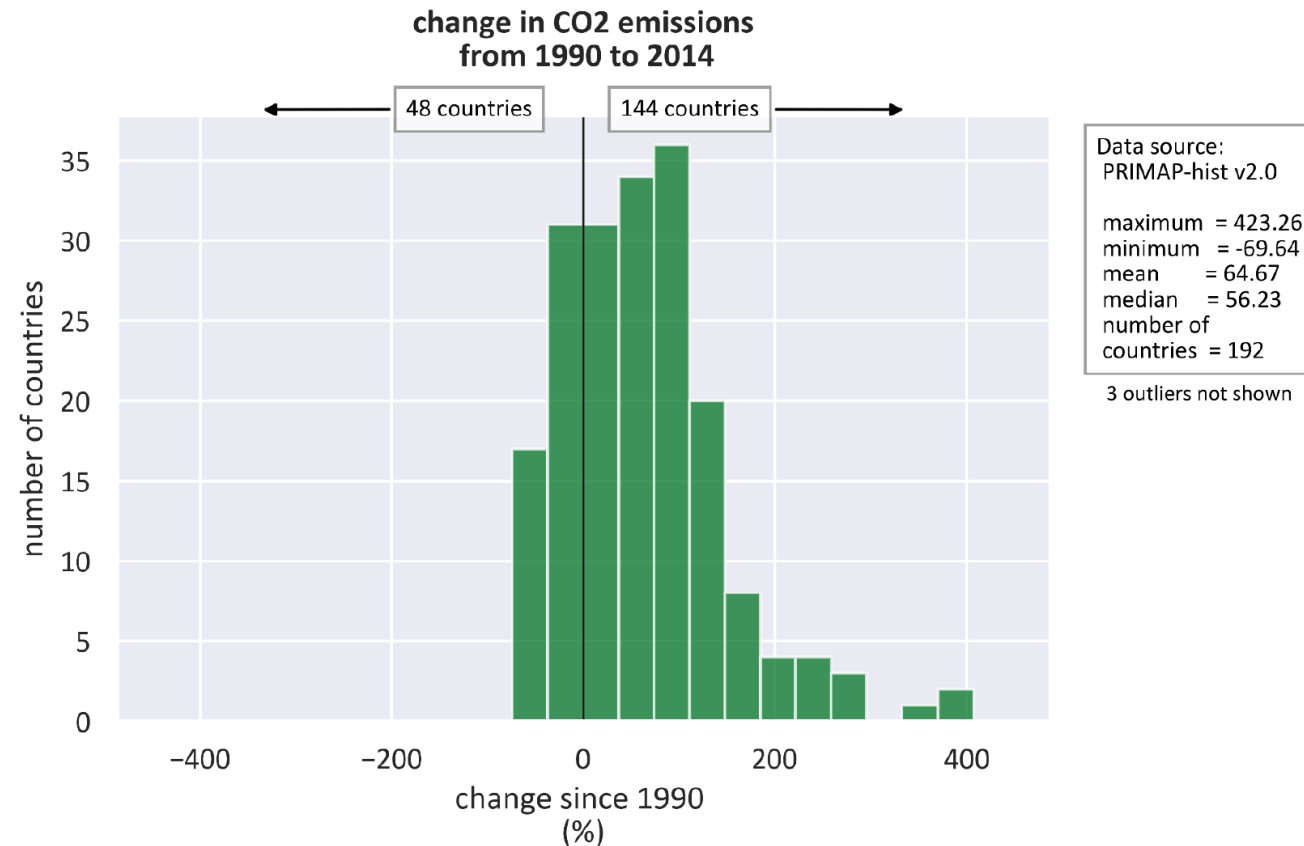
### Example 2: Changes through time

#### WHAT DO WE LEARN?

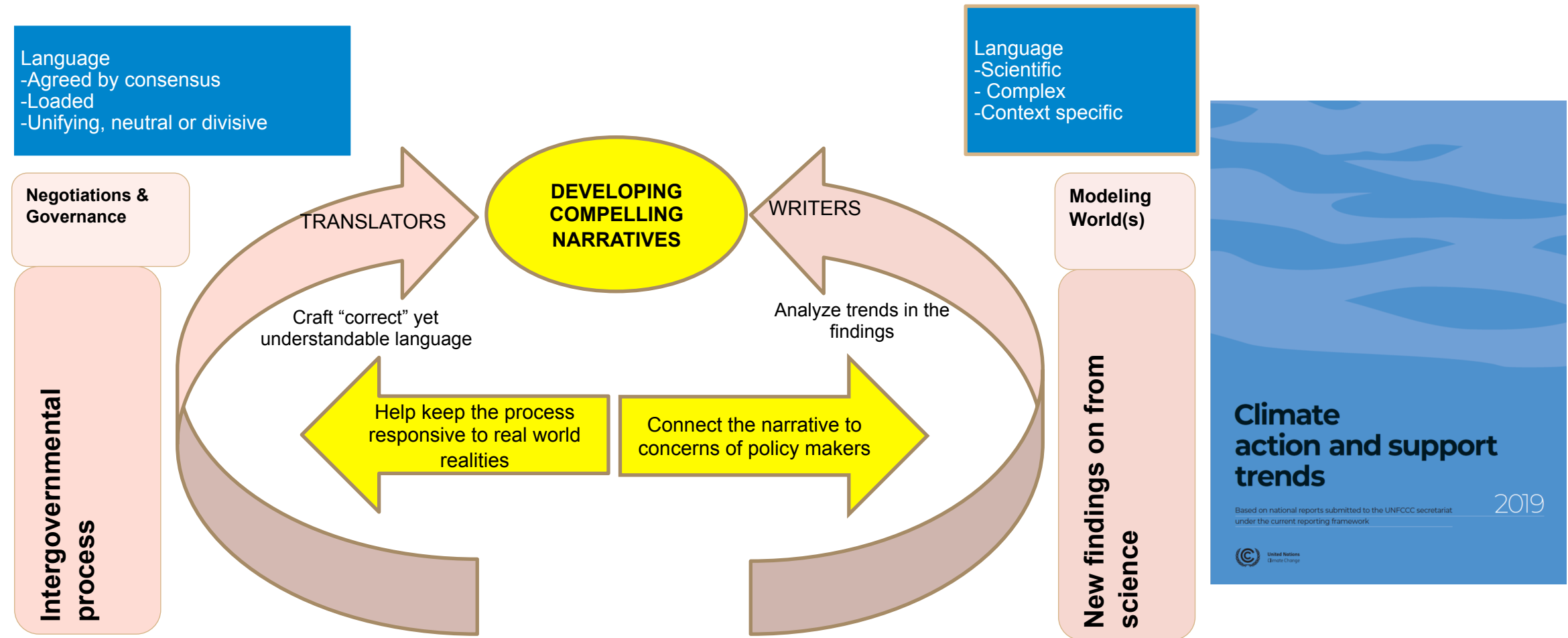
- Majority of countries have increased emissions since 1990
- Still, a substantial share have decreasing emissions
- Shows wide spread across countries

#### HOW DO WE ENABLE COMPARABILITY?

- Can put all countries into the same metric
- All countries are equally weighted
- Similar plot possible for comparison relative to 2000 or 2010



## Opening the back box by developing compelling narratives on the role of low-carbon energy sources, including nuclear power



- It is important to **identify, understand and make use of all entry points** for providing scientific knowledge to support Parties to implement the Paris Agreement
- Develop the **narrative** and highlight **new findings**
- Identify **specific topics** that should be synthesized – carbon dioxide removal, tracking progress on adaptation, progress towards peaking and CO<sub>2</sub> neutrality

---

**Thank you!**





# Towards the AR6 SYR: building on SR15 and AR6 WGI

Valérie Masson-Delmotte and Panmao Zhai

**SR15 and SYR**

# Global warming of 1.5°C (SR1.5)

*An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.*

## Chapter 1: Framing and context (integration WGI-WGII-III)

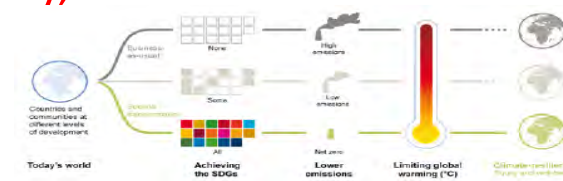
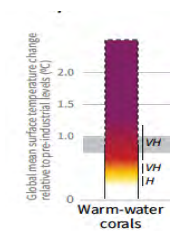
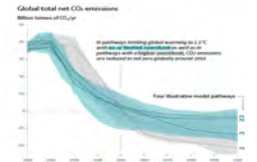
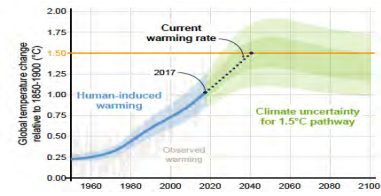
New

## Chapter 2: Mitigation pathways compatible with 1.5°C in the context of sustainable development (integration WGI-WGIII, carbon budgets, pathways)

## Chapter 3: Impacts of 1.5°C global warming on natural and human systems (integration WGI-WGII, global / regional; regional hotspots; storylines of warmer worlds; traceability for risk assessment for selected systems)

## Chapter 4: Strengthening and implementing the global response to the threat of climate change (systems transitions, behaviour, dimensions of feasibility)

## Chapter 5: Sustainable development, poverty eradication and reducing inequalities (ethics, equity, societal transformation, SDGs)



# Global warming of 1.5°C (SR1.5)

*An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.*

## Chapter 1: Framing and context

Gaps

**Chapter 2:** Mitigation pathways compatible with 1.5°C in the context of sustainable development (carbon feedbacks; inclusion of climate change in pathways; land use emissions; negative emissions)

**Chapter 3:** Impacts of 1.5°C global warming on natural and human systems (stabilised 1.5°C world; land use and SLCF; resilience ; cascading effects; overshoot)

**Chapter 4:** Strengthening and implementing the global response to the threat of climate change (rates of changes; governance and implementation; finance)

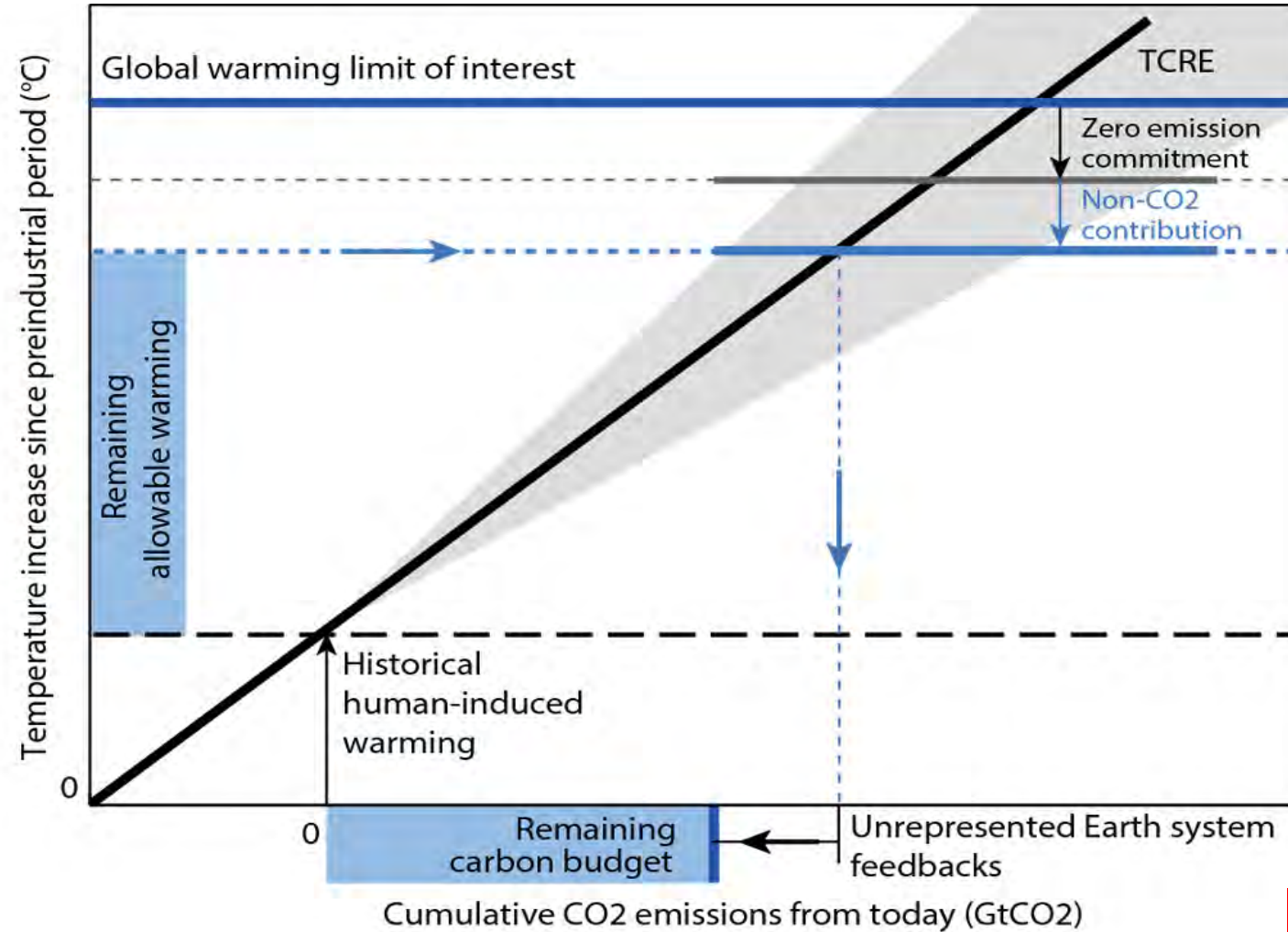
**Chapter 5:** Sustainable development, poverty eradication and reducing inequalities (connecting local-level visions with global trajectories; urgent climate action and leaving no-one behind)



## Improved formalisation of remaining carbon budgets

Range of zero emission commitment

Range of transient climate response to cumulative emissions



Non CO<sub>2</sub> warming consistent with net zero CO<sub>2</sub> pathways

Choice of temperature metrics (GMST or GSAT) and reference period

Accounting for unrepresented Earth system feedbacks (e.g. permafrost)

# Global warming of 1.5°C (SR1.5)

*An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.*

## Structure of the Summary for Policy Makers

- Understanding global warming of 1.5°C
- Projected climate change, potential impacts and associated risks
- Emission pathways and system transitions consistent with 1.5°C
- Strengthening the global response in the context of sustainable development and efforts to eradicate poverty

Storylines / 1.5°C – 2°C

Challenge / where to  
address adaptation

Regional information

# Global warming of 1.5°C (SR1.5)

*An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.*

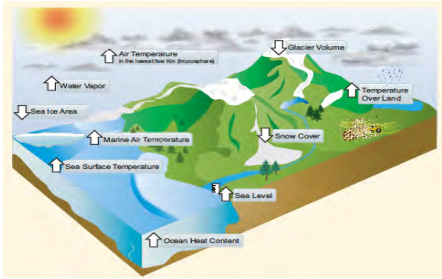
## Key messages :

- Climate change is already affecting people, ecosystems and livelihoods around the world
- Limiting global warming to 1.5°C is not impossible but would require unprecedented transitions in all aspects of society
- There are clear benefits to keeping warming to 1.5°C rather than 2°C or higher
- Limiting warming to 1.5°C can go hand in hand with achieving other world goals

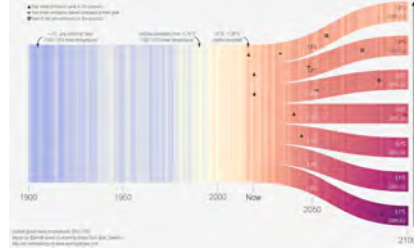
EVERY HALF A DEGREE MATTERS  
EVERY YEAR MATTERS  
EVERY CHOICE MATTERS

# AR6 WG1 and SYR

## Changing state of the climate system



## Clear communication



*End user needs*

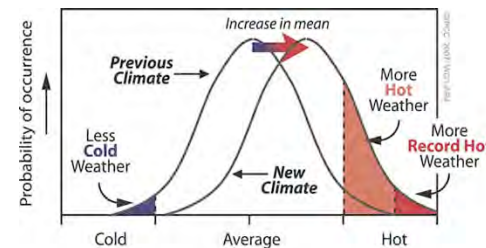


*Climate information for decision making  
(incl. confidence in projections)*

*Understanding drivers, processes and responses*



*Regional climate information  
incl. hazards, case studies*



# Working Group I AR6

Chapter 1: Framing, context, methods  
Chapter 2: Changing state of the climate system  
Chapter 3: Human influence on the climate system  
Chapter 4: Future global climate: scenario-based projections and near-term information  
Chapter 5: Global carbon and other biogeochemical cycles and feedbacks  
Chapter 6: Short-lived climate forcers  
Chapter 7: The Earth's energy budget, climate feedbacks, and climate sensitivity  
Chapter 8: Water cycle changes  
Chapter 9: Ocean, cryosphere, and sea level change  
Chapter 10: Linking global to regional climate change  
Chapter 11: Weather and climate extreme events in a changing climate  
Chapter 12: Climate change information for regional impact and for risk assessment  
Atlas of Regional Climate Information

# Working Group I AR6

## Framing

Chapter 1: Framing, context, methods

Chapter 2: Changing state of the climate system

Chapter 3: Human influence on the climate system

Chapter 4: Future global climate: scenario-based projections

Chapter 5: Global carbon and other biogeochemical cycles and fluxes

Chapter 6: Short-lived climate forcers

Chapter 7: The Earth's energy budget, climate feedbacks, and climate sensitivity

Chapter 8: Water cycle changes

Chapter 9: Ocean, cryosphere, and sea level change

Chapter 10: Linking global to regional climate change

Chapter 11: Weather and climate extreme events in a changing climate

Chapter 12: Climate change information for regional impact and for risk assessment

Atlas of Regional Climate Information

Reference periods  
Scenarios & temperature levels  
SSPs and RCPs

# Working Group I AR6

## Large-scale climate change

Chapter 1: Framing, context, methods

Chapter 2: Changing state of the climate system

Chapter 3: Human influence on the climate system

Chapter 4: Future global climate: scenario-based projections and near-term information

Chapter 5: Global carbon and other biogeochemical cycles and feedbacks

Chapter 6: Short-lived climate forcers

Chapter 7: The Earth's energy budget, climate feedbacks, and climate sensitivity

Chapter 8: Water cycle changes

Chapter 9: Ocean, cryosphere, and sea level change

Chapter 10: Linking global to regional climate change

Chapter 11: Weather and climate extreme events in a changing climate

Chapter 12: Climate change information for regional impact and for risk assessment

Atlas of Regional Climate Information



# Working Group I AR6

## Large-scale climate change

Chapter 1: Framing, context, methods

Chapter 2: Changing state of the climate system

Chapter 3: Human influence on the climate system

Chapter 4: Future global climate: scenario-based projections and near-term information

Chapter 5: Global carbon and other biogeochemical cycles and feedbacks

Chapter 6: Short-lived climate forcers

Chapter 7: The Earth's energy budget, climate feedbacks

Chapter 8: Water cycle changes

Chapter 9: Ocean, cryosphere, and sea level change

Chapter 10: Linking global to regional climate change

Chapter 11: Weather and climate extreme events in a changing climate

Chapter 12: Climate change information for regional planning and decision-making

Atlas of Regional Climate Information

Targets, path dependence, overshoot  
Climate response to mitigation, CDR, SRM  
Climate change beyond 2100  
Potential for low-probability, high-impact change



# Working Group I AR6

## Climate processes

Chapter 1: Framing, context, methods

Chapter 2: Changing state of the climate system

Chapter 3: Human influence on the climate system

Chapter 4: Future global climate: scenario-based projections and near-term information

Chapter 5: Global carbon and other biogeochemical cycles and feedbacks

Chapter 6: Short-lived climate forcers

Chapter 7: The Earth's energy budget, climate feedbacks, and climate sensitivity

Chapter 8: Water cycle changes

Chapter 9: Ocean, cryosphere, and sea level change

Chapter 10: Linking global to regional climate change

Chapter 11: Weather and climate extreme events in a changing climate

Chapter 12: Climate change information for regional impact and for risk assessment

Atlas of Regional Climate Information

# Working Group I AR6

## Climate processes

- Chapter 1: Framing, context, methods
- Chapter 2: Changing state of the climate system
- Chapter 3: Human influence on the climate system
- Chapter 4: Future global climate: scenario-based projections and near-term information
- Chapter 5: Global carbon and other biogeochemical cycles and feedbacks
- Chapter 6: Short-lived climate forcers
- Chapter 7: The Earth's energy budget, climate feedbacks, and climate sensitivity
- Chapter 8: Water cycle changes
- Chapter 9: Ocean, cryosphere, and sea level change
- Chapter 10: Linking global to regional climate change
- Chapter 11: Weather and climate extreme events in a changing climate
- Chapter 12: Climate change information for regional impact and for risk assessment
- Atlas of Regional Climate Information

Remaining carbon budgets  
Biogeochemical implications of CDR, SRM

# Working Group I AR6

## Climate processes

- Chapter 1: Framing, context, methods
- Chapter 2: Changing state of the climate system
- Chapter 3: Human influence on the climate system
- Chapter 4: Future global climate: scenario-based projections and near-term information
- Chapter 5: Global carbon and other biogeochemical cycles and feedbacks
- Chapter 6: Short-lived climate forcers
- Chapter 7: The Earth's energy budget, climate feedbacks, and climate sensitivity
- Chapter 8: Water cycle changes
- Chapter 9: Ocean, cryosphere, and sea level change
- Chapter 10: Linking global to regional climate change
- Chapter 11: Weather and climate extreme events in a changing climate
- Chapter 12: Climate change information for regional impact and for risk assessment
- Atlas of Regional Climate Information

Scenarios and time-dependent  
implications for radiative  
forcing and climate response  
Air quality

# Working Group I AR6

## Climate processes

- Chapter 1: Framing, context, methods
- Chapter 2: Changing state of the climate system
- Chapter 3: Human influence on the climate system
- Chapter 4: Future global climate: scenario-based projections and near-term information
- Chapter 5: Global carbon and other biogeochemical cycles and feedbacks
- Chapter 6: Short-lived climate forcers
- Chapter 7: The Earth's energy budget, climate feedbacks, and climate sensitivity
- Chapter 8: Water cycle changes
- Chapter 9: Ocean, cryosphere, and sea level change
- Chapter 10: Linking global to regional climate change
- Chapter 11: Weather and climate extreme events in a changing climate
- Chapter 12: Climate change information for regional impact and for risk assessment
- Atlas of Regional Climate Information

Climate and Earth system  
feedbacks  
Estimates of ECS, TCR, TCRE  
Metrics to evaluate emissions

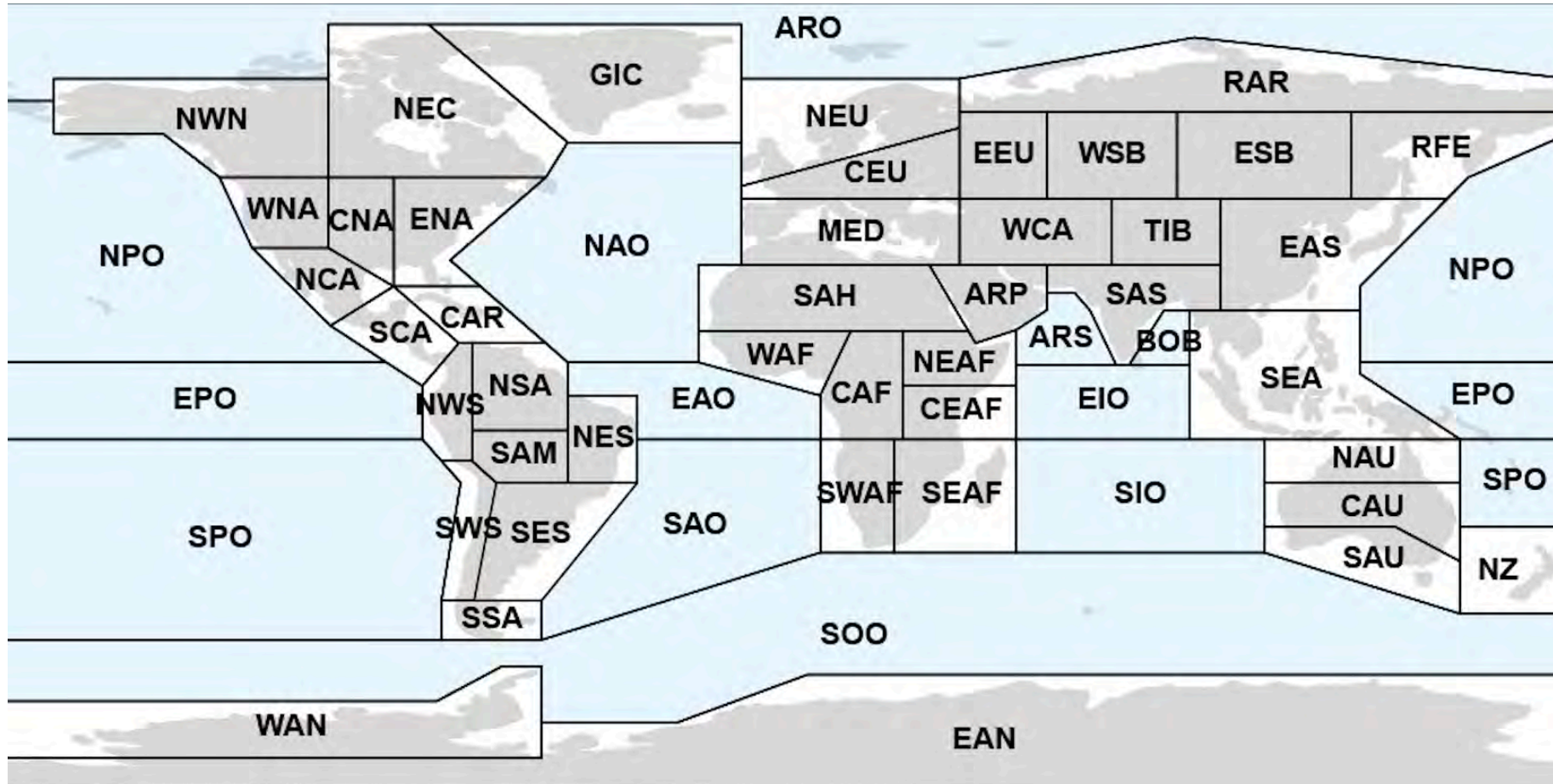
# Working Group I AR6

## Regional climate information

- Chapter 1: Framing, context, methods
- Chapter 2: Changing state of the climate system
- Chapter 3: Human influence on the climate system
- Chapter 4: Future global climate: scenario-based projections and near-term information
- Chapter 5: Global carbon and other biogeochemical cycles and feedbacks
- Chapter 6: Short-lived climate forcers
- Chapter 7: The Earth's energy budget, climate feedbacks, and climate sensitivity
- Chapter 8: Water cycle changes
- Chapter 9: Ocean, cryosphere, and sea level change
- Chapter 10: Linking global to regional climate change
- Chapter 11: Weather and climate extreme events in a changing climate
- Chapter 12: Climate change information for regional impact and for risk assessment
- Atlas of Regional Climate Information

Regional messages, narratives and storylines  
Hazards

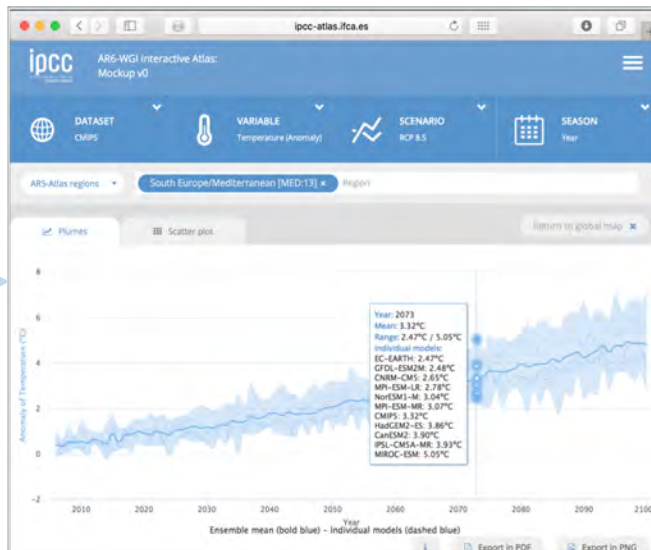
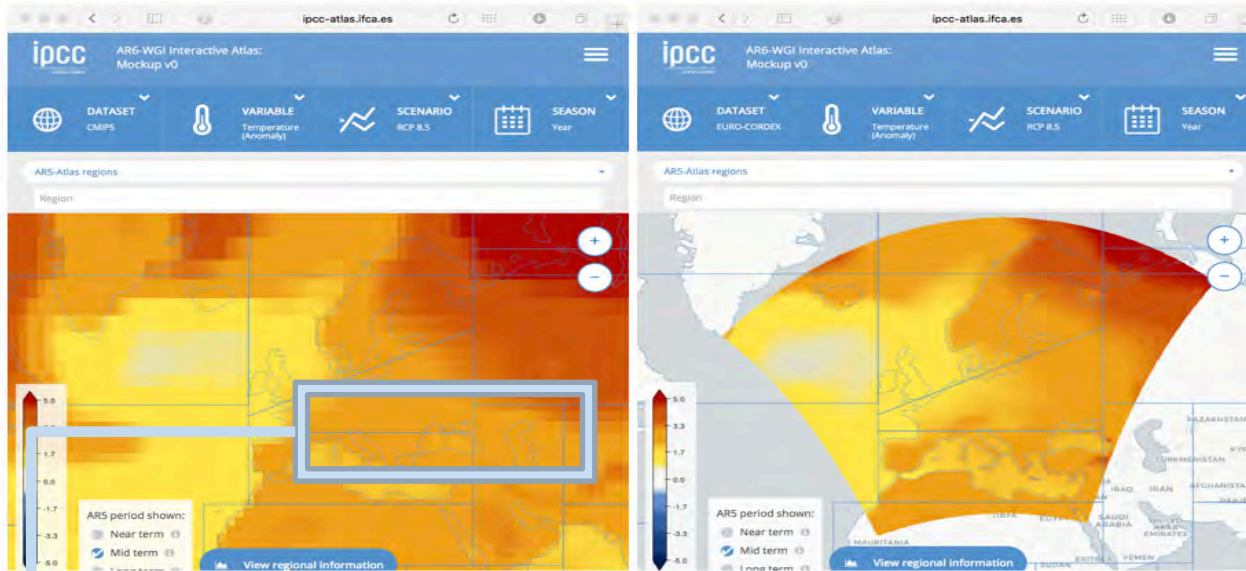
# WGI Regions



ITURBIDE ET AL., IN PREP.



# WGI Atlas and online-interactive tool



- Temporal and spatial and typological domains
- Multiple lines of evidence
- Global synthesis
- Regional syntheses (*observations and attribution; model performance; projections*)
- Communication of climate change information
- Interactive Atlas
- FAIR Data and script (*accessible, reproducible, curated*)

# Development of AR6 WGI key findings



Survey of authors and users  
Defining the objectives and users

Facilitated mini-dialogues of authors  
CLAs and WGI Bureau



# New opportunities for WGI narrative

- Moving on from 'it is happening and it is caused by humans'
- We can combine observed change and attributed change – strengthening evidence over past 35 years.
- The climate of today - not just in terms of mean, but also in context of internal variability, incl. volcanoes, and extremes
- Emerging signals
- Assessment and linkages between global and regional

# Use of compelling storylines

- Useful, actionable guidance to policymakers – particularly to communicate integrated findings, including on regional climate change
- Highlights the links between different components of the climate system
- Sets out where we are now (present and committed climate change) through plausible temperature futures, taking the reader from global to local within each future.
- A complementary Technical Summary strengthens approach and its link to chapters

# WGI SPM narrative

BOX - Key concepts, definitions, reference periods etc.

## A: Framing

Context and concepts; evidence base; from global to regional; integrated knowledge

## B: The state of the climate: where are we now and how did we get here

Historical context

**Climate today** (atmosphere incl. air quality, carbon budgets, ocean, cryosphere, sea level, biosphere, water cycle, hazards and extremes)  
(*advances in event attribution*)

**Committed change:** interplay with natural variability

## C: Our different futures : multiple choices, multiple futures

Choices (emissions, dates, net zero etc).

Linking choices to global threads

Quantification of outcomes : global indices, regional indices, hotspots (link to atlas)

Sources of uncertainty : signal/noise and process (region, thread, term, scale of warming), time of emergence, surprise potential

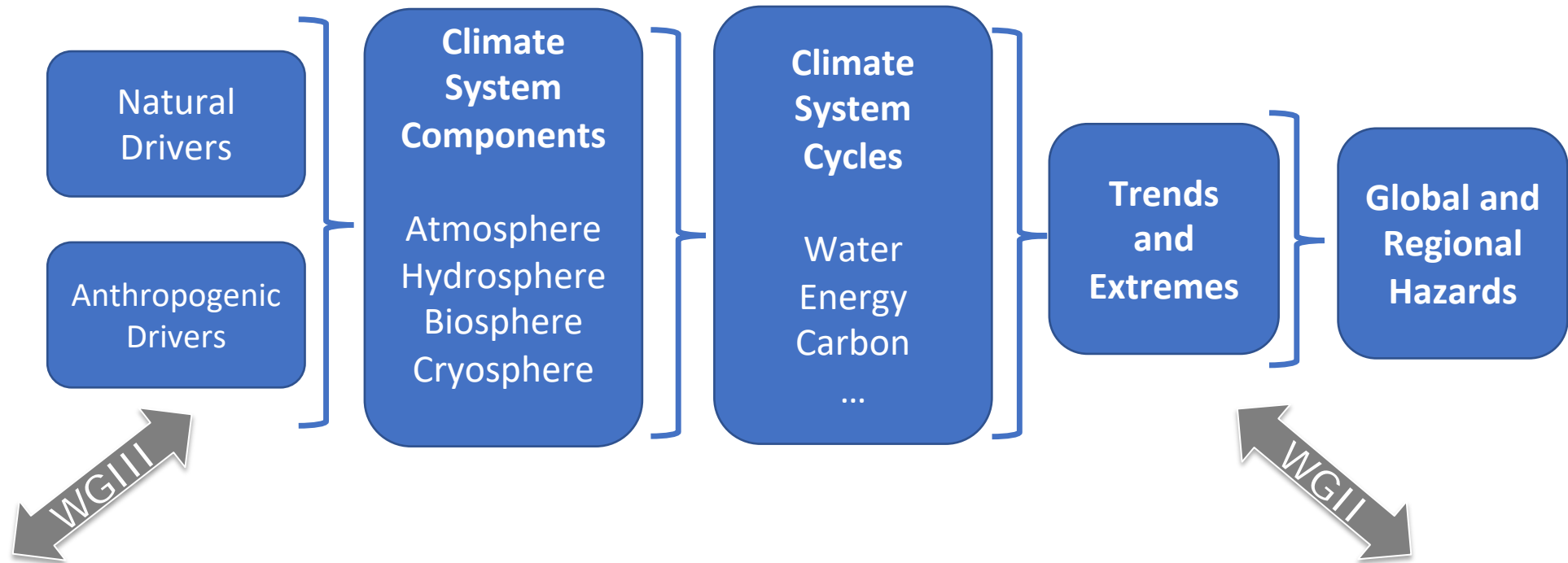
BOX — Regional Hot Spots (e.g., CH3 SR15) emerging and projected (sections B & C).

## D: Understanding the responses to climate change

**Reducing GHG emissions** would limit the degree of climate change: Near-term & role of SLCF: **Internal variability:** **Net zero emissions:**

**Climate responses to CDR & SRM:** **Climate info for Risk & solutions:** Integration of adaptation and mitigation **handshake** to WGII & WGIII

# Integrated climate knowledge to inform global and regional action



*Emission and land use pathways  
in a changing climate,  
geophysical feasibility of response  
options, air quality*

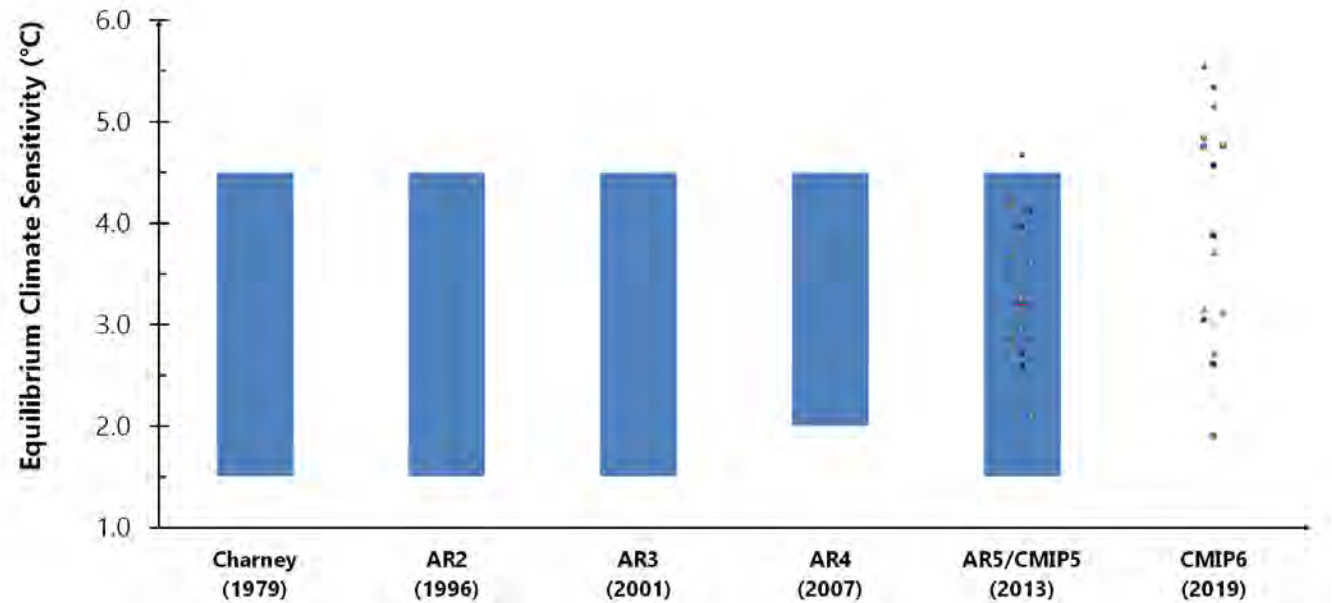
*Climate information  
relevant for response  
strategies, risk  
management*

# CMIP6 results

## Provisional key statements

The range of projected warming by the end of the 21<sup>st</sup> century, relative to the pre-industrial period, is around 30% larger than in corresponding scenarios of the AR5. The increase of the upper end of the projected warming range is closely tied to the larger fraction of models with high equilibrium climate sensitivity and transient climate response in AR6, compared to AR5.

Based on multiple lines of evidence the best estimate of equilibrium climate sensitivity (ECS) is 3 °C, the *likely* range is 2.5 to 4 °C and the *very likely* range is 2 to 5 °C. It is *virtually certain* that ECS is larger than 1.5 °C



# WGI Technical Summary

Emerging characteristics for the structure,  
assembling *thematic focus elements*

## Complementing the SPM:

- Metrics, incl. at regional level
- More regional aspects
- Information relevant for the Global Stocktake
- Uncertainties & knowledge gaps

- **Introduction** – incl. key concepts
- **TS1: Large scale change**
  - TS1.1 *Updates to AR5* [Comparing Projections and key metrics from previous IPCC Assessments with Observations]
  - TS 1.2 Atmosphere
  - TS 1.3 Oceans
  - TS 1.4 Biosphere
  - TS 1.5 Cryosphere
- **TS2: Earth system change and feedbacks**
  - TS2.1: Earth System Change
  - TS2.2: *Water Cycle Change*
  - TS2.3: *Sea Level Change*
  - TS2.4: *The Changing Energy Budget*
  - TS2.5: *Carbon Cycle*
  - TS2.6: *Irreversibility and Abrupt Change*
  - TS2.7: *Climate Sensitivity and Feedbacks*
  - TS2.8: *Climate Targets and Stabilization* (incl. SRM/CDR?)
- **TS 3: Regional climate change**
  - TS3.1: Modes of variability/climate dynamics
  - TS3.2: *Climate Extremes*
  - TS3.4: Regional change (region-specific e.g. Polar regions, Megacities)

**Ongoing cross-WG  
coordination**

# Scenarios across all WG

- Enhanced awareness and understanding (incl. underlying assumptions)
- Consistent terminology, information, data, uses of timeframes
- Consistency across chapters and reports
- Coordination in assessment of warming levels, key climate variables, natural and human system parameters (WGI-WGII)
- Consistency between climate system parameters (WGI) and reduced complexity models used for classification of scenarios (WGIII)
- Coordinated communication (storylines) and integration



# Coordination across WGI and WGII

- Harmonization of regional assessments (across regional domains – Africa, Australasia, Asia, Central and South America, Europe, North America, Small Islands; also efforts for 'typological regions' – Polar, cities and settlements; ecosystems, biodiversity)
- Case Studies (regional and sectoral)
- Hazards for risk assessment, incl. compound events, air quality, low probability / high impact, physically plausible future changes
- Confidence in climate information used for impact / risk studies, incl. CMIP3-CMIP5-CMIP6, global / regional models, and water cycle changes

## Coordination across WGI-WGIII

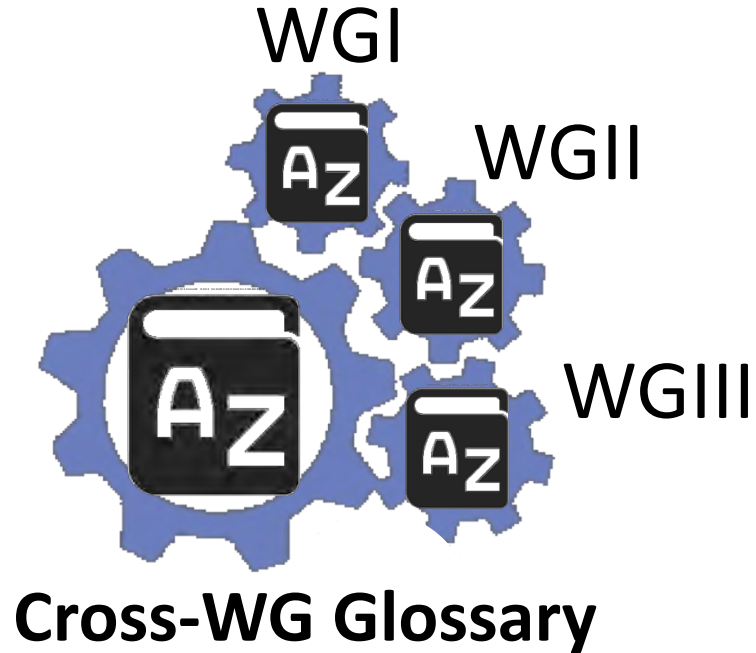
- Emission metrics, remaining carbon budget
- Separation of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, other GHG, SLCF
- Health co-benefits of non-CO<sub>2</sub> mitigation
- How to best assess “commitment” (climate system, current infrastructure and investments)

## Coordination across WGI-WGII-WGIII

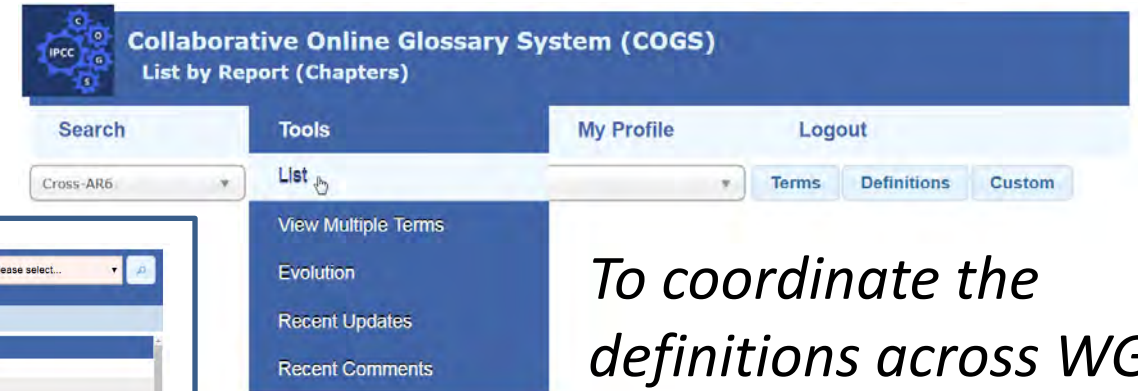
- Glossary
- *Feasibility*
- *Land use*
- *Geophysical limits and climate change (biomass, energy)*
- *Extremes and their impacts (case studies)*
- *SRM*
- *Shipping and aviation*

# Cross-WG Glossary

- *Developing a single cross-WG glossary for the WG reports*
- *Standardized definition for each term*



## Collaborative Online Glossary System (COGS)



ipcc IPCC Glossary Search

Search for term  Please select...

A - B - C - D - E - F - G - H - I - K - L - M - N - O - P - Q - R - S - T - U - V - W

Term	Report
Abrupt change/abrupt climate change	AR5-SYR
Abrupt climate change	SREX
Active control	SRREN
Active solar	SRREN
Adaptation	AR5-SYR, AR5-SYR, SREX
Adaptation assessment	SREX
Adaptation deficit	AR5-SYR
Adaptation limit	AR5-SYR
Adaptive capacity	AR5-SYR, SREX
Adverse side effects	AR5-SYR
Aerosols	SRREN, SREX
Afforestation	GDPRN, AR5-SYR

**Public IPCC Glossary**

[apps.ipcc.ch/glossary](https://apps.ipcc.ch/glossary)

## Reflections for the SYR Storyline

# WGII Elements evolving from AR6 SRs and main report

SR 1.5 approved October 2018

SRCLL approved August 2019

SROCC approved September 2019



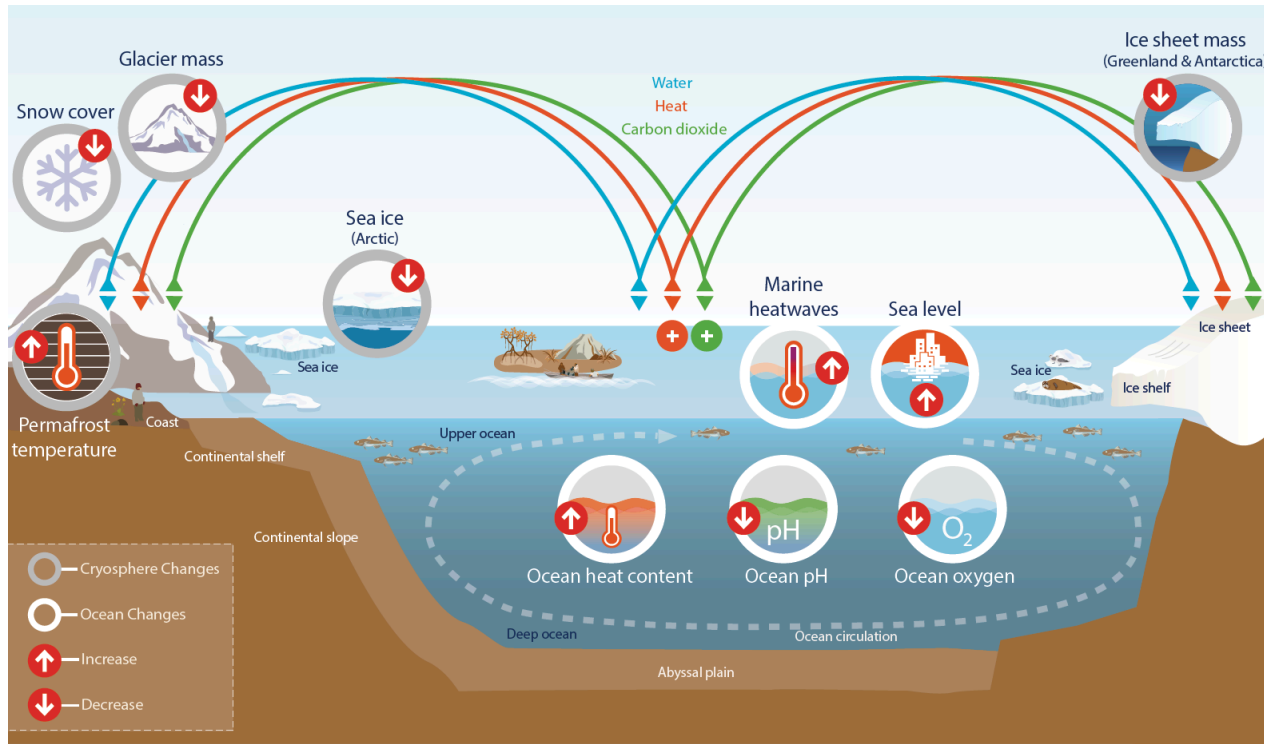
Let us make AR6SYR a success!

**Hans-O. Pörtner and Debra Roberts**  
**IPCC WGII Co-Chairs**

# General Themes for AR6 WGII (SRs and WGIISPM)

- Impacts and Risks across sectors and regions
- Reasons for Concern
- Reasons for Action
- Adaptation pathways, feasibility and limits, mitigation interactions
- Solution space
  - Enabling conditions, governance context, societal and technological transformations
- Climate Resilient Development Pathways

# The complexity of hazards, exposures, vulnerabilities ... risks



e.g. SROCC  
in a nutshell: ...over 80 % of the earth surface climate change affects life sustaining systems - from the top of the mountains to the depth of oceans. These changes will continue for generations to come.

# Captured in WGII AR6 Outline

Chapter 1: Point of departure and key concepts

*SECTION 1: Risks, adaptation and sustainability for systems impacted by climate change*

Chapter 2: Terrestrial and freshwater ecosystems and their services

Chapter 3: Ocean and coastal ecosystems and their services

Chapter 4: Water

Chapter 5: Food, fibre, and other ecosystem products

Chapter 6: Cities, settlements and key infrastructure

Chapter 7: Health, wellbeing and the changing structure of communities

Chapter 8: Poverty, livelihoods and sustainable development

*SECTION 2: Regions*

Chapter 9: Africa

Chapter 10: Asia

Chapter 11: Australasia

Chapter 12: Central and South America

Chapter 13: Europe

Chapter 14: North America

Chapter 15: Small Islands

*SECTION 3: Sustainable development pathways: integrating adaptation and mitigation*

Chapter 16: Key risks across sectors and regions

Chapter 17: Decision-making options for managing risk

Chapter 18: Climate resilient development pathways



# NEW for WGII in AR6: Integrative Cross-Chapter Papers

1. Biodiversity hotspots (land, coasts and oceans)
2. Cities and settlements by the sea
3. Deserts, semi-arid areas, and desertification
4. Mediterranean region
5. Mountains
6. Polar regions
7. Tropical forests

Could be **adopted as highlights** in SYR and complemented by WGI and WGIII aspects.

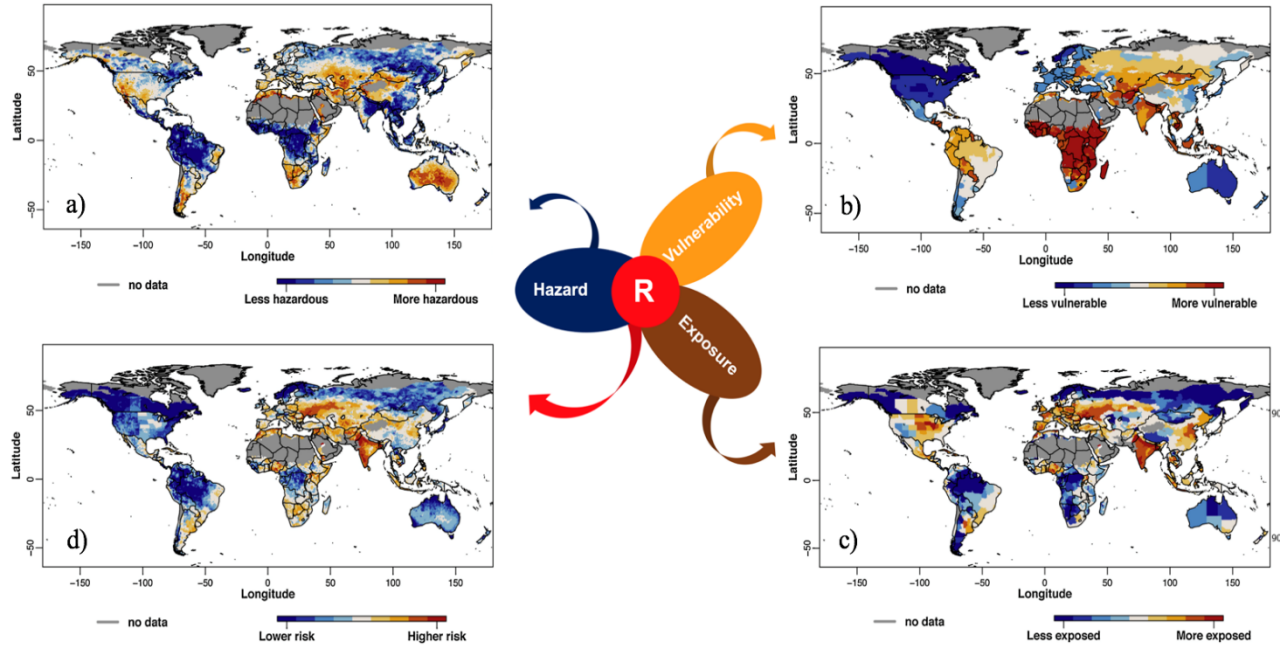




## Regional differentiation (WGI + II.... + III)

- Regionalisation according to
- e.g. Climatic zones (WGI) vs (sub)continental (WGII chapters) vs biogeographic (WGII papers)
- Distribution of impacts and key risks (WGII)
- Combining Regional Climate Information (WGI) and Impact and Risk Assessment (WGII) and regional adaptation / mitigation efforts (WGIII)
- Pursuing WGII Atlas...
  - Global to regional
  - Case studies

e.g. WGII atlas integrating WGI information:  
**Drought hazard, vulnerability, exposure and risk**



**AR6 WGII FOD Figure 4.8**

## **Sectoral integration: Urban areas / Cities (WGI + II + III)**

- Potential to accelerate and upscale climate action
- Urban trends and climate interactions
  - Eg. Urban emissions
- Urban adaptation and mitigation options
  - Eg. Green, blue, grey infrastructure,
  - Innovation and transformative action
- Co-benefits and tradeoffs
  - Eg. Short-lived climate forcers, air quality and health
- Addressing development concerns: poverty and inequality

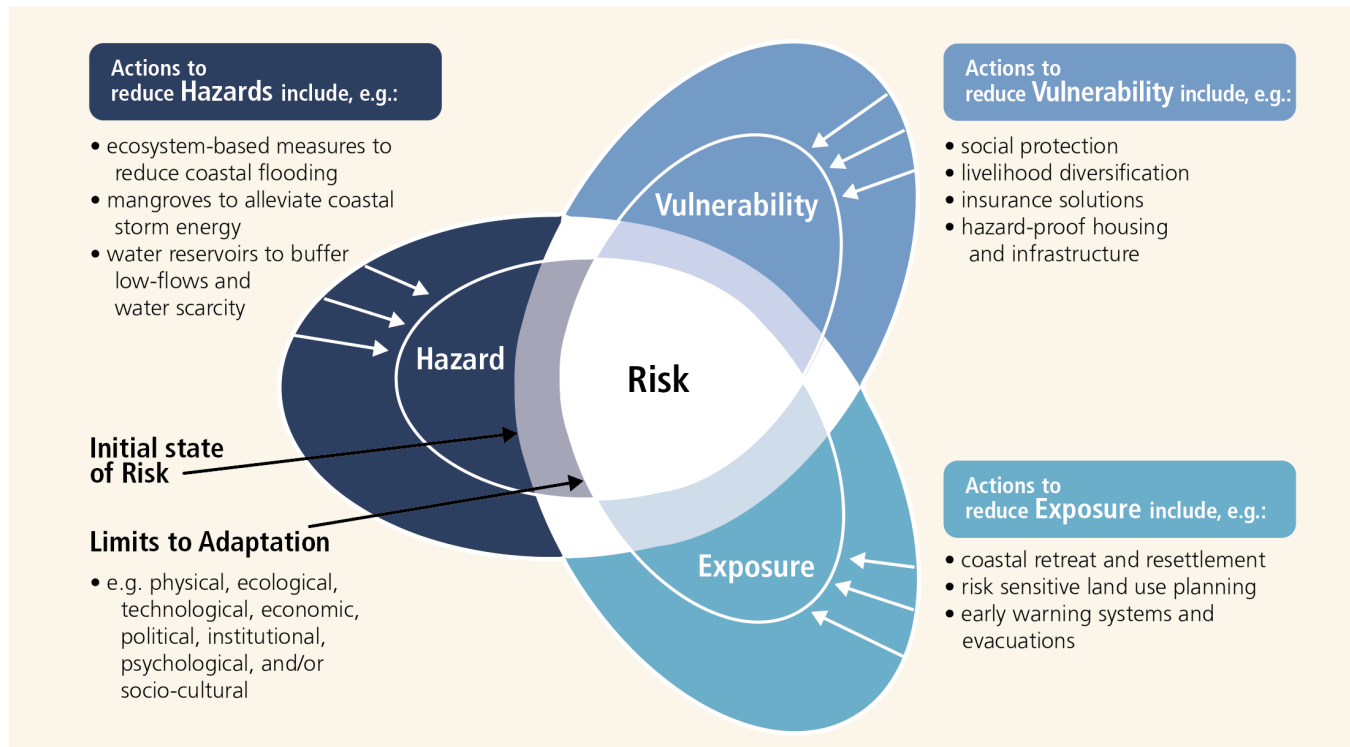
## Adaptation and Mitigation Tradeoffs (WGII + III)

- Adaptation pathways, limits and residual risks
- Adaptation gaps and deficits
- Adaptation and mitigation feasibility assessments
- Synergies and trade-offs among adaptation,, mitigation and sustainable development
  - e.g., energy and water sectors, food production systems, biodiversity, poverty alleviation, health

# Biodiversity and Ecosystems across WGs

- Climate feedbacks
  - eg, habitat losses and gains,
  - browning/greening of freshwater and land, wildfires,
  - ocean nutrient and carbon cycles,
  - permafrost degradation,
  - biodiversity and carbon stores
- Climate mitigation
  - eg afforestation/reforestation, land management, ocean solutions
- Ecosystem-based adaptation
  - eg MPAs,
  - integrated water management,
  - green and blue infrastructure,
  - maintaining and building carbon stocks

# Continued development of Risk and Adaptation Concepts

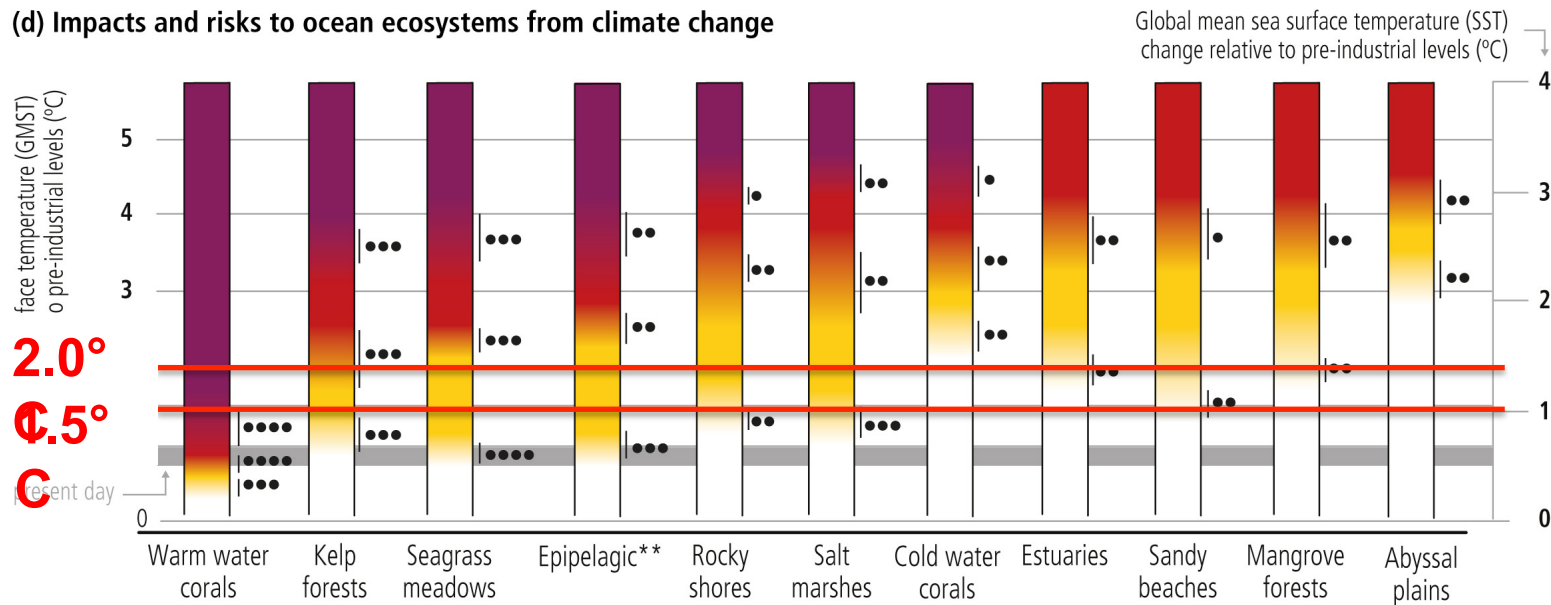


SROCC Figure CB2.1

# Key risks and adaptation options by system and region (WGII Chp 16)

- Key risks eg risks to ecosystems, to living standards, to human health, to food security, economic performance, response strategies

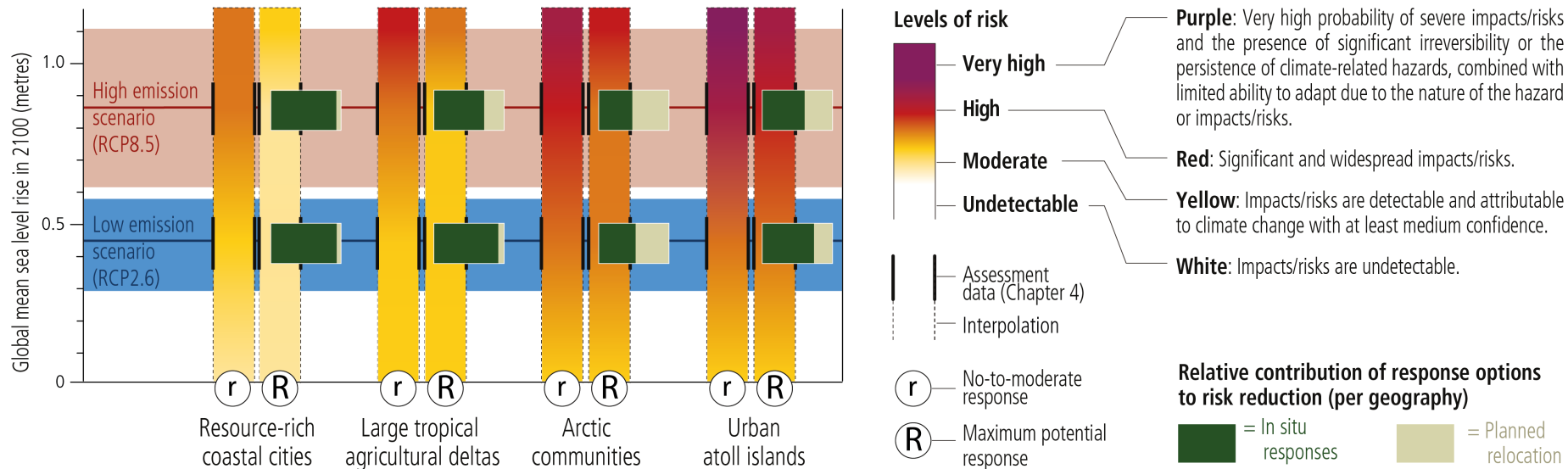
(d) Impacts and risks to ocean ecosystems from climate change



SROCC Figure SPM.3

## (a) Risk in 2100 under different sea level rise and response scenarios

Risk for illustrative geographies based on mean sea level changes (*medium confidence*)



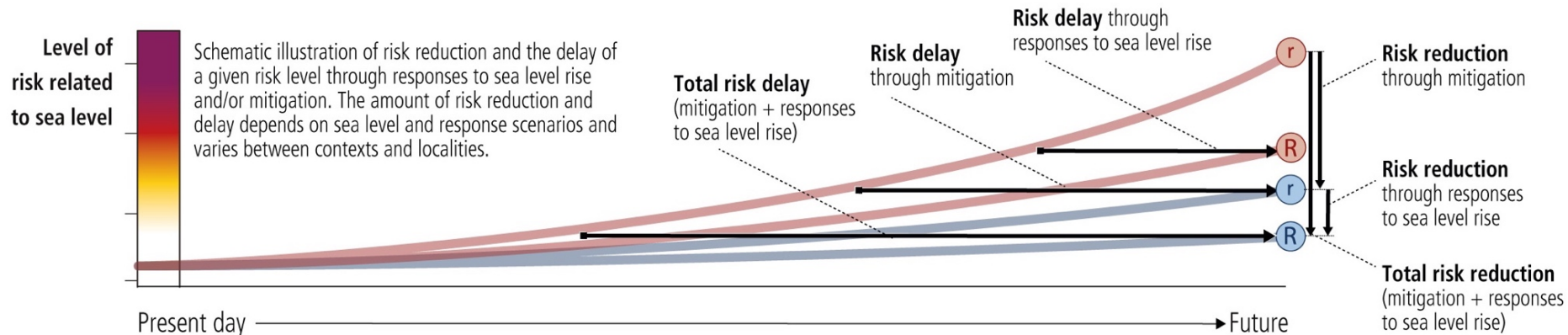
**SROCC Figure SPM.5**



# Sea level rise risk and responses

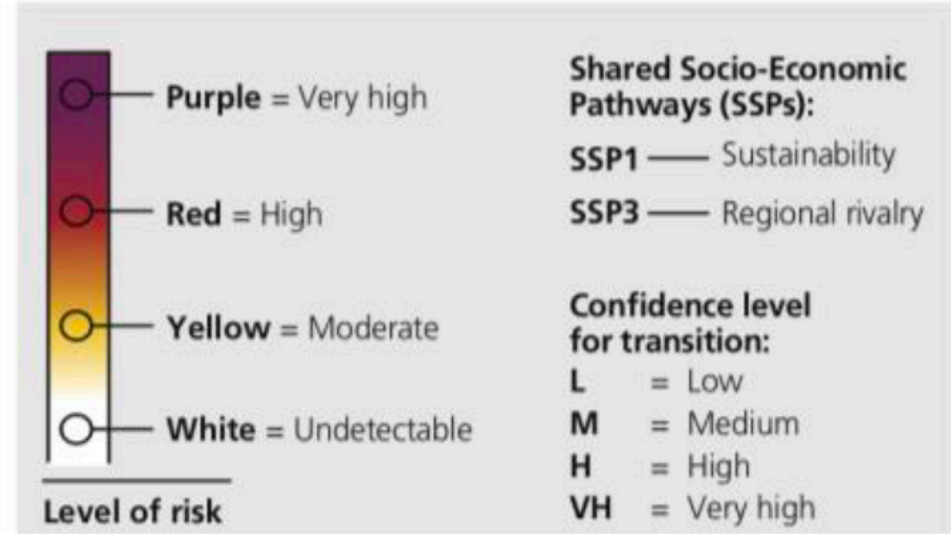
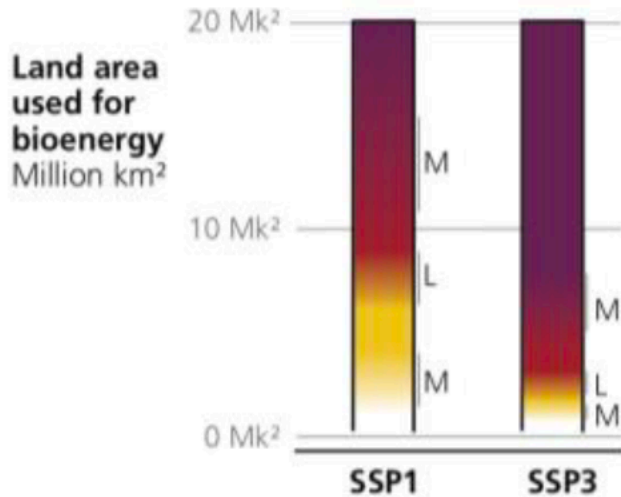
The term response is used here instead of adaptation because some responses, such as retreat, may or may not be considered to be adaptation.

## (b) Benefits of responses to sea level rise and mitigation



Risk may continue to increase at different rates, exemplified by sea level rise, also depending on the capacity of responses, i.e. local adaptation and/or retreat, as well as depending on mitigation efforts;  
...Risk reduction through adaptation may therefore be time limited....

# Risk associated with adaptation and mitigation measures, including Geoengineering distinguishing socioeconomic pathways

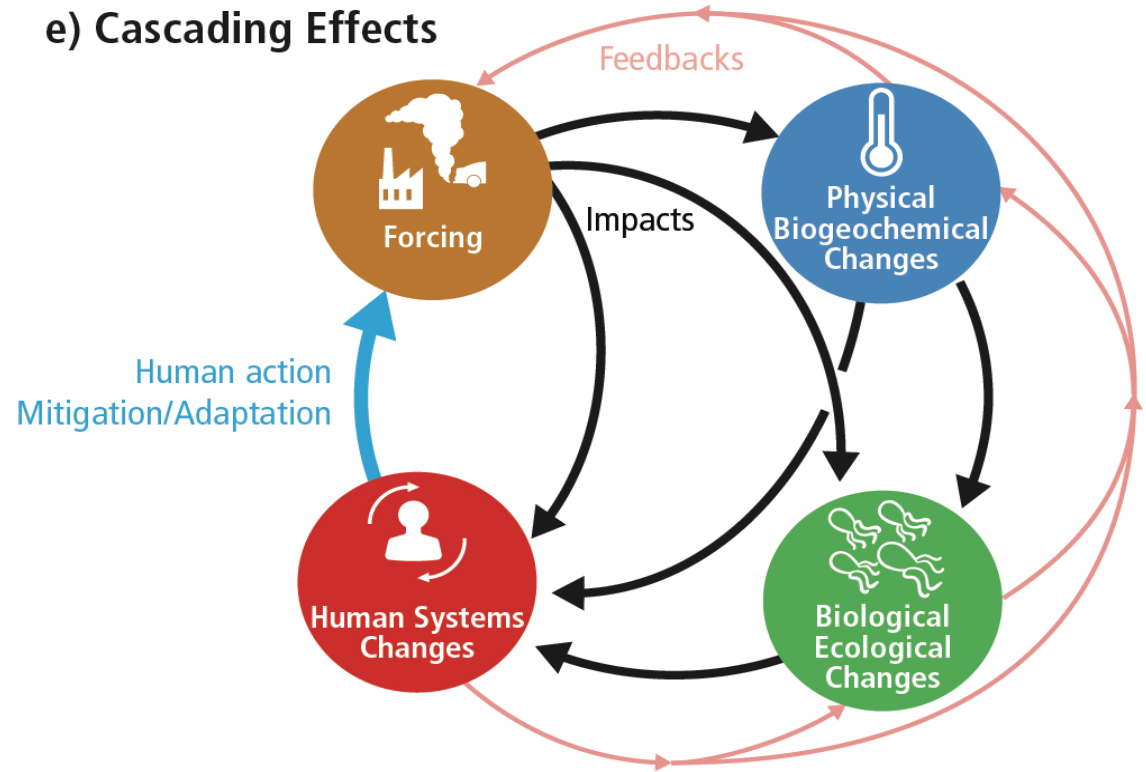


SRCCCL ch. 7

# Interconnected Risks and Responses

- Cascading interactions of risks within and among regions
- Inter-regional / societal teleconnections of impacts and risks
  - eg human migration, energy, health, food supply and price

## e) Cascading Effects



**SROCC Figure 1.1(e)**

# WGII and cross WG Elements evolving from AR6 SRs and Main Report

- **Natural carbon stocks as adaptation mitigation nexus:** sustainable land and ocean management emphasizing nature-based solutions and biodiversity conservation
- **Cities as hotspots of adaptation and mitigation efforts and tradeoffs**
- **Risks of adaptation and mitigation options** (risks exacerbating climate change risks), e.g, bioenergy CCS: WGII WGIII
  - Include time dependence of risk development, time limit for adaptation success, e.g. for sea level, consider macro-indicators such as adaptive capacities, life expectancy
- **Enabling conditions and governance context, informed decision making**
- **Reference to regions to integrate synergies and tradeoffs of adaptation and mitigation:** mitigation targets which allow adaptation to be successful (WGI-II-III)
- **SDGs and CRDPs as landing zones, through SSPs?**

# SRCCL and WG III AR6

PR Shukla and Jim Skea  
WG III CO-CHAIRS

# Messaging from the Special Report on Climate Change and Land (SRCCL)

- **Land is a critical resource: we rely on it for food, water, health and wellbeing –** but it is already under growing human pressure. Climate change is adding to these pressures
- Coordinated action to tackle climate change can **simultaneously improve land, food security and nutrition, and help to end hunger.**
- **The land that we are already using could feed the world in a changing climate and provide biomass for renewable energy,** but it would require early, far-reaching action across several fronts.
- **Better land management can play its part** in tackling climate change, but it can't do it all.





# SRCCL Reminders

- **The long title:** An IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems
- Consultations were held with FAO, UN Convention to Combat Desertification (UNCCD) and IPBES prior to scoping the report
- Authors included FAO employees, members of the UNCCD Science-Policy Interface, and IPBES report authors
- The assessed literature included IPBES reports and the UNCCD Global Land Outlook

# How land-related response options were classified

## Responses by broad type

- Land management
- Value chain management
- Risk management

## Responses by magnitude of impact (technical mitigation potential)

- $> 3 \text{ Gt CO}_2\text{eq yr}^{-1}$
- $0.3 - 3 \text{ Gt CO}_2\text{eq yr}^{-1}$
- $< 0.3 \text{ Gt CO}_2\text{eq yr}^{-1}$

## Responses by impact on land competition

- No or limited competition for land
- Those that rely on additional land use change



## No or limited competition for land: co-benefits and adverse side effects

## Additional land-use change: co-benefits and adverse side effects (BECCS example)

### Bioenergy and BECCS



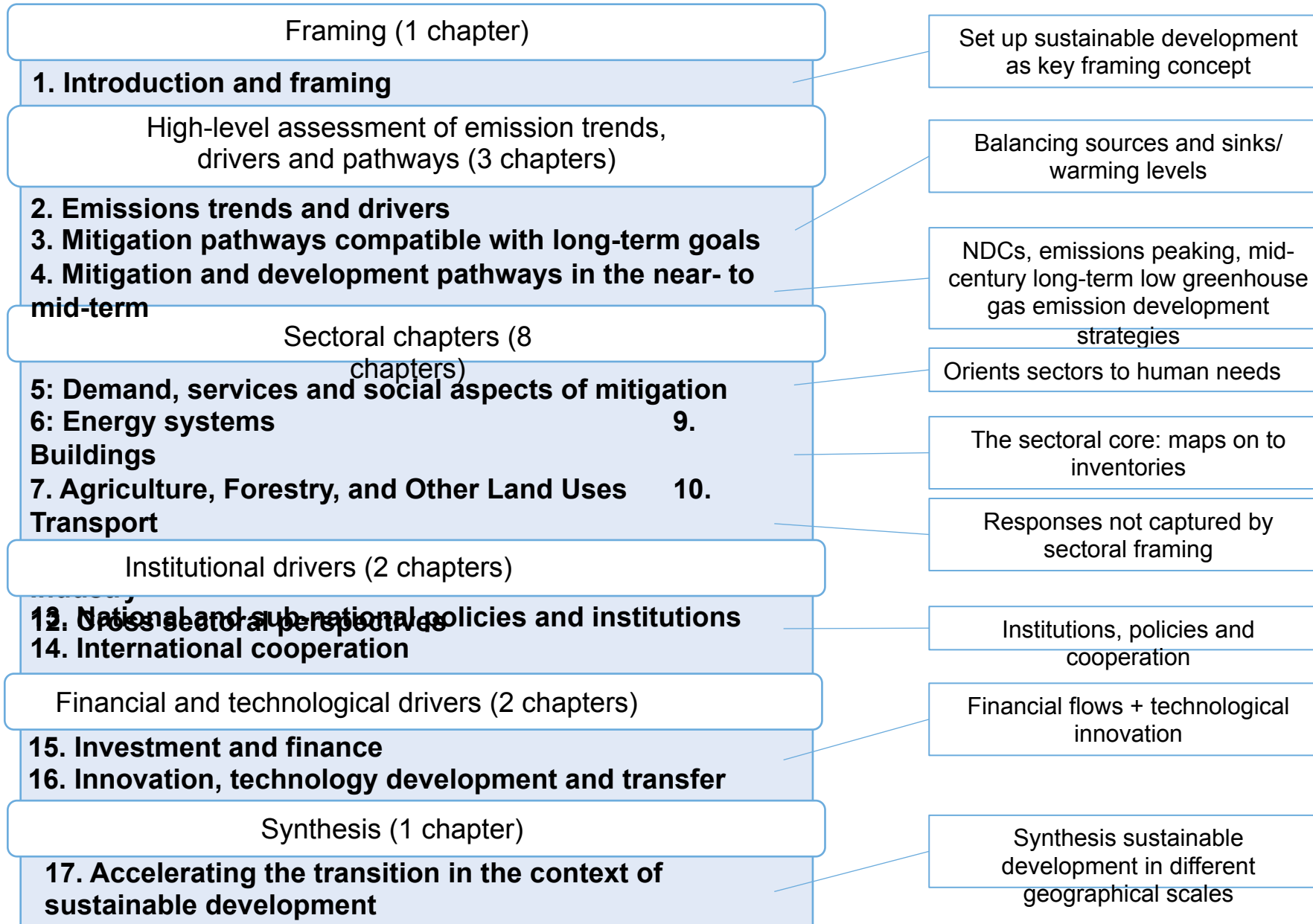
**High level:** Impacts on adaptation, desertification, land degradation and food security are maximum potential impacts, assuming carbon dioxide removal by BECCS at a scale of 11.3 GtCO<sub>2</sub> yr<sup>-1</sup> in 2050, and noting that bioenergy without CCS can also achieve emissions reductions of up to several GtCO<sub>2</sub> yr<sup>-1</sup> when it is a low carbon energy source {2.7.1.5; 6.4.1.1.5}. Studies linking bioenergy to food security estimate an increase in the population at risk of hunger to up to 150 million people at this level of implementation {6.4.5.1.5}. The red hatched cells for desertification and land degradation indicate that while up to 15 million km<sup>2</sup> of additional land is required in 2100 in 2°C scenarios which will increase pressure for desertification and land degradation, the actual area affected by this additional pressure is not easily quantified {6.4.3.1.5; 6.4.4.1.5}.



**Best practice:** The sign and magnitude of the effects of bioenergy and BECCS depends on the scale of deployment, the type of bioenergy feedstock, which other response options are included, and where bioenergy is grown (including prior land use and indirect land use change emissions). For example, limiting bioenergy production to marginal lands or abandoned cropland would have negligible effects on biodiversity, food security, and potentially co-benefits for land degradation; however, the benefits for mitigation could also be smaller. {Table 6.58}

Response options based on land management		Mitigation	Adaptation	Desertification	Land Degradation	Food Security	Cost
Agriculture	Increased food productivity	L	M	L	M	H	—
	Agro-forestry	M	M	M	M	L	●
	Improved cropland management	M	L	L	L	L	●●
	Improved livestock management	M	L	L	L	L	●●●
	Agricultural diversification	L	L	L	M	L	●
	Improved grazing land management	M	L	L	L	L	—
	Integrated water management	L	L	L	L	L	●●
	Reduced grassland conversion to cropland	L	—	L	L	L	●
Forests	Forest management	M	L	L	L	L	●●
	Reduced deforestation and forest degradation	H	L	L	L	L	●●
Soils	Increased soil organic carbon content	H	L	M	M	L	●●
	Reduced soil erosion	↔ L	L	M	M	L	●●
	Reduced soil salinization	—	L	L	L	L	●●
	Reduced soil compaction	—	L	—	L	L	●
Other ecosystems	Fire management	M	M	M	M	L	●
	Reduced landslides and natural hazards	L	L	L	L	L	—
	Reduced pollution including acidification	↔ M	M	L	L	L	—
	Restoration & reduced conversion of coastal wetlands	M	L	M	M	↔ L	—
	Restoration & reduced conversion of peatlands	M	—	na	M	L	●
Response options based on value chain management		Mitigation	Adaptation	Desertification	Land Degradation	Food Security	Cost
Demand	Reduced post-harvest losses	H	M	L	L	H	—
	Dietary change	H	—	L	H	H	—
	Reduced food waste (consumer or retailer)	H	—	L	M	M	—
Supply	Sustainable sourcing	—	L	—	L	L	—
	Improved food processing and retailing	L	L	—	—	L	—
	Improved energy use in food systems	L	L	—	—	L	—
Response options based on risk management		Mitigation	Adaptation	Desertification	Land Degradation	Food Security	Cost
Risk	Livelihood diversification	—	L	—	L	L	—
	Management of urban sprawl	—	L	L	M	L	—
	Risk sharing instruments	↔ L	L	—	↔ L	L	●●

# Outline of the Working Group III AR6 Report



# Cross-cutting elements addressed in WG III LAM2

## Framing

- Scenarios, including x-WG links (full “Day 0” on scenarios at LAM2)
- Narratives/storylines
- Feasibility
- Sustainable development

## Other elements

- Urban
- Costs and potentials
- Finance and investment
- Policies
- Carbon dioxide removal and bioenergy
- Data harmonisation including regional categorisation

# Scenarios and illustrative pathways

- Prising open the black box: Annex on scenarios and modelling methods
- Illustrative pathways have a strong communication potential and can provide linkage between the WGs.
- Illustrative pathways within WG III, and illustrative pathways that get linkages between WGs
- The SSPs and naming conventions for illustrative pathways
- We should have 4-5 pathways as a minimum that are assessed in each WG, which then can be brought into the Synthesis Report
- Need to look at what makes scenarios *infeasible*

# A feasibility framework

- Retain six dimensions of feasibility as in SR1.5
  - *Geophysical*
  - *Environmental-ecological*
  - *Technological*
  - *Economic*
  - *Socio-cultural*
  - *Institutional*
- Identify observable indicators for each dimension
- Indicators developed and applied at the system and sectoral level as well as at the level of individual options as in SR1.5

# Other x-WG/synthesis issues

## All

- Scenarios/illustrative pathways

## WG I/III

- Temperature metrics (implications for carbon budgets)
- Climate sensitivity
- CO<sub>2</sub> and non-CO<sub>2</sub> emissions
- Land-related emissions and sinks (plus TFI/inventories link)
- Solar radiation management

## WG II/III

- Mitigation–adaptation synergies
- Finance issues in the context of the Paris Agreement
- Cities
- Ecosystem service/biodiversity implications of large-scale land-based mitigation

# Draft WG III Summary for Policymakers outline

1. Introduction and framing
  - Sustainable development assertion (Ch.1&17)
2. The current pathway
  - Current drivers and trends (Ch.2 + Chs.5-12, 13-16)
  - Where we are headed (Ch.4)
3. System transitions to limit global warming
  - What does the “gap” imply in terms of system change (Ch.3)
  - Solutions and choices for systems and sectors (Chs.3,4,6-12)
4. Opportunities and challenges (Chs.1,17,all)
  - “Feasibility”
  - Mitigation and sustainable development
5. Enabling system transitions
  - Social aspects (Ch.5)
  - Institutions and policies (Chs.13-16)

## Annex 7 - Nominations and participant selection

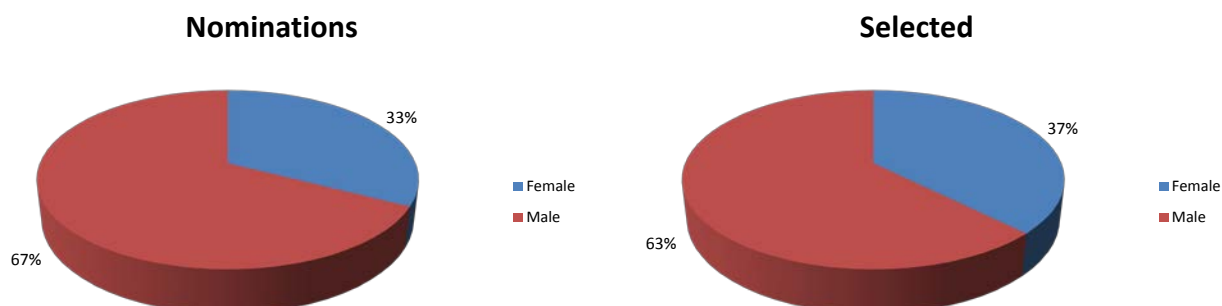
The IPCC procedures related to scoping meetings state that nominations for participation will be solicited from Government Focal Points, observer organizations, and Bureau members.

The IPCC Secretariat sent the invitation to nominate experts for the AR6 Synthesis Report scoping meeting on 30 April 2019 to Government Focal Points, observer organizations and Bureau members. By the deadline of 2 June 2019, a total of 549 nominations had been received. Of these, 48% were from developing countries and countries with economies in transition, and 33% were female.

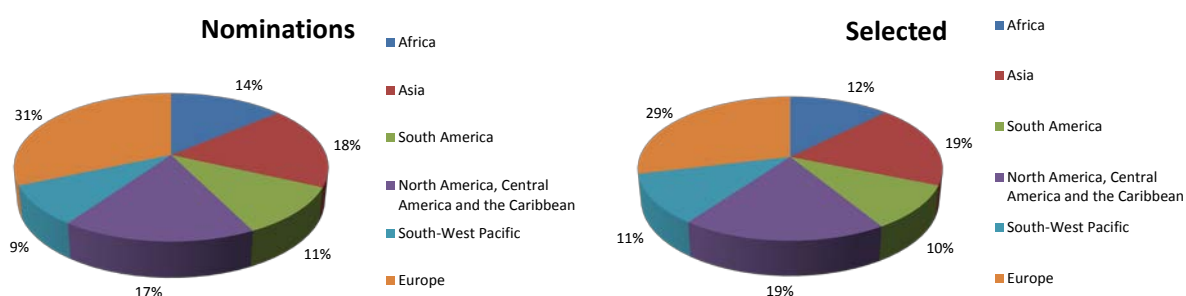
The IPCC procedures on the participants selection for scoping of SYR states that the IPCC Chair selects the participants in consultation with the Working Group Co-Chairs. The procedures further state that In selecting scoping meeting participants, consideration should be given to the following criteria: 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. Following the procedures, the Chair consulted with the WG Co-Chairs, asking a recommendation of twenty-five nominees from each WG. The WG Co-Chairs provided recommendations after consultation with their bureau members. The Chair added five nominees to complete a list of eighty participants. Seventy experts took part in the scoping meeting: Forty-one males and twenty-nine females. Thirty-five experts were from developed countries and thirty-five from developing countries or CEITs. Other participants to the scoping meeting included Bureau members and staff of the Technical Support Units.

Country distribution of nominations and selected experts.

### GENDER



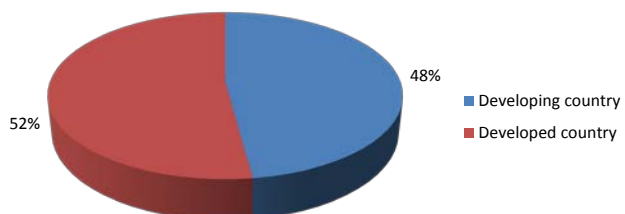
### WMO REGIONS



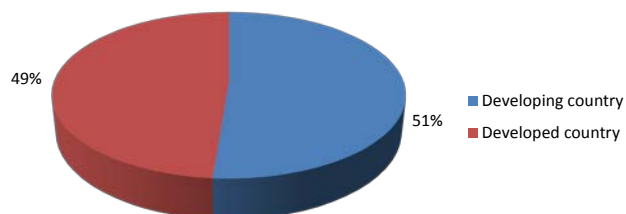


## CLASSIFICATION OF COUNTRIES

**Nominations**

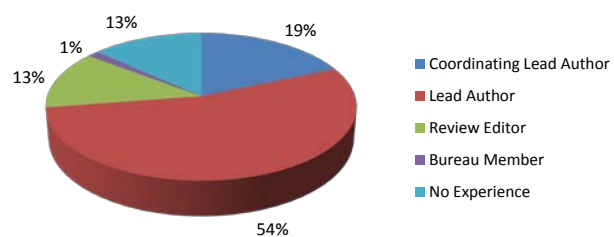


**Selected**

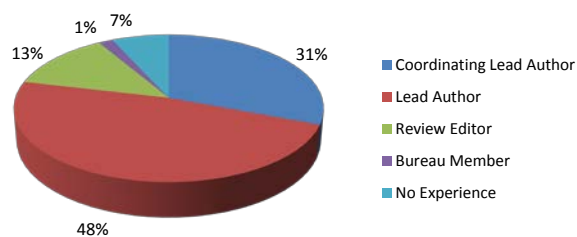


## IPCC EXPERIENCE

**Nominations**

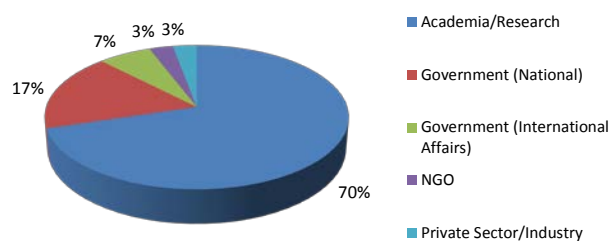


**Selected**

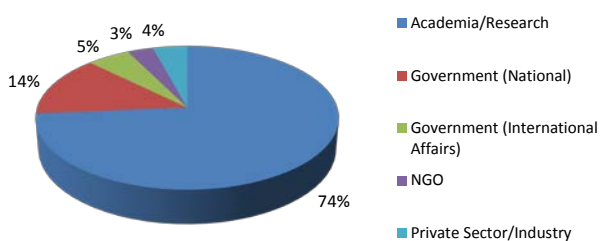


## SECTORS

**Nominations**



**Selected**



Country distribution of nominations and selected experts.

<b>Country</b>	<b>Nominated</b>	<b>Selected</b>	<b>Country</b>	<b>Nominated</b>	<b>Selected</b>
Algeria	3	-	Ghana	1	-
Argentina	8	2	Greece	1	-
Australia	18	2	Guatemala	1	-
Austria	6	1	Hungary	1	-
Bangladesh	3	1	India	18	4
Belgium	7	-	Indonesia	15	3
Benin	1	1	Iran	4	-
Botswana	1	1	Ireland	5	-
Brazil	32	3	Italy	13	-
Burkina Faso	1	-	Jamaica	4	2
Cambodia	1	-	Japan	35	4
Cameroon	1	-	Kenya	13	1
Canada	12	3	Lithuania	1	-
Chile	14	2	Malaysia	1	-
China	15	2	Maldives	1	-
Congo	1	-	Mexico	15	2
Costa Rica	1	-	Mongolia	1	-
Cote d'Ivoire	1	-	Morocco	2	-
Croatia	1	-	Myanmar	1	-
Cuba	7	-	Nepal	6	-
Democratic Republic of the Congo	1	-	Netherlands	8	3
Egypt	8	-	New Zealand	5	1
Finland	3	-	Nigeria	10	1
France	15	2	Norway	2	-
Germany	31	6	Pakistan	4	1
Peru	1	-	Switzerland	6	1

Philippines	5	1	Togo	2	-
Portugal	1	-	Tunisia	1	-
Republic of Korea	9	2	Turkey	3	-
Republic of North Macedonia	1	-	Uganda	2	-
Romania	1	1	Ukraine	1	-
Russian Federation	4	2	United Kingdom	36	6
Senegal	2	1	United Republic of Tanzania	12	1
Serbia	1	-	United States of America	54	8
Singapore	3	2	Uzbekistan	1	-
Solomon Islands	1	1	Venezuela	4	1
South Africa	3	2	Yemen	1	-
Spain	18	-	Zambia	5	1
Sudan	4	1	Zimbabwe	1	-
Sweden	6	1			
<b>Total</b>				<b>549</b>	<b>80</b>

## Annex 8 - Registered Participants

Participant	Nationality	Capacity
Abdulla, Amjad	Maldives	Bureau Member
Aldrian, Edvin	Indonesia	Bureau Member
Barrett, Ko	United States of America	Bureau Member
Calvo, Eduardo	Peru	Bureau Member
Carraro, Carlo	Italy	Bureau Member
Dadi, Diriba	Ethiopia	Bureau Member
Fischlin, Andreas	Switzerland	Bureau Member
Flato, Gregory	Canada	Bureau Member
Fuglestad, Jan	Norway	Bureau Member
Howden, Mark	Australia	Bureau Member
Krug, Thelma	Brazil	Bureau Member
Masson Delmotte, Valerie	France	Bureau Member
Mendez, Carlos	Venezuela	Bureau Member

<b>Participant</b>	<b>Nationality</b>	<b>Capacity</b>
Yassaa, Noureddine	Algeria	Bureau Member
Zhai, Panmao	China	Bureau Member
Lee, Hoesung	Republic of Korea	Chairman of the IPCC
Abe-Ouchi, Ayako	Japan	Expert
Akimoto, Keigo	Japan	Expert
Artaxo, Paulo	Brazil	Expert
Bernoux, Martial	France	Expert
Blanco, Hilda	United States of America	Expert
Calvin, Katherine	United States of America	Expert
Canadell, Josep	Australia	Expert
Cerezo Mota, Ruth	Mexico	Expert
Chacón , Noemi	Venezuela	Expert
Chao, Qingchen	China	Expert
Cheah, Lynette	Singapore	Expert

<b>Participant</b>	<b>Nationality</b>	<b>Capacity</b>
Chow, Winston	Singapore	Expert
Clarke, Leon	United States of America	Expert
Daka, Julius	Zambia	Expert
Dasgupta, Purnamita	India	Expert
De Coninck, Heleen	Netherlands	Expert
Diedhiou, Arona	Senegal	Expert
Dodman, David Richard	Jamaica	Expert
Dubash, Navroz	India	Expert
Dube, Pauline	Botswana	Expert
Elgizouli, Ismail	Sudan	Expert
Garschagen, Matthias	Germany	Expert
Geden, Oliver	Germany	Expert
Godoy-Faúndez, Alex	Chile	Expert

<b>Participant</b>	<b>Nationality</b>	<b>Capacity</b>
Haigh, Martin	UK	Expert
Hallberg, Robert	United States of America	Expert
Hayward, Bronwyn	New Zealand	Expert
Hurlbert, Margot	Canada	Expert
Kangalawe, Richard	United Republic of Tanzania	Expert
Kattsov, Vladimir	Russian Federation	Expert
Kheshgi, Haroon	United States of America	Expert
Lam, Jacqueline	Singapore	Expert
Lee, June-Yi	Republic of Korea	Expert
Ley, Debora	Mexico	Expert
Meinshausen, Malte	Germany	Expert
Narisma, Gemma teresa	Philippines	Expert
New, Mark	South Africa	Expert
Nurhati, Intan	Indonesia	Expert
O'Neill, Brian	United States of America	Expert

<b>Participant</b>	<b>Nationality</b>	<b>Capacity</b>
Okereke, Chukwumerije	Nigeria	Expert
Oki, Taikan	Japan	Expert
Otto, Friederike	Germany	Expert
Pedace, Alberto	Argentina	Expert
Revi, Aromar	India	Expert
Rojas, Maisa	Chile	Expert
Romanovskaia, Anna	Russian Federation	Expert
Roy, Joyashree	India	Expert
Saad-Hussein, Amal	Egypt	Expert
Schaeffer, Roberto	Brazil	Expert
Schipper, E. Lisa F.	Sweden	Expert
Schoeman, David	Australia	Expert
Seneviratne, Sonia	Switzerland	Expert
Shaw, Rajib	Japan	Expert



<b>Participant</b>	<b>Nationality</b>	<b>Capacity</b>
Shepherd, Theodore	Canada	Expert
Smith, Peter	UK	Expert
Sörensson, Anna	Argentina	Expert
Soussana, Jean-Francois	France	Expert
Sulistiawati, Linda Yanti	Indonesia	Expert
Tebaldi, Claudia	United States of America	Expert
Textor, Christiane	Germany	Expert
Thorne, Peter	UK	Expert
Totin, G.G. Edmond	Benin	Expert
Trisos, Christopher	South Africa	Expert
Van Aalst, Maarten	Netherlands	Expert
Van Vuuren, Detlef	Netherlands	Expert
Viner, David	UK	Expert
Vladu, Iulian Florin	Romania	Expert
von Schuckmann, Karina	Germany	Expert

<b>Participant</b>	<b>Nationality</b>	<b>Capacity</b>
Wrona, Frederick	Canada	Expert
Yong Hun, Jung	Republic of Korea	Expert
Connors, Sarah	UK	TSU
Federici, Sandro	Italy	TSU
Goldfarb, Leah	France	TSU
Kissick, Katie	UK	TSU
Matthews, Robin	UK	TSU
Mintenbeck, Katja	Germany	TSU
Pathak, Minal	India	TSU
Pirani, Anna	Italy	TSU
Poloczanska, Elvira	UK	TSU
Slade, Raphael	UK	TSU
Tignor, Melinda	United States of America	TSU



**AR6 Synthesis Report Scoping Meeting  
Singapore, 21 – 23 October 2019**

AR6/SYR-SCOP/INF. 3  
(3.X.2019)  
ENGLISH ONLY

**ANALYSIS OF GOVERNMENTS AND OBSERVER ORGANIZATIONS RESPONSES  
AND KEY ISSUES IDENTIFIED**

(Submitted by the Secretary of the IPCC)

## BACKGROUND

At the 46<sup>th</sup> Session of the IPCC (Montreal, Canada, 6 – 10 September 2017) broad elements underpinning the outline of the Sixth Assessment Report (AR6) Synthesis Report (SYR), which were developed during the AR6 Scoping Meeting (Addis Ababa, Ethiopia, 1 – 5 May 2017) were presented to the Panel in Document [IPCC-XLVI/Doc. 6](#). There were suggestions for further work to identify the most crucial cross-cutting themes. The Executive Committee of the IPCC was requested to prepare an updated document to be presented for the discussion at a subsequent IPCC Session.

On 10 June 2019, governments and IPCC Observer Organizations were invited to provide comments on the overall structure of the AR6 SYR, which was developed at the AR6 Scoping Meeting and to provide guidance on scientific technical topics as well as areas of emphasis to be addressed in the SYR. In particular, governments were requested to provide their views on the following:

1. Comments on the overall scope and proposed elements of the AR6 SYR;
2. Policy-relevant issues for the AR6 SYR not covered by the five elements mentioned above;
3. Overarching conceptual framework relevant to guide the AR6 SYR;
4. Consideration of issues addressed by other global assessments such as IPBES, GEO/UNE;
5. Expected use of AR6 SYR by your government; and
6. Any other comments.

A total of 18 responses were received. Member countries which submitted responses were:

1. Australia
2. Canada
3. China
4. France
5. Germany
6. India
7. Ireland
8. Islamic Republic of Iran
9. Japan
10. Norway
11. Saint Lucia
12. Singapore
13. Switzerland
14. United Kingdom

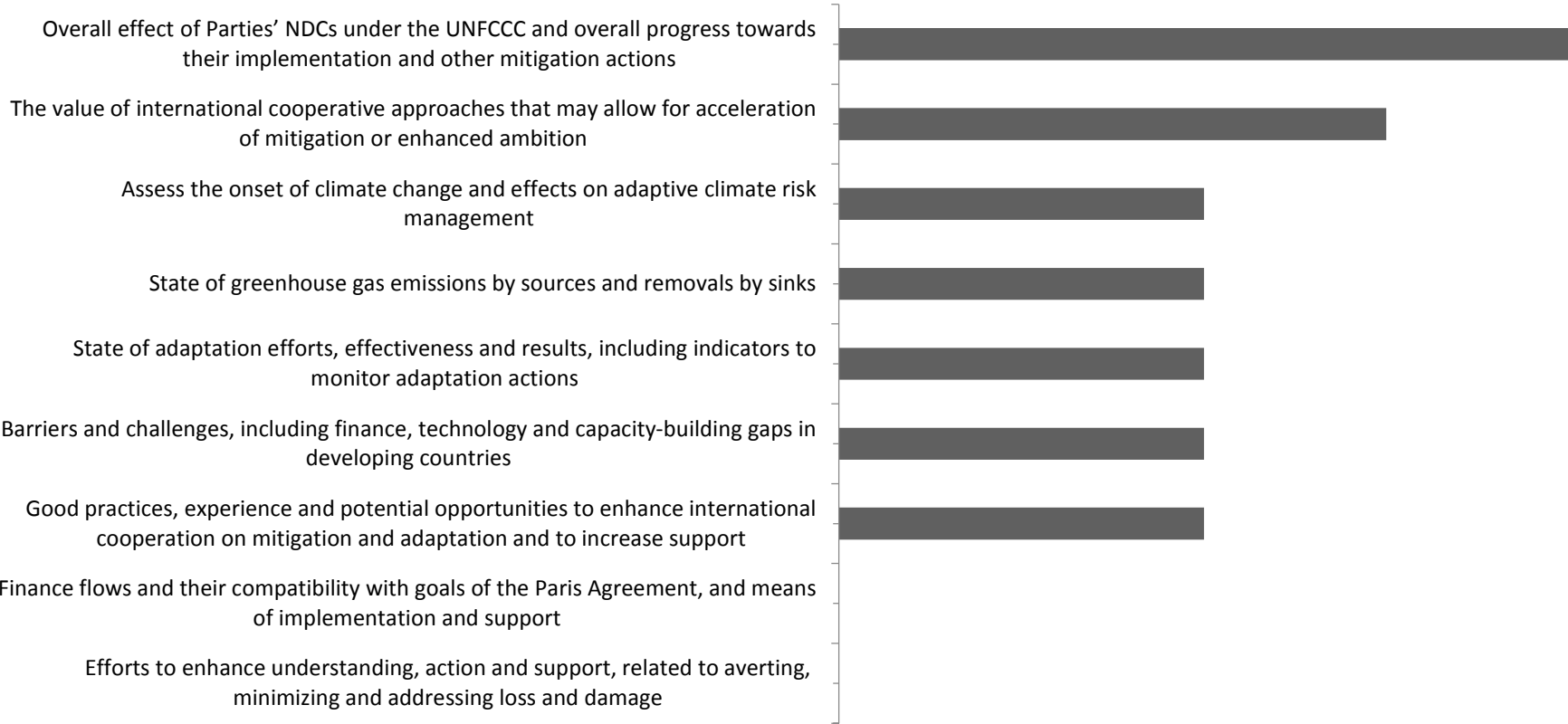
IPCC Observer Organizations which submitted responses were:

1. Future Earth International
2. Group on Earth Observations (GEO)
3. International Petroleum Industry Environmental Conservation Association (IPIECA)
4. United Nations University

## SYNTHESIS OF THE SUBMISSIONS

The responses received were synthesized to present a succinct view, presented in the figures below. Notwithstanding the vast diversity of the responses, certain common elements emerge. Topics and issues that are similar across more than one response are indicated by the bars in the figures.

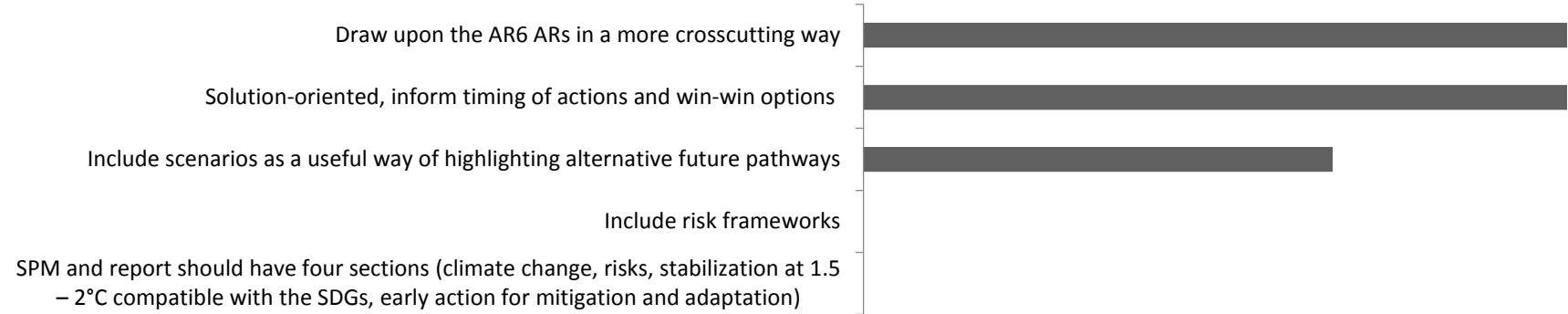
**The overall scope and proposed elements of the AR6 SYR**



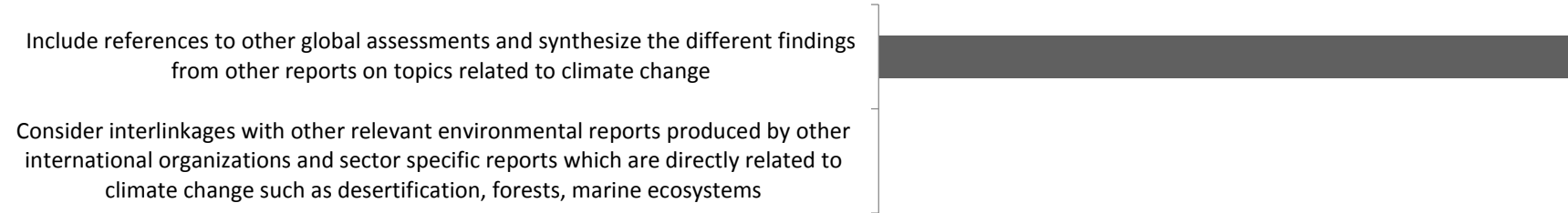
**Policy relevant issues for the AR6 SYR not covered by the five elements**



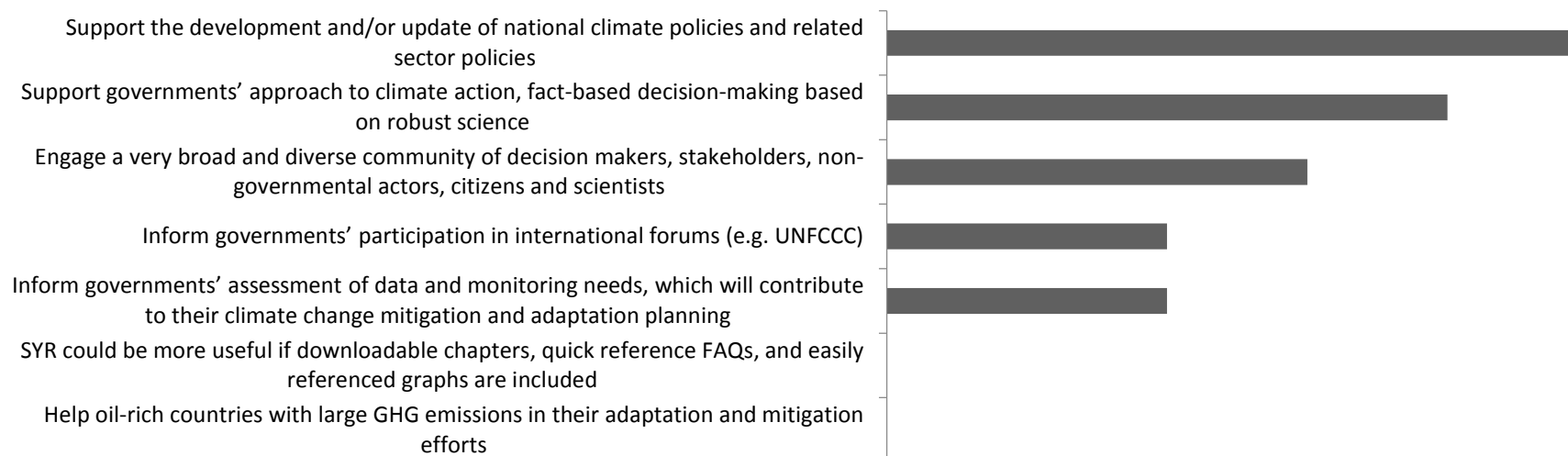
**Overarching conceptual framework relevant to guide the AR6 SYR**



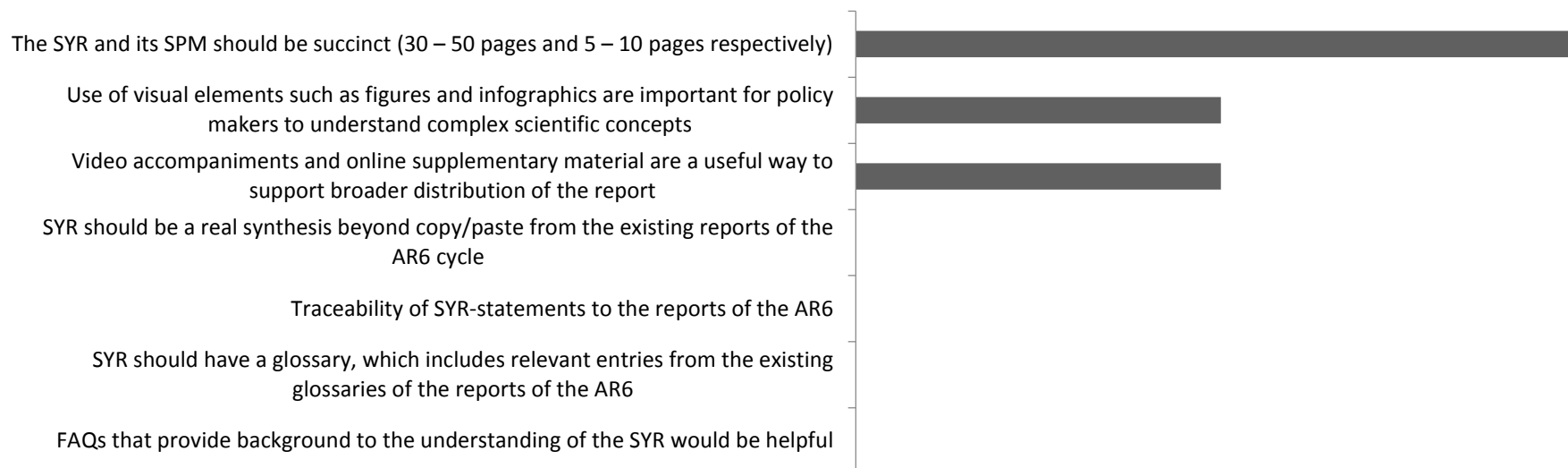
**Consideration of issues addressed by other global assessments such as IPBES, GEO/UNE**



## Expected use of AR6 SYR by Governments



## Any other comments





## Key issues raised in the government and observer organizations responses to the survey

Listed below are the survey questions and the main points raised in the responses.

### Question 1: Comments on the overall scope and proposed elements of the Sixth Assessment Report – Synthesis Report

Proposed elements from the meeting in Addis Ababa:

- Global Stocktake
- Interaction among emissions, climate, risks and development pathways
- Economic and social costs and benefits of mitigation and adaptation in the context of development pathways
- Impacts, Adaptation and mitigation actions in the context of sustainable development
- Finance and means of support

#### Summary of responses:

- No need for a separate point on Global Stocktake (GST), the whole SYR is input for GST
- Emphasis on: Adaptation, Impacts, Sustainable Development (SD), Innovation
- Geoengineering: clear definitions, separation of Carbon Dioxide Removal (CDR) from Solar Radiation Management (SRM)
- Regional information is needed
- SYR should be policy neutral but useful for policymaking
- Assess realism/adequacy of 1.5°C
- Be clear on changes in knowledge since AR5
- Need for transformational changes (towards net zero in the sectors, behavioral changes, younger generations...) for different types of economies
- Nature Based Solutions should be addressed in the synthesis report

### Question 2: Policy-relevant issues for the AR6 SYR not covered by the five elements identified during the scoping of the AR6 report

Countries ask for more details on the following issues/topics:

- International cooperation/governance:
  - synergies and tradeoffs between CC adaptation and mitigation and SD/ biodiversity protection and conservation/SDGs/other environmental goals
  - Climate justice (fairness, equality, poverty...)
- Migration and security
- Achieving/implementation of the Paris Agreement
- Consequences of inaction
- Impact of overshoot/irreversibility
- Implementation/feasibility of pathways
- Near term policies
- Loss and damage
- Understanding and implication of remaining carbon budgets
- Developing countries/vulnerable regions
- Polar regions

- Assessment of carbon dioxide removal, solar radiation modification and governance
- Negative emissions/Net zero
- Biodiversity/ecosystems
- Inclusion of environmental considerations in the third element from the meeting in Addis Ababa
- Integrated treatment of low probability but high risks events/impacts
- Ocean use (like land use)
- Emphasis on Dangerous Anthropogenic Interference (DAI) with the climate system
- Multiple stressors
- Role of SSPs/risk assessment in different SSPs
- Negative impacts on financial stability if long-term climate risks are not integrated into financial decision making
- Rate and velocity of changes
- Monitoring and Observations
- Not only focus on 1.5 and 2°C but also on higher temperature scenarios
- Sea-level rise

**Question 3: Overarching conceptual framework relevant to guide the AR6 SYR**

- Cross cutting across the reports and WGs
- Narrative approach (global and regional scale)
- Scenarios to highlight alternatives future pathways
- Risks framework (global and regional scale)
- Focus on time scales and implication for near term actions
- Solution and timing of action, challenges and barriers
- Gap between action and ambition/assessment of NDCs
- Climate change – SDGs and other environmental goals
- Paris Agreement frame
- Focus on updates in science / new knowledge

**Question 4: Consideration of issues addressed by other global assessment such as IPBES, GEO/UNE**

Governments show support for considering issues addressed in other assessments, while bearing in mind that such issues must also be included in the underlying IPCC AR6 reports.

**Question 5: Expected use of AR6 SYR by your government**

- Useful for non-specialists, the general public, decision-making, mitigation/adaptation planning, international fora
- Communications tool/Basis for outreach
- Scientific input for GST
- Supporting action
- Highlighting opportunities and risks for a world achieving net zero by 2050

**Question 6: Other comments**

**About the structure:**

- Use new formats for visualization, figures suitable for presentations, animations
- Interactive regional maps
- Length: stick to IPCC mandate (SPM 5 to 10 pages and SyR 30 to 50 pages)
- Same structure for report and SPM
- Succinct language

- Headline statements are useful
- Clear and traceable statements
- Include practical case studies
- Should not follow WG reports structure but make a robust linking between all WG reports

**About the content:**

- Should not be a summary of summaries / not copy and paste
- The most updated science possible, integrated across reports and Working Groups
- Approaches and limitation of scenarios and models/communication of uncertainties/decision making under uncertainty
- Indigenous knowledge (ILK), gender diversity and inclusion should be addressed
- Aviation and maritime transports should be included



**AR6 Synthesis Report Scoping Meeting  
Singapore, 21 – 23 October 2019**

AR6/SYR-SCOP/INF. 4  
(3.X.2019)  
ENGLISH ONLY

**SUMMARY ANALYSIS OF RESPONSES FROM THE AR5 AND AR6 AUTHORS**

(Submitted by the Secretary of the IPCC as received)

## Summary of the authors' answers to the AR6 SYR scoping meeting survey

This document is a summary of the responses to a survey sent by the IPCC secretariat to the Coordinating Lead Authors and the Lead Authors of the IPCC sixth cycle and the Core Writing Team of the IPCC fifth cycle. The summary analysis has been developed by Léna Gurriaran, under the supervision of Jan Fuglestad, Valérie Masson Delmotte, Kerstin Stendahl and Robin Matthews.

### Information on the Respondents

A total of 130 authors responded to the survey.

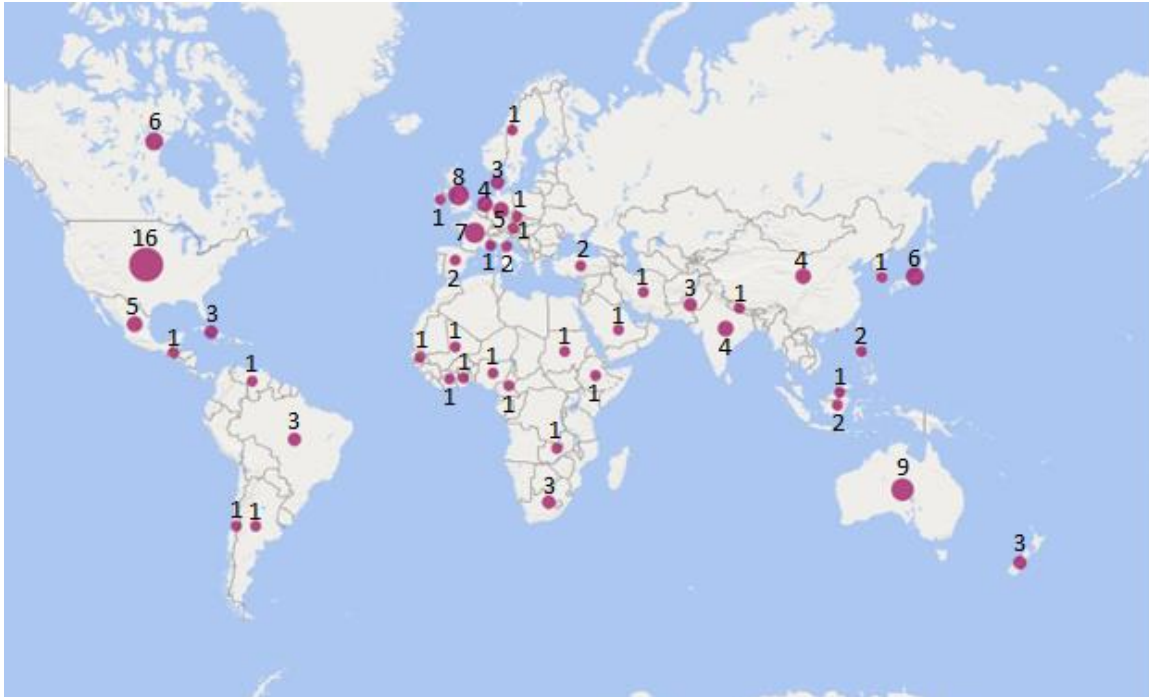


Figure 1. Country-of-work of the respondents. The size of the dots is in proportion to the number of respondents.

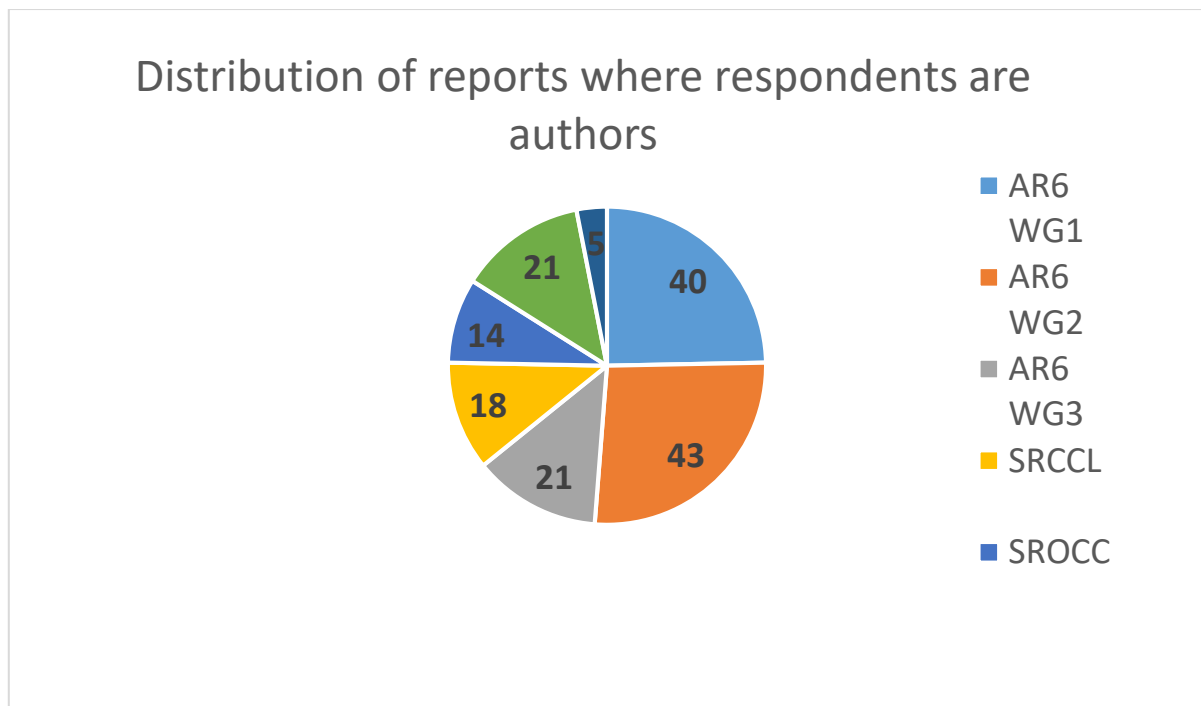


Figure 2. Number of respondents per report for IPCC 6<sup>th</sup> cycle. All of the respondent were involved in the 6<sup>th</sup> cycle, 51 of the respondents were also authors for the 4<sup>th</sup> or 5<sup>th</sup> cycle. 19 of the respondents are authors for at least one of the assessment report and one of the special report. 5 of the respondents are authors for two Working Groups. We also had two responses of the bureau members.

## Working Group of the respondents for cycle 4, 5 and 6

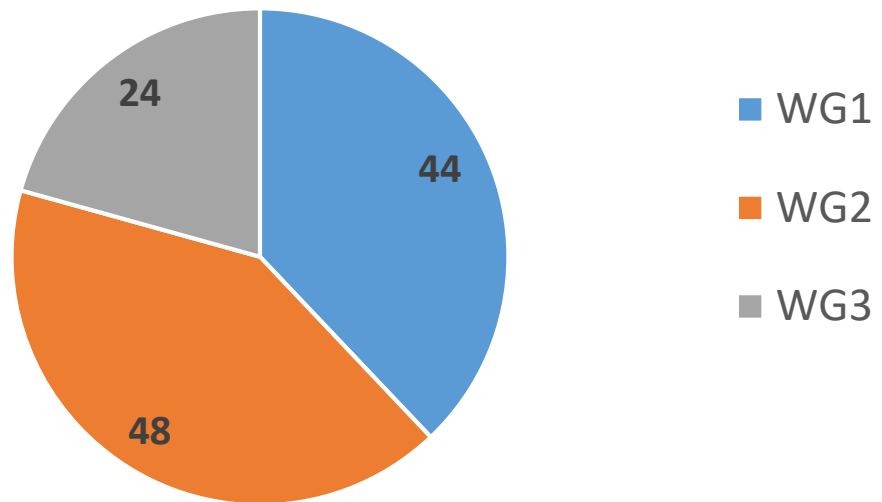


Figure 3. Number of respondent per working group (without the SRs)

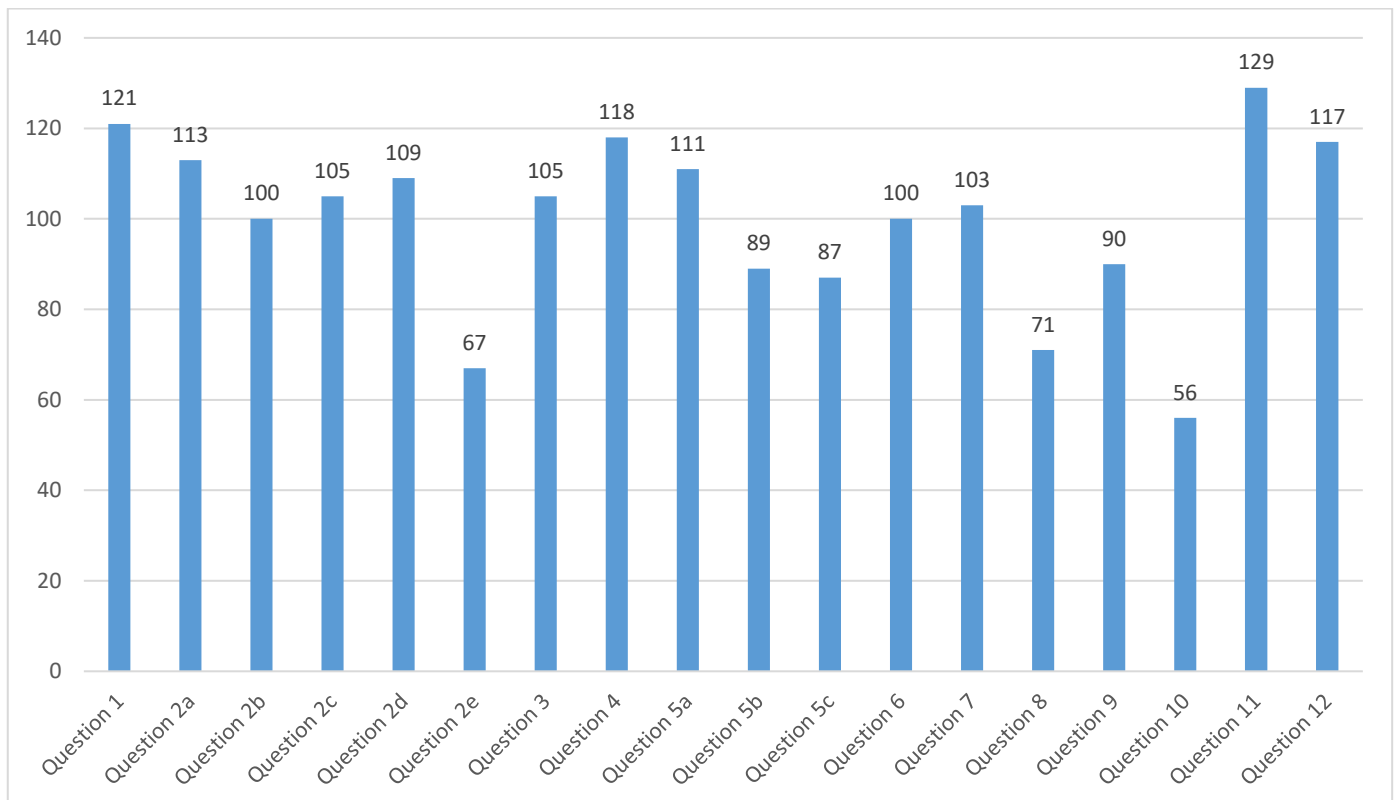


Figure 4. Number of responses per question

See appendix 1 for more statistics.

# Summary of the responses

**Question 1. The SYR should be written in a non-technical style suitable for policymakers. With this in mind, what would be the most relevant report structure for the SYR?**

121 responses

Even if the question was about the structure, many answers provide suggestions for content. Fig. 5 shows the number of occurrences of the most frequent topics mentioned.

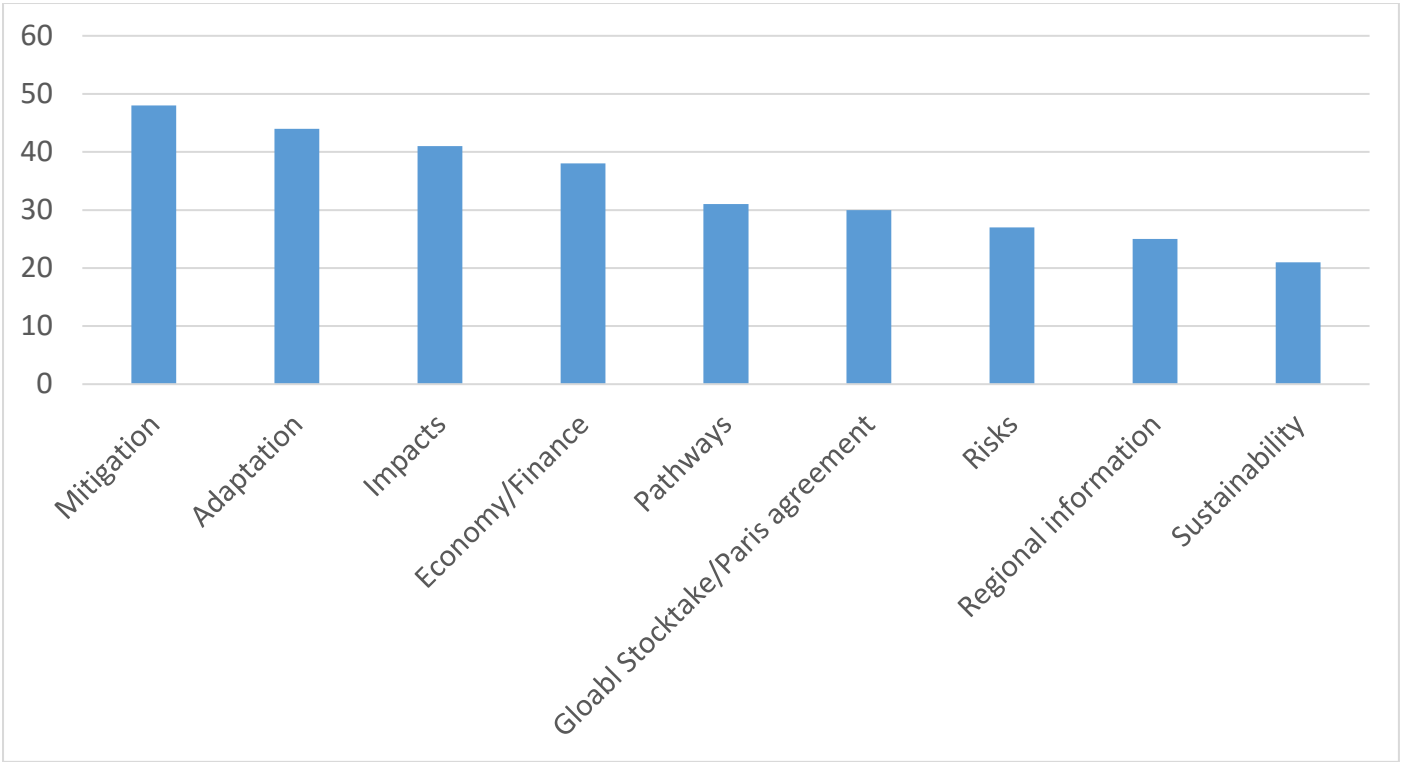


Figure 1. Topics that come up the most

Two broad structures were suggested by several authors (see Figure 5) while other authors suggested very precise structures (see figure 6)

<ul style="list-style-type: none"><li>• Where are we?</li><li>• Where are we going?</li><li>• What can we do about it?</li></ul>	<ul style="list-style-type: none"><li>• Begin with observations and projections</li><li>• Finish with sustainable pathways</li></ul>
--	--

Figure 5. The two structures that were the most often suggested

The ideas concerning only the **structure** of the report are listed below:

- Storyline structure / Not a storyline structure because too disconnected from scientific assessment
- Same structure as AR5, with integrated storylines perhaps in boxes, but less technical
- Adapt structure of SR1.5 to the overarching framework of the SYR framing around SDGs or begin with Chapter 5, followed by Chapters 1, 2, 3, 4
- Structure the report around key questions/debates
- Structure around the Paris agreement
- Structure around sectoral issues and timelines for actions
- Structure around pathways at different scale
- Separate Mitigation from Adaptation

- Headline statement at the beginning of each chapter
- Active voice, clear direct language (journalistic)
- Bullet-style text with more illustration
- Summary for youth

The **regional aspects** were highlighted to be important and suggestions were made to take them in account into the structure:

- Base the structure on a regional scale, insist on regional aspects
- Regional classification of the findings of the three Working Groups
- Bottom up approach: start from local and go to global / Top down approach
- Based on the 5 broad elements but with regional aspects

#### Compilation of the precise structure suggestions:

1) Pathways 2) Response options and opportunities 3) Climate finance 4) Global Stocktake
1) Why business as usual is not sustainable 2) Adaptation and mitigation actions in the context of sustainable development 3) Economic and social costs and benefits of mitigation and adaptation in the context of development pathways 4) Finance and means to support
1. Global Stocktake - Where do we stand? 2. Major new scientific findings (from all WGs and SRs) 3. Solution-oriented risk management, adaptation and mitigation strategies 4. Accelerating the transition and integration with SD
1. Global Stocktake: a. Global warming of 1.5 C: mitigation pathways, impacts and global response in the context of sustainable development. b. Climate system, observed impacts and scientific information for tracking progress towards achieving the Paris Agreement. c. Climate change and land interactions: emergent risks, decision making and sustainable development. 2. Interaction among emissions, climate risks and development pathways: a. Emission and mitigation pathways, climate scenarios and development pathways. b. Climate impacts and risks, and disasters. c. Uncertainties at local and regional scales. 3. Mitigation and adaptation actions in the context of sustainable development: a. Current and emerging mitigation and adaptation needs and options. b. Technological, social and political transformation for resilience. c. Climate finance, institutions, policies and governance. 4. Sustainable development pathways to 1.5C. a. Integration of adaptation, mitigation and sustainable development b. Eradicating poverty and reducing inequalities c. Climate resilient development pathways.
1 - Urgency to act 2 - Balanced information 3 - Background 4 - Alternatives 5 - Consequences if CC not taken seriously
1 - Exposure and vulnerability 2 - Projection, risks, impacts 3 - Mitigation and adaptation



1 - Global Stocktake 2 - Risks and Impacts 3 - Synergies and trade-offs 4 - Policy options
1) Climate change is real; 2) Manifestation will be in the form of extremes in the decades ahead. 3) uncertainties are too large on small spatial and time scales because of internal variability; 4) we do not know if the impacts would be benign or catastrophic because of large uncertainties in impacts science; 4) Prevention is better cure. Therefore, mitigation is a better option going forward. 5) Both climate system and societal systems have large inertia (on multiple decades).
Topic I : Observations, causes and projection of CC Topic II : Risks and impacts Topic III : 1.5C° and 2C° goals at different time and spatial scales Topic IV : Adaptation and Mitigation and sustainable development
Topic I : Where do we stand ? Topic II : Scope of the challenge Topic III : Climate change projections Topic IV : Climate change impacts Topic V : Lands and CC Topic VI : Energy Topic VII : Policies at different scales Topic VIII : Sustainable development
1 - Policy context and progress 2 - Policy opportunities and challenges 3 - Underpinning scientific assessment
1 - Changing state of the climate system 2 - Future pathways of development and emission changes, and resulting climate change and risks 3 - Costs and benefit of adaptation and mitigation 4 - Sustainable development in this context 5 - Investment and finance
1- Introduction. 2- Reasons of concern. a. Observed changes, past and recent drivers of climate change. b. Future climate changes, risks and impacts. 3- Strengthening responses to climate change a. Adaptation b. Mitigation 4- Sustainable development pathways a. Synergies between adaptation and mitigation b. Institutions and governance c. Towards a common international agenda
1 introducing the current challenges of climate change 2 highlighting WG1 key findings 3 highlighting WG2 key findings 4 highlighting WG3 key findings 5 synthesis across all three WGs

Figure 6. Precise structure suggestions

## Question 2a – Please provide your suggestions for the format of the SYR: the use of visual elements (e.g. figure, animation, and infographics)?

113 responses

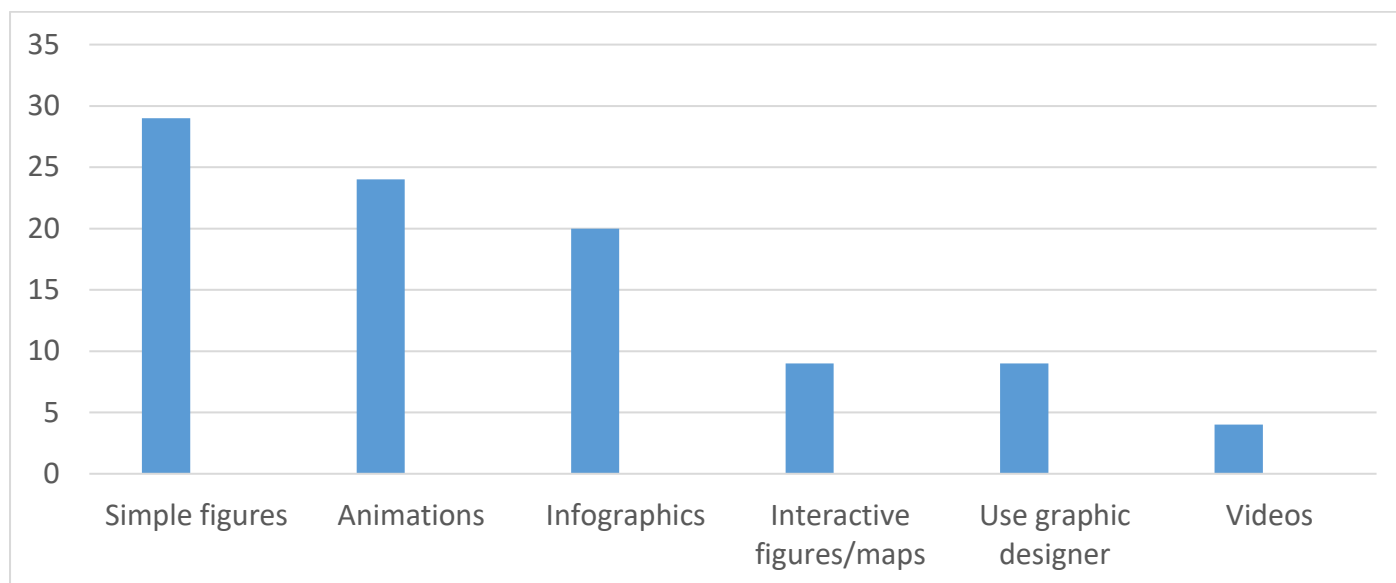


Figure 7. Most frequent suggestions

Authors generally asked for simpler, self-explanatory figures/infographics, with shorter captions than in AR5 SyR so that non-specialist can understand them easily. Some of the authors want figures supporting only one message while others want them to be synthetic. They also asked for more consistency in the visual elements and suggested to update iconic schematics (e.g. Reasons for Concern). There is also a strong request for animations.

Some **specific suggestions** are listed below:

- Animation of climate change signal through time
- Picture of the impact of society on environment
- Infographics to compare damages
- Gantt chart, warning boxes and burning embers for communicating risks
- One figure summarizing impacts with and without mitigation and adaptation for different levels of GW
- Work with humorist to make cartoons
- Simple figure that explains carbon budget
- Show longitudinal variations with maps showing climate change and impacts
- Animation on climate hazard and associated risks
- Animations for link between human activities and climate change
- Graphics: "Choices for solutions", similar to "Reasons for Concern"
- Global map of different scenarios of human vulnerability and of risk trends

## Question 2b – Please provide your suggestions for the format of the SYR: The use and formulation of the FAQs?

100 responses

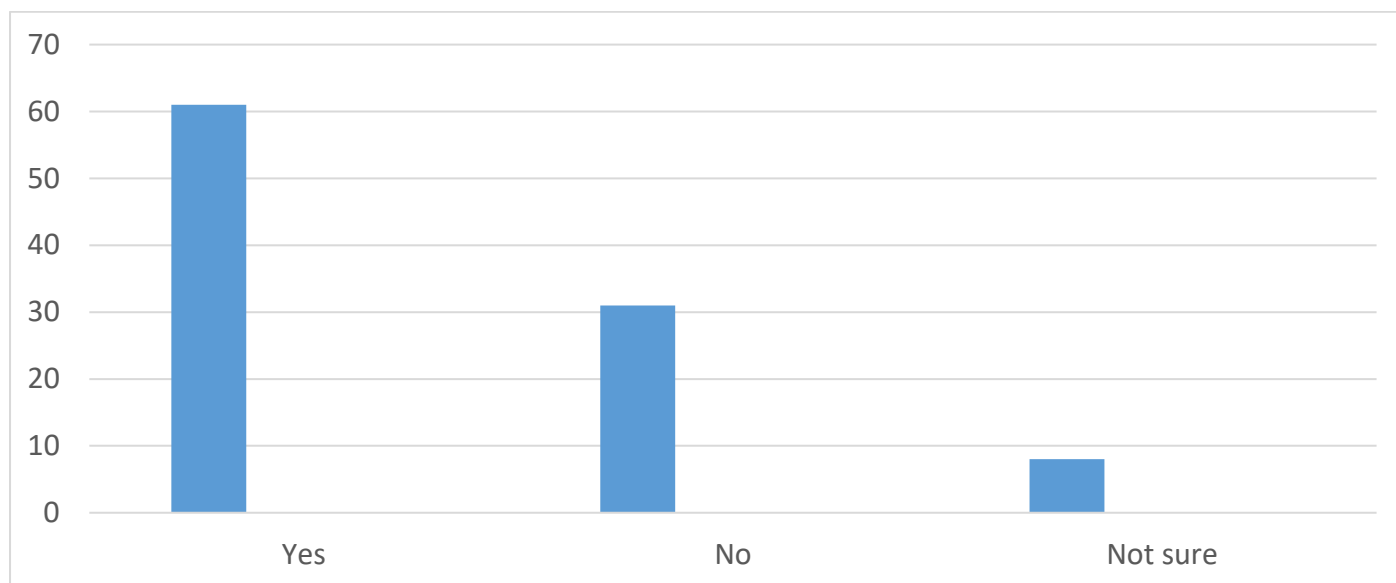


Figure 8. Bar chart summarizing the responses

A large majority (2/3) of authors express support for the inclusion of FAQs which they find important for the understanding of non-academics, but about 1/3 of respondents express strong reluctance. They think it is not suitable for the SyR and that people just have to refer to the FAQs in the WG reports if they need more information on one subject.

### General remarks:

- Punchy, short questions
- Main messages of the report in a simple language
- Storylines of the report and key messages
- Simple and Cross-cutting questions
- Combine FAQs with figures

### Specific suggestions:

- Ok if the whole report is only FAQs otherwise it is too much work
- Select the most relevant from AR6
- Try to reach people from the southern countries
- Should reflect major concerns of the public and policy makers/Ask policy makers and public for which FAQs
- Two FAQs: one for the policy arena and one for the scientific arena
- Follow the bottom up approach
- Tell a story about CC and how to overcome it
- FAQs on Sustainable Land Management and on Land Degradation Neutrality
- Organize them in clusters by topic/In boxes for each chapter
- Put them in appendix
- Web-based interactive versions

## Question 2c – Please provide your suggestions for the format of the SYR: Use of appendices?

105 responses

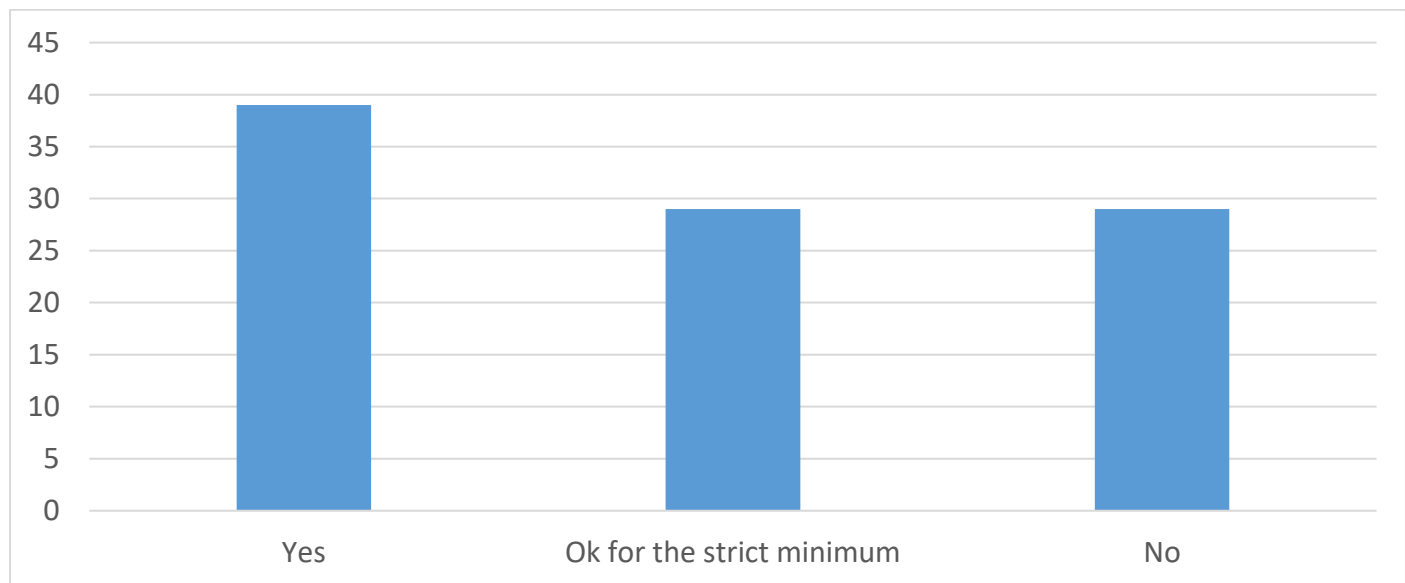


Figure 9. Bar chart summarizing the responses

Respondents mostly agree that appendices are needed but about a third of respondents insist on keeping them to the strict minimum (ie. Same as in AR5 SyR: Glossary, user guide, references, etc.)

### General points:

- Arguments for No: Refer to AR for more information, appendices hardly get looked at
- Should not be too technical
- Synthesize interdisciplinary findings
- Graphs and tables to illustrate detailed information.

### Specific Suggestions:

- Data sources/Where new methods and models can be found
- On scenarios, impacts, adaptation and mitigation
- Map of observed impacts and responses
- Regional info and sub regional details for larger countries
- One appendice for each overarching region
- Specific statistics and case study to show the urgency
- Examples of system approaches, and how they can support sectorial transformation

## Question 2d – Please provide your suggestions for the format of the SYR: Use of online supplementary material?

109 responses

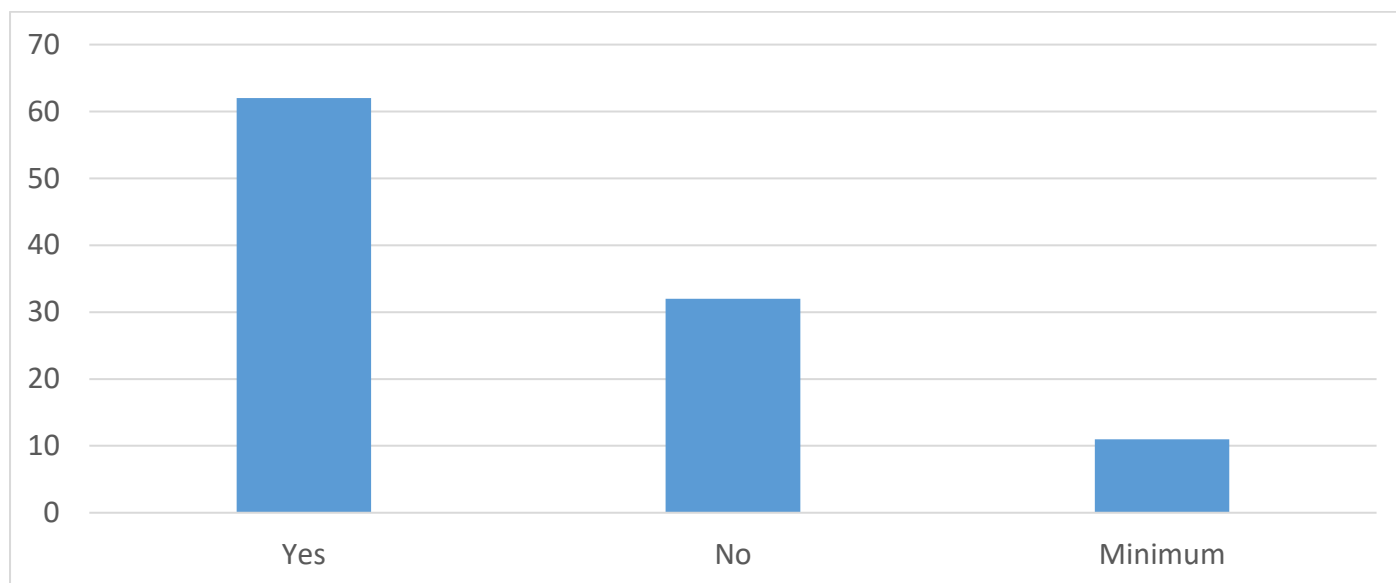


Figure 10. Bar chart summarizing the responses

A majority of authors think that online supplementary material is useful, for example to reduce the text in the SyR and focus it on key messages.

Below are some suggestions about the **type of content**:

- Interactive maps and graphics [10 responses]
- Videos and animations [6 responses]
- Dynamic global risks atlas [3 responses]

Other suggestions:

- Very visual
- Quick and easy references
- Good practice examples
- Scientific standpoints
- Basic issues posed by climate change
- Raw data and methodology assumptions
- Regional information with downscaling methodologies
- Make a mobile app

## Question 2e – Please provide your suggestions for the format of the SYR: Other suggestions?

67 responses

- Roadmap to guide policy makers with key recommendations
- Include concrete example distributed throughout the report in boxes
- Turn SPM into a short video with key messages/ Video summary
- Introductory section with simple graphs/infographics of key mechanisms
- Put the user guide upfront
- Make interactive links to references
- Downloadable through a QR code, Instagram account, or other social media venues.
- Compile a list of questions from decision-makers to provide guidance for future research
- Synthesis report for young people
- Synergies and trade-offs between the sectors and continents on all feasible aspects
- Represent human vulnerability and impacts on maps
- The use of Key Risks for Regions should be emphasized
- Show "climate change related officials" are themselves responsible to act "to what they recommended"
- Overall conclusion of SYR should be what the costs are of inaction or delayed action
- Include discussion of issues such as gender responsive adaptation actions, human rights and migration...
- Ensure that SR1.5 spirit is maintained

**Question 3 - Five broad elements for the SYR were identified during the preliminary scoping meeting of the SYR in the AR6 scoping meeting and noted at the IPCC 46th session. Are there other broad elements that should help guide the scoping process?**

- Global Stocktake
- Interaction among emissions, climate, risks and development pathways
- Economic and social costs and benefits of mitigation and adaptation in the context of development pathways
- Adaptation and mitigation actions in the context of sustainable development
- Finance and means of support

**105 responses**

For about 15 of the authors the 5 elements are enough. The other generally agree the elements can be taken in account in the scoping but they made some additional suggestions or highlighted some subjects that need to be emphasized (see bullet points). There are also some concerns that those 5 elements are sometimes overlapping and should not be seen as a determining structure, they need further development and refinement. A few authors also pointed out that a prioritization of the issues is important.

Suggested additions:

- Regional aspects/cooperation
- Risks
- Ecological and environmental pathways
- Attribution of climate change and impacts to human activity
- Temporal scales
- Implementation of pathways/climate solution
- Governance issue to align national actions with global challenge, feasibility assessments
- Sustainable development
- Technology
- Solutions options/actions and challenges
- Climate justice
- Emergency of the situation/ CC already a problem
- Limiting warming to 1.5 degrees
- Decoupling and Disruptive innovation
- Systems transitions as in SR1.5
- Climate perspective should be an integral part of development programs
- Why business as usual is not sustainable
- Climate change influence on trade and cultural exchanges
- Vulnerable/poor governance areas
- Interaction between climate and development to achieve SDGs and others

**Question 4 - Considering the products in and context for the AR6 cycle so far, please highlight emerging knowledge that you consider particularly relevant for the SYR (especially in relation to current policy developments such as the Agenda 2030) and topics that are of importance that can be addressed by the SYR?**

**118 responses**

Many suggestions covering a broad range of subjects were received. We listed them below, classified by topics to ease the overview of the responses.

**Socio-economic topics:**

- SDGs and regional development agendas (e.g. Agenda 2063 for Africa)
- Inequality, Justice, Security, Poverty, health
- Nexus of food security, water security and energy supply
- Urbanization and climate change
- Impact on/Adaptation of vulnerable people and areas
- Impacts, benefits, costs across key vulnerability gradients (gender, socio economic status)
- Major emitting countries/companies

**Mitigation pathways:**

- Paris Agreement Goal
- Carbon budget importance for GST
- Pathways comparison and different socio economic scenarios
- Feasibility of 1.5C, 2C pathways
- Urgency in addressing climate change, Impacts of the lack of actions
- Concentration pathways more representative
- Replacement of energy sources and recarbonization of agricultural land
- Achieving land degradation neutrality

**Governance and international processes:**

- Losses and damages
- Global environmental governance
- Governance for human vulnerability
- Highlight failures and their challenges
- Potential and applicability of climate finance
- Gap between action and ambition

**Climate Science and models:**

- Extreme events attribution to human influence
- Cryosphere: Trend in Antarctic sea ice extent, sea level, Change in Arctic and Carbon cycle, permafrost
- Large simulation ensembles, higher sensitivity of models
- Acceleration of observed/expected changes
- Anthropogenic GHG emissions
- Threat of slow-onset events, tipping points and hotspots
- Ecosystem biophysical feedback to climate change
- Air quality
- Near term projection (2100) and long term impacts
- High end (low probability) scenarios
- New uncertainties on previous global scale questions
- Biodiversity



- Data showing that climate change is already happening

**Solution options, ideas for adaptation and mitigation:**

- Synergies and tradeoffs
- Decoupling and disruption
- System transition and transformative changes
- Sustainable land management: solution for both adaptation and mitigation
- Nature Based Solutions
- Geoengineering: SDR and SRM
- Blue Economy
- Energy transition
- Policy instrument that have work in the past to make people take beneficial decision

## Question 5a - Which are topics that would benefit from integrated treatment in the SYR?

### 111 responses

Question 5a is very similar to question 9 which, just below. The majority of the answer focused on socio-economic and governance topics but some of the respondents focused on climate sciences subjects.

#### Socio-economic and governance topics:

- Adaptation
- Mitigation
- Sustainable Development, SDGs
- Climate justice: food, water, health, poverty, education, migration
- Risks
- Land
- Governance
- Pathways, Scenarios
- Decarbonisation pathways that meet the Paris Agreement
- Global Stocktake
- Urbanization
- Regional aspects (Ruane, USA, WG1 | Iqbal, Pakistan, WG2 | Amjad, Pakistan, WG1 | Shaw, Japan, WG2 | Diongue-Niang, Senegal, WG1 | Von Schukmann, France, SROCC)
- Impacts
- Costs of inaction/Emergency
- Nature-based solutions
- Exposure and vulnerability
- Losses and damages

#### Climate science topics:

- Ocean, sea level
- Geoengineering
- Biodiversity
- GHG Emissions
- 1.5C and 2C scenarios
- Climate extremes

## **Question 9 - Are there topics that can only be addressed through an integrated approach in the SYR?**

**90 responses**

Question 9 is very similar to question 5a, which is why we moved it here. The most common answer are the same as question 5a (adaptation, mitigation, SDGs, climate justice, risks, land, etc.). The differences appears only when one respondent make a very specific suggestions (for example digital revolution or decoupling and disruption).

### **Socio-economic and governance topics:**

- Adaptation and mitigation
- SDGs/ SD/ Agenda 2030
- Water – energy – Food – climate nexus
- Migration
- Gender and poverty
- Treatment of risks and their costs
- Human-driven land processes and climatic changes, Agriculture
- Governance
- Climate resilient development pathways
- Cities and CC
- Achieving Paris Agreement Goals
- System transitions/transformational changes
- Decoupling and disruption
- Feasibility of implementation policies
- Digital Revolution
- Climate finance, technologies and SD

### **Climate science topics:**

- Data quality and accessibility
- Confidence and uncertainties about CC and linkage with decision making
- Multi spatial scale assessment
- Role of emissions and GHG inventories
- Climate scenarios/potential futures
- Extreme events

## **Question 5b - Are there topics which are specific to any of the reports that should nonetheless be presented in the SYR?**

### **89 responses**

For this question the responses are generally very specific and coming from only one or two people. They can be classified in three categories (see below). The last category, cross-cutting subject, is for the responses that do not really answer the question (because of their cross cutting nature) but that were mentioned by several respondents as an important topic.

#### **Socio-economic subject:**

- Gender
- Health and wellbeing
- Poverty eradication
- Migration
- Urbanization near to coastal zones
- Food security
- Waste management
- Energy transition

#### **Policy subjects:**

- SDG achievements
- Long-term commitment
- Decision making processes for risk management

#### **Climate science topics:**

- Summary findings of WG1
- Climate sensitivity/variability
- Past climate change and attribution, projected future climate
- Climate forcing
- Desertification
- Improvement of impact assessment
- Tipping points and abrupt climate surprises
- Extreme events
- How to deal with the uncertainty of models
- Consequences of CC for ocean and cryosphere
- Global warming of 1.5 vs 2C
- Negative emissions, carbon sequestration, blue carbon
- Biodiversity loss

#### **Cross cutting subjects:**

- Nature Based Solutions
- Pressure on land and its role in adaptation and mitigation
- Impacts and risks at various degree of T
- Transformation as demonstrated by decoupling and disruptive innovation

**Question 5c - What issues that are already addressed by other global assessments should be considered in the SYR? Other global assessments include among others, the Intergovernmental Platform for Biodiversity and Ecosystem Services, and UN Environment's Sixth Global Environment Outlook.**

**87 responses**

Various authors reminded that these issues need to be addressed in the underlying reports to be considered in the SYR. Many of the respondents approach environmental topics, generally addressed in the IPBES report. Other issues mentioned are societal and economic topics.

**Environmental Topics:**

- Biodiversity loss
- Ecosystem services
- Land management policy
- Desertification
- UNFCCC
- Climate change and spread of diseases and invasive species
- IPBES: adaptation measures that would reduce climate impacts on marine and coastal ecosystems
- Situate climate as part of a broader environmental crisis
- Bioenergy, Renewable energy
- Ecosystem disturbances (like fire)
- IPBES: plastics
- Nature Based Solutions
- Land component of 6<sup>th</sup> GEO Report
- Cascading effects of climate-influenced hazards on humans and the environment

**Societal and economic topics:**

- SDGs
- Sendai Framework for Disaster Risk Reduction.
- Urbanization
- Transformative changes
- Bottom up vs top down approaches to scenarios and sustainable development
- Ecosystem based approach for adaptation and mitigation studies
- Assessments of science knowledge impact on society/policy and economy
- Water accessibility
- Climate justice
- Social entrepreneurship, citizen science and civil society movement
- Innovation, technology, Research & Development
- Cascading effects of climate-influenced hazards on humans and the environment
- Talk about the Human Development Report
- Human wellbeing

## Question 6 – What overarching frameworks would be relevant to guide the SYR and its scoping?

### 100 responses

All the answers are listed below but the majority are about an important subject that, according to the respondent, needs to be in the SyR in a crosscutting/integrated way, rather than an overarching conceptual framework.

- Risk management framework
- Sustainable development framework, Agenda 2030
- Just climate transition (food, water, education, safety)
- Drivers – Pressures and changes – Impacts – Responses
- Mitigation and adaptation pathways
- The Anthropocene. Sustainable development. Climate resilience. Disaster Risk Reduction.
- Transformative changes – Adaptation and mitigation – Human wellbeing
- Paris Agreement
- National Adaptation Programs
- IPBES Conceptual Framework
- Solution-oriented conceptual framework
- Robust, quality-controlled data, and on high-quality analysis
- Urgency of action
- Differentiate scenario uncertainties and scientific uncertainties
- Feedbacks and tipping points between the climate system and socio-environmental systems
- Policy Cycle Approach
- Co-benefits framework
- Decoupling and disruption
- Socio-ecological-technical framework
- Evolutionary governance theory
- NDCs
- Assessment at local/regional scale – Cost and impact of inaction – options and benefits
- Policy to quickly reduce emissions
- Total net future emissions
- Climate resilient development pathways
- Human – Land/Ocean – Climate System
- Previous conceptual framework is ok
- More detailed set of questions as in TAR
- Paradigm shift since AR5?

## **Question 7 - How should the SYR treat interactions across spatial (global, regional, national, local) and temporal (short term, mid-term, long term) scales in a policy relevant way?**

**103 responses**

The answers can easily be classified into two categories: responses for the content and responses for the presentation of the content (how to address the idea for the content in the SyR, with graphics, bottom up/top down approach, on what to focus, etc.).

### **Content:**

- Emphasis on major regions of vulnerability: spatial heterogeneity of climate change with examples of associated risks
- Long term warming and short term cooling
- Be explicit on the role of actors in spatial and temporal scales, the potential for cooperation
- Pathways for regional development
- Short term: internal variability, long term: model/RCP differences
- Impact happening now while some interventions take years to show benefit
- Local scale climate strongly influenced by global circulation
- Consider country-specific needs in relation to neighbors
- Highlight limitations/uncertainties of climate models and Uncertainty larger on short time-scales and small space-scales
- Temporal resolution for considering timing in decisions
- Focus on global commitment needed to reduce emissions
- Don't focus only on EU, USA and Australia
- Focus on cities and settlements
- Temporal: Paris agreement 2030, 2050, 2100... / Spatial: consequences of different global temperatures at regional scale

### **Presentation:**

- Example of regional/local specificities, case study, Human interest stories
- Bottom up approach / Top down approach
- Long-term to short-term
- From the most urgent to the long term
- Roadmaps reflecting different timeframes
- Split the world into developed countries, emerging countries and least developed countries
- Regional and global assessments of climate change with a limited number of indicators
- More on national and local issues
- Focus on global scale and discuss national/local changes as examples
- Focus on local/regional and short/mid-term in SYR, Refer to ARs for long-term/global scale
- Put national and local info in appendices or in supplementary materials online
- Provide instruction to media and NGOs
- With tables and infographics showing specific spatial and temporal roles of policies and their interactions
- Figure showing regional/sectoral impacts with/without adaptation and mitigation for different levels of warming
- Short term, midterm, long term could be defined by the lifetime of human investments (a house, a power plant, a dam...a pyramid)
- Highlight the kind of questions for which global info is sufficient and where regional is vital
- Stommel Diagram

## Question 8 - What are the lessons learned from the AR5 SYR for improving AR6 SYR?

### 71 responses

Once again we were able to classify the responses into two categories, one about the content and one about the style and the process. For the content most of the suggestions were very specific and coming from one or two respondents. For the style many respondents emphasize on the clarity of the text and the figure so the SyR could be more accessible for non-scientist than last time. About the process almost all the ideas relate to the people involved in the writing of the SyR and the communication between them.

#### Content:

- Better delineation between new findings and conclusions already in the last SYR
- Present policy context and progress up front and policy opportunities and challenges
- More emphasis on economic, policy and social approaches to the different topics
- Represent the social science and bottom up results in illustrations
- More on the cost/consequences of inaction and benefits of timely action
- Emphasize speed of climate change, Impart the urgency
- More discussion on the confidence of the climate change signal/ Deal with the uncertainty
- Reasons for Concern approach extended to capture the implications of different socio economic futures at the same level of warming
- Country scale consequences of actions taken at national level
- Take local/regional issues in account, Include one case study per region
- Rely on the new conceptual framework developed by the special reports
- Closer link to UNFCCC articles
- Don't forget connections with IPBES conclusions

#### Style and process:

- Communicate concepts clearly, clear policy relevant structure, more accessible
  - Simplify captions and figures/more attractive and powerful illustrations
  - Practical examples, Storylines
  - Avoid repetition
  - Material traceable in a clear way to the other reports
  - Controversial issues addressed in an open, transparent manner
  - Don't become too general, take SR1.5 as an example
  - Need an appropriate treatment of regional and local aspects
- 
- Start earlier, improve communication between the authors, more discussion/meetings
  - Mutual interaction between the CTW and the WG author, Share authors and increase interaction across WGs
  - Same number of authors from the different report
  - Recruit young scientists for technical and logistical support
  - Consistent and early engagement with communications experts will be important to focus effort on areas that matter
  - Speak to a larger audience/Clearly define target population for the report
  - Don't dilute information in the approval (like what happened with the D&A map in AR5 SYR)
  - Don't add material not supported in WGs



## Question 10 - Any other suggestions that would facilitate developing a draft outline of the AR6 SYR?

→ 56 responses

We didn't receive a lot of answers for question 10 but all of them were specific suggestions in general based on previous experience. They are listed below under four categories:

### Methods/Organization suggestions:

- Clear responsibilities, clear deadlines, writeshop session
- Clearer language and more engaging media
- Ask ourselves what is really new in the AR6 cycle and which info is necessary for policymakers
- Keep in mind what's realistic and achievable, don't re-state generalities
- Use grey literature and focus on developing/least developed countries
- Communicate key messages of AR6, get them before the finalization of ARs to be sure they are treated in them
- Send an outline ToC and skeleton report for comment
- Start from the target audience and work back

### People involved in the process and linking with the audience of the report:

- Make clear that policy makers, private sector, cultural influencers... affect changes and need to work together
- Involve people close to policy makers in the scoping
- Involve commercial/private sector
- Include indigenous knowledge holders
- LAs from around the world, avoid OECD dominance, authors from all the SRs and ARs, CLA from every regional chapter at the scoping meeting
- Proportionate representation of North and South and 50% women
- Graphics and communication specialist to develop the storyline
- Consult people from all sectors and countries and different levels of decision makers

### Style:

- Plain and readable, clear and simple
- Consistent with original AR6 report
- Storybook of key messages of SRs
- Approach topics from a top down, user relevant angle

### Content:

- Don't talk too much of negative emissions
- Use the approach "climate emergency"
- Framework figures at the beginning of SPM that link the three WGs
- Map explaining linkages between processes at global, regional, local level
- Use consistent/comparable scenarios and reference temperature levels
- Strong message: inaction will cost and damages will happen
- Don't forget that implementing the recommendations of IPCC on adaptation/mitigation depends on technical capabilities of developing countries and local circumstances
- Link with UNFCCC, Paris agreement, IPBES...
- About SD, don't summarize everything, choose the most important elements
- "Sustainable development supports, and often enables, the fundamental societal and systems transitions and transformations that help limit global warming to 1.5°C." (SR1.5), include this message in the SYR

## Question 11 - Where do you work?

→ 129 responses

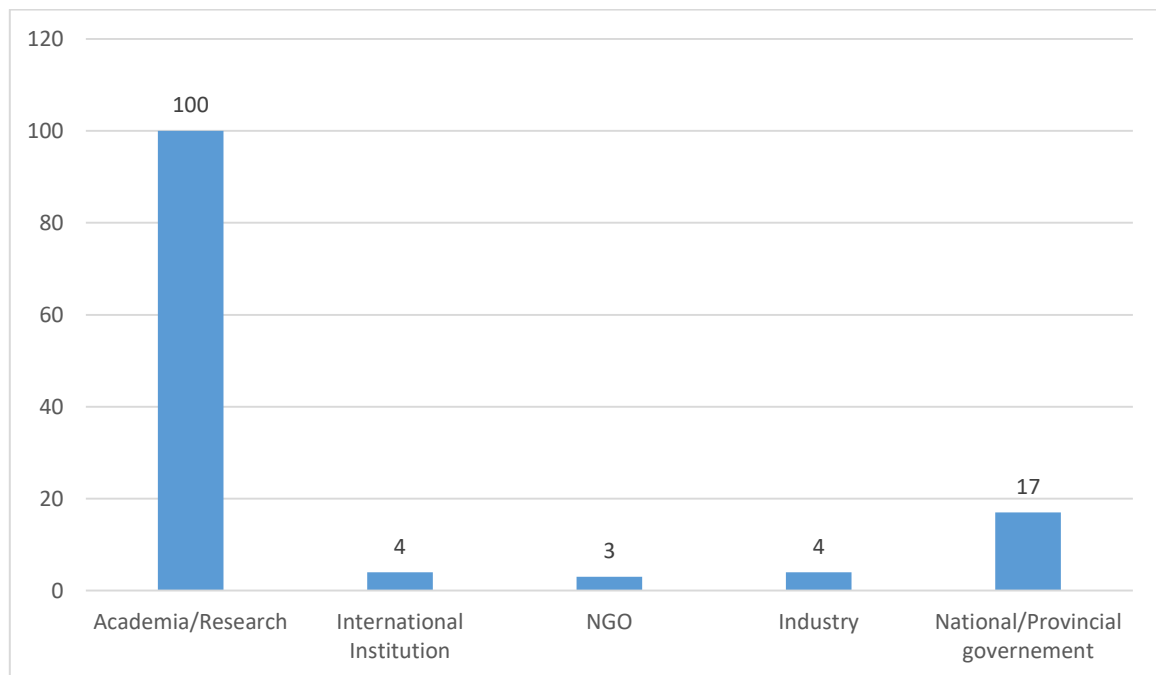


Figure 11. Number of respondents per sector

## **Question 12 - How do you expect the SYR to be used? What is its expected impact for your institution, area of concern and/or field of expertise?**

➔ 117 responses

The vast majority of the respondents see the SyR as a useful tool for policy making. They think it is made for policymakers to help them implement their climate policies.

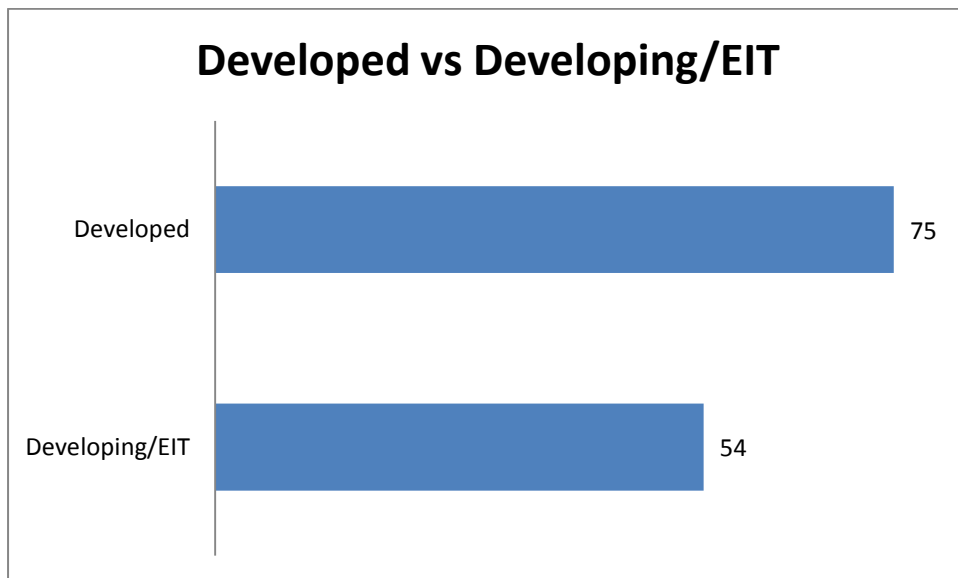
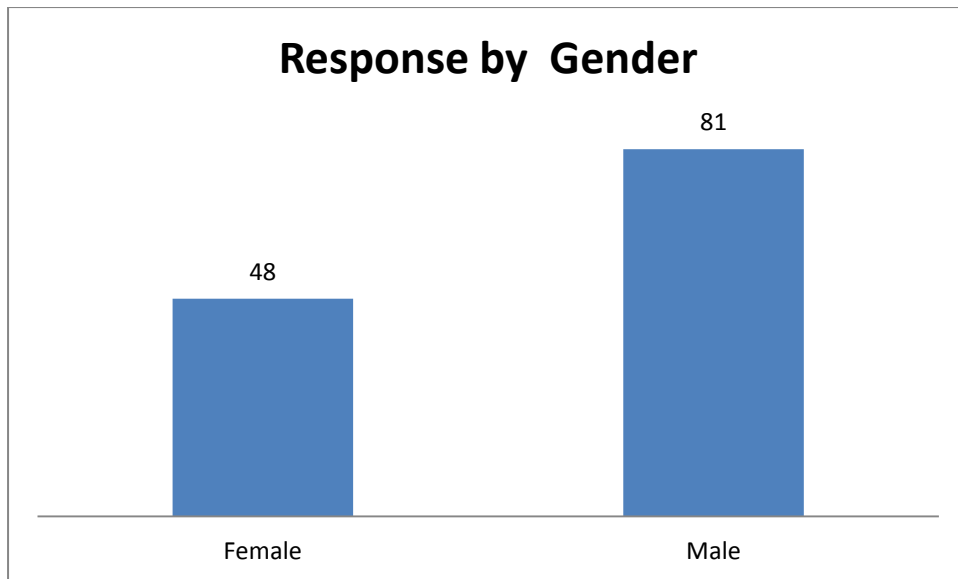
The answers could easily be classified in two categories:

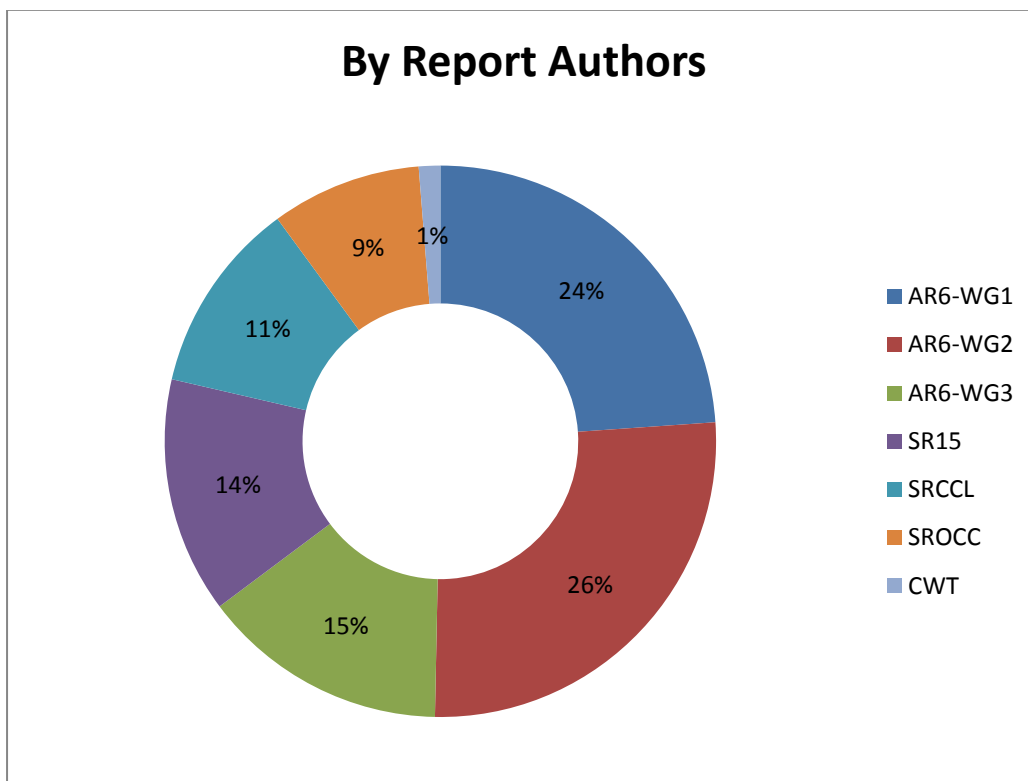
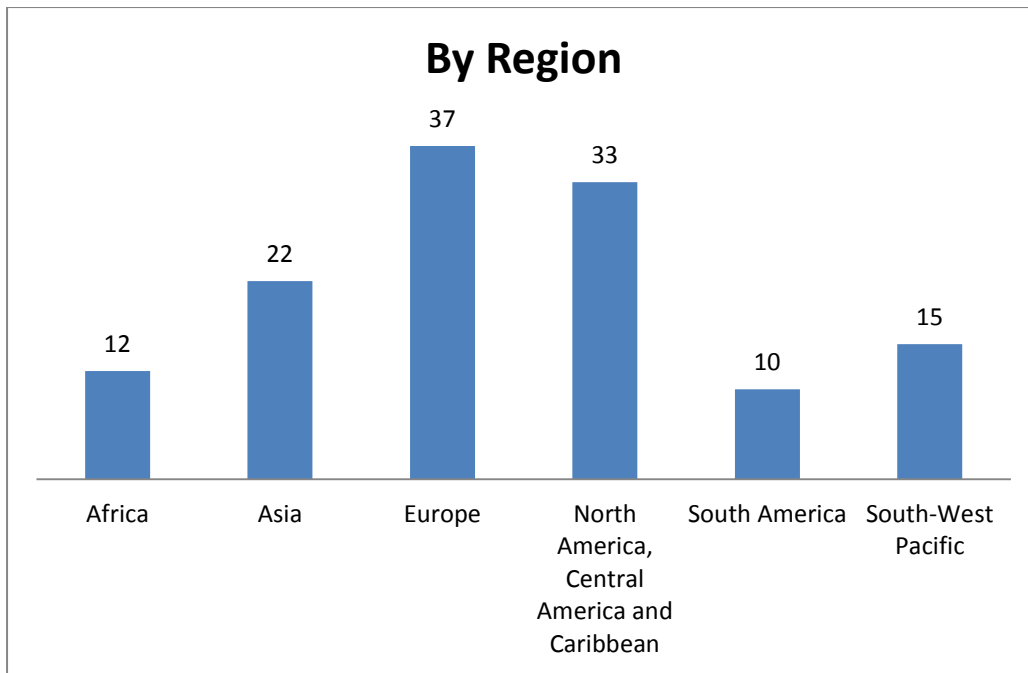
### **People susceptible to use the SyR:**

- Policymakers to understand the issue
- Teachers, academics, in schools' programs
- Broad science community, student, expert...
- Media
- NGOs

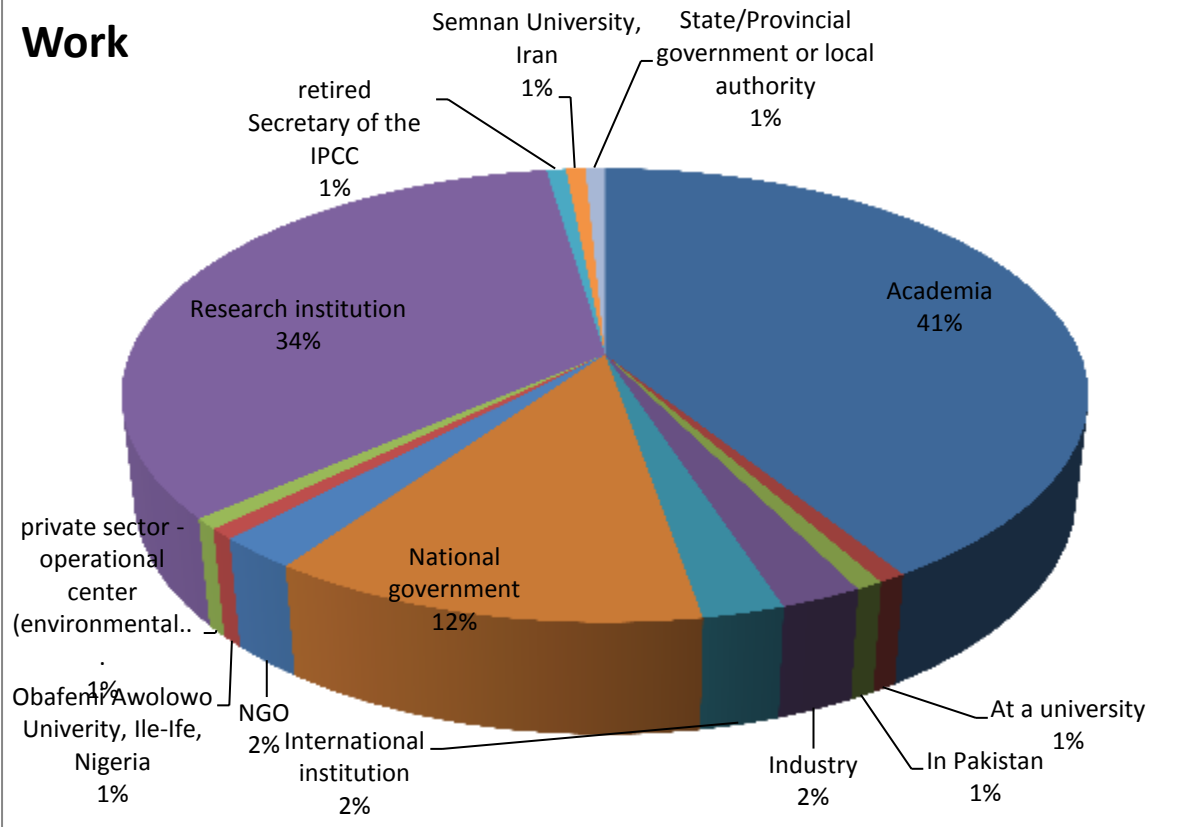
### **For which purpose?**

- Impact on public funding policies, Specific policy implementation
- Develop climate solutions/stimulate action
- The options for mitigation/adaptation
- Identify where more research is needed
- Better communication with politics, civil society, industry...
- Discuss with administration
- Industrial/national planning
- Concise summary of the most relevant parts of AR6
- Provide recommendations for SD, Help to achieve SDGs
- Support for emissions targets consistent with Paris Agreement, for GST, draw country report of CC
- Reference document for assessment projects
- Raise the sense of urgency
- Very important for agriculture in Pakistan





## Work



**ipcc**  
INTERGOVERNMENTAL PANEL ON climate change

**AR6 Synthesis Report Scoping Meeting  
Singapore, 21 – 23 October 2019**

AR6/SYR-SCOP/Doc. 1, Rev.3  
(22.X.2019)  
ENGLISH ONLY

**PROVISIONAL AGENDA AND ORGANIZATION OF WORK**

(Submitted by the Secretary of the IPCC)

# AR6 SYR SCOPING MEETING 21-23 OCTOBER 2019, SINGAPORE PROVISIONAL AGENDA

## 20 October

14:00 – 18:00 Registration of participants

**17:00 – 19:00 Scientific Steering Committee (SSC) meeting – Room: Aquarius 4**

## 21 October

### Day 1 – Presided over by the Chair of the IPCC

10:00 – 10:30 **Plenary – LEO 1, 2, 3 room**  
Opening statements *by the Chair, the Minister of the Environment and the Secretary of the IPCC*

10:30 – 11:00 Chair's vision and the evolution of SYRs, *Chair of the IPCC*

11:00 – 11:10 The AR6 SYR procedures and process, *Kerstin Stendahl*

11:10 – 11:25 Government and author responses – Key issues, *Jan Fuglestad*

11:25 – 11:35 View from the UNFCCC, *Florin Vladu*

11:35 – 11:50 Break

11:50 – 12:35 **Plenary – LEO 1, 2, 3 room**  
Integration of new knowledge across the working groups in AR6  
Development of Technical Summaries and Summaries for Policymakers, common glossary, a coordinated approach to scenarios and risk, regional information and other key issues,  
Key messages from the three Special Reports  
*Valérie Masson-Delmotte, Panmao Chai, Debra Roberts, Hans-Otto Pörtner, Jim Skea and Priyadarshi Shukla*

12:35 – 12:50 Discussion, *moderated by Thelma Krug*

12:50 – 13:00 Break-out group *modus operandi*, *introduced by Ko Barrett*  
- Terms of reference  
- Modalities for capturing and conveying detailed discussions

13:00 – 14:00 Time for LUNCH

14:00 – 16:00 First round of Break-Out Groups (BOG 1)  
Brainstorm, defining first sets of themes and content, discussion  
*Facilitators: Carolina Vera, Joy Pereira, Diana Urge-Vorsatz, Jan Fuglestad, Roberto Sanchez, Andy Reisinger, Fatima Driouech, Sergey Semenov, Ramon Pichs Madruga,*  
**Room Assignment:**  
**BOG 1: Leo 1,2,3**  
**BOG 2: Leo 4**  
**BOG 3: Pisces**  
**BOG 4: Aquarius 4**  
**BOG 5: Aquarius 3**  
**BOG 6: Aquarius 2**  
**BOG 7: Aquarius 1**  
**BOG 8: Taurus**  
**BOG 9: Gemini 2**



16:00 – 16:15	Break
16:15 – 17:30	Plenary to discuss BOG 1 outcome based on 5-minute reports back from BOG rapporteurs, <i>moderated by Ko Barrett</i> <b>Room: Leo 1,2,3</b>
17:30 – 18:30	SSC meeting
18:30 – 20:30	Reception at the Maritime Experiential Museum

<b>22 October</b>	<b>Day 2</b>
08.00 – 09.00	SSC meeting to decide on thematic issues to be explored on Day 2 and new topics for BOG2, participant allocation process for next BOGs <b>Room: Aquarius 4</b>
09:00 – 09:30	Plenary - summary of Day 1, thematic issues to be explored in and guidance for BOG2, <i>moderated by Youba Sokona</i> <b>Room: Leo 1,2,3</b>
09:30 – 12:00	Second round of BOGs (BOG2) to discuss themes and cross-cutting aspects  NB. Coffee/tea breaks as needed <b><u>Room Allocation:</u></b> <b>BOG 1: Leo 1,2,3</b> <b>BOG 2: Leo 4</b> <b>BOG 3: Pisces</b> <b>BOG 4: Aquarius 4</b> <b>BOG 5: Aquarius 3</b> <b>BOG 6: Aquarius 2</b>
12.00-13:00	Plenary to discuss BOG2 outputs and structure with draft section descriptors based on 2-3-minute reports by the BOG rapporteurs, <i>moderated by Thelma Krug</i> <b>Room: Leo 1,2,3</b>
13:00-15:00	Time for LUNCH
13:00-14:30	SSC meeting <b>Aquarius 4</b>
15:00-15:15	Plenary to clarify the goals of BOG3, reallocation of participants, <i>moderated by Thelma Krug</i> <b>Room: Leo 1,2,3</b>
15:15 – 17:30	Third round of BOGs (BOG3) Discuss viability of sections and develop section titles and draft outlines <i>Facilitators: tbd.</i>
17:30 – 18:30	Plenary to bring together draft titles and outline based on reports back from BOG3; discuss parts that have worked and particularly things that either didn't work or need more work, <i>moderated by Youba Sokona</i> <b>Room: Leo 1,2,3</b>
18:30-	Time for DINNER

19:00 – 20:00

SSC Meeting  
**Room: Aquarius 4**

<b>23 October</b>	<b>Day 3</b>
08:00 – 09:00	SSC meeting – <b>Room: Aquarius 4</b>
9:00 – 11:15	Plenary, <i>Chair of the IPCC</i> Proposed structure and content of outline, discussions, possible BOG4 <b>Room: Leo 1,2,3</b>
11:15 – 11:30	Break
11:30 – 13:00	Fourth round of BOGs (BOG4) to reflect on implications for each WG and how to facilitate integration in the overall SYR structure as well as implications of the SYR discussions on the underlying reports – how to integrate the elements of cross-cutting and new issues. Facilitators tbd.
13:00 – 14:00	Time for LUNCH
13:00 – 14:00	Possibility for SSC meeting – <b>Room: Aquarius 4</b>
14:00 – 15:00	Reports back from BOG4, discussion <b>Room: Leo 1,2,3</b>
15:00 – 15:15	Break
15:15 – 18:00	Concluding Plenary, <i>Chair of the IPCC</i> to agree on the outline of the Synthesis report <b>Room: Leo 1,2,3</b>
18:00 – 19:00	SSC meeting – <b>Room: Aquarius 4</b>

Scientific Steering Committee for the Scoping of Synthesis Report (SYR) of the IPCC Sixth Assessment Report (AR6)

**Terms of Reference**

**Introduction**

Following Section 4.1 of Appendix A to the Principles Governing IPCC Work, "Convening a Scoping Meeting to Prepare Report Outline", each IPCC Assessment Report, Special Report, Methodology Report and Synthesis Report, as defined in Section 2 of Appendix A to the Principles Governing IPCC work, should be preceded by a scoping meeting that develops its draft outline (and explanatory notes as appropriate).

Participants should be selected by the IPCC Chair in consultation with the Working Group Co-Chairs.

The Chair of the IPCC herein establishes a Scientific Steering Committee (SSC) to undertake the preparations for the scoping of the SYR with the following composition and mandate:

**Composition of the Scientific Steering Committee:**

- Mr Hoesung Lee (Chair, IPCC)
- Mr Youba Sokona (Vice Chair, IPCC)
- Ms Thelma Krug (Vice Chair, IPCC)
- Ms Ko Barrett (Vice Chair, IPCC)
- Ms Valerie Masson-Delmotte (Co-Chair of Working Group I)
- Mr Panmao Zhai (Co-Chair of Working Group I)
- Mr Hans-Otto Portner (Co-Chair of Working Group II)
- Ms Debra Roberts (Co-Chair of Working Group II)
- Mr Jim Skea (Co-Chair of Working Group III)
- Mr Priyadarshi Shukla (Co-Chair of Working Group III)
- Mr Kiyoto, Tanabe (Co-Chair of TFI)
- Mr Eduardo Calvo (Co-chair of TFI)
- Mr. Jan Fuglestad (Vice-Chair Working Group I)
- Mrs. Fatima Driouech (Vice-Chair Working Group I)
- Mr. Mark Howden (Vice-Chair Working Group II)
- Mr. Roberto Sanchez-Rodriguez (Vice-Chair Working Group II)
- Mr. Ramon Pichs Madruga (Vice-Chair Working Group III)
- Mr. Amjad Abdulla (Vice-chair WG III)

The Scientific Steering Committee will be chaired by the Chair of the IPCC, Mr Hoesung Lee.

Scientific Steering Committee membership does not imply authorship of the SYR.

The mandate of the SSC ends with the delivery of the document with the outcomes of the SYR Scoping Meeting to the 52<sup>nd</sup> Plenary Session of the Panel.

**Mandate**

1. To advise on two parallel pre-scoping surveys: one with member Governments, Observer Organizations, and Bureau members; and one with Coordinating Lead Authors and Lead Authors of the reports of the Sixth Assessment cycle and members of the Fifth Assessment Report (AR5) SYR Core Writing Team. The responses received will be synthesized with the support from the Secretariat and made available to the Scoping Meeting participants.
2. To advise on the necessary documentation to inform the SYR Scoping Meeting including the preparation of a Scoping Meeting Background Document.
3. To advise on the draft agenda for the SYR Scoping Meeting to be held in October 2019.
4. To advise on the preparation of a document with the outcomes of the SYR Scoping Meeting, including a draft outline, to be transmitted, through the Secretariat, to the 57<sup>th</sup> Session of the Bureau and the 52<sup>nd</sup> Session of the IPCC for their consideration.



# BOG 3 Outcome Structure

October 23, 2019

AR6 SYR Scoping Meeting  
Sentosa Island, Singapore  
21 – 23 October 2019

**ipcc**  
INTERGOVERNMENTAL PANEL ON climate change



## 0. INTRODUCTION (1/2 page)

- Context
- Setting the stage for the report
- *Aim of the report*
- *What is new in AR6*
- *AR6 background, the Special Reports*
- *Overview of the structure of the report*
- *Set the stage for the report*
- *Climate change in the context of sustainable development, climate justice and equity*
- *Rate of change*
- *Changed policy context (the SDGs, the Paris Agreement, and the Sendai framework)*
- *New advances in science*
- *Role of indigenous and local knowledge*

# 1. WHERE WE ARE NOW

- Socio-economic development and climate policy affected by a changing climate.
- Climate system and regional/global changes (unprecedented, scale, rate, causes and commitment).
- Impacts on human, natural and managed systems and key sectoral and regional risks and vulnerability
- CO<sub>2</sub> emissions by sources and removals by sinks, non-CO<sub>2</sub> forcers, including short-lived climate forcers.
- Socio-economic and technological drivers of emissions.
- State of adaptation and mitigation efforts and implications for sustainable development.

## 2. LONG TERM (Our possible futures (5)// Climate futures and sustainable development (6)// The future we anticipate in 2100 and beyond (3)// Some plausible futures (0)// Climate and development into the future (10)// Where could we go? (1) Long-term directions, future climate (1)// Understanding uncertainty in climate futures (1))

- Future climate change and different global warming levels, rate of change, and interplay with adaptation and mitigation pathways.
- Global and regional impacts and risks for natural and human systems, rate of change.
- Adaptation, limits to adaptation, and implications for adaptation planning.
- Mitigation pathways including carbon budgets, timing of net-zero emissions, dependence on socio-economic development, and risks and co-benefits from mitigation.
- The economics, equity and ethical foundations of climate responses in the near- and long-term.
- Deep uncertainty, tipping points, compound events, high-impact events including beyond 2100, technological disruptions and societal consequences.
- Linkages between and implications of long-term and near-term action including overshoot pathways, CDR, SRM, and enabling adaptation.  
(Windows of opportunity related to near-term action.)



### 3. NEAR TERM (TITLE - A thousand mile journey.. begins with a single step/Urgent and immediate actions addressing climate change/Actions in the near term/What we can do now and in the near term/The benefits of early action/How do we get there?)

- Climate trends and variability, and implications for risk management in natural, managed and human systems.
- Near term pathways consistent with limiting warming to different levels.
- Diverse response options across sectors and scales including timings and implications for futures (adaptation, risk management, mitigation)
- Initiating and strengthening system transitions and implications for sustainable development
- Implications of delayed action in a changing climate, including irreversibility.
- Enabling conditions including finance, institutions, capacity, governance, international cooperation, technological innovation and technology transfer, behaviour change.
- Just transition



# BOG IV Outcomes

23 October 2019

ipcc

INTERGOVERNMENTAL PANEL ON climate change



## 0. INTRODUCTION (1/2 page)

- Context
- Setting the stage for the report
- Information for the INF document: (to be split into two parts)
- *Aim of the report*
- *Based on what is new in AR6*
- *AR6 background, the Special Reports*
- *Overview of the structure of the report*
- *Set the stage for the report*
- *Climate change in the context of sustainable development, climate justice and equity*
- *Rate/status of change*
- *Changed policy context (the SDGs, the Paris Agreement, and the Sendai framework)*
- *Based on new advances in science*
- *Role of indigenous and local knowledge*

## CURRENT STATUS AND TRENDS

- Socio-economic development, changing climate, differentiated risks, and climate policy.
- CO<sub>2</sub> emissions by sources and removals by sinks, non-CO<sub>2</sub> forcers, including short-lived climate forcers.
- Socio-economic and technological drivers of emissions.
- Regional/global changes in the climate system, their causes and committed changes.
- Impacts on human, natural and managed systems and key sectoral and regional risks and vulnerability
- Status of adaptation and mitigation efforts and implications for sustainable development.
- 
- 
- *NB: Order of bullets does not indicate order for the chapter.*

## TITLE SUGGESTIONS

### CLIMATE AND DEVELOPMENT INTO THE LONG-TERM

### CLIMATE AND DEVELOPMENT FUTURES

- Climate change at different global warming levels, rate of change, and dependency on forcing characteristics.
- Global and regional risks for natural and human systems, and dependence on socio-economic development.
- Adaptation: options and limits, dependence on socio-economic development.
- Mitigation pathways, carbon budgets, net-zero emissions, dependence on socio-economic development, and risks and co-benefits from mitigation.
- Interactions between adaptation, mitigation and development, including economics, equity, ethical and governance dimensions.
- Deep uncertainty, tipping points, irreversibility, compound events, high-impact events, and societal and technological disruptions.
- Near-term and long-term interactions, overshoot, CDR, SRM, and adaptation.

- **[FOR INF DOC:**

- Future climate change at different global warming levels, rate of change, and dependency on forcing characteristics.
- Global and regional risks for natural and human systems, and dependence on socio-economic development.
- Adaptation: options and limits, dependence on socio-economic development.
- Mitigation pathways including carbon budgets, net-zero emissions, dependence on socio-economic development, and risks and co-benefits from mitigation, including benefits of avoided impacts.
- Interactions between adaptation, mitigation and sustainable development, including economics, equity, ethical and governance dimensions
- Deep uncertainty, tipping points, irreversibility, compound events, high-impact events including beyond 2100, technological disruptions and societal consequences.
- Linkages between and implications of long-term and near-term action including overshoot pathways, CDR, SRM, and enabling adaptation.

# NEAR TERM ACTION IN A CHANGING CLIMATE

- Near-term climate change and variability, vulnerability, exposure and risks for natural, managed and human systems, across scales.
- Near term development pathways consistent with limiting warming to different levels and enhancing adaptation.
- Path dependency, lock-in and implications of delayed action in a changing climate, including irreversibility.
- Diverse response options across and within sectors and scales, including policies, co-benefits/synergies and trade-offs (adaptation, risk management, mitigation).
- Strengthening and initiating system transitions, including for adaptation and mitigation, in the context of sustainable development, poverty eradication and equity; just transitions.
- Enabling conditions including finance, institutions, capacity, governance, international cooperation, technological innovation and technology transfer, behaviour change.