

SUMMARY OF THE 46TH SESSION OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE: 6-10 SEPTEMBER 2017

The 46th session of the Intergovernmental Panel on Climate Change (IPCC-46) convened from 6-10 September 2017, in Montreal, Canada, and brought together approximately 320 participants from over 107 countries. IPCC-46 approved the chapter outlines for the three Working Group (WG) reports that will comprise the Sixth Assessment Report (AR6), together with the Synthesis Report (SYR). The WGs, which also met in Montreal, reached agreement on the chapter outlines before they were presented to the IPCC plenary for approval.

The Panel also received an update on the progress of the *Ad Hoc* Task Group on Financial Stability (ATG-Finance), discussed various funding options for the IPCC, and agreed to extend the Group's mandate and to return to the issue of funding at IPCC-47.

The Panel also: agreed to admit 12 new observer organizations, heard a report of the Conflict of Interest Committee; heard a report on the future of the Task Group on Data and Scenario Support for Impact and Climate Analysis (TGICA); and agreed to establish a task group on aligning the IPCC cycles and the global stocktake under the UN Framework Convention on Climate Change (UNFCCC); and agreed to convene an expert meeting on short-lived climate forcers (SLCFs). The Panel also heard progress reports on, *inter alia*: communication and outreach activities, the IPCC Scholarship Programme, and the Special Report on Global Warming of 1.5°C.

Due to time constraints, the Panel agreed to discuss developing country participation in IPCC activities and matters related to the UNFCCC and other international bodies at IPCC-47. The Panel also agreed to convene IPCC-47 in Paris, France, during the first half of 2018.

A BRIEF HISTORY OF THE IPCC

The IPCC was established in 1988 by the World Meteorological Organization (WMO) and the UN Environment Programme (UNEP) to assess, on a comprehensive, objective, open and transparent basis, the scientific, technical and socio-economic information relevant to understanding human-induced climate change, its potential impacts, and options for adaptation and mitigation. The IPCC is an intergovernmental and scientific body with 195 member countries. It does not undertake new research, nor does it monitor climate-related data. Instead, it conducts assessments of the state of climate change knowledge on the basis of published and peer-reviewed scientific and technical literature. IPCC reports are intended to be policy relevant but not policy prescriptive.

The IPCC has three WGs: Working Group I (WGI) addresses the physical science basis of climate change; Working Group II (WGII) addresses climate change impacts, adaptation and vulnerability; and Working Group III (WGIII) addresses options for limiting greenhouse gas (GHG) emissions and mitigating climate change. Each WG has two Co-Chairs and six Vice-Chairs. The Co-Chairs guide the WGs in fulfilling the mandates given to them by the Panel and are assisted in this task by Technical Support Units (TSUs).

The IPCC also has a Task Force on National GHG Inventories (TFI) to oversee the IPCC National GHG Inventories Programme, also supported by a TSU. The Programme aims to develop and refine an internationally-agreed methodology and software for the calculation and reporting of national GHG emissions and removals, and encourage its use by parties to the UNFCCC.

The Panel elects its Bureau for the duration of a full assessment cycle, which lasts between five and seven years and includes the preparation of an IPCC assessment report. The

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Bureau plans, coordinates and monitors the IPCC's work, and is composed of climate change experts representing all regions. Currently, the Bureau comprises 34 members, and includes the IPCC Chair and Vice-Chairs, the WG Co-Chairs and Vice-Chairs, and the TFI Co-Chairs and its Bureau. In 2011, the IPCC established an Executive Committee (ExComm) to assist with intersessional work and coordination among the WGs. The IPCC Secretariat is located in Geneva, Switzerland, and is hosted by the WMO.

IPCC PRODUCTS: Since its inception, the IPCC has prepared a series of comprehensive assessment reports, special reports (SRs) and technical papers that provide scientific information on climate change to the international community.

The IPCC's First Assessment Report was completed in 1990; the Second Assessment Report in 1995; the Third Assessment Report in 2001; the Fourth Assessment Report (AR4) in 2007; and the Fifth Assessment Report (AR5) in 2014. Currently, the assessment reports are structured in three parts, one for each WG. Each WG's contribution comprises a Summary for Policymakers (SPM), a Technical Summary and an underlying assessment report. All sections of each report undergo an exhaustive and intensive review process by experts and governments, which takes place in three stages: a first review by experts; a second review by experts and governments; and a third review by governments. Each SPM is then approved line by line by the respective WG. A SYR is produced for the assessment report as a whole, which integrates the most relevant aspects of the three WG reports, and a SPM of the SYR is then approved line by line by the Panel.

The IPCC also produces SRs, methodology reports and technical papers, focusing on specific issues related to climate change. Thus far, SRs include: Land Use, Land-Use Change and Forestry (2000); Carbon Dioxide Capture and Storage (2005); Renewable Energy Sources and Climate Change Mitigation (2011); and Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (2011). Technical papers have also been prepared on, among other things, Climate Change and Water (2008).

In addition, the IPCC produces methodology reports, which provide guidelines to assist countries in reporting on GHGs. Good Practice Guidance reports were approved by the Panel in 2000 and 2003, and the latest version of the IPCC Guidelines on National GHG Inventories (2006 IPCC Guidelines) was approved in 2006. The IPCC also adopted the 2013 Supplement to the 2006 IPCC Guidelines: Wetlands (Wetlands Supplement), and the 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol (KP Supplement).

For its work and efforts "to build up and disseminate greater knowledge about manmade climate change, and to lay the foundations needed to counteract such change," the IPCC was awarded the Nobel Peace Prize, jointly with former United States Vice President Al Gore, in December 2007.

INTERACADEMY COUNCIL (IAC) REVIEW: In response to public criticism of the IPCC related to inaccuracies in AR4 and the Panel's response to the criticism, UN Secretary-General Ban Ki-moon and then IPCC Chair Rajendra Pachauri requested the IAC to conduct an independent review of IPCC processes and procedures and to present recommendations to strengthen the IPCC and to ensure the quality of its reports.

The IAC presented its results in a report in August 2010 and made recommendations regarding, *inter alia*: the IPCC's management structure; a communications strategy, including a plan to respond to crises; transparency, including criteria for selecting participants and the type of scientific and technical information to be assessed; and consistency in how the WGs characterize uncertainty. The Panel adopted a number of

IAC-related decisions on the treatment of gray literature and uncertainty, and on a process to address errors in previous reports. It also established task groups on processes and procedures, communications, Conflict of Interest (COI) Policy, and governance and management.

AR5: WGI's contribution to AR5 (Climate Change 2013: The Physical Science Basis) was approved during IPCC-36 in September 2013 in Stockholm, Sweden. WGII's contribution (Climate Change 2014: Impacts, Adaptation and Vulnerability) was approved during IPCC-38 in March 2014 in Yokohama, Japan. The WGIII contribution to AR5 (Climate Change 2014: Mitigation of Climate Change) was approved during IPCC-39 in April 2014 in Berlin, Germany. During IPCC-40 (27 October – 1 November 2014, Copenhagen, Denmark), the Panel approved the SYR's SPM line by line, and adopted the longer SYR section by section. IPCC-37, in October 2013, in Batumi, Georgia, adopted two methodology reports, the Wetlands Supplement and KP Supplement; and undertook initial discussions on mapping the IPCC's future.

IPCC-41: This meeting (24-27 February 2015, Nairobi, Kenya) addressed future IPCC work, and took a decision on the size, structure and composition of the IPCC Bureau and TFI Bureau (TFB). The Panel also adopted a number of decisions relevant to the AR6 cycle.

IPCC-42: This meeting (5-8 October 2015, Dubrovnik, Croatia) elected members of the IPCC Bureau and the TFB. The Panel elected Hoesung Lee (Republic of Korea) as IPCC Chair for the sixth assessment cycle.

IPCC-43: During this session (11-13 April 2016, Nairobi, Kenya), the Panel agreed to undertake three SRs in the AR6 cycle on: the impacts of global warming of 1.5°C above preindustrial levels and related global GHG emission pathways (SR15); climate change, desertification, land degradation, sustainable land management, food security and GHG fluxes in terrestrial ecosystems (SRCLL); and climate change and oceans and the cryosphere (SROCC). The Panel also agreed that a SR on cities would be prepared as part of the seventh assessment cycle.

IPCC-44: During this session (17-21 October 2016, Bangkok, Thailand), the Panel adopted the outlines of: SR15; and the Methodology Report to refine the 2006 IPCC Guidelines. The IPCC also adopted decisions on, *inter alia*: the Expert Meeting on Mitigation, Sustainability and Climate Stabilization Scenarios; communications and the scoping process; the future of the TGICA; review of the IPCC communications strategy; and a workshop on climate change and cities.

IPCC-45: This meeting (28-31 March, Guadalajara, Mexico) approved the SRCLL and SROCC outlines. IPCC-45 also discussed, *inter alia*: the Strategic Planning Schedule for the AR6; a proposal to consider SLCFs; and programme and budget, including options for resourcing. The Panel also decided to create the ATG-Finance and agreed to its terms of reference.

AR6 SCOPING MEETING: This meeting took place from 1-5 May 2017 in Addis Ababa, Ethiopia, to draft chapter outlines for the three WG contributions to the AR6 for presentation to IPCC-46, and discuss issues related to the SYR. Over 200 experts from approximately 60 countries participated.

IPCC-46 REPORT

On Wednesday, 6 September, IPCC Chair Hoesung Lee opened the session, noting the importance of this meeting in the AR6 cycle. He commented on the timely progress of the SRs, noting the expert review of the first order draft of SR15 is underway, and that the first draft of the refinement of the 2006 IPCC Guidelines is expected by the end of the year. He emphasized the importance of financial support for the IPCC to carry out its

work, communicate its findings, and demonstrate commitment to climate resilient development pathways.

In a ceremonial blessing to the meeting, Chief Christine Zachary-Deom, Mohawk Council of Kahnawà:ke, welcomed participants to Montreal and, in line with Mohawk tradition, thanked various elements in nature, as well as the creators, whoever they are.

Martine Dubuc, Associate Deputy Minister of Environment and Climate Change, Canada, welcomed participants and emphasized that Canada is relying on scientists to deliver cutting-edge knowledge to support national efforts to implement the Paris Agreement and other national sustainable development plans.

David Grimes, WMO President, underscored the WMO's contribution to the IPCC's work and the mutual benefits resulting from the active involvement of WMO scientists and member countries' hydrological and weather services, especially those from developing countries.

Elena Manaenkova, WMO Deputy Secretary-General, noted the outsize role that national meteorological services play in the IPCC, and underscored the WMO's commitment to support the IPCC's activities at all stages of the AR6 cycle.

Jian Liu, UN Environment Chief Scientist, stressed the importance of bringing science to policymakers and commended the IPCC for its "bold and courageous" work in this regard. He called attention to a joint event planned for the 23rd session of the Conference of the Parties to the UNFCCC (COP 23) later this year that will encourage countries to be more supportive of the IPCC both politically and financially.

Addressing the plenary via video, Catherine McKenna, Canadian Minister of Environment and Climate Change, highlighted the Pan-Canadian Framework on Clean Growth and Climate Change, and underscored the importance of the IPCC's work to realize countries' objectives under the Paris Agreement.

Also via video presentation, Kirsty Duncan, Canadian Minister of Science, emphasized Canada's commitment and support for science and research on climate change, and noted the importance of bringing the international community together to address such a vital global challenge.

Youssef Nassef, Director of Adaptation, UNFCCC Secretariat, discussed areas where the IPCC's contributions add value to the UNFCCC's work, including policy. He highlighted opportunities for the IPCC to engage with the UNFCCC regarding: alignment of the IPCC and the global stocktake cycles; Nationally Determined Contributions (NDCs); the enhanced transparency framework; and the 2018 facilitative dialogue.

Saudi Arabia lamented the absence of members of their delegation due to their inability to obtain visas and underscored the right to express reservations regarding meeting outcomes until such time as his country's experts could contribute. He requested that his statement be reflected in the record of the meeting, to which the Panel agreed. At Saudi Arabia's request, IPCC Secretary Abdalrahman Mokssit promised to deliver a written report on the visa issue, saying that the Secretariat plans to communicate more proactively with immigration authorities in the future to facilitate the visa process.

IPCC Chair Lee then introduced the provisional agenda (IPCC-XLVI/Doc.1 and Add.1). Norway, Switzerland, the UK, Germany, Finland, France, the Netherlands, Mexico, Belgium, Spain, Luxembourg, New Zealand and others requested that a verbal report from the side event on enhancing gender balance in the IPCC, which took place on Tuesday, 5 September, be presented under the agenda item, "Any Other Business." Saudi Arabia opposed, noting the need to confer with his capital regarding any new agenda items. New Zealand said that the issue could be added to a future session agenda if substantive discussions were

required, and Finland requested a written report from the gender meeting to facilitate information sharing for those who were not present. IPCC Chair Lee suggested hearing the verbal report on gender balance during the WG reports.

The Panel then adopted the agenda as presented, as well as the draft report of IPCC-45 (IPCC-XLVI/Doc.5).

IPCC TRUST FUND PROGRAMME AND BUDGET

Budget for 2018, 2019, 2020: On Wednesday, the Secretariat introduced the agenda sub-item (IPCC-XLVI/Doc.2) on income and expenditure for 2017 and on the budget until 2020. The Financial Task Team (FiTT) was asked to undertake discussions and report back to plenary.

On Sunday, FiTT Co-Chair Helen Plume presented the outcome of the group's discussions, as well as a draft decision and a proposed 2018 budget. She noted that the budget will likely be insufficient for 2018 given standard costs calculation, but that rapidly declining reserves underscore the urgent need for the IPCC to find "more stable footing," especially in light of the AR6 work programme. The Panel adopted the decision and the budget as presented.

Final Decision: In its decision (IPCC-XLVI-1), the Panel, *inter alia*: thanks those who contribute to the budget; urges governments to maintain and preferably increase their contributions, and provide multi-year contributions; notes with grave concern that the level of contributions to the IPCC Trust Fund received and pledged to date are insufficient to implement the work programme for 2018; and notes that the 2017 funding gap of CHF 1.8 million needs to be filled.

Resource Mobilization: IPCC Secretary Mokssit presented an information document on resource mobilization activities carried out for AR6 (IPCC-XLVI/INF.9), noting the gravity of the situation and calling on all member states to address the need for a financial plan and to consider participating in fundraising. He reported on reductions in airfare costs due to early travel arrangements and noted that all meetings until 2019 will be hosted without drawing from the IPCC's budget.

Several countries announced their support for the IPCC Trust Fund. The UK, Norway and Japan announced their intention to expand their financial contributions. The European Union (EU) noted its plan to substantially increase its contribution in the coming years, including with a EUR 1.7 million grant by the end of 2017 and a EUR 4 million grant in the next three years, all in addition to individual EU members' contributions. The Netherlands announced its intention to double its contribution to a total of EUR 100,000. Norway said it expects to increase its contribution in 2018 to more than double the amount of past years. Mali explained that its contribution will be made via the WMO. Australia announced its 2018 contribution will be at the same rate as in previous years, and that it will host a Lead Author meeting on inventory guidelines in April 2018. The Republic of Korea noted its multi-year contribution commitment and offered to host an IPCC plenary in 2018. Canada announced a doubling of its annual contribution of CAD 150,000 until 2022.

Poland suggested skipping IPCC sessions that are not essential to the AR6 cycle.

Audit of 2016 Financial Statements: The Secretariat presented the audit of the 2016 financial statements (IPCC-XLVI/INF.1). The Panel took note of the document.

Any Other Matters: The Secretariat presented the budget preparation process (IPCC-XLVI/INF.2). The Panel took note of the document.

Jonathan Lynn, Head, Communications and Media Relations, IPCC Secretariat, presented the communication and outreach strategy for the SRs in the AR6 cycle (IPCC-XLVI/Doc.4).

Germany, supported by Norway and Luxembourg, emphasized the importance of ensuring the SR15 SPM, at a minimum, and, optimally, the full SR15 report be made available in multiple languages ahead of UNFCCC COP 24 in 2018.

Germany, Sweden and Switzerland remarked on the gap between funding needs and budgeted activities, recommending solutions including non-travel meeting options, leaving IPCC derivative materials out of the budget, and conducting a budget efficiency review. Mexico suggested developing strategic partnerships with academic institutions to enhance communications and outreach activities, while Finland suggested ensuring the clearest possible language in the original AR6 products to reduce the need for those activities in the first place. Lynn explained that efforts are already underway to ensure report language is understandable to non-specialists, and that the Secretariat is looking into additional funding options for outreach and communications.

AD HOC TASK GROUP ON FINANCIAL STABILITY

On Saturday morning, ATG-Finance Co-Chair Thelma Krug presented the Group's report (IPCC-XLVI/Doc.8) and noted documents outlining the pros and cons for potential funding options (IPCC-XLVI/INF.12) and comments from Task Group members (IPCC-XLVI/INF.14). She recalled that the ATG-Finance was established at IPCC-45 to explore avenues for sustainable and adequate funding, noted that contributions to the IPCC have been steadily declining, and said annual contributions have not exceeded CHF 4.4 million over the past few years. She explained that in 2017, to date, income has totaled CHF 1.9 million in-hand contributions, and pledges have totaled CHF 1.8 million, which means that the IPCC's reserves of approximately CHF 6 million could be exhausted by the end of 2017.

ATG-Finance Co-Chair Youba Sokona presented eight possible funding options for consideration: maintaining voluntary and assessed contributions; increasing voluntary contributions; assessed or mandatory contributions from governments; crowdfunding from the public; contributions from scientific, research and philanthropic institutions; contributions from UN entities and international financial institutions; private sector contributions; and a "funding" meeting supported by good will.

IPCC Chair Lee recalled the ATG-Finance mandates to: explore options for increasing member country contributions, mobilizing additional resources, including from the UN and other organizations; and providing guidance on the eligibility of potential donors, including the private sector. He asked governments to take a decision on the various options presented in order to reverse the trend of declining contributions.

All countries underscored the importance of ensuring the independence and integrity of IPCC, and the urgency of the financial situation. They also stressed that as an intergovernmental organization, the main source of funding for the IPCC must come from governments and that the number of member countries providing contributions should be increased.

Regarding the options presented by the ATG-Finance, the US, South Africa, Saudi Arabia and others supported voluntary contributions, with Japan and others highlighting the value of in-kind contributions. In contrast, Mali, Bolivia and Benin preferred mandatory contributions.

Mexico, Canada, Kenya and many others proposed exploring options besides government contributions, with Germany and others stressing the need to develop eligibility criteria if this option were to be pursued. The Netherlands suggested a separate fund for other sources of funding.

The UK, Belgium and others were open to exploring contributions from UN entities and international and regional

financial institutions. Australia expressed disappointment that annual cash contributions from the WMO and UN Environment (UNEP) had not always materialized, and, with China, Morocco and others, called for engaging the IPCC's two parent organizations in this regard.

Mexico, supported by Italy, Belgium and others, proposed approaching the Green Climate Fund (GCF) for funding. Co-Chairs Krug and Sokona noted the Global Environment Facility has contributed to the IPCC in the past. However, they underscored the need to ascertain whether the rules governing other institutions allow for such contributions.

Belgium, Kenya, South Africa, Greece, Brazil and others suggested exploring contributions from scientific, research and philanthropic institutions as needed so long as conflict of interest is avoided. Belgium drew attention to substantial funds received by the UNFCCC from Bloomberg Philanthropies and suggested the IPCC learn more about this. Italy noted that research communities are often stressed for funding, while Future Earth suggested exploring other options since diverting resources from scientific research would ultimately weaken the IPCC.

Hungary, Poland and Brazil, opposed by Germany and Mali, suggested considering crowdfunding. Italy pointed out that properly undertaking this option requires particular skills and could be costly. Togo suggested the possibility of having users pay for some IPCC products. The US, supported by Switzerland, urged caution regarding the perception of IPCC products being sponsored by particular organizations.

IPCC Chair Lee then asked for views on whether the Panel should continue to be government funded only or whether it should pivot and adopt a hybrid approach with outside financial contributions.

Austria, Switzerland, the Bahamas, Peru, Saudi Arabia and others preferred that governments continue to be the sole financial contributors to the IPCC. Saudi Arabia, Mexico, Switzerland and Morocco suggested a fundraising campaign to align with the IPCC's 30th Anniversary in 2018.

Nicaragua, South Africa, Zambia, Argentina, Chile and Bolivia preferred adopting a hybrid-financing approach. Bolivia said that soliciting contributions from all levels of government could be a potential interim solution. Zambia and Argentina favored a hybrid approach in order to ensure "fallback positions" if and when budgetary constraints require the pursuit of other funding sources. In a similar vein, the Netherlands and Germany requested a funding timeline to ensure "Plan B" options could be drawn on to ensure the continuation of indispensable activities if the IPCC is unable to extricate itself from its financial troubles.

The US, France, Mali, Mexico, Finland, the Maldives and others expressed openness to a hybrid financing approach, with caveats. Many participants requested more specificity on the budget to: determine budget shortfalls; have a clear picture of income and expenses; and determine what would be acceptable to have other organizations pay for.

Many countries supported extending the mandate of the ATG-Finance to continue to assess various funding options before taking a formal decision on whether or not to adopt a hybrid approach. IPCC Chair Lee assured delegates that fundraising efforts would continue in earnest in the interim. The Group then agreed to extend the mandate of the ATG-Finance and to revisit the funding issue at IPCC-47.

SCOPING OF THE IPCC SIXTH ASSESSMENT REPORT

Following presentations of the WG report chapter outlines to the IPCC plenary by the respective WG Co-Chairs, the WGs convened from Thursday to Sunday to discuss and agree on their report outlines. Revised versions of the text were presented

throughout the week, and informal consultations took place as needed on the more contentious issues. WGI agreed on its chapter outline on Friday, while WGII and WGIII concluded their work on Sunday morning. The agreed WG report outlines were forwarded to the IPCC plenary for adoption.

During the WG sessions, a number of issues were raised regarding coherence and consistency among the WGs. In addition, some participants supported creating a dedicated group to ensure coherence across all WGs, with Spain adding that such a group should focus on cross-cutting issues, language and metrics used to measure progress, and a common glossary. A number of participants also called for accessible technical and executive summaries, and stand-alone high-level headline statements.

The plenary and WG discussions of the respective report outlines are summarized below.

WORKING GROUP I, AR6 REPORT OUTLINE:

Presentation to the Plenary: On Wednesday, WGI Co-Chair Valérie Masson-Delmotte presented the WGI outline to the Panel as a significant evolution from the AR4 and AR5 reports, given developments in, *inter alia*, climate science, better understanding of climate systems and events, and integration of new evidence, such as observations, statistics, theory, and modeling. She noted enhanced exchange of information across the three WGs in this cycle, including on risk assessment and management, and in the preparation of the three SRs.

Co-Chair Masson-Delmotte provided an overview of the report's structure, which addresses three themes: large-scale climate change; global climate processes, including a new comprehensive chapter on SLCFs; and regional climate information. She noted that groups of chapters follow a more holistic approach than in previous assessments, presenting current research approaches and scientific advances to ensure coherence.

Co-Chair Masson-Delmotte explained that the report would address extreme events in multiple chapters, given their relevance for risk assessment and management. She also noted that the chapters on global climate processes are linked to WGIII, while chapters on regional climate information are linked to WGII. She expressed WGI's willingness to support other WGs on cross-chapter needs. She said the AR6 scoping meeting had recommended: an expert meeting to address cross-WG treatment of regional issues, and noted the need for financial support in this regard; developing a regional risk atlas, which would require a new team with authors from each WG; and a cross-WG scenario team to be active throughout the AR6 process.

WGI-13 Chapter Outline Discussions: On Thursday morning, WGI Co-Chair Panmao Zhai opened the 13th plenary session of WGI. WGI Co-Chair Masson-Delmotte encouraged diversity in author nominations for the WGI report, including in expertise, career stage, region and gender. IPCC Chair Lee said that WGI is the foundation for IPCC reports, emphasizing the importance of robust science to inform policy. WGI approved the agenda as presented (WG-I:13th/Doc.1 and WG-I:13th/Doc.1, Add.1, Rev.1).

Delegates then proceeded to make general comments on the chapter outline (WG-I:13th/Doc.2). Germany called for a maximum report length of 800 pages and inclusion of low-probability, high-impact events. China urged consistency by all WGs on the use of scenarios, with Senegal requesting that the treatment of risk and scenarios be consistent across WGs.

Climate Action Network (CAN), supported by the Republic of Korea and the Friends World Committee for Consultation (FWCC), expressed concern regarding the inclusion of geoengineering solutions. Sudan, supported by the US, cautioned against duplication of research in the WGI report and the SRs.

Germany, with Ireland, Norway, and the US, urged coherence across all chapters and clear communication of complex scientific concepts from the report's outset.

Saudi Arabia said the WGI outline puts too much emphasis on social science and policy-related issues, supported limiting the use of new terminology, and requested a stand-alone chapter on uncertainties. The US requested more explicit treatment of uncertainty regarding multi-model assessments, model downscaling and carbon budgets.

A number of delegates welcomed the regional focus in Chapters 10-12. Citing cross-WG report consistency, Japan encouraged using WGI downscaling results in WGII, which was not done in AR5.

Framing, context and methods (Chapter 1): Mali requested including a brief summary of the results of the first five ARs and to do so in each WG report. Saint Lucia, the Russian Federation and Saudi Arabia requested clarity regarding the report's role in the global stocktake and said its contribution should be scientific in nature. Switzerland requested moving reference to the carbon budget from the chapter on biogeochemical cycles and feedbacks (Chapter 5) to this chapter. Saudi Arabia opposed, proposing to delete all references to the carbon budget.

On Friday morning, the WGI Co-Chairs presented the revised chapter outline, highlighting a new bullet point on treatment and evaluation of uncertainty throughout the report. With this addition, the chapter was agreed.

Changing state of the climate system (Chapter 2): This chapter was agreed on Friday without amendment.

Human influence on the climate system (Chapter 3): This chapter was agreed on Friday without amendment.

Future global climate: scenario-based projections and near-term information (Chapter 4): On Thursday, Saint Lucia, supported by Ireland, Norway, the EU, Belgium, the UK, Bolivia, Zambia and others, opposed conflating separate geoengineering concepts, noting that while GHG removal is a policy response included in the Paris Agreement, solar radiation management is not. CAN underscored that geoengineering options are not realistic response strategies at this time. The Russian Federation, Senegal and Saudi Arabia pointed to scientific literature on geoengineering solutions that should be included.

On Friday morning, the WGI Co-Chairs presented a revised outline, which included two separate bullet points on GHG removal and on solar radiation management. With these changes, the chapter outline was agreed.

Global carbon, and other biogeochemical cycles and feedbacks (Chapter 5): On Thursday, Saudi Arabia and Singapore disagreed with the reference to carbon budgets in the proposed draft. Japan and Co-Chair Masson-Delmotte clarified that carbon budget in this context refers to a scientific global assessment resulting from new literature. The Russian Federation proposed referring to "global" carbon. Japan, backed by the UK and others, supported consideration of abrupt changes and irreversibility post-2100, which Co-Chair Masson-Delmotte confirmed would be done.

On Friday, the Group discussed the revised chapter outline, with Belgium raising concern about use of the word "global" in the revised title due to the regional aspects of the carbon cycle, and, supported by Luxembourg, suggested referring to the importance of regional aspects in the recommendations for authors, which was agreed. Following a concern expressed by Norway, an additional recommendation for authors on ensuring differentiation between natural and anthropogenic changes was agreed.

Norway also asked for clarification on whether a bullet point on biogeochemical land management considered coastal areas like blue carbon. Mexico and Saudi Arabia supported its inclusion in the chapter, and the Co-Chairs suggested including it as an example at the end of the bullet point. This was opposed by Ireland, Germany, Spain, Norway and the UK, who noted this would give the issue of blue carbon too much prominence, and instead proposed a consideration of blue carbon in the guidance for authors. Norway suggested changing the same bullet point to reference “land and coastal management mitigation.” The Group agreed to the chapter with these suggestions.

Short-lived climate forcers (Chapter 6): On Thursday, Ireland and Mali welcomed the inclusion of this chapter as per their request. China underscored the need for a clear connection in the treatment of air quality and climate change. Belgium and Future Earth called for inclusion of sulfates when addressing SLCFs, with Belgium asking that WGII and WGIII consider SLCFs as a cross-cutting issue affecting climate change impacts and mitigation. India questioned this standalone chapter on SLCFs, as well as the reference to air quality, which was in the original formulation of the title, noting this is outside the IPCC’s scope and gives too much prominence to the issue, and pointing to other SLCF connections, such as glaciers and monsoons.

On Friday, delegates discussed the revised chapter outline, India said he could not accept maintaining reference to air quality in the chapter title, and stressed the importance of differentiating between lifespans of SLCFs, noting the temperature contribution of SLCFs is highly uncertain.

Following another revision of the chapter, and informal consultations, the Co-Chairs proposed to shorten the title to “SLCFs” and add a new bullet point on connections to air quality. India proposed adding reference to atmospheric compositions. With these revisions, the chapter was agreed.

The Earth’s energy budget, climate feedbacks, and climate sensitivity (Chapter 7): This chapter outline was agreed without comment.

Water cycle changes (Chapter 8): On Thursday, Saudi Arabia requested treating clouds and aerosols as a stand-alone chapter, as was done in AR5. Friday’s revised outline included a reference to cloud-aerosol processes in the bullet point on circulation, processes and phenomena affecting moisture and precipitation patterns. With that change, the chapter outline was agreed.

Ocean, cryosphere, and sea level change (Chapter 9): This chapter outline was agreed without discussion.

Linking global to regional climate change (Chapter 10): Saint Lucia suggested adding reference to regional challenges in the bullet point on evaluation of methods including downscaling and bias adjustment. Following the addition of language to reflect these proposals, the chapter was agreed.

Weather and climate extreme events (Chapter 11): On Thursday, El Salvador, supported by Nicaragua, called for reference to the specific circumstances of Central America as a particularly sensitive tropical area at the intersection of two ocean systems. The Philippines called for including reference to tropical cyclones, while Mali requested reference to drought. With the addition of reference to droughts and tropical cyclones, the chapter outline was agreed.

Climate change information for regional impact and risk assessment (Chapter 12): This chapter outline was agreed without amendment.

On Friday morning, WGI Co-Chair Zhai said the next WGI meeting will convene in April 2021 at a location to be determined. He noted that a joint WG session to approve and accept SR15 is scheduled for October 2018. Norway expressed concern that the timing of the joint session might be inadequate

for completion and distribution of SR15 ahead of COP 24 in November 2018. He closed the WGI session at approximately 12:30 pm.

Report to the IPCC Plenary: On Sunday afternoon during the IPCC plenary, WGI Co-Chair Masson-Delmotte presented the WGI report outline as agreed during the WG session, and stressed the importance of governments supporting gender-diverse and multiple author nominations. Echoing this sentiment, Canada delivered an oral report on the session on enhancing gender balance in the IPCC that took place on Tuesday, 5 September, noting a written report will be available on the IPCC website. She said that a consultation for a gender action plan would take place in October 2017 in Ottawa.

Poland lamented the lack of scientists from Eastern Europe and stressed the importance of intra-regional balance. The Russian Federation suggested turning to the WMO to bring in scientists from national meteorological services in order to increase diversity. Morocco and others expressed concern about the author selection process, which often leaves developing country authors out.

Belgium called for limiting the length of the SPM to no more than 10 pages, to ensure a clear and concise message, with Co-Chair Masson-Delmotte responding that flexibility is required for such a long report. She estimated 20-25 pages for the SPM, with 10 figures. Norway and WGII Co-Chair Hans-Otto Pörtner suggested that the discussion regarding page length take place at a later date, noting that the WGs have not yet had the opportunity to coordinate on the matter.

The US proposed text for inclusion in the decisions on the all three WG report outlines clarifying that the bullets are indicative and that authors should follow IPCC guidelines regarding the scientific literature covered. Venezuela requested that this be included in the report of the plenary but not in the WG outlines. Belgium, supported by Germany and Luxembourg, expressed concern that referring specifically to literature related to the physical science aspects could affect WGI’s ability to fully participate on cross-cutting issues. Following further discussion and clarification, the Panel agreed to include, in each WG decision, text reflecting that the report “assesses relevant literature, especially since AR5, in a manner consistent with IPCC guidance on the use of literature.”

Final Decision: In the final decision (IPCC-XLVI/Doc.11), the Panel: agrees to the outline of the WGI contribution to AR6; invites the WG Co-Chairs to develop appropriate mechanisms to ensure the effective coordination of the WGs work, oversee the treatment of cross-cutting themes, and prepare a common glossary for the three WGs. The decision also sets out a timetable for the production of the WGI report, and states that the budget for the WG’s work is contained in the decision on the IPCC Trust Fund Programme and Budget (IPCC/XLVI-1).

The outline contains reference to a SPM, a Technical Summary, and a number of annexes, including on options for cross-WG integration, a regional atlas, and the cross-WG glossary. The outline includes chapters on:

- framing, context and methods;
- changing state of the climate system;
- human influence on the climate system;
- future global climate: scenario-based projections and near-term information;
- global carbon and other biogeochemical cycles and feedbacks;
- SLCFs;
- the Earth’s energy budget, climate feedbacks, and climate sensitivity;
- water cycle changes;
- ocean, cryosphere and sea level change;

- linking global to regional climate change;
- weather and climate extreme events in a changing climate; and
- climate change information for regional impact and for risk assessment.

WORKING GROUP II, AR6 REPORT OUTLINE:

Presentation to the Plenary: WGII Co-Chairs Hans-Otto Pörtner and Debra Roberts presented the proposed outline for the WGII report to plenary on Wednesday, noting its overarching story line, which goes from natural to human systems and regions, to synthetic approaches. They pointed to three overarching themes in the report: theme one, on risks, adaptation and sustainability for systems impacted by climate change; theme two, on the different regions; and theme three, on sustainable development pathways, integrating adaptation and mitigation. They explained that the WGII outline also includes cross-chapter boxes that complement information available in the report.

WGII-II Chapter Outline Discussions: On Thursday afternoon, WGII Co-Chair Pörtner opened the 11th plenary session of WGII. IPCC Chair Lee commended the outline for its integrated consideration of risk, adaptation, mitigation, and development. The Group approved the agenda (WG-II:11th/Doc.1 and WG-II:11th/Doc.1, Add.1, Rev.1).

Regarding general comments on the outline (WG-II:11th/Doc.2), Japan requested addressing the social cost of carbon in the sectoral chapters, while Saudi Arabia requested deleting reference to the social cost of carbon from the WGII outline altogether. Norway proposed considering WGII's contribution to the global stocktake more broadly, and supported greater focus on ecosystem services, nature-based solutions and ecological shifts, and their linkages to the Sustainable Development Goals (SDGs).

Canada, supported by Bolivia, Ecuador, Norway, Venezuela, Indonesia and Future Earth, proposed developing guidelines for including indigenous and local knowledge in AR6 products. Canada recommended convening an expert meeting with indigenous leaders and offered support for such a meeting. Switzerland suggested the IPCC could leapfrog on the approach used by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) in this regard.

Trinidad and Tobago, Saint Lucia, Mali, Tanzania, Grenada, the Bahamas, the Maldives, Venezuela and Zimbabwe called for reference to loss and damage in the outline, noting the issue's relevance for policymakers. Bolivia, Chile and Ecuador supported including it either as a separate chapter or as a bullet point within each chapter. The US stressed the need to approach loss and damage from a scientific perspective and to avoid unclear and/or political definitions. A breakout group was established to further address loss and damage.

Bolivia and Singapore supported including reference to the concept of equity throughout the report.

Recalling problems in the AR5 related to the lack of data on Africa, Mali, supported by Tanzania, South Africa and Zimbabwe, underscored the need to address data gaps for Africa in the AR6, and called for the use of grey literature in this regard.

The US stressed adequate consideration of natural climate variability, feedbacks and drivers other than climate change, and the consistent treatment of uncertainty, noting that the sources and quantification of uncertainty should be explicitly addressed within each chapter.

Saudi Arabia opined that the outline was too mitigation-centric, and suggested that "trade-offs between adaptation and mitigation" should be replaced with "adaptation and mitigation co-benefits." He noted the lack of an agreed definition for incremental or transformational adaptation, and pointed to economic

diversification as a core part of sustainable development and climate change response.

Multiple countries proposed the addition of new chapters. Canada, supported by Denmark, Sweden, Finland, Chile, Norway and the US, suggested that polar regions be treated in a standalone chapter. Saudi Arabia proposed separate chapters on desertification and on uncertainties. India suggested three new chapters on: adaptation planning and implementation at national and subnational levels; international cooperation for adaptation; and, supported by Norway and the Maldives, climate risks to the economy, including the tourism and insurance sectors. The Republic of Korea requested adding a chapter on lessons learned from the implementation, monitoring and verification of national adaptation plans.

Point of departure and key concepts (Chapter 1): On Thursday, Bolivia said this chapter should include interactions between human and natural systems. India supported including reference to adaptation stocktaking.

On Friday, Co-Chair Roberts highlighted changes in the revised chapter outline, including: a more consistent treatment of risk; a more exhaustive treatment of adaptation options; and a better reflection of the intersections between mitigation and adaptation. Nicaragua requested adding reference to the UNFCCC in the bullet point addressing the changing policy context. Following further discussions, the Group agreed to include references to risk uncertainties in the bullet point addressing the climate risk framework, and nature and ecosystem-based adaptation and resilience in the bullet point addressing the significance of adaptation.

On Sunday morning, Co-Chair Roberts introduced new text resulting from informal consultations on loss and damage, which included a new bullet point on "scientific, technical and socio-economic aspects of current and future residual impacts, including residual damage, irreversible loss, and non-economic losses caused by slow onset and extreme events." She explained that a reference to limits to adaptation was added to the bullet point on enabling conditions for effective adaptation. Saint Lucia and Trinidad and Tobago expressed their support for the proposed text.

Saudi Arabia requested removing reference to "non-economic losses," expressing his concern that authors would fail to consider economic losses if only non-economic losses were mentioned. Saint Lucia, Jamaica and FWCC opposed, noting the importance of considering losses that are difficult to monetize. Co-Chair Roberts proposed "economic and non-economic losses" as a compromise. With those changes, the chapter outline was agreed.

Terrestrial and freshwater ecosystems and their services (Chapter 2): On Thursday, Ireland requested consideration of the vulnerability of carbon stocks in soils and biomass and of major ocean cycles. Bolivia, Venezuela and South Africa called for referring to ecosystem "benefits" rather than "services."

On Friday, Co-Chair Roberts noted that the revised outline endeavored to ensure consistency in the treatment of sustainable development and the SDGs. The group agreed to relocate reference to ecosystem "benefits" to the guidance to authors. With this change, the chapter outline was agreed.

Ocean and coastal ecosystems and their services (Chapter 3): On Thursday, Norway, Japan, Canada and Belgium requested adding reference to impacts from ocean acidification, and Bolivia to economic development.

Following discussion of the revised draft on Friday, Co-Chair Pörtner proposed, and the group agreed, to reference "ocean warming, ocean acidification and oxygen loss" in the bullet addressing projected hazards and exposure. Regarding the terminology of ecosystem "services" and "benefits," Bolivia

proposed, and the group agreed, to include a reference to IPBES in the guidance to authors. With these changes, the chapter outline was agreed.

Water (Chapter 4): In Thursday's discussions, China called for removing reference to transboundary water resources, while India suggested addressing the link between water and food, potentially in a cross-chapter box.

On Friday, during the discussion on the revised outline, Ukraine suggested, and the group agreed, to refer to quality and quantity of water resources when addressing long-term risks of water security. The chapter outline was then agreed.

Food, fibre and other ecosystem products (Chapter 5): On Thursday, India, with Norway, called for reference to fishing and subsistence farming. India, supported by Switzerland, Belgium and Zambia, urged a stronger focus on agriculture. The Food and Agriculture Organization of the UN (FAO) supported inclusion of socio-economic impacts.

On Friday, Co-Chair Roberts noted the revised chapter outline gave greater visibility to agriculture, forestry and fisheries and aimed to clarify the concept of managed ecosystems, which had been in the original chapter title, by referring to "ecosystem products."

Switzerland and Haiti, opposed by India, Ecuador and Venezuela, favored referring to "ecosystem goods and services" rather than "ecosystem products" in the chapter's title, but this was not taken on board. India requested including reference to "feed" to the title. In the ensuing discussion, some participants requested assurance that the distinction between inputs and outputs is maintained. As such, the Group agreed that consideration of inputs like feed and fertilizer would be added to guidance for authors.

Zambia favored broadening the text beyond "the production of food" in a bullet on adaptation options, noting that many countries experience losses along the entire food chain. The group also agreed to include reference to other ecosystem products in this bullet point.

The chapter outline was agreed.

Cities, settlements and key infrastructure (Chapter 6): On Friday, Saudi Arabia questioned the placement of reference to health and air quality in the bullet point mentioning adaptation options, adaptive capacity, responses and outcomes, with the group agreeing to relocate it to the bullet point addressing the energy-water-health nexus. After further debate, the Group agreed not to mention specific sectors in the bullet point on the detection and attribution of observed impacts and responses, and to include sectoral consideration in guidance to authors. With these changes, the chapter outline was agreed.

Health, wellbeing and the changing structure of communities (Chapter 7): On Friday, Saudi Arabia and South Africa opposed reference to human security in the bullet point on psychological, cultural and socio-economic dimensions. Germany supported including reference to conflict and human security. The WGII Bureau suggested to delete reference to "human security" and to add reference to the sustainable development context in the bullet point on adaptation options, limits to adaptation, and their social, environmental and economic implications. With these changes, the chapter outline was agreed.

Poverty, livelihoods and economic development (Chapter 8): On Thursday, India noted missing links between actual and predicted vulnerability conditions and suggested addressing human security. Returning to this issue and in response to Saudi Arabia's concern about reference to human security in the bullet point addressing opportunities for development, Co-Chair Pörtner suggested, and the group agreed, to reference the definition of

human security as contained in the AR5 in the guidance for authors.

On Sunday morning, the group considered revised text on the bullet point addressing opportunities for development, with Co-Chair Pörtner noting the insertion of "coping with loss and residual risk" after "human security," which the Group agreed to. The chapter outline was then agreed.

Regional chapters (Chapters 9-15): These chapters were first addressed on Thursday. Belgium suggested reflecting limitations of regional assessments in the regional chapters. Following consultations, several elements were added to the initial list of common elements to be considered across all regional chapters, including:

- detection and attribution of observed impacts and responses in natural and human systems on diverse time scales;
- region-specific information on exposure and vulnerability;
- current sectoral climate risks, including specific regional and sub-regional considerations related to land, coasts and regional oceans;
- different types of knowledge systems;
- diverse adaptation options;
- interaction of risks and responses to climate change with sustainable development pathways; and
- implications of availability and heterogeneity of data, including the use of grey literature.

The proposed regional chapters and the list of common elements were agreed on Saturday afternoon.

Key risks across sectors and regions (Chapter 16): This chapter outline was agreed as presented without modification.

Decision-making options for managing risk through adaptation (Chapter 17): On Thursday, Saudi Arabia, opposed by France, requested removing reference to the social cost of carbon from the bullet point on costs and non-monetized loss, benefits, synergies and trade-offs. On Saturday afternoon, Co-Chair Pörtner presented a revised version of the chapter outline, noting that reference to the social cost of carbon had been removed. The Maldives, supported by Mali and others, asked for explicit mention of adaptation costs, which Co-Chair Pörtner suggested adding to the author guidance. Saint Lucia asked to mention residual risk and limits to risk management in the bullet on decision-making and governance for managing risk, which was also agreed to. India, supported by Venezuela, asked for a bullet on international cooperation for adaptation and adaptation planning and implementation to the chapter. With these changes, the chapter outline was approved.

Climate resilient development pathways (Chapter 18): The Russian Federation proposed deleting reference to progress on the global stocktake from the bullet point on assessing risk and the level of adaptation. Supported by Saudi Arabia, he preferred referring to "adaptation pathways" instead of "transformation" in the proposed title. Saudi Arabia supported including economic diversification in a bullet point on drivers of decision making.

On Saturday afternoon, a revised chapter outline was presented. The Russian Federation, supported by Saudi Arabia and the US, expressed concern that including reference to the global stocktake in this chapter would imply an obligation for the IPCC to analyze the level of adaptation and presented alternative text. The US suggested removing reference to the level of adaptation, and maintaining reference to the global stocktake in the framing chapter (Chapter 1). Norway opposed.

Following informal consultations, IPCC Vice-Chair Ko Barrett suggested altering the language to read "considering risk and adaptation in the context of the global stocktake." South Africa opposed, preferring to retain reference to the level of adaptation

insofar as it links to climate resilient development pathways, and suggested moving reference to the global stocktake to the guidance for the authors.

Regarding a bullet point on adaptation pathways, Saudi Arabia, Venezuela and Bolivia, opposed by Norway, asked for the addition of economic diversification, and requested removal of reference to the social cost of carbon, preferring instead to refer to the “social effects of GHG emissions,” which India supported and Ireland, Belgium and the Netherlands opposed, with the latter proposing to refer to externalities as an alternative. Following further discussions, the Group agreed to accept language on the “social effects of GHG emissions,” and to include that the social effects of GHG emissions include their external costs (social cost of GHGs) be included in the guidance to authors.

Venezuela, supported by Ecuador and Saudi Arabia, proposed removing the concept of “human security” in the bullet on adaptation pathways, noting it was not appropriate in the context of resilience. Co-Chair Pörtner suggested replacing it with “human wellbeing,” to which the group agreed. The Netherlands requested, and the group agreed, to include the definition of human security as contained in the AR5 glossary in the guide to authors.

On Sunday morning, following informal consultations, the Group revisited the bullet point addressing the synthesis of risk and levels of adaptation. The US requested to include reference to the global stocktake in guidance for authors and to simultaneously add reference to the global stocktake to the introduction and framing chapter bullet on changing policy context. Saint Lucia suggested adding reference to the Warsaw International Mechanism for Loss and Damage and periodic review of temperature goals in the guidance for authors. With those changes, the chapter outline was approved.

Cross-chapter papers: On Thursday, France and Spain asked for a cross-chapter box on Mediterranean regions. The Group agreed to have cross-chapter papers instead of boxes.

On Friday, Sweden, Canada and Norway suggesting covering polar regions in a stand-alone chapter, because the polar regions require an arrangement to ensure that the material is assessed by the right scientists. The US suggested inserting the cross-chapter paper on polar regions with the regional chapters.

Saudi Arabia and Switzerland expressed concern regarding the number of pages proposed for the cross-chapter paper on deserts, semi-arid areas and desertification (5 pages) and mountains (also 5 pages), noting more pages may be required.

On Saturday afternoon, Co-Chair Pörtner presented the revised cross-chapter papers for approval. India asked for a cross-chapter paper on the Himalayas and Saudi Arabia called for the paper on deserts to include consideration of sandstorms and dust. Agreement was reached to include reference to the Himalayas, and to sandstorms and dust, in the guidance document for authors. Ecuador, supported by India, asked for an increase in the length for the cross-chapter paper on mountains from 10 to 15 pages, which was agreed. The cross-chapter papers were approved.

On Sunday, during the closing of the WGII session, Co-Chair Roberts noted that author nominations will begin after the conclusion of IPCC-46, author selection is expected in January 2018, and the first Lead Author meeting is scheduled for January 2019 in Durban, South Africa. She emphasized that countries pay particular attention to which authors they nominate for the cross-chapter papers. Co-Chair Roberts noted that the next WGII session is scheduled for October 2021 when participants will approve the SPM, while a joint WG session will approve SR15 in October 2018. She closed the WGII session at 11:00 am.

Report to the IPCC Plenary: On Sunday afternoon, during the IPCC plenary, Co-Chair Pörtner presented the WGII report outline that was agreed during the WGII plenary session, noting that the WGs will develop a glossary common to all three reports.

Saint Lucia expressed regret that, given the outcome of WGII discussions, the IPCC is “still not ready to take the term ‘loss and damage’ on board,” calling it a “missed opportunity” given that the issue currently figures in the scientific literature and will continue to do so. She affirmed her confidence that the authors will consider the relevant literature as appropriate, and expressed her wish that the concept be considered in the SYR. The WGII outline was agreed.

Final Decision: In the final decision (WGII:11th/Doc.2, Rev.1), the Panel agrees to the outline of WGII’s contribution to the AR6. The Panel decided that the bulleted text in the outline should be considered indicative by the authors and that the authors elaborate on the relevant scientific literature available since AR5, consistent with IPCC guidance. The report will total approximately 970 pages.

The outline contains: an SPM (pages TBD) and a Technical Summary (40 pages), as well as 18 chapters separated into three sections. Chapter 1 addresses the point of departure and key concepts (30 pages). Section 1 addresses risks, adaptation and sustainability for systems impacts by climate change and is comprised of seven chapters:

- terrestrial and freshwater ecosystems and their services (60 pages);
 - ocean and coastal ecosystems and their services (60 pages);
 - water (60 pages);
 - food, fibre, and other ecosystem products (60 pages);
 - cities, settlements and key infrastructure (60 pages);
 - health, wellbeing and the changing structure of communities (50 pages); and
 - poverty, livelihoods and sustainable development (60 pages).
- Section 2 addresses regions and has seven chapters:
- Africa (50 pages);
 - Asia (50 pages);
 - Australasia (30 pages);
 - Central and South America (50 pages);
 - Europe (40 pages);
 - North America (40 pages); and
 - Small Islands (30 pages).

Section 2 also includes 12 bullet points containing guidance for authors on common elements across all regional chapters and seven cross-chapter papers including:

- biodiversity hotspots (land, coasts and oceans) (10 pages);
- cities and settlements by the sea (10 pages);
- deserts, semi-arid areas, and desertification (10 pages);
- Mediterranean region (10 pages);
- mountains (15 pages);
- polar regions (15 pages); and
- tropical forests (10 pages).

Section 3 addresses sustainable development pathways: integrating adaptation and mitigation, and includes three chapters:

- key risks across sectors and regions (40 pages);
- decision-making options for managing risk (40 pages); and
- climate resilient development pathways (40 pages).

There are five annexes including: regional atlas; glossary; list of acronyms; list of contributors; and list of reviewers.

The approval of the WGII report is planned for October 2021.

WORKING GROUP III, AR6 REPORT OUTLINE:

Presentation to the Plenary: On Wednesday, WGIII Co-Chair Jim Skea presented the WGIII report outline to plenary, noting the WGIII report scoping meeting had aimed to: establish stronger links between high-level climate stabilization goals and scenarios,

and short- and medium-term practical steps; introduce disciplines and strands of literature that are relevant to mitigation issues but have not been previously showcased; and connect mitigation to sustainable development and the SDGs.

Co-Chair Skea presented the report outline features that depart or innovate from AR5, noting the first and last chapters are intended to frame the report in the broader sustainable development context, and addressed key developments since AR5, including the SDGs and the Paris Agreement. He noted the intent to include literature not historically addressed in IPCC outputs.

Co-Chair Skea said that proposed chapters on high-level assessments of emissions trends, drivers and pathways should include literature sources that deal with all scales and go beyond traditional modeling approaches, distinguishing between long-term goals and medium- and near-term actions. He explained that six chapters focus on economic sectors, primarily address incremental changes since AR5, and highlight regional specificities and case studies to supplement high-level messaging. He noted that a chapter presenting climate change responses not captured by the sectoral chapters, such as carbon capture and removal, will examine how responses can add up across sectors, including a consideration of trade-offs, co-benefits and ethics. Co-Chair Skea welcomed offers to host WGIII Lead Authors meetings.

WGIII Chapter Outline Discussions: On Thursday, WGIII Co-Chair Skea opened the 13th session of WGIII, explaining that his Co-Chair, P.R. Shukla, was unable to attend the session, and that WGIII Vice-Chair Ramon Pichs-Madruga would take his place. IPCC Chair Lee provided introductory remarks, saying that the WGIII report addresses the vital transition from business as usual to sustainable development pathways.

The group adopted the agenda as proposed (WG-III:13th/Doc.1 and WG-III:13th/Doc.1, Add.1, Rev.1) and proceeded to provide general comments on the draft outline (WG-III:13th/Doc.2). Japan requested addressing feasibility and considering the negative impacts of climate change as it relates to the SDGs. She also suggested preparing a manual to interpret the various scenarios and assumptions. Vice-Chair Pichs-Madruga and Co-Chair Skea said they were proposing to include one as an annex to ensure transparency.

India emphasized the importance of the report in the global stocktake process and the need for linkages with present commitments. China proposed reflecting all elements of the global stocktake in a comprehensive and balanced manner, and considering the provision of funds and capacity building to developing countries in addition to an assessment of NDCs. China, supported by the Netherlands, also called for improving synergies in the treatment of sectors, for example consistently addressing progress since AR5 or including case studies. China stressed the importance of coordination among the WGs on cross-cutting issues such as the global carbon budget, pathways, mitigation/adaptation and their links with sustainable development, and geoengineering. Co-Chair Skea noted that the WGs would develop a common glossary as a means to ensure consistency across the WG reports.

Poland lamented the absence of a link to climate neutrality. Saint Lucia called for including links to climate change impacts, adaptation options, and the benefits of mitigation in all chapters.

The UK supported inclusion of a range of representative concentration pathways, while Estonia called for addressing the economic and social opportunities embedded in these pathways.

Saudi Arabia said that uncertainties should be elaborated upon and stressed the need for a policy neutral approach, objecting, *inter alia*, to concepts such as “lock-in” and “decarbonization.”

WGII Vice-Chair Sergey Semenov expressed concern with the focus on policy in what is supposed to be a scientific assessment, for example, when assessing the efficacy of political instruments such as the Paris Agreement. Together with Saudi Arabia, he objected to reference to transformational technology.

Introduction and framing (Chapter 1): On Thursday, Venezuela and Bolivia opposed reference to markets and the price of carbon. Saint Lucia suggested referring to limiting global temperature rise to both 1.5°C and 2°C, not just 2°C. Discussing the revised outline on Friday, Germany, Luxembourg, France, the UK, Estonia, Hungary, Ireland, Poland, Sweden, the EU and others, opposed by Saudi Arabia, objected to deleting reference to the global stocktake. As a compromise, New Zealand, supported by the US, Brazil and WGII Vice Chair Sergey Semenov, suggested that the general reference to the Paris Agreement was enough to cover the stocktake process. The US proposed separating policy from technological issues. France called for maintaining reference to the long-term 2°C goal, while Estonia echoed Saint Lucia’s earlier request to also refer to the 1.5°C target.

On Sunday morning, the Group considered another revised text. In the bullet addressing recent developments including the Paris Agreement, Luxembourg, supported by Germany and opposed by Saudi Arabia, requested reinserting reference to the global stocktake, noting that such a reference had already been agreed upon in the WGI and WGII outlines. Following a brief discussion, the group agreed to change the bullet to “recent developments including: the Paris Agreement and potential scientific inputs from the IPCC, including to the global stocktake and the SDGs.”

With this change, the chapter outline was agreed.

Emission trends and drivers (Chapter 2): On Thursday, the Republic of Korea suggested, and the Group agreed, to address past and present consumption trends in the same manner as proposed for production trends, to allow for comparability.

On Friday, the Netherlands, supported by Norway, called for including both annual and cumulative emissions. Norway also requested focusing on anthropogenic emissions.

Discussing a revised outline on Sunday morning, on the bullet point on climate and non-climate policies, WGII Vice-Chair Semenov and Norway suggested adding a reference to different scales. Regarding the bullet point addressing infrastructure and locked-in future emissions, Saudi Arabia, supported by the Bahamas, proposed alternative language on “future emissions associated with infrastructure.” Germany, France, the Netherlands and Norway opposed, stressing the importance of maintaining reference to “locked-in.” Following informal consultations, the Group agreed to include reference to “existing and planned long-lived infrastructure.” The chapter outline was agreed.

Mitigation pathways compatible with long-term goals (Chapter 3): On Thursday, Saudi Arabia called for including reference to spill-over effects when addressing links to sustainable development, to ensure continuity with the AR5. Ghana suggested more focus on adaptation and mitigation co-benefits. In the revised outline, Japan, opposed by Saudi Arabia, requested inclusion of trade-offs as well as adaptation and mitigation co-benefits.

Discussing a revised text on Sunday morning, Co-Chair Skea invited comments on the bullet addressing modeled emission pathways. Saudi Arabia expressed reservations regarding reference to “carbon budgets” and “the long-term temperature goal.” Following informal consultations, alternative text was proposed on “modeled emission pathways compatible with the Paris Agreement, including the long-term temperature goal, and higher warming levels, taking into account CO₂, non-CO₂ and

SLCFs (including peaking, rates of change and balancing sources and sinks and cumulative emissions).” The UK requested that reference to carbon budgets be included in the guidance for authors. The Group agreed to these changes.

Regarding the bullet point addressing system transitions, Germany, supported by Belgium and Mexico, and opposed by Saudi Arabia, requested removing reference to “transitions” and reverting to the original formulation of “transformations,” noting these concepts imply alternate meanings. Following informal consultations, the Group agreed to include reference to both transitions and transformations. With these changes, the chapter outline was agreed.

Mitigation and development pathways in the near- to mid-term (Chapter 4): On Thursday, Bolivia suggested referring to subnational programmes “as appropriate” and objected to reference to “green growth” given the lack of consensus on what that might entail. Spain highlighted the importance of demographics and called for reference to population. Norway emphasized the importance of including international emissions such as those resulting from aviation and maritime transport, and underscored the need to address the carbon budget. Japan suggested addressing trade-offs. France regretted the removal of a reference to mid-century when addressing mitigation and development pathways.

On Sunday morning, WGIII returned to consider the revised chapter outline. In the bullet addressing national, regional and international modeling, Saudi Arabia requested, and the group agreed, to reinsert the bullet on addressing benefits of mitigation, which had previously been deleted, to ensure cross-WG linkages. With those changes, the chapter outline was agreed.

Demand, services and social aspects of mitigation (Chapter 5): On Thursday, Venezuela suggested that the social aspects of transformation in the chapter refer clearly to sustainable development. On Friday, considering a revised title for the chapter, Germany, supported by Luxembourg, Hungary and Belgium, and opposed by Saudi Arabia, proposed reverting to the original formulation, which references transformation rather than mitigation. Saudi Arabia requested an explanation of the proposed reference to circular economy, due to lack of clarity regarding the term. The Netherlands, supported by Norway, Luxembourg, Spain, Hungary and Belgium, preferred maintaining reference to circular economy, as the concept relates to sustainable production and consumption, but Saudi Arabia opposed. Informal consultations convened to further clarify the concept of circular economy. On Saturday evening, the Group agreed to include a definition of circular economy, as “maximizing material and resource efficiency, closing loops.” The chapter outline was then agreed.

Common elements for sectoral chapters: On Friday, the Group decided to include a list of common elements regarding sectoral chapters 6-11. The UK suggested including infrastructure lock-in as a common element, the Netherlands supported adding the social aspects of implementation, and Saudi Arabia proposed adding mitigation co-benefits to the mitigation-adaptation interactions bullet.

On Saturday evening, following further consultations, the Group agreed to Saudi Arabia’s proposal to add reference to “adaptation with mitigation co-benefits.” The Group also agreed to the UK’s suggestion to insert “infrastructure and lock-in as appropriate” and to refer to barriers when addressing sector specific policies, financing and enabling conditions, as suggested by Switzerland.

Energy systems (Chapter 6): On Thursday, the US and FWCC suggested adding reference to energy efficiency as an important form of emissions reduction. Saudi Arabia, opposed

by Norway, requested removing reference to fossil fuel prices and, supported by Norway, to retain reference to carbon capture and storage (CCS). Bolivia suggested referring to supply and demand patterns instead of fossil fuel prices, while France favored reference to energy prices. China called for the inclusion of nuclear energy as one of the low-carbon energy supply options. Japan requested reference to food production in the bullet point addressing biomass for energy.

On Saturday evening, discussing a revised version of the text that replaced reference to “fossil fuel prices” with “energy prices,” Saudi Arabia suggested replacing “prices” with “policies and measures.” Norway, Co-Chair Skea and others noted that prices are not necessarily included in the literature as policies and measures. Following further discussions, the Group decided to separate the concepts into two bullet points, and referring to “global and regional new trends and drivers” in one and “policies and measures and other regulatory frameworks; and supply and demand systems” in the other. Norway, supported by Saudi Arabia, the Netherlands and Japan, asked for reinsertion of CCS as an example of mitigation options, noting this was done in AR5. Japan also called for adding mention to public perception, social acceptance of CCS and related aspects. With these changes, the chapter outline was agreed.

Agriculture, Forestry and Other Land-Use (AFOLU) (Chapter 7): On Thursday, India called for further inclusion of ecosystem services. South Africa urged for balanced treatment of all biomass types, especially in the context of mitigation, adaptation and sustainable development. He suggested incorporating an assessment of global carbon sinks, pools and fluxes, noting that this would be invaluable for policymakers. Co-Chair Jim Skea noted that the topics raised by South Africa are addressed in the SROCC but assured that the link between the two reports will be clearly presented. Japan said that the chapter should include a review of the feasibility of carbon storage options and consider carbon removal and storage, and, with Spain, expressed concern about the political associations with the term “accounting.” Spain cautioned against overstating the mitigation potential from forestry. Norway, supported by Ireland, suggested addressing bioenergy in the forestry sector and mitigation strategies within agriculture.

On Friday, in the revised chapter outline, Switzerland, Spain and Luxembourg asked for disaggregated data on AFOLU’s component sectors. The EU, Norway, Luxembourg and Brazil asked that the bullet point on calculations of emissions and removals not be restricted to non-managed land. Spain underscored the need for clarity as to what is being calculated when addressing emissions and removals in this sector.

A revised version of the chapter outline presented on Saturday evening reflected the request to separate emissions and removals in AFOLU, and to consider a range of information sources when addressing emissions and removals. Brazil suggested, and the group agreed, to refer to “anthropogenic” emissions and removals. Norway urged inserting specific reference to the role and implications of emissions and removals in this sector for mitigation pathways. In response to a request by the EU, reference to waste minimization and recycling of agriculture and forestry residues was added in the guidance to authors. After some further drafting for clarification, the chapter outline was agreed.

Urban systems and other settlements (Chapter 8): Switzerland asked to include reference to technologies and standards for buildings in the bullet point on urban mitigation options and strategies. WGIII Vice-Chair Diana Ürge-Vorsatz explained that the standards for buildings are covered in the

buildings chapter. With this change, the chapter outline was agreed.

Buildings (Chapter 9): Following the presentation of a revised outline on Friday, which included, among other things, moving some bullet points from this chapter to the list of common elements, the chapter outline was agreed.

Transport (Chapter 10): Following the presentation of a revised outline on Friday, which included, among other things, moving some bullet points from this chapter to the list of common elements, the chapter outline was agreed.

Industry (Chapter 11): On Thursday, the Republic of Korea requested that the chapter differentiate between structural change in developed and developing country contexts. Norway noted that circular economy and waste should be treated more broadly, and should be included as stand-alone chapters or in the chapters dealing with: demand, services and social aspects of transformation; energy systems; AFOLU; urban systems and other settlements; and transport.

Following presentation of the revised chapter outline on Friday, the Netherlands suggested removing reference to the Paris Agreement and the Kigali Amendment. France, supported by the EU, requested reinserting reference to deep decarbonization, which Saudi Arabia opposed. The Republic of Korea requested differentiating between developed and developing countries in the bullet point addressing evolving demand for industrial products.

On Saturday evening, Switzerland asked for a reference to scale in the bullet point on industrial development patterns. Saudi Arabia, opposed by the Netherlands and Vice-Chair Ürge-Vorsatz, requested inclusion of “material substitution” in a revised bullet point on maximizing material and resource efficiency, closing loops and material substitution. Following informal consultations, the Co-Chairs proposed “substitution of industrial material inputs,” which Saudi Arabia opposed. The Group then agreed that the reference to material substitution would be included in the guidance for authors, and the chapter outline was agreed.

Cross-sectoral perspectives (Chapter 12): On Thursday, Poland called for consideration of land GHG removals in addition to ocean GHG removals, and to their co-benefits. Saint Lucia supported further consideration of trade-offs and benefits, and, supported by Germany, requested removing solar radiation management from a bullet point addressing ethics and governance of land. Germany requested including information on risks, impacts, and possible adverse side effects associated with the emissions technologies presented. The US suggested removing reference to “competition for finite resources,” and replacing reference to “mitigation opportunities in diet changes” with “energy intensity of food systems.” FWCC opposed, noting that diet changes are a way for individual citizens to contribute to mitigation efforts. Norway stated that the chapter ought to present the “big picture” of costs and co-benefits within and across all sectors, and noted a number of overlaps between this and other chapters, suggesting that some bullet points could be relocated.

On Friday, in the revised chapter outline, Germany, supported by Japan, requested that the bullet point on GHG removal techniques and spill-over effects include a consideration of impacts. Norway suggested dealing with GHG removal techniques on land and in water separately, noting that these processes are very different, and requested reinserting reference to competition for finite resources.

Following further consultations, the Group returned to this chapter. Norway, supported by the Netherlands, noted redundancy between two bullet points both addressing GHG removal techniques. The Group agreed to merge the two bullet points for clarity and to specify aspects of GHG removal techniques not covered in the sectoral chapters.

Regarding a bullet on impacts and risks from large-scale land-based mitigation, Mexico, supported by Saudi Arabia, asked to include reference to ocean-based mitigation. Vice-Chair Reisinger disagreed, noting this would mix mitigation approaches with different levels of maturity and deployment. Following additional consultations, the Group agreed that the bullet point would include reference to “land, water, food security, use of shared resources, management and governance.” The chapter outline was agreed on Sunday morning.

National and sub-national policies and institutions (Chapter 13): On Friday, the US cautioned against any prejudicial treatment of countries’ governance systems and Greece requested reference to “building agreement” rather than “building public agreement.” On Sunday morning, the chapter outline was agreed with textual modifications that refer to, *inter alia*, governance systems and climate action.

International cooperation (Chapter 14): On Thursday, Bolivia said the chapter should also include reference to non-market approaches. Mexico suggested including links to the SDGs.

Discussing a revised outline on Friday, the US suggested clarifying that international environmental agreements are not part of development policy and, with Mexico, Saudi Arabia and others preferred to avoid naming specific programmes and organizations in the outline. Saudi Arabia and Venezuela suggested deleting reference to “market and non-market approaches.” The EU, Netherlands, Norway and Ireland opposed, noting that the reference will help guide authors about the potential range of international climate policy tools and experiences as they relate to cooperation. Singapore suggested a compromise to include reference to “international climate policy and cooperative approaches.” The Group also agreed to a bullet point on links to development policy and relevant international environmental agreements.

Participants debated a proposed bullet point on ethics and governance of solar radiation management and risk management, with Germany proposing to refer to “risk assessment” instead of “management.” WGII Vice-Chair Semenov preferred “associated risks,” which was agreed. The chapter outline was then agreed.

Investment and finance (Chapter 15): On Thursday, Germany and Norway supported changing the chapter title to “Climate Finance and Financial Flows,” while the Netherlands, supported by the EU and Norway, suggested including “Investment” in the title and including a bullet point on enabling environments for financial investment and flows. Japan suggested adding the private sector perspective and clarifying the definition of climate finance.

On Friday, when discussing the revised outline, China and Saudi Arabia suggested adding reference to financial flows to developing countries in the bullet point on investment needs. The EU, Ireland and Germany opposed, to ensure political neutrality and avoid being policy prescriptive. Ecuador suggested including a review of methodologies used to assess financial flows to help ensure objectivity. Saudi Arabia and China responded that the UNFCCC and the Paris Agreement mention financial flows to developing countries and emphasized the need to respect this language. Switzerland, Germany, the Netherlands and France said that adding reference to financial flows to developing countries would be acceptable if its associated context is provided, noting the difference between global climate finance requirements and national climate financial flows. Switzerland requested adding language on the efficiency of climate finance and investment disclosures. China requested reference to gap analysis.

In the bullet point on links between national and international finance, Saudi Arabia and the Maldives, opposed by Norway, Ireland and France, supported removing reference to “innovative financial mechanisms.”

The Group returned to the issue of financial flows to developing countries again on Saturday evening, when the Netherlands proposed referencing global and regional investment needs on the one hand, and financial flows to developing countries on the other, as they related to the bullet point addressing “investment related to mitigation on pathways and climate change action.” After further consultations on the matter, the Group agreed on Sunday morning to two bullet points that begin with the following identical wording: “scenarios of, and needs for, investment and financial flows related to mitigation pathways and climate change action,” where one bullet point concludes “at the global and regional scales” and the other concludes “in developing countries.” With these modifications, the chapter outline was agreed.

Innovation, technology development and transfer (Chapter 16): On Thursday, the Republic of Korea said that the UN Technology Facilitation Mechanism should be included. The US supported more emphasis on improving and scaling-up technology, and market penetration.

The text was revised to reduce specificity and, *inter alia*: include references to deployment incentives; refer to “partnerships and cooperative approaches” instead of the Paris Agreement and the UNFCCC Technology Mechanism; and include the characterization and implications of new disruptive technologies.

On Sunday morning, discussions resulted in bullet text on the “role of innovation, technology development, diffusion and transfer in contributing to sustainable development and the aims of the Paris Agreement, including mitigation pathways.” Following some debate over whether to include reference to climate resilience, the Group agreed to include that climate resilience is an important part of sustainable development in guidance for the authors. With these changes, the chapter outline was agreed.

Accelerating the transition in the context of sustainable development (Chapter 17): On Friday, the Co-Chairs presented a revised outline, including an additional bullet point addressing uncertainties and knowledge needs based on the previous day’s discussions.

On Sunday morning, the Group revisited the bullet point referring to decision-making and governance, with Co-Chair Skea proposing to insert “considering residual risk and the limits to risk management” after “managing risk.” With this change, the chapter outline was agreed.

Report to the IPCC Plenary: On Sunday afternoon, Co-Chair Skea presented the WGIII report outline as agreed in the WGIII plenary. He noted that, while enthusiastic about enhancing “readability,” he does not favor limiting SPM page length at this time. The WGIII outline was agreed.

Final Decision: In the decision (WGIII-13th/Doc.2, Rev.1), the IPCC agrees to the outline of the WGIII contribution to the AR6, and that the text resulting from the scoping process and comments by the plenary be considered by authors as indicative and that the authors elaborate on the relevant scientific literature available since AR5, consistent with IPCC guidance. The outline specifies that the report will contain an SPM, Technical Summary, a list of common elements across six sectoral chapters, and a total of 17 chapters covering:

- introduction and framing;
- emissions trends and drivers;
- mitigation pathways compatible with long-term goals;
- mitigation and development pathways in the near- to mid-term;

- demand, services and social aspects of mitigation;
- energy systems;
- AFOLU;
- urban systems and other settlements;
- buildings;
- transport;
- industry;
- cross-sectoral perspectives;
- national and sub-national policies and institutions;
- international cooperation;
- investment and finance;
- innovation, technology development and transfer; and
- accelerating the transition in the context of sustainable development.

The length of the report, SPM and Technical Summary will be determined and the next session will be held in April 2021.

AR6 SYNTHESIS REPORT: On Sunday afternoon, IPCC Vice-Chairs Krug and Sokona presented the results of the SYR scoping meeting (IPCC-XLVI/Doc.6). Vice-Chair Krug said that the scoping identified cross-cutting issues applicable to the three WGs and explored coordination avenues to facilitate synthesis.

Vice-Chair Sokona explained the broad, non-exhaustive elements underpinning the SYR outline: the 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; and finance and means of support. He also said that a dedicated scoping meeting will be held and a TSU would be established in 2019.

The Netherlands asked for a proposal to streamline the process of synthesizing the WG reports, requesting that authors be selected according to specific themes and that the process begin as soon as possible.

On cross-cutting themes, IPCC Chair Lee said that the main inputs came from the outcome of the May 2017 scoping meeting, and that eight themes had been identified: regions; scenarios; risks; cities; global stocktake; geoengineering; adaptation and mitigation; and approaches and processes for WG integration. India asked that cross-cutting teams start interacting as soon as possible and that the IPCC move towards more integration. Germany called for coordination across WGs on issues such as social susceptibility and governance, and requested taking a common approach to risk. IPCC Chair Lee said the points would be taken into consideration when preparing for IPCC-47.

FUTURE OF THE TASK GROUP ON DATA AND SCENARIO SUPPORT FOR IMPACT AND CLIMATE ANALYSIS (ATF-TGICA)

TGICA Co-Chair Andreas Fischlin presented a progress report (IPCC-XLVI/Doc.9), which included identifying key priorities for the future of TGICA and initiating a mapping exercise of activities undertaken by external organizations that are similar or related to TGICA or the Data Distribution Centre. Co-Chair Fischlin reported that although progress had been made, the ATF-TGICA had been unable to finish its work, and proposed to extend the mandate of the ATF-TGICA until IPCC-47, which was agreed.

ALIGNMENT OF THE CYCLES OF THE IPCC AND THE GLOBAL STOCKTAKE

On Sunday, IPCC Secretary Mokssit introduced this agenda item (IPCC-XLVI/Doc.3), noting IPCC-43 requested the Secretariat to prepare proposals for aligning the work of the IPCC during the AR7 with the global stocktake. He noted three options for alignment: reducing the assessment cycle to every five years;

increasing the assessment cycle to every 10 years with an update every five years; or maintain the current seven-year assessment cycle and produce a targeted SR to coincide with the stocktake when IPCC cycles do not align with the global stocktake.

Germany, France, India, Brazil, Saudi Arabia, Luxembourg and others, noting lack of time for proper discussion at IPCC-46, proposed establishing a task force to address the issue. A number of countries noted that, without a mandate, such a group could not be established. France and Norway suggested, and the panel agreed, to ask the Secretariat to invite IPCC members to make submissions expressing their views on the issue. Following additional debate, the Panel agreed, in principle, to establish a task force, co-chaired by France and Mexico, and to agree on its mandate at IPCC-47, and to request submissions in the interim regarding the three options on alignment.

PARTICIPATION OF DEVELOPING COUNTRIES IN IPCC ACTIVITIES

This agenda item (IPCC-XLVI/INF.3) was not taken up by the Panel due to lack of time. During Sunday's plenary, India asked, and the Panel agreed, that it be considered at IPCC-47. Zimbabwe registered his concern regarding gaps in participation of developing countries in IPCC activities, and asked for action to be taken to increase their participation intersessionally. Chair Lee promised that at the next Bureau meeting, where Lead Authors will be selected, he would raise the concerns expressed by Zimbabwe.

SHORT-LIVED CLIMATE FORCERS

On Sunday, TFI Co-Chair Eduardo Calvo Buendía presented this agenda item (IPCC-XLVI/Doc.7), outlining three options for an expert meeting to take place on SLCFs during the sixth assessment cycle: option 1, addressing issues related to estimation of SLCF emissions, mainly with experts working with TFI; option 2, addressing issues related to estimation of SLCF emissions and estimations of their climatic effects, including TFI and WGI experts; and, option 3, addressing issues related to estimation of SLCF emissions and estimations of climatic effects including socio-economic implications and experts from TFI and all the WGs. He said that in all cases the methodology for inventories would be included in the proposal.

While noting the relevance of the topic, the US, seconded by Brazil, expressed caution due to the IPCC's financial situation and the timing of the meeting and appropriate prioritization of IPCC activities. Norway stressed the importance of reducing uncertainty regarding SLCFs and recommended establishing a scientific steering committee and expressed willingness to financially support the expert meeting. Germany welcomed the discussion on SLCFs especially in relation to black carbon. Norway, Germany, Sweden, Chile, South Africa, Brazil and Canada supported option 2, Argentina supported option 1, noting the focus should be on methodology, and Ecuador supported option 3 but could support option 2 if funds were limited. IPCC Chair Lee proposed that the Panel support option 2 for the expert meeting, which was agreed.

PROGRESS REPORTS

SR15: On Sunday, WGI Co-Chair Masson-Delmotte provided an oral report on SR15, noting that the first order draft is currently under review by the TSU and that Sweden will host the next Lead Authors meeting. She invited offers to host the fourth and final Lead Authors meeting. The Panel took note of the report.

She proposed a Technical Summary for SR15 to ensure as much information as possible is translated into different languages and for consistency among SRs. She asked that a decision be

taken on this issue to ensure SR15 is prepared in time, noting the need to implement such a decision for the second order draft of the report. The Panel agreed to a Technical Summary for SR15.

Co-Chair Masson-Delmotte added that a decision was required regarding an expert meeting to develop regional guidelines. Co-Chair Pörtner asked if the ExComm could take a final decision regarding the meeting and inform all focal points. Following some discussion, the Panel agreed to organize the expert meeting, and mandate the ExComm to consider the document prepared by WGI on the expert meeting, and begin preparations.

SROCC: Due to time constraints, the Panel took note of the report (IPCC-XLVI/INF.10) without discussion.

SRCLL: Due to time constraints, the Panel took note of the report (IPCC-XLVI/INF.11) without discussion.

TFI: TFI Co-Chair Kiyoto Tanabe provided a progress report regarding ongoing TFI work (IPCC-XLVI/INF.5). He noted that the group is in the process of developing an inventory methodology, and received 328 expert nominations, 190 of which were selected. The first Lead Authors meeting for the Methodology Report to update and supplement the 2006 IPCC Guidelines took place in June 2017 in Spain and the second meeting will take place in Zimbabwe in late September 2017. He noted the literature cutoff date of 25 June 2018 and that agreement was reached to update the online inventory in coordination with the UNFCCC. He invited member governments to nominate experts later in 2017. The Panel took note of the report (IPCC-XLVI/INF.5).

TGICA: Due to time constraints, the Panel took note of the report (IPCC-XLVI/INF.7) without discussion.

Expert Meeting on Mitigation, Sustainability and Climate Stabilization Scenarios: Due to time constraints, the Panel took note of the report (IPCC-XLVI/INF.6) without discussion.

Communication and Outreach Activities: On Sunday, Jonathan Lynn, IPCC Secretariat, presented the progress report on this agenda item (IPCC-XLVI/INF.8), noting that cost-effective outreach has been conducted in the form of webinars and that work is ongoing to improve the IPCC's website and enhance social media outreach activities. The Panel took note of the report.

Saudi Arabia announced it will convene a regional outreach workshop from 19-20 September 2017 in Riyadh to present the AR5 results, potential climate solutions and ways forward.

IPCC Scholarship Programme: On Sunday, IPCC Vice-Chair Barrett introduced the progress report on the IPCC Scholarship Programme (IPCC-XLVI/INF.4), noting that 188 applications were received for the fourth round of awards and that 13 Ph.D. and post-doctoral students had been selected. She requested that participants send suggestions to the Secretariat regarding the proposal to establish a Board of Trustees. The Panel took note of the report.

MATTERS RELATED TO THE UNFCCC AND OTHER INTERNATIONAL BODIES

On Sunday, Norway lamented that due to time constraints, this agenda item could not be discussed and asked IPCC Chair Lee to communicate with the UNFCCC ahead of COP 23 and work with the UNFCCC Secretariat intersessionally. This agenda item will be taken up at IPCC-47.

PLACE AND DATE FOR IPCC-47

On Sunday, FiTT Co-Chair Plume noted that the FiTT had discussed that the timing of the first plenary session in 2018 should convene later than is standard, to allow for adequate time to process country contributions for 2018 and to assess the IPCC's overall financial situation. Noting financial constraints,

Luxembourg and Norway suggested shortening the duration of IPCC-47.

France confirmed his country's offer to host IPCC-47, cautioning against holding the meeting too late in the year, which could put critical IPCC activities at risk. The Republic of Korea extended an offer to host IPCC-48 during the first week of October 2018.

IPCC Chair Lee noted the Bureau's decision to hold a three-day Bureau meeting in late January or early February 2018 in Geneva, Switzerland, to, *inter alia*, select Lead Authors.

The Panel agreed that IPCC-47 will be held in Paris, France, at a time to be determined following further discussion between France and the Secretariat.

CLOSING OF THE SESSION

On Sunday, IPCC Chair Lee thanked the Government of Canada for its hospitality. He said the meeting had charted the IPCC's work for the next five years. He commended the strong outlines, which will help ensure the AR6 is policy relevant, and urged delegates to nominate the best authors across disciplines and areas of expertise, ensuring geographical and gender balance and improved representation by developing countries. Noting the gravity of the financial situation, he said that "completion of the current work programme is under threat," and that resources must be strengthened and the resource base broadened. He closed the meeting at 8:31 pm.

A BRIEF ANALYSIS OF IPCC-46

As Hurricane Irma pounded the Caribbean, and weather and other natural disasters filled the news, delegates gathered in Montreal for the 46th session of the IPCC. The climatic context was keenly felt, given that various delegates from small island states in the Caribbean were unable to attend the meeting. The irony of this was not lost on delegates.

Dominating the agenda for IPCC-46 was the approval of the draft outlines of the three Working Group reports, which, together with the SYR, make up the IPCC's Sixth Assessment Report. This entailed a governmental review of the draft outlines that had been prepared by each WG in a scoping meeting held in Addis Ababa in May 2017. The Panel also had to address the financial stability of the organization and the alignment with the UNFCCC cycle of global stocktaking, two key issues for the continued operation of the IPCC and its ability to fulfill its mission.

The following brief analysis places IPCC-46 in context, while focusing on key issues addressed at the meeting.

APPROVAL OF THE AR6 WG REPORT OUTLINES: EVIDENCE-BASED POLICY, OR POLICY-BASED EVIDENCE?

The last time the WGs went through the approval of their reports' draft outlines was at IPCC-31, held in Bali in October 2009—just two months before the UNFCCC COP in Copenhagen. Discussion then centered on references to UNFCCC Article 2, that is, the ultimate objective of the Convention: to stabilize GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. This was seen as an important advance in the policy relevance of IPCC reports, but was also especially difficult in that it required, as former IPCC Chair Rajendra Pachauri commented at the time, balancing the need for better scientific information on dangerous climate change while refraining from defining what actually constitutes dangerous climate change.

Eight years, or one assessment report later, what constitutes dangerous climate change seems oddly irrelevant. The question now is how to address it. As the discussion on climate change

has moved from establishing the science towards actionable options to address it, what governments are asking for is not only an update on the physical science of climate change and its impacts, but also an assessment of the socio-economic costs and benefits of mitigation and adaptation in the context of sustainable development pathways for all. To accomplish this, consideration of issues such as the carbon budget, limits to adaptation, risks and impacts from extreme events and from slow onset events such as gradual, progressive warming and sea level rise, finance and other means of support, and all available mitigation options—including untested ones in the realm of geoengineering—had to be included.

While the focus in the AR6 is broader than in previous assessment reports, some things have not changed: the need for a clear explanation of uncertainties—including what we can know with more research and funding, and what we cannot know with certainty; the importance of coordination and integration among the three WGs; the need for efficient communication and accessibility; and perhaps most importantly, the overarching challenge of ensuring greater and more meaningful participation by developing countries.

Within this context, participants took up the approval of the WG report outlines. This is a necessary part of the IPCC process whereby governments take ownership of the reports. As always in these cases, a certain amount of self-interested interventions were to be expected. Once in negotiation mode, it was perhaps inevitable that some delegates would be unable to refrain from the compulsion to draft political language, even when the objective was to provide clear guidance to authors as to what policymakers would find useful to know. As one participant stated, it made you wonder whether the goal is evidence-based policy, or policy-based evidence. Still, it is now up to the authors and reviewers to present their scientific findings, and these are sure to transcend political interests.

ENSURING IPCC'S SUSTAINABLE DEVELOPMENT

The demand for objective assessments of climate change that can be used by policymakers at all levels has greatly increased. The IPCC has responded to this demand with an almost impossible agenda, which includes not only the three WG contributions to the AR6, but also an AR6 Synthesis Report, three Special Reports and a Methodological Report. All are to be delivered in the next 4-5 years.

Yet timely delivery of all this work is at risk due to a lack of funds. Since its inception in 1989, the IPCC has received voluntary contributions on an annual basis from some of its member governments and organizations. But a steady decline in contributions since 2010 and a reduction of the donor base has resulted in the IPCC having to draw upon its reserve funds. If this trend continues, the completion of the current work programme will be under threat, as IPCC Chair Lee warned in the closing plenary.

The IPCC operates on a minuscule budget. The bulk of the work is done by scientists on a voluntary basis and is supported by host institutions and specific in-kind contributions. As noted by the Co-Chairs of the *Ad Hoc* Task Group on Finance, the decline in funds has nothing to do with a decline in support and trust in the work of the IPCC, but more to do with the problems associated with relying on a narrow donor base. There is also a tendency towards complacency, where everyone assumes that someone else will step up when needed to save the day. But the IPCC's financial stability is a serious issue that needs addressing. The Panel, therefore, decided to explore in earnest means to broaden its donor base, while intensifying efforts to engage all member governments in providing funds.

Another issue on the agenda that touches upon the sustainable development of the IPCC is the question of how to align the IPCC cycles with the global stocktake process under the UNFCCC. Under the Paris Agreement, a global stocktake is to take place every five years from 2023 onwards to assess collective progress towards achieving the objectives of the Agreement and its long-term goals. The stocktake is meant to assess “collective progress,” not the activities of individual parties. This is precisely the kind of work the IPCC was set up to do. But the IPCC assessment cycles usually take seven to eight years, so the IPCC calendar and products need to be revised so that the cycles coincide in a more effective manner. Despite the fact that discussions on the WG outlines took longer than expected in Montreal, leaving little time for the plenary to discuss alignment with the stocktake process and pushing decisions until the next meeting, the Panel decided to set up a task group and call for members’ views. Addressing this question is necessary to ensure that the IPCC reports come at a time when they can be most useful in terms of informing international policy-making and thus remain true to the IPCC’s mission.

THE GLOBAL SUSTAINABLE DEVELOPMENT AGENDA

With climate change now more clearly understood as a matter of sustainable development for all, the work of the IPCC has been placed squarely in the global sustainable development agenda. This includes not only the Paris Agreement, but the 2030 Agenda for Sustainable Development, including the SDGs, the Sendai Framework for Disaster Risk Reduction, and the New Urban Agenda. This focus was evident in the WG report outlines approved in Montreal, which are packed with references to the SDGs.

2018 marks the 30th anniversary of the IPCC, a moment in the organization that, to some observers, feels like a 30th birthday: having gone through its growing pains, the IPCC is now more experienced, familiar with its own identity, and knowledgeable of its strengths and shortcomings. It is also at its peak physical performance and productivity; it certainly has set a full and ambitious programme for itself in the next five years, with not a single day to waste. For example, the call for author nominations for the various chapters of the WG reports began on the very same day that the Panel adopted the outlines.

Work now starts in earnest for the WGs, as they begin with the work of assessing relevant scientific literature and preparing the WG report drafts according to the chapter outlines agreed in Montreal. Once the first order drafts are ready in 2019-2020, an iterative process commences of expert review by scientists and, eventually, governments. The WG plenaries reconvene again in 2021 to adopt their respective reports for acceptance, approval and adoption by the Panel. If that sounds intense, there is more: a Special Report on Global Warming of 1.5°C is scheduled for 2018; a Special Report on the Ocean and Cryosphere in a Changing Climate, for 2019; a Special Report on Climate Change and Land, for 2019; and a Methodology Report to update and supplement the 2006 IPCC Guidelines for National GHG Inventories, also for 2019. The work is thus charted for the next five years, and the IPCC certainly has its work cut out for itself. It is a tall order, but according to many observers, the IPCC is in a good place to undertake it. If only it can find the funds.

UPCOMING MEETINGS

Climate Week NYC 2017: The 9th annual Climate Week NYC will take place during the General Debate of the UN General Assembly. It will gather leaders from business and

government to demonstrate how continued investment in innovation, technology and clean energy will drive profitability and lead us towards a net-zero emissions global economy. **dates:** 18-24 September 2017 **location:** New York City, US **contact:** The Climate Group **email:** info@theclimategroup.org **www:** <https://www.theclimategroup.org/ClimateWeekNYC>

Twelfth meeting of the UNFCCC Adaptation Committee (AC12): The 12th meeting of the UNFCCC Adaptation Committee (AC) is expected to focus on, among others: ways to support implementation of the Paris Agreement on climate change; work of the AC’s working group on the Technical Examination Process on Adaptation; technical support and guidance to the parties on adaptation action and on means of implementation; awareness raising, outreach and sharing of information; and the report of the AC to COP 23. **dates:** 19-22 September 2017 **location:** Bonn, Germany **contact:** UNFCCC Secretariat **phone:** +49-228-815-1000 **fax:** +49-228-815-1999 **email:** secretariat@unfccc.int **www:** http://unfccc.int/adaptation/groups_committees/adaptation_committee/items/10375.php

Meetings for the Elaboration of the 2019 Refinement to the 2006 IPCC Guidelines for National GHG Inventories: The Coordinating Lead Author meeting will take place on the 24 September and then Lead Authors will meet from 25-28 September. **dates:** 24-28 September 2017 **location:** Victoria Falls, Zimbabwe **contact:** IPCC Secretariat **phone:** +41-22-730-8208/54/84 **fax:** +41-22-730-8025/13 **email:** IPCC-Sec@wmo.int **www:** <http://www.ipcc.ch>

Mobilizing Local and Indigenous Knowledge for Climate Change Observations and Solutions: A Perspective from the Caribbean Region: This conference will be organized by UNESCO and will contribute to the mobilization of local and indigenous knowledge in the Caribbean by: providing a regional overview of the state-of-the-art of local and indigenous knowledge of the environment in the Caribbean, including tools and methodologies for working with local and indigenous knowledge; and understanding the key regional issues, experiences and good practices for promoting local and indigenous knowledge in climate change assessment and action. **dates:** 27-29 September 2017 **location:** Georgetown, Guyana **contact:** Jen Rubis, UNESCO **email:** j.rubis@unesco.org **www:** <https://en.unesco.org/lik-climate-caribbean-conference>

First Lead Author Meeting for SROCC: This meeting is for IPCC WG I/II and will be organized by WGII. **dates:** 2-6 October 2017 **location:** Nadi, Fiji **contact:** IPCC Secretariat **phone:** +41-22-730-8208/54/84 **fax:** +41-22-730-8025/13 **email:** IPCC-Sec@wmo.int **www:** <http://www.ipcc.ch/>

Sixth Meeting of the Executive Committee of the Warsaw International Mechanism for Loss and Damage: The sixth meeting of the UNFCCC ExCom of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts (WIM) will discuss, among other issues: supporting implementation of the Paris outcomes; recommendations to improve knowledge and capacity to address slow onset events and their impacts; development of activities for the ExCom’s five-year rolling workplan; awareness raising, outreach and sharing of information; and the ExCom’s report to COP 23. **dates:** 11-13 October 2017 **location:** Bonn, Germany **contact:** UNFCCC Secretariat **phone:** +49-228-815-1000 **fax:** +49-228-815-1999 **email:** secretariat@unfccc.int **www:** http://unfccc.int/adaptation/workstreams/loss_and_damage/items/9073.php

First Lead Author Meeting on SRCLL: This meeting is for WG I/II/III and will be organized by WGIII. **dates:** 16-20 October 2017 **location:** Oslo, Norway **contact:** IPCC Secretariat **phone:** +41-22-730-8208/54/84 **fax:** +41-22-730-8025/13 **email:** IPCC-Sec@wmo.int **www:** <http://www.ipcc.ch/>

Latin American and Caribbean Carbon Forum 2017: The tenth Latin American and Caribbean Carbon Forum (LACCF) will bring together representatives from the private and public sectors to discuss the state of climate change mitigation in the region and engage with cooperating agencies, potential investors and service providers. **dates:** 18-20 October 2017 **location:** Mexico City, Mexico **contact:** Latin American Carbon Forum **email:** latincarbon@dtu.dk **www:** <http://www.latincarbon.com/>

Third Lead Author Meeting on SR15: This meeting on the IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways is for WG I/II/III and will be organized by WGI. **dates:** 23-29 October 2017 **location:** Malmö, Sweden **contact:** IPCC Secretariat **phone:** +41-22-730-8208/54/84 **fax:** +41-22-730-8025/13 **email:** IPCC-Sec@wmo.int **www:** <http://www.ipcc.ch/>

People's Climate Summit 2017: This event will take place immediately prior to, and in parallel with, UNFCCC COP 23. The People's Climate Summit will provide a space for networking and information exchange that inspires and strengthens work on issues related to climate justice. Evening panels will take place on 3-5 November, addressing: Global Climate Justice, Leave it in the ground: How to go on with decarbonization, and Who is making the transition? On 6-7 November, over 50 workshops will debate how to put a social-ecological transition into practice, will consider global struggles for climate justice, and will share skills and build networks. **dates:** 3-7 November 2017 **location:** Bonn, Germany **contact:** People's Climate Summit **email:** contact@pcs2017.org **www:** <https://pcs2017.org/en/>

UNFCCC COP 23: The 23rd session of the Conference of the Parties (COP 23) to the UN Convention on Climate Change (UNFCCC) will be organized by Fiji and hosted at the headquarters of the UNFCCC Secretariat in Bonn, Germany. **dates:** 6-17 November 2017 **location:** Bonn, Germany **contact:** UNFCCC Secretariat **phone:** +49-228-815-1000 **fax:** +49-228-815-1999 **email:** secretariat@unfccc.int **www:** http://unfccc.int/meetings/bonn_nov_2017/meeting/10084.php

Sustainable Innovation Forum 2017: This business-focused event will be held during COP 23. Now in its eighth year, the event is expected to gather over 600 participants, including national and local policy makers, UN agencies, business leaders, investors and international NGOs. Debate and discussions will be held on: renewable energy; circular economy; sustainable land and water management; carbon markets; climate finance; and climate innovation in emerging regions. The Forum is being organized by Climate Action, in partnership with UNEP. **dates:** 13-14 November 2017 **location:** Bonn, Germany **contact:** Climate Action **phone:** +44-20-7871-0173 **fax:** +44-20-7871-0101 **email:** info@climateactionprogramme.org **www:** <http://www.cop-23.org/>

4th Global Science Conference on Climate Smart Agriculture: The 4th Global Science conference on Climate Smart Agriculture (CSA) will be organized around the theme "Catalysing local innovations and action to accelerate scaling up of CSA." The Conference is hosted by the New Partnership for Africa's Development (NEPAD). **dates:** 28-30 November 2017 **location:** Johannesburg, South Africa **contact:** Conference Organizers **email:** csa2015.montpellier@agropolis.fr **www:** <http://csa2017.nepad.org/en/>

Global Workshop on Climate Change Adaptation: This workshop is organized by the UN Economic Commission for Europe (UNECE). **dates:** 11-12 December 2017 **location:** Geneva, Switzerland **www:** <https://www.unece.org/index.php?id=43633#/>

Cities & Climate Change Science Conference: The aim of the conference is to: identify key research and knowledge gaps related to cities and climate change; inspire global and regional research that will lead to peer-reviewed publications and scientific reports; and stimulate research on cities and climate change throughout the AR6 cycle. Its outcomes are anticipated to inform the upcoming IPCC reports, and support cities and citizens in building low-carbon, climate-resilient and sustainable cities towards the implementation of the Paris Agreement on climate change, the New Urban Agenda, and the SDGs. **dates:** 5-7 March 2018 **location:** Edmonton, Alberta, Canada **contact:** Conference organizers **email:** <https://www.citiesipcc.org/en/contact> **www:** <http://www.citiesipcc.org/>

47th Session of the IPCC: IPCC-47 will take place in the first half of 2018, and will meet to discuss, *inter alia*, funding, developing country participation in the IPCC process and alignment of IPCC and Global Stocktake. **dates:** Spring 2018 **location:** Paris, France **contact:** IPCC Secretariat **phone:** +41-22-730-8208/54/84 **fax:** +41-22-730-8025/13 **email:** IPCC-Sec@wmo.int **www:** <http://www.ipcc.ch>

For additional meetings, see: <http://sdg.iisd.org/>

GLOSSARY

AFOLU	Agriculture, Forestry and Other Land-Use
AR4	Fourth Assessment Report of the IPCC
AR5	Fifth Assessment Report of the IPCC
AR6	Sixth Assessment Report of the IPCC
ATG-Finance	<i>Ad Hoc</i> Task Group on the Financial Stability of the IPCC
CAN	Climate Action Network
COI	Conflict of interest
COP	Conference of the Parties
CCS	Carbon capture and storage
ExComm	Executive Committee of the IPCC
FiTT	Financial Task Team
FWCC	Friends World Committee for Consultation
GHG	Greenhouse gases
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
NDC	Nationally Determined Contributions
SDGs	Sustainable Development Goals
SLCFs	Short-lived climate forcers
SPM	Summary for Policymakers
SR	Special Report
SR15	Special Report on Global Warming of 1.5°C
SRCCCL	Special Report on Climate Change and Land
SROCC	Special Report on the Ocean and Cryosphere in a Changing Climate
SYR	Synthesis Report
TFI	Task Force on National Greenhouse Gas Inventories
TGICA	Task Group on Data and Scenario Support for Impact and Climate Analysis
TSU	Technical Support Unit
UNEP	UN Environment
UNFCCC	UN Framework Convention on Climate Change
WG	Working Group
WMO	World Meteorological Organization