Earth Negotiations Bulletin

IPCC-38 FINAL

A Reporting Service for Environment and Development Negotiations

Online at http://www.iisd.ca/climate/ipcc38/

Vol. 12 No. 596 *Published by the International Institute for Sustainable Development (IISD)* *Tuesday, 1 April 2014*

SUMMARY OF THE 10TH SESSION OF WORKING GROUP II OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC) AND THIRTY-EIGHTH SESSION OF THE IPCC: 25-29 MARCH 2014

The 10th session of Working Group II (WGII) of the Intergovernmental Panel on Climate Change (IPCC) and the 38th session of the IPCC were held from 25-29 March 2014 in Yokohama, Japan. The meeting was attended by more than 271 delegates representing 115 countries as well as representatives from the United Nations and intergovernmental and observer organizations, and drew worldwide media attention.

During the five-day meeting, delegates met in plenary and informally to consider the WGII contribution to the IPCC Fifth Assessment Report (AR5). Participants were assisted by short informal presentations by the Coordinating Lead Authors (CLAs) on various sections and topics of the Summary for Policymakers (SPM). At the end of the meeting, WGII approved the SPM and accepted the underlying report including the Technical Summary and annexes.

The SPM consists of an introduction plus three main parts. The introduction addresses the assessment and management of climate change risks. Section A addresses observed impacts, vulnerability and adaptation in a complex and changing world, including: observed impacts, vulnerability and exposure; adaptation experience; and the decision-making context. Section B addresses future risks and opportunities for adaptation, including: key risks across sectors and regions; sectoral risks and potential for adaptation; and regional key risks and potential for adaptation. Section C focuses on managing future risks and building resilience, and includes subsections on: principles for effective adaptation; and climate-resilient pathways and transformation. In addition, the SPM contains several background and assessment boxes as well as supplementary material, including a number of figures and tables.

Following the conclusion of WGII, IPCC-38 convened to formally adopt the WGII contribution to the AR5. The approved SPM and its underlying report can be found on the IPCC website http://ipcc.ch.

A BRIEF HISTORY OF THE IPCC

The IPCC was established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP). Its purpose is to assess scientific, technical and socio-economic information relevant to understanding the risks associated with human-induced climate change, its potential impacts, and options for adaptation and mitigation. The IPCC does not undertake new research, nor does it monitor climate-related data. Instead, it conducts assessments of knowledge on the basis of published and peer-reviewed scientific and technical literature.

The IPCC has three working groups: WGI addresses the scientific aspects of the climate system and climate change; WGII addresses the vulnerability of socio-economic and natural systems to climate change, impacts of climate change and adaptation options; and WGIII addresses options for limiting greenhouse gas (GHG) emissions and mitigating climate change. Each working group has two Co-Chairs and six Vice-Chairs, except WGIII, which, for the Fifth Assessment cycle, has three Co-Chairs. The Co-Chairs guide the WGs in fulfilling the

IN THIS ISSUE

This issue of the *Earth Negotiations Bulletin* © <enb@iisd.org> is written and edited by Deborah Davenport, Ph.D., María Gutiérrez, Ph.D., Elena Kosolapova, Ph.D., Leila Mead, and Hugh Wilkins, LL.M. The Editor is Pamela Chasek, Ph.D. <pam@iisd.org>. The Director of IISD Reporting Services is Langston James "Kimo" Goree VI <kimo@iisd.org>. The Sustaining Donor of the *Bulletin* is the European Commission (DG-ENV). General Support for the *Bulletin* during 2014 is provided by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), the New Zealand Ministry of Foreign Affairs and Trade, SWAN International, the Swiss Federal Office for the Environment (FOEN), the Finnish Ministry for Foreign Affairs, the Japanese Ministry of Environment (through the Institute for Global Environmental Strategies - IGES), the United Nations Environment Programme (UNEP), and the International Development Research Centre (IDRC). Specific funding for the coverage of this meeting has been provided by the Norwegian Environment Agency, the Japanese Institute for Global Environmental Strategies - IGES, and the Intergovernmental Panel on Climate Change. Funding for translation of the *Bulletin* into French has been provided by the Government of France, the Wallonia, Québec, and the International Organization of La Francophonie/Institute for Sustainable Development of La Francophonie (IOF/IFDD). The opinions expressed in the *Bulletin* are those of the authors and do not necessarily reflect the views of IISD or other donors. Excerpts from the *Bulletin* may be used in non-commercial publications with appropriate academic citation. For information on the *Bulletin*, including requests to provide reporting services, contact the Director of IISD Reporting Services at <kimo@iisd.org>, +1-646-536-7556 or 300 East 56th St., 11D, New York, NY 10022 USA.

http://enb.iisd.mobi/

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 Greenhouse Gas Inventories (TFI). The TFI oversees the IPCC National Greenhouse Gas Inventories Programme, which aims to develop and refine an internationally agreed methodology and software for the calculation and reporting of national GHG emissions and removals, and to encourage the use of this methodology by parties to the UN Framework Convention on Climate Change (UNFCCC).

The IPCC Bureau is elected by the Panel for the duration of the preparation of an IPCC assessment report (approximately six years). Its role is to assist the IPCC Chair in planning, coordinating and monitoring the work of the IPCC. The Bureau is composed of climate change experts representing all regions. Currently, the Bureau comprises 31 members: the Chair of the IPCC, the IPCC Vice-Chairs, the Co-Chairs of the three WGs and the Bureau of the TFI (TFB), and the Vice-Chairs of the three WGs. In addition to the Bureau, in 2011 the IPCC established an Executive Committee to assist with intersessional work and coordination among WGs. The Committee consists of the IPCC Chair, IPCC Vice-Chairs, WG and TFB Co-Chairs and advisory members, which include the Head of the Secretariat and four Heads of TSUs. 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 assessments, special reports and technical papers that provide scientific information on climate change to the international community and that are subject to extensive review by experts and governments.

The IPCC has so far undertaken four comprehensive assessments of climate change, each credited with playing a key role in advancing negotiations under the UNFCCC: the First Assessment Report was completed in 1990; the Second Assessment Report in 1995; the Third Assessment Report in 2001; and the Fourth Assessment Report (AR4) in 2007. In 2008, IPCC-28 decided to undertake a Fifth Assessment Report (AR5) to be completed in 2014.

The Assessment Reports are structured in three volumes, one for each WG. Each volume is comprised of a Summary for Policymakers (SPM), a Technical Summary and an underlying assessment report. All assessment sections of the reports undergo an intensive review process, 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 approved line-by-line by the respective WG. The Assessment Report also includes a Synthesis Report (SYR), highlighting the most relevant aspects of the three WG reports, and an SPM of the SYR, which is approved line-by-line by the Panel. More than 800 authors and review editors from 85 countries are participating in the preparation of the AR5.

In addition to the comprehensive assessments, the IPCC produces special reports, methodology reports and technical papers focusing on specific issues related to climate change. Special reports prepared by the IPCC include: Land Use, Land-use Change and Forestry (2000); Carbon Dioxide Capture and Storage (2005); Renewable Energy Sources and Climate Change Mitigation (SRREN) (2011); and, most recently, the Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX) (2011). Technical papers have been prepared on Climate Change and Biodiversity (2002) and on Climate Change and Water (2008), among others.

The IPCC also produces methodology reports or guidelines to assist countries in reporting on GHGs. Good Practice Guidance reports were approved by the Panel in 2000, 2003 and 2013. The latest version of the IPCC Guidelines on National Greenhouse Gas Inventories was approved by the Panel in 2006, with a supplement on wetlands approved in 2013.

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 US Vice-President Al Gore, in December 2007.

IPCC-28: This session was held from 9-10 April 2008, in Budapest, Hungary, with discussions centering on the future of the IPCC, including key aspects of its work programme, such as WG structure, type and timing of future reports, and the future structure of the IPCC Bureau and the TFB. The IPCC agreed to prepare the AR5 and to retain the current structure of its WGs. In order to enable significant use of new scenarios in the AR5, the Panel requested the Bureau to ensure delivery of the WGI report by early 2013 and completion of the other WG reports and the SYR at the earliest feasible date in 2014.

IPCC-29: This session, which commemorated the IPCC's 20th anniversary, was held from 31 August to 4 September 2008 in Geneva, Switzerland. At this time, the Panel elected the new IPCC Bureau and the TFB, and re-elected Rajendra Pachauri (India) as IPCC Chair. The Panel also continued discussions on the future of the IPCC and agreed to create a scholarship fund for young climate change scientists from developing countries with the funds from the Nobel Peace Prize. It also asked the Bureau to consider a scoping meeting on the SREX, which took place from 23-26 March 2009 in Oslo, Norway.

IPCC-30: This session was held from 21-23 April 2009 in Antalya, Turkey. At the meeting, the Panel focused mainly on the near-term future of the IPCC and provided guidance for an AR5 scoping meeting, which was held in Venice, Italy, from 13-17 July 2009.

IPCC-31: This session was held from 26-29 October 2009 in Bali, Indonesia. Discussions focused on approving the proposed AR5 chapter outlines developed by participants at the Venice scoping meeting. The Panel also considered progress on the implementation of decisions taken at IPCC-30 regarding the involvement of scientists from developing countries and countries with economies in transition, use of electronic technologies, and the longer-term future of the IPCC.

INTERACADEMY COUNCIL (IAC) REVIEW: In response to public criticism of the IPCC related to inaccuracies in the AR4 and the Panel's response to the criticism, UN Secretary-General Ban Ki-moon and IPCC Chair Pachauri requested the IAC to conduct an independent review of the IPCC processes and procedures and to present recommendations in order to strengthen the IPCC and ensure the quality of its reports. The IAC presented its results in a report in August 2010 and made recommendations regarding, *inter alia*: 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.

IPCC-32: This session, held from 11-14 October 2010 in Busan, Republic of Korea, addressed the recommendations of the IAC Review. The Panel adopted a number of decisions in this regard, including on the treatment of gray literature and uncertainty, and on a process to address errors in previous reports. For recommendations that required further examination, the Panel established task groups on processes and procedures, communications, Conflict of Interest (COI) policy, and governance and management. The Panel also accepted a revised outline for the AR5 SYR.

SRREN: The eleventh session of WGIII met from 5-8 May 2011 in Abu Dhabi, United Arab Emirates, and endorsed the SRREN and its SPM. Discussions focused, *inter alia*, on chapters addressing sustainable development, biomass and policy. Key findings of the SRREN include that the technical potential for renewable energies is substantially higher than projected future energy demand, and that renewable energies play a crucial role in all mitigation scenarios.

IPCC-33: The session, held from 10-13 May 2011 in Abu Dhabi, United Arab Emirates, focused primarily on follow-up actions to the IAC Review of the IPCC processes and procedures. The Panel decided to establish an Executive Committee, adopted a COI Policy, and introduced several changes to the procedures for IPCC reports. The Panel also endorsed the actions of WGIII in relation to the SRREN and its SPM, and considered progress on AR5.

SREX: The first joint session of IPCC WGs I and II, which took place from 14-17 November 2011 in Kampala, Uganda, accepted the SREX and approved its SPM. The SREX addressed the interaction of climatic, environmental and human factors leading to adverse impacts of climate extremes and disasters, options for managing the risks posed by impacts and disasters, and the important role that non-climatic factors play in determining impacts.

IPCC-34: The meeting, held from 18-19 November 2011 in Kampala, Uganda, focused on follow-up actions to the IAC Review of the IPCC processes and procedures, namely in relation to procedures, COI policy and communications strategy. The Panel adopted the revised Procedures for the Preparation, Review, Acceptance, Adoption, Approval and Publication of IPCC Reports, as well as the Implementation Procedures and Disclosure Form for the COI Policy. The Panel also formally accepted the SPM of the SREX, which was approved by WGs I and II at their joint meeting held prior to IPCC-34.

IPCC-35: This session took place from 6-9 June 2012 in Geneva, Switzerland. The meeting concluded the Panel's consideration of the recommendations from the IAC Review by approving the functions of the IPCC Secretariat and TSUs, and the Communications Strategy. Delegates also agreed to revisions to the Procedures for the IPCC Reports, and the Procedures for the Election of the IPCC Bureau and Any Task Force Bureau.

IPCC-36: At its meeting, held from 23-26 September 2013 in Stockholm, Sweden, WGI finalized its AR5 contribution titled "Climate Change 2013: The Physical Science Basis." The Panel then met to approve the WGI SPM and accepted the underlying report, including the Technical Summary and annexes.

IPCC-37: This session was held from 14-17 October 2013 in Batumi, Georgia. At the meeting, the Panel considered and adopted two methodology reports: "2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands" and "2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol." The IPCC also addressed a range of procedural matters and undertook initial discussions on mapping the future of the IPCC.

IPCC-38 REPORT

On Tuesday morning, 25 March, IPCC Chair Rajendra Pachauri opened the session, highlighting its value in enhancing understanding on vulnerability, impact and adaptation issues. He stated that by providing detailed assessments of regional impacts, vulnerability and responses, the session would equip national and subnational governments with critical information for making decisions on adaptation. He also emphasized that the session's outcomes will provide the scientific basis for UNFCCC negotiations in this area.

Noting many recent extreme weather events, Nobuteru Ishihara, Minister for the Environment, Japan, highlighted Japan's leadership in: chairing UNEP's Global Adaptation Network, pushing the international discussion on the post-2020 climate change framework, and diplomacy to promote environmental and low-carbon technologies, renewable energy, and ecofriendly lifestyles.

WMO Deputy Secretary-General Jeremiah Lengoasa, via a video-recorded message, highlighted: the IPCC's unique credibility for policymakers; the WGII report's contribution to the development of adaptation and mitigation policies; its role in exposing potential risks and benefits; and opportunities and benefits rendered by climate services.

Via a video-recorded message, UNEP Executive Director Achim Steiner stressed that the session will help people understand climate change, informing them on the prospects and risks that lie ahead. He said the IPCC's message must be made loud and clear to the world.

UNFCCC Executive Secretary Christiana Figueres congratulated the IPCC via a video-recorded message, noting that its reports shine a light on what the world needs to do to face the climate change challenge with solutions based on sound science. She stated that the WGII contribution to the AR5 will open more options for action for the UNFCCC than ever before, will underscore why immediate action is needed, and will provide a global picture of integrated actions across regions.

WGII Co-Chair Christopher Field (US) highlighted topics to be addressed at the session, describing the draft report as "scientifically bold" on the need to consider the full range of possibilities in managing risks, including a broad set of tools available to countries, and in highlighting opportunities for how to combine adaptation and mitigation, while focusing on an analytical view of the challenges.

WGII Co-Chair Vicente Barros (Argentina) thanked Japan and WGII contributors for their work and cooperative spirit and called on them to ensure that the session has the best outcome possible.

Participants observed a minute of silence to honor the memory of Yuri Antonievich Izrael and then adopted the agenda for IPCC-38 (IPCC-XXXVIII/Doc.1) and the IPCC-37 draft report (IPCC-XXXVIII/Doc.2).

WGII-10 REPORT

APPROVAL OF THE SUMMARY FOR POLICYMAKERS

On Tuesday morning, WGII Co-Chair Barros opened the WGII session. WGII Co-Chair Field emphasized that the SPM is a stand-alone document as well as a portal to the report. Among the key themes, he listed, *inter alia*: core framing of discussions in terms of risk; addressing climate change in a multi-stressor setting; a strong narrative addressing observed changes and responses, a broad range of positive futures and impacts, potential risk reduction in terms of mitigation and adaptation, and framing "problem spaces" and "solution spaces"; and the need to embrace diverse values and time horizons.

WGII Vice-Chair Neville Smith (Australia) presented on the role of review editors in the AR5 as defined in the 2011 Revised Guidance Note. He said their roles include identifying reviewers, ensuring all comments are considered, advising authors on controversial issues, and ensuring that genuine controversies are adequately reflected in the report. He highlighted the value of the written reports that review editors will prepare at the end of their work processes.

INTRODUCTION. ASSESSING AND MANAGING THE RISKS OF CLIMATE CHANGE: Participants commenced discussions with a review of **Figure SPM.1: Illustration of the core concepts of the WGII AR5.** On the caption for the figure, Bolivia, supported by Saudi Arabia, recommended qualifying development as "sustainable" and queried the meaning of "governance." In response to these and other queries, a Coordinating Lead Author (CLA) explained that: the overall concept of risk encompasses all individual risks and specifying the risk of disaster in the figure was not necessary; technology is only one feature of development; sustainable development is only one type of development; and governance includes all categories and levels of governance.

Bolivia and Nicaragua stressed that the caption's text should take a cosmo-centric rather than an anthropocentric approach and include reference to the vulnerability and exposure of Mother Earth. Venezuela said that Mother Earth is a universal UN concept and could be included in the SPM. Panama suggested using the term "socio-ecological systems" to address this concern. Mexico said the impacts of human and natural systems on development must be highlighted. Canada, supported by Austria, opposed reference to Mother Earth in the operative text. A CLA suggested the inclusion of "impacts on interlinked human and natural systems" to address this concern. Co-Chair Field noted that "risk of climate-related impacts" captures both risk and impact and that aspects of the report already encompass values and worldviews, which include the concept of Mother Earth. He reminded participants that the report cannot go beyond the concepts in the literature it reviews, and participants decided not to adopt these proposed amendments.

Norway, supported by Panama, suggested that the text state that climate-related risk and impacts result from the interaction of hazards with vulnerability and exposure. Austria, with Canada and Saudi Arabia, said that risk does not always become an impact. Co-Chair Field suggested adding an additional sentence clarifying that risks are potential impacts. The UK cautioned against mixing risks of climate and risks of climate change. Switzerland explained that everything that influences the climate is an impact, and risks are impacts with an uncertain outcome that can sometimes be quantified. Participants adopted the caption's text without these proposed amendments.

On **Figure SPM.1: Illustration of the Core Concepts of the WGII AR5,** the UK, supported by Canada, proposed that the figure include an arrow showing a feedback loop indicating that impacts are integral to the climate change system. Canada stated that emissions are not the only source of climate change, urging inclusion of an arrow showing the role of land-use change. Regarding the caption for Figure SPM.1, the UK expressed concerns over language describing changes in both the climate system and "development processes" as drivers of hazards, exposure and vulnerability. He said reference to "development processes" appears to target developing countries and should be changed. Austria suggested using the term "human systems." The UK supported, and participants agreed to, changing the language in the figure and the caption from "development processes" to "socio-economic processes."

On the SPM Introduction's operative text, Co-Chair Field proposed, and participants agreed, to include a title reading **Assessing and Managing the Risks of Climate Risks Change**. For the first sentence of the SPM Introduction, stating that human interference with the climate system is occurring and climate change poses risks for human and natural systems, Norway called for linking human interference to the risks posed by climate change. Canada, with the US, Saudi Arabia, Australia and Austria, opposed this, noting that the report covers more than just anthropogenic climate change. Slovenia and the Russian Federation suggested specifying climate change as a "consequence" or "resulting from" human interference. Bolivia called for including reference to "Mother Earth." India suggested replacing "natural systems" with "ecosystems," while Norway called for, and participants agreed to "natural systems," as it is broader.

A UK proposal on considering how climate "change"-related risks can be reduced was accepted. China proposed placing adaptation before mitigation, noting current negative impacts are more urgent.

An extensive discussion unfolded regarding a paragraph on the relationship between risks, adaptation, and mitigation. The UK, supported by Italy, suggested language on reducing risks "locally through adaptation and globally through mitigation," emphasizing that these processes reduce risk in different ways. The UK's proposed language stated that risks can be reduced through sustainable development as well as through adaptation and mitigation. Saudi Arabia proposed replacing "risks" with "adverse impacts." India, opposed by Switzerland, Bolivia, France, Australia and others, proposed deleting reference to limits to adaptation. Germany proposed alternative language "recognizing that some risks of adverse effects are unavoidable." Bolivia proposed inserting reference to loss and damage further undermining adaptation. Austria warned that a statement specifying limits to adaptation might suggest that there are no limits to mitigation. Saint Lucia proposed recognizing limits to both adaptation and mitigation. A number of delegates, including South Africa, Chile, France and Luxembourg, stressed that WGIII was the more appropriate place to address mitigation. The discussion also focused on, *inter alia*: whether risks should be "climate-related" or "climate change-related"; and whether impacts should be "managed" or "reduced."

Co-Chair Field introduced a new paragraph addressing the complex interactions and changing likelihood of diverse impacts of climate change, noting that a focus on risks can inform decision-making, and underscoring that people and societies may perceive or rank risks and potential benefits differently. Bolivia stressed the need to focus on impacts. The UK, supported by Switzerland, said the sentence should focus on providing a decision-making framework to support decisions on climate change. Canada, supported by Saudi Arabia, queried whether the proposed change would provide value for decision makers and policy-makers. Canada and Australia stressed that many relevant decisions will be made in non-climate change-related policy situations. Tanzania said language referring to a focus on risk as being "new" to the assessment was confusing, and should be removed. Switzerland called for language stating that a focus on risks can inform decision making on adaptation.

The US cautioned against framing the report as using a risk-based approach. Co-Chair Field suggested stating that a focus on risk, which is new in this report, can support decision making in the context of climate change. Saudi Arabia said the text introduced a new concept focusing on risk at the expense of focusing on impacts. After informal consultations, participants agreed that the focus on risk in the report supports decision making in the context of climate change. Several participants noted that risk was complementary to impacts. The group agreed to deal with risk and impacts in one part and adaptation in another.

Regarding a sentence on the diversity of values, Bolivia questioned the need for this issue as it is addressed elsewhere in the report, but noted that if it were included, it should focus on taking into account different visions and approaches. Switzerland, supported by Austria stressed its importance, underlining the need for adaptation to take account of different values and not be policy prescriptive.

On the next paragraph on the knowledge base for the WGII contribution to the AR5, participants accepted a sentence noting the larger base of relevant literature assessed compared to past WGII reports. Participants also discussed how to acknowledge gaps in data from certain regions and agreed to delete text stating that the amount of literature "from all regions" has increased.

Discussion on **Background Box SPM.1: Context for the Assessment** engendered some debate over use of the term "middle-income countries." China and Argentina supported the term "developing countries." Explaining that "middle-income countries" was more consistent with the literature, Co-Chair Field proposed stating that coverage from all regions has increased, although it is unevenly distributed. Austria expressed concern that this formulation did not reflect the gaps in authorship of climate change publications. Canada proposed stating that "authorship of climate change publications has increased, but authors from developed countries are over-represented."

On **Background Box SPM.2: Terms Central for Understanding the Summary**, Co-Chair Field noted that the key terms included in the box are exactly as presented in the Glossary and previously agreed by WGI, and urged acceptance of the terms to uphold the unity of the assessment. Venezuela, Bolivia and Ecuador stressed the need to take into account governments' comments and called for a registry with all suggestions, even if not agreed, to be officially published as an annex. Bolivia also said that his country did not recognize the concept of "environmental services" since it is linked to a certain view of nature promoting commodification, and suggested referring to "environmental functions" instead. He added that the term "transformation" was unacceptable as it undermines a country's sovereignty and, supported by Venezuela, called for deleting reference to transformation throughout the SPM and draft report. Venezuela called for referring to adaptation commitments under the UNFCCC throughout the SPM as part of the overall conceptual framework. Austria recommended avoiding political debates that should take place under the UNFCCC and, with Switzerland and Australia, appealed to participants to respect what is presented in the scientific literature. Niger called for agreeing to terms already defined in the underlying report.

On the definition of ***climate change,*** Brazil questioned the need to include reference to land use. Bolivia called for changes in the definition of climate change to reflect the principle of common but differentiated responsibilities and historical responsibility. Co-Chair Field noted the importance of referring to the UNFCCC definition of climate change. Venezuela questioned the exclusion of certain terms from the SPM, such as climate extremes, extreme climate phenomena, extreme events and climate shocks.

Participants agreed to add the definition of ***hazard*** as stated in the Glossary, with the addition of a reference to ecosystems, as proposed by Norway, and some minor editorial changes.

On the definition of ***exposure***, Bolivia requested, and participants agreed, to include "environmental functions" alongside "environmental services" as things that can be adversely affected. Saudi Arabia, opposed by Switzerland and Australia, proposed referring to "situations" instead of, or as well as, "places." A CLA explained that "situations" are encompassed by the term "vulnerability." Following informal consultations, participants agreed to replace "places" with "places and settings" that could be adversely affected.

On ***vulnerability***, Mexico requested that "propensity" and "predisposition" to be adversely affected be specified. A CLA responded that the goal was to keep the definition general. With regard to vulnerability encompassing a variety of "concepts," Switzerland, supported by Costa Rica and opposed by Saudi Arabia, requested that "concepts" be replaced with "elements." Participants agreed to include both "concepts" and "elements."

On ***impacts***, Bolivia raised concern regarding language on the effect of impacts, stating that economic, social and cultural issues should not be described as "assets." Switzerland suggested revisions allowing "assets" to be removed, which was agreed by the Group. Venezuela suggested deleting a reference to "environmental services." Norway suggested that if the term "environmental services" was deleted in this paragraph, it should be kept in the Glossary. With this condition, "environmental services" was deleted.

On ***risk***, Indonesia questioned language referring to the "potential for consequences where something of human value (including humans themselves) is at stake," stating that the reference to "human value" was too narrow and should be expanded to include "ecological value" as well. The US, opposed by Bolivia, suggested removing reference to "human" and leaving it as simply "values". Participants agreed to define risk as "the potential for consequences where something of value

is at stake and where the outcome is uncertain, recognizing the diversity of values." Germany called for a better link between the definition of risk and the concept of risk in Figure SPM.1 as constituting hazard, exposure and vulnerability. Canada, supported by Germany and Norway, suggested stating that risk is often represented as the probability of "exposure to a hazard," multiplied by the "impacts" if these events occur. Norway recommended referring to the impact of both hazardous events and "trends." Participants agreed to language combining proposals from Canada and Australia, adding that risk is a "function of vulnerability, exposure and hazard." On language stating that the report assesses climate-related risks, participants agreed to replace "climate-related risks" with "climate change-related impacts." Saudi Arabia, opposed by Austria, reminded participants that the report does not only assess climate change impacts. Participants agreed to state that the term risk is used primarily to refer to the risk of climate change impacts. Germany asked for clarification that assessment is "based on objective criteria and expert judgment." Austria suggested putting this information in the caption for Figure SPM.1.

On ***adaptation***, Mexico proposed language on capacity building for adaptation and specified the multiple scales at which adaptation occurs, including local, national and individual levels. Co-Chair Field explained that listing specific dimensions would invariably exclude other critical elements and said a more general all-encompassing definition for adaptation was preferable. Participants agreed to maintain the more general language. On adaptation moderating harm, Slovenia proposed, and participants agreed, to add that adaptation also seeks to avoid harm. The Republic of Congo expressed concern over language seeming to imply that human intervention can adjust all natural systems, and text was amended to reflect adjustment in "some" natural systems.

On ***transformation***, Bolivia reiterated its call to delete all references to this term in the SPM, noting it is a complex and ambiguous topic, with normative and prescriptive aspects. Austria underscored that the underlying literature includes multiple references to transformation, which he said is not prescriptive since countries decide on any transformations they may wish to make. Norway and the UK supported including the definition. The Philippines suggested deleting a sentence listing specific systems and structures where transformation can occur, noting this is of greater relevance to developed countries with greater resources. Bolivia and Venezuela said the entire definition should be deleted since the first sentence referring to altering paradigms reflected a "colonial vision of science." After informal group consultations, participants agreed to text defining transformation as: "A change in the fundamental attributes of natural and human systems. Within this summary, transformation could reflect strengthened, altered or aligned paradigms, goals or values towards promoting adaptation for sustainable development, including poverty reduction."

Saudi Arabia proposed, and participants agreed, to add a definition for ***resilience***, stressing its importance for adaptation and its direct links to sustainable development. Saudi Arabia then proposed aligning the definition with sustainable development, amending it to reflect the capacity of a social, economic and environmental system, which was accepted.

Background Box SPM.3: Communication of the Degree of Certainty in Assessment Findings was approved by participants without amendment.

SECTION A. OBSERVED IMPACTS, VULNERABILITY AND ADAPTATION IN A COMPLEX AND CHANGING WORLD: CLA Wolfgang Cramer presented on detection and attribution of climate change impacts. He emphasized that absence of attributed impacts does not mean that no impacts have occurred. CLA Petra Tschakert presented on "people in the equation" and discussed multidimensional variability, dynamic livelihoods and climate change as a threat multiplier.

A-1. Observed Impacts, Vulnerability and Exposure: On a paragraph regarding the impacts of climate change on natural and human systems, the UK, supported by the US, requested that attribution of some impacts on human systems to climate change "beyond the influence of non-climatic drivers" be described as "distinguishable from other causes," whereas Austria and Belgium preferred the original text. Australia cautioned against implying that some impacts may be solely attributable to climate change. Participants agreed to revise the sentence to state that some impacts on human systems have also been attributed to climate change with a major or minor contribution of climate change distinguishable to some extent from other influences.

Regarding a sentence on attribution of observed impacts linking responses of natural and human systems to climate change, Austria supported a Canadian proposal reflecting that observed climate change includes anthropogenic and natural change. The US called for specific reference to "anthropogenic" climate change and, with Belgium and the Netherlands and others, supported reference to WGI's assessment of human influence on the climate system, to distinguish it from WGII's emphasis on responses to climate change. Saudi Arabia, supported by Canada, the US and the Russian Federation, noted that, in contrast to WGI's focus, WGII links responses of natural and human systems to observed climate change "regardless of its cause," not just anthropogenic climate change. Australia, opposed by Chile, called for language clarifying that climate change is not just anthropogenic. Canada said the SYR was the appropriate place to contrast the WG reports. Following informal group discussions, participants agreed that "attribution" is used differently in WGI and WGII. A sentence on attribution of observed impacts was approved without amendment.

Participants then considered the footnote on attribution. Its sentence stating that "attribution" is used differently in WGI and WGII and a sentence on how attribution is considered in WGII were both approved. Regarding a sentence on how attribution is considered in WGI, Canada proposed stating that WGI quantifies the link "between observed climate change and external drivers, including human activities." WGI Co-Chair Stocker proposed stating that WGI quantifies the links between observed climate change, human activity as well as other external drivers, which was agreed.

The UK, supported by Finland, Norway, the European Union (EU) and Canada, stressed the need to include in a footnote a quote from the WGI report on attribution to human causes. Participants agreed to a footnote stating that a key finding of WGI AR5 is that "it is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century."

On a sentence stating that "changing precipitation or melting snow and ice are altering hydrological systems," affecting water resources, the UK proposed referring more clearly and extensively to the impacts of these changes. Japan, Luxembourg, Republic of Congo, Sweden and others called for referring to water quality as well. Co-Chair Barros suggested adding reference to "water quantity and quality." Slovenia, opposed by Japan and China, suggested "availability" instead of quantity. Norway, Mali and the Cook Islands preferred a more general reference to water resources. India proposed referring to "the whole water cycle," while Ghana and Saint Lucia suggested adding reference to pattern changes. The Cook Islands called for a reference to sediment transport. France proposed, and participants agreed, to refer to "affecting water resources in terms of quality and quantity."

On the continuing shrinking of glaciers, the US, UK, EU, New Zealand and others supported referring to the actual impacts of such shrinking, such as increased runoff or river flow, sediment transport and problems with downstream water resources. Participants agreed to add reference to "affecting runoff and water resources downstream."

In the following sentence stating that climate change has caused "permafrost warming and thawing in high-latitude and in high-elevation regions," Slovenia suggested, and participants agreed to, language reflecting that the warming and thawing are still occurring. In response to a question by Austria regarding the confidence level of this statement, authors proposed, and participants agreed, to add "high confidence" to the text.

The first sentence of the paragraph on species shifts, noting that many species have shifted in response to climate change, was accepted without discussion, but two subsequent sentences on attributing extinctions to recent warming engendered much debate. Several countries, including Germany, Austria, the UK and Switzerland, queried why earlier mention of increased tree mortality had been deleted. Co-Chair Field explained that mention of specific effects had been moved to a comprehensive listing in Table SPM.1 and Figure SPM.2.C. Costa Rica, opposed by Spain and Panama, favored deleting an example of extinction of many species of Central American amphibians. Switzerland, supported by Australia, suggested clarifying that "only a small fraction of observed species extinctions have been attributed to climate change." Questions were also raised by: the US on the number of years that species extinctions have been taking place; Japan on whether a reference to species included terrestrial as well as marine species; Switzerland on whether "ecosystem shift" includes ecosystem change, space displacement only, or, as suggested by Tanzania, temporal shifts; Canada on whether extinction rates have actually changed; and Tanzania on the level of confidence of this finding. Participants agreed to text stating that "while only a few recent species extinctions have been attributed as yet to climate change (*high confidence*), natural global climate change at rates slower than current anthropogenic climate change caused significant ecosystem shifts and species extinctions during the past millions of years (*high confidence*)."

A figure intended to show tree mortality and forest dieback caused by drought and heat was opposed by Sudan and Tanzania. They stated that the figure misleadingly appeared to present Africa as less subject to drought than America or Europe. A CLA explained that the figure was based on available studies and that, as such, it portrayed the lack of relevant studies in Africa. Recognizing the potential for misinterpretation, Germany, Norway, Bolivia, Peru, Co-Chair Field and the CLA proposed various editorial changes to the caption and title, which Tanzania found acceptable. Noting the lack of delegates from African countries present in the room, Sudan called for deletion of the figure, to which participants agreed.

Participants agreed to text on the role of social processes, resulting inequalities, and the vulnerability and exposure of ecosystems and human systems to climate variability. On text on the impacts of climate-related extremes, Bolivia called for inserting a sentence stating that "there is evidence suggesting that loss and damage will occur from climate change despite efforts at adaptation." Co-Chair Field stated that language on residual damages is found elsewhere in the report and that this paragraph focuses only on the impacts of vulnerability. Participants agreed to text on the effects of the adaptation deficit and climate-related hazards exacerbating other stressors. On the impacts of climate-related hazards on livelihoods, Bolivia suggested adding a reference to food security, which a CLA stated is already implicit in the existing language. They also agreed to text noting limited and often indirect positive climate effects for poor and marginalized people and text stating that violent conflict increases vulnerability to climate change. On the role of violent conflict in harming assets that facilitate adaptation, Bolivia asked, and participants agreed, to replace "natural capital" with "natural resources."

On **Figure SPM.2A: Observed Impacts Attributable to Climate Change**, participants informally consulted and agreed to add language to the figure to address concerns that impacts were not reflected for all countries. Tanzania, with South Africa, Ghana and the Gambia, expressed concern that coastal erosion and impacts on marine ecosystems, including coral bleaching, were not included in the figure for Africa. CLAs explained that various recognized impacts did not withstand the test of detected and attributed observed changes and that the figure referred only to assessed literature since AR4. They noted that absence from the figure did not imply that impacts had not occurred.

Participants approved **Figure SPM.2B** on **Average Rates of Change in Distribution for Marine Taxonomic Groups and Positive Distribution Changes** and **Figure SPM.2C** on **Estimated Impacts of Observed Climate Changes on Yields over 1960-2013 for Four Major Crops** with no changes.

Participants agreed to remove a figure on glacier loss in the Himalayas that was deemed too complex.

A-2. Adaptation Experience: In the introductory sentence on people and societies adjusting and coping with climate variability and extremes throughout history, Saudi Arabia suggested changing "coping with" to "adapting to." The UK said this would change the meaning and, with Austria, favored the original language. Germany, with Belgium and New Zealand, proposed deleting the sentence. Ultimately, participants agreed the sentence was introductory, approving it without changes.

A sentence, explaining that the section focuses on adaptive human responses to observed and projected climate change impacts, was approved with minor textual revisions. On a sentence on most evaluations of adaptation restricted to impacts, vulnerability and adaptation planning, Canada queried the term "evaluations." A CLA proposed replacing it with "assessments," which was agreed. The UK, supported by France, proposed

referring to adaptation projects or programmes, but the CLAs recommended retaining the original broader formulation.

On examples of adaptation across regions, for Europe, the EU requested, and participants agreed, to insert reference to "environmental protection and land planning."

For Asia, the Republic of Korea proposed, and participants agreed to, stating that adaptation in Asia is also being facilitated through "mainstreaming climate adaptation action into subnational development planning."

The rest of the regional examples were accepted with minor or no revisions.

A-3. The Decision-making Context: Participants approved chapeau language stating that climate variability and extremes have long been important in many decision-making contexts and climate-related risks are evolving due to climate change and development.

Participants considered four findings in this section: responding to climate-related risks, adaptation and mitigation choices, assessment of risks, and uncertainties. Participants approved without comment text on responding to climate-related risks. The approved texts states that: responding to climate-related risks involves decision making in a changing world, with continuing uncertainty about the severity and timing of climate change impacts and with limits to the effectiveness of adaptation; iterative risk management is a useful framework for decision-making in complex situations characterized by large potential consequences, persistent uncertainties, long timeframes, potential for learning and multiple climate and non-climate influences changing over time; assessment of the widest range of potential impacts, including low-probability outcomes with large consequences, is central to understanding the benefits and tradeoffs of alternative risk management actions; and the complexity of adaptation actions across scales and contexts necessitates monitoring and institutional learning.

On mitigation and adaptation choices, after some discussion delegates agreed, *inter alia*, that: near-term adaptation and mitigation choices will affect the risks of climate change throughout the 21st century; projected global temperature increase over the next few decades is similar across emission scenarios; during this near-term period, risks will evolve as socio-economic trends interact with the changing climate; societal responses, particularly adaptations, will influence near-term outcomes in the second half of the 21st century and beyond; global temperature increase diverges across emission scenarios; and for the longer-term period, near-term and longer-term adaptation and mitigation and development pathways will determine the risks of climate change.

On assessment of risks in the WGII AR5, participants agreed to text stating, *inter alia*, that: future risks related to climate change vary substantially across plausible alternative development pathways, and the relative importance of development and climate change varies by sector, region and time period; and scenarios are useful tools for characterizing possible future socio-economic pathways, climate change and its risks, and policy implications.

On uncertainties, participants agreed that: uncertainties about future vulnerability, exposure, and responses of interlinked human and natural systems are large; this motivates exploration of a wide range of socio-economic futures in assessments of risks; understanding future vulnerability, exposure, and response capacity of human and natural systems is challenging due to the number of interacting social, economic and cultural factors; these factors include, *inter alia*, wealth distribution across society, demographics, migration, access to information, societal values, governance structures and institutions to resolve conflicts; and international dimensions, such as trade, are also important for understanding climate change risks at regional scales.

Participants approved without comment **Figure SPM.3: Climate Change Adaptation as an Iterative Risk Management Process with Multiple Feedbacks**.

On **Figure SPM.4: Observed and Projected Changes in Annual Average Surface Temperature**, Canada and the US favored using a similar figure from the WGI report. As an alternative, Canada, supported by the US, called for adjusting the color bar to eliminate sharp steps at 2 and 4°C and extending it to illustrate warming in the Arctic. Participants approved the figure and its caption with these modifications.

SECTION B. FUTURE RISKS AND OPPORTUNITIES FOR ADAPTATION: On a sentence in the introductory paragraph noting that the section points to opportunities for managing risks through adaptation and mitigation, the US, supported by Canada, Ireland, India, the EU and Saudi Arabia, suggested that it should also refer to "reducing risks," which was agreed to by the Group.

B-1. Key Risks across Sectors and Regions: In the introductory paragraph, Canada, opposed by Germany, Slovenia, Switzerland, Brazil and others, said key risks are not described in UNFCCC Article 2 on dangerous anthropogenic interference with the climate system, and should not be linked in this paragraph to that article. To resolve the issue, New Zealand proposed, and participants agreed, that "described in" should be replaced with "refers to." The agreed text reads: "Key risks are potentially severe impacts relevant to Article 2 of the UNFCCC, which refers to dangerous interference with the climate system." The US proposed, and participants agreed to, a definition of key risks, stating: "Risks are considered key due to high hazard or high vulnerability of societies and systems exposed, or both."

On the paragraph on the risks of climate change that warrant consideration, Germany expressed concern with the ordering and weighting of the key risks in the paragraph, and India expressed concern with the timing of impacts. CLAs explained that the criteria are much clearer without introducing the concept of weighting. Regarding a sentence noting that "expert judgments" were used in identifying key risks, Switzerland, opposed by the US, Austria and Germany, recommended deleting the term "expert judgments," noting it diminishes credibility. Saudi Arabia suggested the wording "expert inferred judgment." Germany proposed language stating: "Determination of which risks are key was based on expert judgment using the following specific criteria." Saudi Arabia suggested replacing "determination" with "assessment." Participants agreed to Canada's suggestion to use the term "identification." Japan, Tanzania and others made proposals to qualify the criteria. Canada stated that the criteria have already been applied by the authors and cannot be changed.

Participants discussed key risks all of which are identified with high confidence and contribute to one or more reasons for concern (RFC).

A key risk on risk of death, injury, ill-health or disrupted livelihoods in low-lying coastal zones and small island developing states, due to storm surges, coastal flooding, and

sea-level rise, was the subject of lengthy discussion. The US proposed replacing "small island developing states" with "small islands" as their consideration was geographical, not political. Brazil, the Philippines, the EU and Australia supported this. Australia also emphasized risks for small islands within other states. Saint Lucia, the Maldives, Tuvalu, China, Cuba and others supported retaining "small island developing states." Austria, supported by Mexico, Ireland, Switzerland, Saint Lucia, the US and others, proposed referring to "small island developing states and other small islands."

Chad, Mali, South Sudan, Sudan, Senegal and others, opposed by Australia and Germany, supported reference to least developed countries (LDCs). Mali, supported by Niger, proposed "other vulnerable areas" as compromise text to cover LDCs. Canada and the CLAs cautioned against adding new risks to the list as it might compromise scientific findings. New Zealand and the EU supported a proposal to add a sentence clarifying that risks were "especially pertinent" to LDCs. The US proposed chapeau language specifying the pertinence of risks to least developed and most vulnerable countries due to higher levels of exposure and vulnerability, including those that arise from their development status. Australia suggested adding "vulnerable groups."

South Sudan clarified that the increased vulnerability of LDCs is not due to development status, but rather to a lack of resources. Canada emphasized that exposure levels may not depend on development status. Kenya stated that risks to coastal zones, for example, cover all countries irrespective of development status. South Sudan said damage to, and destruction of, property should be covered in the list of risks.

Saint Lucia suggested qualifying language to reflect that not all risks are pertinent to LDCs. The US suggested "some" key risks may be particularly challenging for least developed and vulnerable countries. Austria flagged that risks vary within countries as well, and suggested mention of vulnerable groups within countries.

Following the presentation of various formulations of, and discussion on, this text, Canada proposed that "some key risks may be particularly challenging for LDCs and communities, given their higher vulnerability and limited ability to cope," to which the UK proposed adding "vulnerable" communities.

Mali, supported by Sudan, called for text stating that key risks "are," rather than "may be," challenging for LDCs, while Austria, supported by Canada, pointed out that no assessment was carried out specifically on key risks in LDCs, and that such a definitive declaration was thus not in line with the assessment. France proposed deleting "some," while South Sudan suggested that "most of these key risks are" challenging for LDCs.

Switzerland proposed, and participants agreed, that "many" key risks "constitute" particular challenges, and participants agreed. The final text states that many key risks constitute particular challenges for LDCs and vulnerable communities, given their limited ability to cope.

After this discussion, the text on death, injury, ill-health or disrupted livelihoods in low-lying coastal zones and small island developing states and other small islands from storm surges, coastal flooding, and sea-level rise, was accepted.

On the key risk of severe ill-health and disrupted livelihoods for large urban populations due to inland flooding in some regions, several proposed changes were rejected on the basis of inconsistency with the chapters from which the key risks were drawn. A suggestion from Pakistan, to add "displacement" to the effects of inland flooding, was rejected on the basis that it is captured in the existing language. This subparagraph was accepted as written.

On systemic risks due to extreme weather events, participants accepted Madagascar's suggestion to add examples from the underlying report on critical services being affected. The final text refers to "systemic risks due to extreme weather events leading to breakdown of infrastructure networks and critical services, such as electricity, water supply, health and emergency services."

On the key risk of excess mortality and morbidity during periods of extreme heat, "excess" was removed upon request from Tanzania and Canada. Participants agreed to a request by Ecuador and Ethiopia that the final clause refer to "those working outdoors in urban and rural areas." The final text refers to the risk of mortality and morbidity during periods of extreme heat, particularly for vulnerable urban populations and those working outdoors in urban or rural areas."

On the key risk of food insecurity linked to warming, drought, flooding, and precipitation variability and extremes, particularly for poorer urban and rural populations, the reference to food insecurity was expanded to include the "breakdown of food systems," from the underlying report, upon request from Bolivia.

On the key risk of loss of rural livelihoods and income, a suggestion by India to add reference to farmers in "arid" regions was rejected as inconsistent with the report, and the key risk was approved without change. The final text refers to the key risk of loss of rural livelihoods and income due to insufficient access to drinking and irrigation water and reduced agricultural productivity, particularly for farmers and pastoralists with minimal capital in semi-arid regions.

On the key risk of loss of marine ecosystems and biodiversity, a suggestion from Bolivia to add "functions" to ecosystem goods and services was accepted. Reference to "coastal" ecosystems was added to capture Nicaragua's concern about wetlands. The final text refers to the risk of loss of marine and coastal ecosystems, biodiversity, and ecosystem goods, functions and services for coastal livelihoods, especially for fishing communities in the tropics and the Arctic.

On the key risk of loss of terrestrial and inland water ecosystems, upon request from Tanzania and the US, a reference to the concept of "terrestrial" livelihoods was deleted. In answer to a question from the Republic of Congo, Co-Chair Field clarified that inland water ecosystems include grasslands and forests. Norway noted that the term "freshwater" used elsewhere should be harmonized with "inland water." The final text refers to a risk of loss of terrestrial and inland water ecosystems, biodiversity, and ecosystem goods, functions and services they provide for livelihoods.

Participants then addressed a paragraph stating that larger magnitudes of warming increase the likelihood of severe, pervasive and challenging impacts. Germany, the UK, Luxembourg, Saint Lucia, Belgium, Finland and others expressed concern that 4ºC had been identified as the critical threshold, given the many serious risks associated with lower temperature increases, and cautioned against giving the impression that impacts below an increase of 4ºC are manageable.

Belgium suggested presenting a general statement instead of looking for a single number associated with high certainty, and then adding specific impacts for various thresholds. Supporting Belgium, Germany, Finland, Saint Lucia, the Philippines and others also called for adding details associated with lower levels of warming, including risks associated with an increase of 2ºC above preindustrial levels. Saint Lucia called for referring to impacts under temperature increases of 1.5-2ºC. Co-Chair Field noted that some of those references were included in Assessment Box SPM.1 on Human Interference with the Climate System on RFCs and in the Key Risk Tables for the regions.

The UK, supported by Belgium, Luxembourg, Australia, Saint Lucia and the US, proposed language from the underlying report referring to major impacts. On the reference to "preindustrial levels," Australia suggested referring to the period 1850-1900 instead to ensure consistency with WGI benchmarks. Co-Chair Field pointed out that the literature assessed refers to preindustrial levels. The UK proposed, and participants agreed, to replace the word "challenging" with "irreversible."

Saudi Arabia, China and the UK argued that the paragraph should be limited to consideration of the risks of a very high temperature rise. Saint Lucia, Germany, Jamaica, Austria, Sweden, Belgium and Tuvalu called for examples of risks associated even with lower temperature rises. Switzerland suggested referring to RCPs used in the WGI report, rather than temperatures, for consistency across the WGs. Sweden suggested moving this language to the introduction of the paragraph, stating that precise levels of climate change sufficient to trigger tipping points remain uncertain, but the likelihood of crossing tipping points in the earth system or in interlinked human and natural systems increases with rising GHG concentrations. Mexico noted that Table SPM.4 shows strong and precise examples of impacts. Bolivia called for putting a comparison of temperatures from 1850-1950 in a footnote.

Saudi Arabia, opposed by Switzerland, reiterated that the paragraph should be considered as a package, not sentence by sentence, and should remain focused on a 4ºC temperature rise relative to preindustrial levels. Following informal consultations, participants discussed the ordering of references to lower and higher temperature increases and how to refer to tipping points. As approved, the paragraph reads that: magnitudes of warming increase the likelihood of severe, pervasive and irreversible impacts; some risks are considerable at 1-2ºC above preindustrial levels; global climate change risks are high to very high with a global mean temperature increase of 4ºC or more above preindustrial levels and include, *inter alia*, substantial species extinctions, large risks to food security, and the potential for some areas to become seasonally uninhabitable for normal human activities; and the risk associated with crossing multiple tipping points in the earth system increases with rising temperature.

Regarding **Assessment Box SPM.1: Human Interference with the Climate System**, which describes five RFCs that provide a framework for summarizing key risks across sectors and illustrate implications of warming and adaptation limits for people, economies and ecosystems, the Group agreed, with some minor amendments, to the introductory paragraph and a chapeau, which, *inter alia*, state that global average temperature changes are relative to 1986-2005 levels.

Participants then discussed the first RFC on **unique and threatened systems**, which asserts that: such systems are at risk from climate change; risk increases with additional warming of around 1°C; and many species and systems are subject to very high risk at 2°C warming. Much of the debate revolved around use of temperature change relative to 1986-2005 levels to describe current and future risk, as well as reference to "above recent temperatures," as proposed by the US. Austria and the US emphasized that temperature references to warming of 1-2°C were intended to reflect a continuous increase in temperature and not a threshold in relation to increased risk. Saudi Arabia urged that temperature rise should be relative to preindustrial levels to better explain risks already being faced, and opposed specific reference to "recent temperatures." Spain recalled WGI's use of the 1986-2005 baseline and its reference to the difference in warming from the preindustrial period and the 1986-2005 baseline. Co-Chair Field stressed the importance of maintaining consistency between the WGs and reiterated that the entire assessment was undertaken based on recent temperatures. Luxembourg proposed adding the WGI SPM language, namely that observed warming from 1850-1900 to 1996-2005 is 0.61°C. The Group agreed to include this in a footnote, with a condition from Saudi Arabia that reference to "above recent temperatures" be deleted. This deletion was accepted, with Norway reiterating that the chapeau already includes reference to the 1986-2005 baseline.

On the RFC on **extreme weather events**, the UK questioned a sentence stating that risks associated with "some" types of extreme events increase at higher temperatures, noting that risks associated with "all" extreme events increase with higher temperatures. A CLA said there are some types of extreme events for which there is insufficient data. The UK said this is not a statement on the risks that might occur, but rather a statement regarding the risks that have been assessed. The sentence was agreed without amendment.

On the RFC on the **distribution of impacts**, the UK raised concerns regarding a sentence stating that risks are unevenly distributed and are generally "greatest" for "disadvantaged" people and communities in "low-, middle- and high-income countries," questioning whether any countries exist that do not fit in that category. He also queried the appropriateness of using the term "disadvantaged." The CLAs proposed referring to "all countries" and replacing "disadvantaged" with "vulnerable and exposed." Switzerland opposed this proposal, expressing that risk is defined as constituting vulnerability and exposure and this sentence would create circular reasoning, stating that the people most at risk are those who have the greatest risk. The US, supported by Saint Lucia and the Philippines, said disadvantaged people are not restricted to those that are vulnerable and exposed, and opposed the proposed change. China favored reference to risks being generally greatest in low-latitude, less developed areas. Mexico said the sentence should also address LDCs. The US, supported by New Zealand and the EU, and opposed by Argentina, expressed concern that this would dilute the point that risks are unevenly distributed and are generally greater for people in the weakest economic situations. Mexico said risk and vulnerability do not always depend on exposure to risk and that capacity to respond must also be addressed. Co-Chair Field proposed, and participants agreed to use "all countries at all levels of development." Tanzania proposed, and participants

agreed, to replace "greatest" with "greater." Some discussion ensued on a sentence stating that "based on risks for regional crop production and water resources in some countries, risks are high for additional warming above 2ºC (*medium confidence*)." The UK, supported by the US, stressed the importance of specifying the risks. The US suggested, and participants agreed to, referring to the risk of reduced yields and water scarcity as found in the text of the underlying report. After requests for clarification from Belgium, Switzerland and the UK on the distribution of impacts, Switzerland suggested, and participants agreed to, stating that "risks of unevenly distributed impacts are high."

On the RFC on **global aggregate impacts**, participants discussed a sentence stating that "risks to the overall global economy and Earth's biodiversity are moderate for additional warming between 1-2°C (*medium confidence*) and high around 3°C, reflecting warming-dependent increases in risks of economic impacts (*low confidence*) and extensive biodiversity loss with concomitant associated loss of ecosystem goods and services (*high confidence*)." Saudi Arabia, Australia and the US questioned the differing confidence levels associated with the statement. CLAs explained that the differences were due to the two sets of literature included, namely on biodiversity and economy. They noted that while studies disagree on specific impacts (therefore the low confidence), they do agree on trajectory, so it is clear that risk increases with temperature increases, even if, given the literature data points, the associated confidence level is low. The UK, the US and Australia proposed separate sentences for biodiversity and economy. Belgium and Venezuela supported maintaining aggregate indicators. The US, with Australia, proposed language from the underlying chapter stating that little is known about economic impacts under a 3ºC increase, but that this does not imply a lack of risk.

CLAs proposed the following text: "Risks of global aggregate impacts are moderate for additional warming between 1-2ºC, reflecting impacts to both Earth's biodiversity and the overall global economy (*medium confidence*). Extensive biodiversity loss with associated loss of ecosystem goods and services results in high risks around 3ºC (*high confidence*), but little is known about aggregate economic impacts above 3ºC." CLAs recalled that "moderate" in this context means detectable and attributable to climate change. Norway, opposed by Saudi Arabia, suggested including this definition of "moderate" in a footnote. After discussion in an informal group, participants agreed to text stating that global aggregate impacts are moderate for additional warming between 1-2°C, reflecting impacts to both the Earth's biodiversity and the overall global economy (*medium confidence*); extensive biodiversity loss with associated loss of ecosystem goods and services results in high risks around 3°C additional warming (*high confidence*); and aggregate economic damages accelerate with increasing temperature (*limited evidence, high agreement*), but few quantitative estimates have been completed for additional warming around 3°C or above. IPCC Chair Pachauri, supported by Luxembourg and the UK, suggested adding a footnote with previously agreed text from the SREX noting that disaster loss estimates are lower bound estimates because many impacts, such as loss of human lives, cultural heritage and ecosystem services, are difficult to value and monetize and thus are poorly reflected in estimates of losses. Participants agreed to the inclusion. After further discussion and editorial changes, as well the addition of the definition of income in the glossary, the text was approved.

On the RFC on **large-scale singular events**, Canada requested the removal of "drastic" in a sentence on physical systems and ecosystems being at risk of abrupt, drastic and irreversible changes. Austria suggested using the word "transformational" and Australia proposed "far-reaching." Norway called for consistency with the WGI report, which refers to "abrupt" and "irreversible." Peru queried whether "drastic" referred to scale, and a CLA clarified that it referred to the rate and was thus redundant. The sentence was accepted with the deletion of "drastic." On a sentence concerning early warning signs of warm-water coral reefs and Arctic ecosystems experiencing irreversible regime shifts, Switzerland queried the meaning of "Arctic ecosystems." A CLA explained that they referred to combined systems, including ice, terrestrial systems and people. The sentence was accepted without changes.

A sentence on risk increases associated with temperature increases and the potential for large and irreversible sea-level rise from ice sheet loss, including in Greenland, engendered much debate. Japan and Tanzania sought clarification on a disproportionate increase in risks associated with temperature increases between 1-2°C. A CLA explained that WGII took WGI's finding on sea levels during the last interglacial period to mean that risk increases substantially at temperature increases of 1-2°C. Japan, China and Australia pointed to inconsistency between the temperature ranges used by WGI and WGII. A CLA explained that WGI referred to polar temperatures (at least 2°C warmer), while the WGII reference was to global mean temperature (1-2°C warmer). Luxembourg suggested specifying that global mean sea-level rise would be "up to 7 meters."

The text was harmonized with the WGI report specifying temperature increases of 1-4°C above preindustrial levels for high risks and 1-2°C above 1986-2005 levels for a disproportionate increase in risks. Australia, the US, the EU, Sweden and others opposed the use of two different timeframes. Participants discussed the need to make WGI and WGII numbers consistent, given differences in the baselines used in their respective assessments ("preindustrial levels" in WGI and "1986-2005" in WGII). The US requested additional text in the footnote to clarify the relationship between the two baselines. New Zealand recalled that the chapeau for the RFCs already states that all temperatures used in the RFCs are based on the 1986-2005 baseline, and the footnote was left unchanged.

To a sentence citing the disproportionate risks as temperature increases between 1 and 2ºC additional warming, the US, supported by the UK, suggested adding "above recent temperatures." The final text notes that risks increase disproportionately as temperature increases between 1-2ºC additional warming and become high above 3ºC, due to the potential for a large and irreversible sea-level rise from ice sheet loss. It further states that for sustained warming greater than some threshold, near-complete loss of the Greenland ice sheet would occur over a millennium or more, contributing up to 7m of global mean sea-level rise. This language is accompanied by an explanatory footnote stating that current estimates indicate that the threshold is greater than about 1ºC, but less than about 4ºC sustained global mean warming above preindustrial levels, and provides references to the WGI SPM.

Regarding **Assessment Box SPM.1 Figure 1: A Global Perspective on Climate-related Risks**, Saint Lucia stressed the importance of setting out a range of temperature scenarios, including low temperature changes. China expressed concern over the vagueness of the term "preindustrial" and urged consistency with the terminology used in WGI to avoid confusing policymakers. Australia said the caption should state that the figure presents untreated risks, and in some areas there is potential for adaptation to mitigate those risks. To address this concern, Norway suggested merging this figure with Figure 19.4 of the underlying report. The UK questioned whether the figure accurately reflected the associated levels of risk, suggesting that the predictions appear conservative. A CLA said the authors took a conservative approach on this to retain credibility. Mali and Ghana said the figure needed to be simplified and better explained. Saudi Arabia, Bolivia and India queried why the scale used is based on recent temperatures and not on a preindustrial baseline. Ecuador, opposed by Slovenia and Spain, favored deleting the figure noting it is unrepresentative. Responding to concerns raised by Saudi Arabia that the temperature scale should be based on preindustrial baselines, Austria said a baseline of recent emissions is not a political baseline and is scientifically grounded.

To take into account the concerns expressed by Saudi Arabia, IPCC Vice-Chair Jean-Pascal van Ypersele suggested reflecting the information on the right side of the figure as a thermometer. Costa Rica, supported by Sweden and Switzerland, proposed adding an explanation of Representative Concentration Pathways (RCPs) and scenarios in the caption, noting that the terms are not familiar to all policymakers. Emphasizing the figure's importance and value, Switzerland urged that it contain all information necessary for use as a stand-alone and self-explanatory figure and suggested including a description of RCPs or scenarios in the figure itself.

Saudi Arabia requested that the Y-axis be labeled "preindustrial" instead of "1850-1900." WGI Co-Chair Thomas Stocker said that reference to "preindustrial" would necessitate use of the term "approximation," which Austria and Australia proposed including in a footnote. Participants considered labeling the Y-axis as "Global mean temperature change (°C relative to 1850-1900, as an approximation of preindustrial levels)," with an explanation inserted in a footnote. China requested text noting that while the earliest data is available for 1850-1900, "preindustrial times" start around 1750.

Following informal consultations, participants agreed to raise the explanation of "preindustrial times" to the text in Assessment Box SPM.1 Figure 1, which now reads: "Based on the longest global surface temperature dataset available, the observed change between the average of the period 1850-1900 and of the AR5 reference period (1986-2005) is 0.61°C (5-95% confidence interval: 0.55 to 0.67°C), which is used here as an approximation of the change in global mean surface temperature since preindustrial times, referred to as the period before 1750."

IPCC Vice-Chair van Ypersele, supported by Norway, proposed inserting a footnote providing a link between the figure and the notion of "preindustrial" based on WGI's work. Saudi Arabia favored using the term "preindustrial" rather than "1850-1900" with an asterisk to the footnote. Participants agreed that the footnote state: "Based on the longest global surface temperature dataset available, the observed change between the average of the period 1850 to 1900 and of the AR5 reference period is 0.61°C [0.55-0.67°C][WRI AR5 SPM.2.4], which is used here as an approximation of the change in global mean surface temperature since preindustrial times."

Participants agreed to the following changes to the figure: referring to temperature change relative to the "1850-1900" baseline instead of "preindustrial" baseline; adding additional text to the caption describing RCPs; and adding the thermometer as proposed by IPCC Vice-Chair van Ypersele. A revised figure incorporating the changes was then presented, which included the addition of the label "global temperature change" on the Y axis, as proposed by Slovenia, and a thermometer showing global mean temperature change relative to 1986-2005 levels aligned with the existing thermometer showing global mean temperature change relative to 1850-1900. Germany, Austria and Sweden objected to the removal of dotted lines that indicated 2°C and 4°C temperature changes above preindustrial levels. Ethiopia and Saudi Arabia objected to the use of "neutral" rather than "low" level of risk. Norway asked for insertion of an explanation of the criteria for distinguishing levels of risk. Co-Chair Field explained that there are many combinations of probability and outcome that can lead to similar risks, necessitating that risk be pegged at "low" to "high," with "low risk" meaning neutral or no risk from climate change, and "high risk" meaning risk of severe impacts, significant irreversibilities or persistent climate-related hazards and limited adaptive capacity. Australia called for including this explanation in the caption.

Saint Lucia, supported by Mali, Dominica, Jamaica, Tuvalu, Cuba, France and others, and opposed by Australia, requested the inclusion of a dotted line at 1.5°C temperatures intervals in the figure. She observed this was policy relevant for the UNFCCC's 2015 review. Germany supported including a dotted line at 1.5°C stating that adding it to those for 2°C and 4°C would not be policy prescriptive. The UK, supported by Slovenia, proposed removing all dotted lines so as to appear scientifically neutral. CLAs, supported by Belgium, the US, Austria and others, and opposed by Saint Lucia, proposed adding dotted lines at all 0.5°C increments. Following informal consultations, participants agreed to remove all the dotted lines and insert markers on the Y-axis at 0.5°C intervals.

Saudi Arabia, the Bahamas, Venezuela, Slovenia, Germany and the Russian Federation questioned a reference in the figure to "neutral" level of risk. A CLA clarified that "neutral" was tied to detection and attribution, meaning that there were no impacts that the authors were able to assess. Germany pointed out that there have already been impacts from extreme weather events. A CLA explained that those were included in the graph, and participants agreed to replace "neutral" with "undetectable."

The Russian Federation sought an explanation of additional risk for a zero-temperature increase. A CLA clarified that the baseline referred to the 1986-2005 period, during which events were attributable to climate change, and not to the present time. To be consistent with the WGI report, participants agreed to add a marker indicating the average temperature increase of 0.78°C since 1986-2005.

Most of the text introducing the figure was approved without comment, although some discussion took place on a reference to "limited adaptive capacity" related to "very high risk of severe impacts." Saudi Arabia and Mali expressed concern that the link could be misleading so as to appear that only the "very high risk"

category is linked to limited adaptive capacity. A CLA noted that the category "very high risk" is defined as that in which the potential for adaptation is overwhelmed. Mexico noted that, if the category "very high risk" is defined as beyond adaptive capacity, referring to it as "limited" in a figure representing it is problematic.

B-2. Sectoral Risks and Potential for Adaptation: In the chapeau to this section, participants discussed how best to express the relative certainty of statements based on models, projections or scenarios of the future or expert judgment. The chapeau, as accepted, reads that: climate change is projected to amplify existing climate-related risks and create new risks for natural and human systems; some of these risks will be limited to a particular sector or region and others may have cascading effects, and to a lesser extent, climate change will also reduce some climate-related risks and is projected to have some potential benefits.

Freshwater Resources: After consultations, an informal group reached agreement on text that states, *inter alia*: the fraction of the global population under water scarcity and the fraction affected by major river floods increase with the level of warming in the 21st century and climate change over the 21st century will reduce renewable surface water and groundwater resources significantly in most dry subtropical regions and to a lesser extent in some other regions, intensifying competition for water among sectors; in presently dry regions, drought frequency will likely increase by the end of the 21st century under RCP8.5; renewable water resources will increase at high latitudes; climate change will reduce raw water quality and pose risks to drinking water quality due to a number of factors; and adaptive water management techniques can help address uncertainty due to climate change.

Terrestrial and freshwater ecosystems: The text on terrestrial and freshwater ecosystems was approved stating, *inter alia*, that: a large fraction of both terrestrial and freshwater species faces increased extinction risk under projected climate change, especially as climate change interacts with other stressors; and magnitudes and rates of climate change associated with medium- to high-emissions scenarios pose a high risk of abrupt and irreversible regional-scale changes in terrestrial and freshwater ecosystems. Participants also adopted **Figure SPM.5: Maximum speeds at which species groups can move across landscapes compared with speeds at which temperatures are projected to move**.

Coastal systems and low-lying areas: Regarding a paragraph stating that due to sea-level rise throughout this century and beyond, coastal systems and low-lying areas will increasingly experience adverse impacts, Switzerland, the US, Canada and Saudi Arabia suggested insertion of "are projected to" experience adverse impacts, rather than "will." Australia and the Bahamas opposed, noting "projected" is not definitive enough. Participants agreed to language that takes both views into consideration.

Côte d'Ivoire and Ghana called for reference to Africa in a sentence stating that by 2100 without adaptation, hundreds of millions of people will be affected by coastal flooding and displaced due to land loss, particularly in Asia. Some participants expressed concern over wording, with the US proposing without "effective" adaptation, and deleting specific reference to Asia. Australia, Canada and the US expressed concern regarding the accuracy of and inferences arising from the text. Participants agreed to delete the sentence.

Participants agreed on text that the population and assets projected to be exposed to coastal risks as well as human pressures on coastal ecosystems will increase significantly in the coming decades due to population growth, economic development, and urbanization.

Participants agreed to a sentence on impacts faced by some low-lying developing countries and small island states having associated damage and adaptation costs of several percentage points of gross domestic product (GDP).

Marine systems: Participants approved text on marine systems, which states, *inter alia*, that: due to climate change, global marine-species redistribution and marine-biodiversity reduction in sensitive regions will challenge the sustained provision of fisheries productivity; and for medium- and high-emissions scenarios, ocean acidification poses substantial risks to marine systems. Participants also adopted **Figure SPM.6: Climate Change Risks for Fisheries** with changes arising from suggestions made by the US on changing the number of exploited fish (1060 instead of "approximately 1000") and by Sweden on inserting language stating "approximately equivalent to ppm in the atmosphere" to clarify μatm (microatmospheres).

Food security and food production systems: On a sentence on impacts of projected climate change without adaptation on the major crops, in response to queries from Tanzania and the UK, a CLA explained that: confidence goes down when restricting projections to certain crops and regions; and the use of local temperatures was consistent with the literature. Germany inquired why 2°C was used as a reference point, and a CLA explained that the number is a conservative reflection of all the crops analyzed. The sentence was approved with minor textual revisions.

A number of participants, including the UK, Slovenia and Austria, found a sentence on climate change reducing yields, as compared to a baseline without climate change, lacking transparency for policymakers. Participants agreed to elaborate on the text by including language stating: "Projected impacts vary across crops and regions and adaptation scenarios, with about 10% of projections for the period 2030-2049 showing yield gains of more than 10%, and about 10% of projections showing yield losses of more than 25%, compared to the late 20th century." The UK, Australia and Saint Lucia found a sentence on agricultural adaptation improving yields misleading and it was deleted.

A sentence on local temperature increases combined with increasing food demand posing large risks to food security globally and regionally was discussed at length. The UK and Australia proposed referring to "global" temperature increase. India noted that local warming generally exceeds global warming. Germany suggested that "non-production elements of the food system" be made more explicit. Participants agreed to text stating: "All aspects of food security are potentially affected by climate change, including food access, utilization, and price stability (*high confidence*)."

On the sentence on food security risks, Saudi Arabia proposed replacing "tropical" with "low latitudes" regions, and stating that all aspects of food security are affected. Participants agreed to text stating: "Risks to food security generally are greater in

low-latitude areas." Norway suggested linking food security to changes in marine fisheries catch potential, which was agreed.

Regarding **Figure SPM.7: Summary of Projected Changes in Crop Yields due to Climate Change over the 21st Century**, Brazil asked whether the figure refers to total global production and Slovenia, Ghana and Sweden expressed concern that it does not distinguish between adaptation and no adaptation cases. A CLA confirmed that the figure does refer to total global production and explained that the figure cannot accurately distinguish between adaptation and no adaptation cases and, that to do so, an additional figure would be needed. Slovenia cautioned that the figure may be misleading as it implies that adaptation does not affect yields. The UK expressed concern that the figure does not state how the risk to food varies with temperature and, with Austria, stressed that information on the risk of reduction of yields is important. Austria, India and Sweden suggested adding an explanation in the caption. Co-Chair Field explained that the figure provides a comprehensive assessment of the data and that if broken down, the ability to draw systematic conclusions may be lost. IPCC Chair Pachauri intervened stating that the figure does not give everything desired, but does provide a good broad indication of what to expect in the future, which will be valuable to policymakers. The UK proposed, and participants agreed, to add a sentence stating: "Relatively few studies have considered impacts on cropping systems for scenarios where global mean temperatures increase by 4°C or more." Participants approved the figure.

Urban areas: The section on urban areas was approved after additions from Ecuador, Venezuela, Norway and Panama. The text states that: many global risks of climate change are concentrated in urban areas; steps that build resilience and enable sustainable development can accelerate adaptation; heat stress, extreme precipitation, inland and coastal flooding, landslides (inserted by Ecuador, Venezuela and Norway), air pollution (inserted by Norway), drought and water scarcity and vector-borne diseases (inserted by Panama) pose risks in urban areas; risks are amplified for those lacking essential infrastructure or in poor quality housing and exposed areas; and reducing basic service deficits, improving housing and building resilient infrastructure systems could significantly reduce vulnerability and exposure. Participants also agreed that urban adaptation benefits from, *inter alia*, effective multi-level urban risk governance and alignment of policies and incentives, and that increased capacity, voice, and influence of low-income groups and vulnerable communities, *inter alia*, also benefit adaptation.

Rural areas: In this section, Botswana suggested adding the word "availability" to language on impacts on water supply. The approved text reads, *inter alia*, that: major future rural impacts are expected in the near-term and beyond through impacts on, *inter alia*, water availability and supply and food security; these impacts are expected to disproportionately affect the poor in rural areas, such as, *inter alia*, those with limited access to modern agricultural inputs; further adaptations can occur through policies taking account of the rural decision making context; and trade reform and investment can improve market access for small-scale farms.

Key economic sectors and services: Participants approved this section after agreeing to a proposal from Saudi Arabia to highlight economic diversification. The final text reads that: the impacts of drivers such as changes in, *inter alia*, population, income, regulation and governance, are projected to be large relative to the impacts of climate change; climate change is projected to affect energy sources and technologies differently depending on the resources, technological processes or locations involved; more severe and/or frequent extreme weather events and/or hazard types are expected to increase losses and loss variability in various regions and challenge insurance systems to offer affordable coverage while raising more risk-based capital; and large-scale public-private risk reduction initiatives and economic diversification are examples of adaptation actions.

Human health: Discussion on this section involved mainly clarification by CLAs and suggestions for editorial modifications. Participants agreed to text stating, *inter alia*: projected climate change will impact health problems that already exist and will lead to increases in ill health in many regions, especially in developing countries.

Human security: In response to questions from Saudi Arabia, the US and the UK, CLAs explained the basis for a sentence noting that multiple lines of evidence relate climate variability to conflict. Clarification was also requested on a sentence stating that "the impacts of climate change on the critical infrastructure and territorial integrity of many states are expected to influence national security policies." Participants agreed to the section with small editorial changes.

Livelihoods and poverty: Participants agreed to text stating that climate change impacts will slow economic growth, make poverty reduction more difficult, and further erode food security, and to text stating that climate change impacts are expected to exacerbate poverty. They also agreed to text stating that poor households that are net buyers of food could be particularly affected due to food price increases, and that insurance programs, social protection measures, and disaster risk management may enhance long-term livelihood resilience among poor and marginalized people.

B-3. Regional Key Risks and Potential for Adaptation: In the chapeau, Austria requested addition of language noting that "the assessment of risk does not take into account adaptation action that may be taken in the future." Participants agreed to refer to "adaptation and mitigation," in that order, wherever they appear in the text.

On a statement referring readers to an extended summary of regional risks and the limited potential benefits, Australia and Canada called for deletion of "limited" potential benefits, to provide balance. This was accepted, and the paragraph was approved.

On **Assessment Box SPM.2: Regional Key Risks**, participants discussed a sentence on key risks and risk levels varying across regions, given differing socio-economic pathways. Tanzania expressed concern that language on "risk perception" was not appropriate for determining risk levels. Co-Chair Field replied that perception is a key factor in determining how risks unfold in different parts of the world. Canada suggested language stating that risk levels vary "over time" as well, which was accepted. Afghanistan and Panama proposed inserting reference to "resilience." While acknowledging the importance of resilience, Co-Chair Field said that it is more of an outcome than a determinant. Participants agreed to the rest of the text as presented.

On **Assessment Box SPM 2 Table 1: Key Regional Risks from Climate Change and the Potential for Reducing Risks through Adaptation and Mitigation**, Co-Chair Field noted that this table constitutes the core representation of regional information in the SPM. Co-Chair Barros said a greater amount of regional-scale climate information is now available, which provides a more coherent picture, but that there is still great disparity in contributions for the different regions. The table sets out three key risks for each global region, and for each risk, adaptation issues and prospects, icons indicating climatic drivers, and bars indicating timeframes on risk and potential adaptation. Co-Chair Field opened discussions, urging participants not to add risks but to improve clarity in the message to policy makers. Participants discussed the key risks for each global region in tandem with the corresponding issues and prospects from the table.

There was discussion on the icons, with various countries suggesting qualifying some of the drivers or adding new ones. Participants agreed to keep the icons simple as graphic representations of risks in different regions.

On **Africa**, Tanzania, with Mali, Sudan, Kenya, Botswana, Ghana, the Gambia, Chad, and South Africa, supported by the Russian Federation, Nicaragua and Saudi Arabia, objected to the absence of reference to droughts and their socio-economic impacts in the key risk on compounded stress on water resources from overexploitation and degradation. Other absences noted were: desertification (Sudan); flooding, sea-level rise and cyclones (Kenya); and tidal waves (Ghana). IPCC Vice-Chair Ismail El Gizouli noted that if information is lacking on Africa, an omission of text is better than statements that could be misleading. Saudi Arabia and the Russian Federation noted the absence of text on dust storms and said the table should be either considered indicative or discarded. A CLA responded that drought did not emerge from the literature on Africa, although drought is a component of both the water stress risk and another key risk of reduced crop productivity as set out in the table.

Madagascar referred to another table in the SPM, which includes mention of drought as a key observable impact. The CLAs proposed, and participants agreed, to include "with drought exacerbated in drought-prone regions of Africa." South Africa suggested, and participants agreed to, adding reference to sustainable urban development as an adaptation issue and prospect, in relation to the risk of stress on water resources.

For the key risk on reduced crop productivity in Africa, Co-Chair Field suggested specifying reduced crop productivity "associated with heat and drought stress." Tanzania, Mali and others suggested including a reference to risks to livelihoods, socio-economic aspects and life. Participants agreed to add a reference to livelihoods. Botswana proposed referring to impacts on the quality of agricultural production. CLAs explained that the literature does not bring up quality of production, only quantity. Senegal asked for explicit reference to animal husbandry among the impacts, but the CLAs clarified that it is included under food security. Tanzania, South Africa, the Gambia, Kenya, Mali and others proposed, and participants agreed, to include reference to enhanced observation systems as an adaptation issue and prospect. Sudan, with South Sudan, Kenya and Swaziland, suggested adding reference to agroforestry and reforestation as an adaptation response. CLAs said they did not have enough literature as a basis. Following informal consultations, participants agreed to a new bullet point setting out "agronomic adaptation responses (e.g. agroforestry and conservation agriculture)" as adaptation prospects.

On the risk of changes in vector- and water-borne diseases, South Africa suggested, and participants agreed to, including sustainable urban development as an adaptation issue and prospect.

On **Europe**, an informal group presented text on restoring wetlands and "implementation of European river basin management and integrated water resources management following European directives" as prospects for adaptation. IPCC Vice-Chair El Gizouli expressed concern regarding the reference to "European directives," with Canada cautioning against using policy-prescriptive language. Austria, supported by the EU, suggested using "European legislation" and Switzerland, with the Former Yugoslav Republic of Macedonia, suggested the more neutral term of "European legislations." Sweden urged deleting any reference to European legislation. Australia recommended stating "practices showing to be best practices in the European context." Participants agreed to use the term "best practices."

During the discussions on polar regions, the Russian Federation requested a separate risk category on forest fires for northern Europe and northern Asia, as in the table for North America. Participants agreed to include such language in the section on Europe.

On **Asia,** on the key risk on increased flooding leading to widespread damage to infrastructure and settlements, Indonesia called for language on economic risks or livelihoods. A CLA agreed to add "livelihood" to the list of things at risk of damage by flooding. Japan suggested adding risks in coastal zones, such as sea-level rise, storm surges and typhoons. CLAs offered to add "particularly in coastal areas of Asia." India preferred "increased riverine flooding and coastal flooding" at the beginning, to which Saudi Arabia added "urban flooding." Pakistan noted that risks from flooding include risks to food security and water security. The text was approved with these additions. On corresponding adaptation issues and prospects, India asked to change "construction" to "commissioning" of monitoring and early warning systems. Saudi Arabia asked to include "economic diversification to build resilience" as a separate adaptation measure. Co-Chair Field proposed noting diversifying economies and livelihoods parenthetically instead as an example of how to assist vulnerable areas and households. Saudi Arabia urged and, after consultations with CLAs, participants agreed to a separate bullet point on the adaptation prospect of "economic diversification."

On an increased risk of mortality, India requested addition of "cold-related mortality" to the reference to heat-related mortality and, with Japan, Singapore and Indonesia, suggested adding "vector- and water-borne disease due to increase in temperature." A CLA responded that the authors had decided not to include the key risk on vector diseases, noting that criteria for deriving three key risks for the SPM were based on the underlying text, the level of confidence and urgency.

On the key risk of drought-related water and food shortage, Pakistan requested adding "energy" shortage due to likely shortage of water. Saudi Arabia, supported by Tajikistan, called for inclusion of dust storms, water stress, dwindling water resources combined with increasing population, and desertification. India, supported by Jordan, highlighted

groundwater shortages. A CLA responded that: the assessed literature did not include enough about energy to include it as a key risk; the authors had assessed dust but did not have enough evidence to support its inclusion; and groundwater had not been assessed due to lack of evidence of significant changes or that it is caused by climate change. Co-Chair Field noted that "drought-related water shortage" in the text was intended to cover Saudi Arabia's concerns, and that desertification is included in the ten key risks in the corresponding assessment chapter. The text was then approved.

India, supported by Indonesia, said climate-resilient agriculture should be included as an adaptation issue. Participants agreed on text including it as an example of more efficient use of water.

In the section on **Australasia**, on the key risk of significant change in community composition and structure of coral reefs and montane ecosystems, Australia requested deletion of reference to montane ecosystems in order to not dilute the focus. A CLA supported replacing it with language on coral reefs from the list of key risks in the underlying report and modifying the icons and risk bars in the Key Regional Risks Table, accordingly. The text was approved with those modifications, along with corresponding language on adaptation issues and prospects concerning the limited and insufficient ability of corals to adapt naturally. Text on the key risks of increased frequency and intensity of flood damage and increasing risks to coastal infrastructure was approved without comment.

On **North America**, participants agreed to add a reference to "wildfire-induced loss" to modify a reference to the risk of "loss of ecosystem integrity."

On **Central and South America**, Nicaragua suggested, and participants agreed, that landslides should be included as a threat and rural areas should be included as vulnerable areas with respect to water availability risks. Participants also agreed with Ecuador to include "rural" flood management as an adaptation prospect. Nicaragua added that reference to integrated water resource management should be included as an adaptation prospect. Regarding adaptation issues arising from the risk of decreased food production and food quality, Bolivia and Nicaragua suggested, and participants agreed to, referring to the use of traditional knowledge and practice and replacing "carbon" with "climate change" as a reason for needing to develop new crop varieties. Panama said the spread of vector-borne diseases such as dengue fever should be mentioned as a risk. Participants agreed to add a new risk on human health.

On **polar regions**, Canada suggested, and participants agreed, that the adaptation prospect of "negotiation of land claim rights" should be clarified to read "adaptive co-management through the settlement of land claims." The remainder of the section was accepted as presented.

On **small islands**, participants agreed to add a reference to the risk of loss of economic stability and to the prospect of maintaining and enhancing ecosystem functions, water and food security. The remainder of the section was accepted as presented.

On **oceans**, participants agreed to text noting the inclusion of ocean acidification as a risk and "sustainable" aquaculture and "development of alternative livelihoods" as adaptation prospects. The remainder of the section was accepted as presented.

SECTION C. MANAGING FUTURE RISKS AND BUILDING RESILIENCE: The introductory paragraph to this section was accepted as presented, along with **Figure SPM.8: The Solution Space**.

C-1. Principles for Effective Adaptation: Regarding a sentence stating that "national governments can coordinate adaptation efforts by local and subnational governments, for example, by protecting vulnerable groups, and by providing information, policy and legal frameworks, and financial support," Saudi Arabia called for reference to economic diversification. India suggested reference to public financing. Saudi Arabia, opposed by Australia, called for removing reference to local and subnational governments.

China, supported by Saudi Arabia, India and Ghana, opposed by the US and Germany, called for a reference to international cooperation. On a sentence on the role of local government and the private sector, the UK suggested, and participants agreed, to include reference to civil society. Regarding a sentence on national governments coordinating efforts of local and subnational governments, participants agreed to language on support for economic diversification.

On a sentence stating that "a first step towards adaptation to future climate change is reducing vulnerability and exposure to present climate, including through actions with co-benefits for other objectives (often called low-regrets measures)," Tanzania and Slovenia asked for clarification on the meaning of the sentence "exposure to present climate." Jamaica and Saudi Arabia proposed, and participants agreed to, alternative language to "vulnerability and exposure" and to "low-regrets measures." The agreed text states: "A first step towards adaptation to future climate change is reducing vulnerability and exposure to present climate variability (*high confidence*). Strategies include actions with co-benefits for other objectives."

Participants agreed to split a sentence in two clarifying a first step of reducing vulnerability and exposure, and a second step on strategies with co-benefits for other objectives. Co-Chair Barros clarified that the high confidence level at the end of the first of these sentences applied to the entire paragraph. Saudi Arabia requested deletion of reference to co-benefits as "low-regrets measures," stating that this term is too narrow. Both sentences were accepted, as amended.

On a sentence on available strategies and actions, the Republic of Congo noted that other species have their own adaptation strategies about which human beings do not have perfect knowledge. The sentence was approved without amendment.

Regarding a statement that integrating adaptation into planning and decision making can promote synergies with development and disaster risk reduction, Bolivia's request to add "sustainable" before development was rejected by a CLA as being too narrow, and the sentence was approved without change.

Regarding a paragraph on adaptation planning and implementation being contingent on values, objectives and risk perception, Bolivia suggested introducing the concept of "world views." Saudi Arabia objected, emphasizing the need to focus on the domestic perspective and proposing a reference to "national circumstances" instead of "world views." Austria emphasized that social and cultural backgrounds inform world views. Mexico proposed recognizing "cultural differences," Peru suggested "cultural practices," and Nicaragua proposed "social and cultural

backgrounds." Saudi Arabia stressed that national circumstances encompass, *inter alia*, values, objectives, and social, religious and cultural values. Argentina said circumstances and conditions vary greatly within countries as well. Regarding a sentence on indigenous, local and traditional knowledge being an adaptation resource, Bolivia called for explicit recognition of indigenous peoples' world views of Mother Earth. Participants agreed to text stating: "Recognition of diverse interest, circumstances, socio-cultural contexts and expectation can benefit decision-making processes. Indigenous, local, and traditional knowledge systems and practices, including indigenous peoples' holistic view of community and environment, are a major resource for adapting to climate change, but these have not been used consistently in existing adaptation efforts. Integrating such forms of knowledge with existing practices increases the effectiveness of adaptation."

Participants approved text on decision-support mechanisms, communication, transfer and development of climate-related knowledge, and use of economic instruments. On a sentence describing economic instruments that may be used for fostering adaptation, Saudi Arabia asked for consistent use of the term "charges and subsidies" instead of "financial incentives." Participants also agreed to text on risk financing mechanisms, the role of governments as regulators, providers or insurers of last resort, and constraints impeding adaptation planning and implementation. On constraints to implementation, Mexico, Panama and Costa Rica sought a reference to the need for research, with Switzerland requesting references to the need for improved observation and monitoring. Participants agreed to add: "Another constraint includes insufficient research, monitoring and observation and the finance to maintain them." Participants also agreed on text on underestimating the complexity of adaptation, poor planning, maladaptation and near-term responses.

Regarding the costs of adaptation, Canada, with Austria and Germany, expressed concern over quality of the scientific data behind the text. Canada proposed language stating: "Estimates, which are highly preliminary due to important omissions and/or shortcomings in data and methods suggest global adaptation costs range very broadly from … (*medium confidence*)." India, China and Panama emphasized that previously deleted text must be returned, stating that: "The most recent global adaptation cost estimates for developing countries suggest a range from 70 to 100 US$ billion per year from 2010 to 2050 (*low confidence*)." Luxembourg said the applicable climate change scenario should be stated. Norway said numbers in a SPM must be based on sound science, and the US said using a set of numbers with low confidence is out of place in a SPM. Brazil, Mali, Peru and South Africa called for more information and discussion regarding the basis for the text. After further discussions in an informal group, participants agreed to soften the language to ensure it was aligned with the evidence, and specific reference to numbers regarding costs of adaptation was deleted.

The final text states that limited evidence indicates a gap between global adaptation needs and funds available for adaptation (*medium confidence*). It also cites the need for better assessment of global adaptation costs, funding and investment; and states that studies estimating global costs of adaptation are characterized by shortcomings in data, methods and coverage (*high confidence*).

Participants approved a paragraph on significant co-benefits, synergies and tradeoffs between mitigation and adaptation and among different adaptation responses after agreeing to add sustainable agriculture and forestry and protection of ecosystem for carbon storage and other ecosystem services as additional examples of actions with co-benefits.

On **Table SPM.1: Approaches for Managing the Risks of Climate Change**, a CLA clarified that the table was included in response to requests for examples of the types of adaptation and vulnerability reduction projects referred to in the report. He added that: approaches in the table should be considered overlapping rather than discrete, and examples given could be relevant to more than one category.

An informal group considered the table, agreeing to minor adjustments to the language and order and adding a few additional examples from the underlying report. Participants noted a graphic modification in the table to better show the overlapping and continuous nature of approaches suggested, and noted the addition of a few examples from the underlying report and the inclusion of reference to mitigation in the caption and its removal from the title.

Some suggestions for additional changes were put forward, including by Costa Rica on a reference to biological corridors and by Bolivia on inserting "in accordance to national policies and circumstances" to compensate for sensitive issues, such as water pricing. No changes were made to the text.

On **Table SPM.A1: Observed impacts attributed to climate change reported in the scientific literature since the AR4**, Co-Chair Field stated that some of the studies for the Africa chapter of the underlying report did not reach the authors and were not processed, but that these studies had since been assessed. A CLA proposed, and participants agreed, to reflect these studies with respect to coral reefs, stating: "decline in coral reefs in tropical African waters beyond due to human impacts (*high confidence, major contribution from climate change*)." Responding to a query from Switzerland, a CLA clarified that "due to human impacts" included anthropogenic climate change.

C-2. Climate-resilient Pathways and Transformation: Participants agreed to a paragraph on prospects for climate-resilient pathways for sustainable development being fundamentally related to what the world accomplishes with climate change mitigation, including statements that mitigation increases time available for adaptation, and delaying mitigation actions may reduce options for climate-resilient pathways in the future.

Regarding a paragraph on greater rates and magnitude of climate change increasing the likelihood of exceeding adaptation limits, participants discussed a sentence on limits occurring when adaptive actions to avoid intolerable risks are not possible. The UK pointed out that adaptation limits do not necessarily imply intolerable risks. Canada reiterated that limits do not only occur in the natural world. The text was amended to reflect these concerns. Participants also agreed, *inter alia*, to a sentence on differing value-based judgments regarding what constitutes an intolerable risk. Regarding a sentence on current failures to address emerging impacts eroding the basis for sustainable development, the UK asked for more specificity regarding "current failures" and "emerging impacts." Following other expressions of concern over the language, participants agreed to

text citing "insufficient responses to emerging impacts," rather than "current failures to address" them.

Regarding a paragraph on transformations in political, economic, social and technological systems facilitating adaptation and mitigation, and promoting sustainable development, Bolivia asked to redraft it to align the language with the definition of transformation. Saudi Arabia underscored that language should not be policy prescriptive, and called for "repackaging the message" to be more politically sensitive. Following informal consultations, participants agreed to text stating that transformations enable climate-resilient pathways, improve livelihoods and are considered most effective when they reflect national visions to achieve sustainable development.

On **Figure SPM.9: Opportunity Space and Climate-resilient Pathways**, participants approved the text with minor changes. The text states, *inter alia*, that: our world is threatened by multiple stressors, which include climate change, climate variability, land-use change, degradation of ecosystems, poverty and inequality, and cultural factors; opportunity space refers to decision points and pathways that lead to a range of possible futures with differing levels of resilience and risk; and decision points result in actions or failures-to-act throughout the opportunity space.

UNDERLYING SCIENTIFIC AND TECHNICAL ASSESSMENT

The underlying assessment and the SPM were accepted by WGII without discussion.

China expressed concern with misrepresentations concerning China's autonomous regions, autonomous provinces and administrative regions, and the use of controversial maps. Noting that this concern remained unaddressed despite China having communicated it to the WG, he called for inserting language indicating that maps contained in the report are for geographical reference only and urged that these problems be addressed in the final version of the WGII report.

IPCC Secretary Renate Christ explained that the Secretariat was awaiting advice from the UN Secretariat on this issue and highlighted the inclusion in the SPM of the UN standard disclaimer noting that the designations quoted do not imply endorsement.

CLOSING OF WGII-10

In closing remarks, the WGII Co-Chairs thanked delegates, authors, the WGII TSU, the host country, translators, and others for their dedication and great work. The WGII session closed at 3:09 pm on Sunday, 30 March.

RESUMED IPCC-38 REPORT

IPCC Chair Pachauri resumed the 38th session of the IPCC immediately after the closing of WGII-10.

DRAFT REPORT OF IPCC-37

IPCC Secretary Christ reminded participants that the revised IPCC-37 report had been circulated with incorporated changes suggested by members of the Panel (IPCC-XXXVIII/Doc. 2). The report was approved by the Panel.

ACCEPTANCE OF THE ACTIONS TAKEN AT WGII-10

Co-Chair Barros proposed acceptance of the WGII contribution to the AR5 underlying report.

Brazil expressed reservations regarding the treatment of bioenergy and biofuels in the underlying report, in particular its references to indirect land-use change. He emphasized the role of bioenergy and biofuels in combating climate change while potentially complementing food production, and asked that reference to bioenergy and biofuels be corrected in time for completion of the assessment. IPCC Secretary Renate Christ said Brazil's statement would be included in the report of the meeting, as requested.

The Panel then accepted the actions of WGII-10 with regard to the approval of the AR5 WGII SPM and the acceptance of its underlying scientific and technical assessment.

IPCC Vice-Chair El Gizouli called for greater flexibility by the Secretariat in making travel arrangements to allow for full participation in closing sessions of the IPCC. He also noted the lack of sufficient studies that would enable the inclusion of risks assailing the African continent and urged developed countries to help with research.

The Panel agreed to dedicate the WGII SPM to the memory of Professor Yuri Antonievich Izrael for his indefatigable commitment to the IPCC.

IPCC Vice-Chair van Ypersele requested clarification on the process for including in the full report changes suggested by review editors in time for its final publication. WGII Co-Chair Field said that all substantive errors and quality control spreadsheets would be made available and taken into account for correction before the final printing.

IPCC Chair Pachauri and Secretary Christ thanked the Japanese government for its hospitality and the local staff for their hard work. They also thanked the interpreters, authors, WGII TSU, Co-Chairs and all delegates.

OTHER BUSINESS

The Republic of Korea objected to reference to a certain geographical body of water west of the Japanese archipelago, and asked that his statement be included in the report of the meeting. Japan also requested adding a statement, saying that the Sea of Japan is the only internationally established name for the area. IPCC Secretary Christ noted that UNEP and WMO have advised on the use of this term, suggesting the term Sea of Japan.

TIME AND PLACE OF THE NEXT SESSION

The next IPCC meeting will take place in Berlin, Germany, from 7-12 April 2014.

CLOSING OF IPCC-38

IPCC Chair Pachauri declared the meeting closed at 3:23 pm on Sunday, 30 March 2014.

A BRIEF ANALYSIS OF THE IPCC MEETINGS

"Under the cherry tree there is no stranger."
Kobayashi Issa (1763-1827)

After five long days and late nights, IPCC Working Group II adopted its contribution to the IPCC Fifth Assessment Report on Impacts, Adaptation and Vulnerability. Detailed line-by-line discussions were undertaken by 115 governments and authors and reviewers to distill findings contained in more than 2500 pages into a Summary for Policymakers (SPM). As IPCC Chair Rajendra Pachauri stated, the report makes clear that "nobody on this planet will be untouched by the impacts of climate

change." Like the strangers under the cherry tree, we are all in this together.

This report is the second in a series of four that will comprise AR5. It follows the approval of the WGI contribution on the physical science basis of climate change in September 2013, and, in turn, will be followed by the WGIII contribution on options for mitigating climate change, due for approval in less than two weeks' time. A Synthesis Report of the three WG contributions will be considered by the Panel in October 2014. As a whole, AR5 is intended to provide the scientific basis for global climate policy, including the new international agreement on climate change that parties to the UNFCCC are expected to adopt in Paris in 2015.

This brief analysis outlines the main findings of the report, reflects on the SPM approval process, and places the meeting in the larger context of evolving global policy.

MAIN FINDINGS

With human influence on the climate system clearly established in WGI's contribution to the AR5, WGII sets out to address the principal objective of the IPCC, which is to be policy-relevant but not policy-prescriptive, by adopting a risk-based approach to its assessment. As Co-Chair Field explained, "if we want to take a smart approach to the future, we need to consider a full range of possible outcomes and that means not only the more likely outcomes, but also outcomes for truly catastrophic impacts, even if those have a lower probability."

The report makes clear that, according to the vast majority of assessed scientific literature, the impacts are mostly negative, and they will only worsen with increased climate change, affecting cities, ecosystems and species, human health, food production—pretty much everything. This is based on a substantially larger knowledge base of relevant scientific literature. And if the still glaring gaps in information about some parts of the world, in particular Africa, were not there, the findings would likely be even starker.

However, as Co-Chair Field said, the report is not all "scary scenarios and doom and gloom." It also highlights, with guarded optimism, steps being taken and opportunities that exist for actions to adapt to adverse impacts of climate change, as well as measures that may help in managing and reducing potential risks in the future.

Perhaps the most distinctive feature of the AR5 WGII report compared to previous ones is that it places climate change more squarely among multiple stressors that drive vulnerability and enhance exposure to risk at many different scales and levels. The report emphasizes the role of poverty, food insecurity, lack of adequate infrastructure, erosion, population density, urbanization, conflict and other such factors of vulnerability, as key to appraising the potential impacts of climate change. This multidimensional character is what makes the risk more serious, but it also makes the path to reducing vulnerability more apparent—simply put, it's about sustainable development.

NOT LOST IN TRANSLATION

As the body of scientific literature on climate change and adaptation has grown exponentially, the academic jargon has also increased and concepts have become more complex and interlinked. Much of the work in Yokohama involved translating this specialized scientific jargon into language that policymakers, the media, and the general public can easily understand. As one scientist put it, what seems like a perfectly legitimate statement for scientists, might not be so appropriate for policymakers. This came up repeatedly as participants faced the challenge of keeping statements in the SPM that scientists believe are sound, but are perhaps of little help to decision makers trying to make a case for action. In this sense, the meeting in Yokohama was characterized by constructive and straight-forward exchange; the hours of work led, in the view of many, to a clearer text that did not compromise its scientific integrity.

BEYOND YOKOHAMA

The influence and reach of the WGII report is coming at a particularly active time in the international environmental and development agenda. Together with the WGI report on the physical science basis and the WGIII report on mitigation, it will inform: the UN Climate Summit, being convened by UN Secretary-General Ban Ki-moon in September in New York; the UNFCCC negotiations, which are expected to culminate in a new climate deal in 2015 in Paris; the Third International Conference on Small Island Developing States in Samoa later this year; the World Conference on Disaster Risk Reduction in 2015; and the discussions on sustainable development goals and the post-2015 development agenda, to name only the most obvious ones. There will also be numerous policy and decision makers at the state, city and municipal level looking into its findings.

Japanese poet Kobayashi Issa once said: "Under the cherry tree, there is no stranger." This could aptly be interpreted to mean that all of humanity and the natural world have something in common: we are all affected by climate change, no matter what. The degree to which we adapt, the degree to which we manage risk, and the degree to which we mitigate will determine the severity of the impacts and risks, but not negate them completely. As was repeatedly highlighted during the week, damage has already been done and some of it is irreversible. So, in effect, one could say that under the cherry tree, as scientist and coordinating lead author Michael Oppenheimer put it, "we are all sitting ducks."

The WGII assessment report offers an important base for decision makers to craft new tools and strategies for adaptation and help them understand the links between climate change, risk and development. While the SPM is, by force, of a more general nature, it is in fact only the tip of the iceberg: for detail and quantification, the underlying assessment provides a wealth of information that decision makers at all levels can use when facing specific questions.

By strengthening and clarifying the links between climate change, risk and development, the WGII report goes a long way towards improving understanding of what needs to be done and has made it clear that the implications of inaction will be catastrophic.

UPCOMING MEETINGS

IPCC WGIII 12th Session and IPCC-39: IPCC WGIII will meet for approval and acceptance of its contribution to AR5. WGIII focuses on mitigation of climate change. Subsequently, IPCC-39 will convene to endorse the WGIII report. **dates**: 7-12 April 2014 **location:** Berlin, Germany **contact**: IPCC Secretariat **phone:** +41-22-730-8208 **fax:** +41-22-730-8025 **email:** IPCC-Sec@wmo.int **www**: http://www.ipcc.ch/

Third International Climate Change Adaptation Conference: The Conference titled "Adaptation Futures 2014" will connect the research community and users of climate change adaptation information at regional and global scales. **dates:** 12-16 May 2014 **location:** Fortaleza, Brazil **contact:** Secretariat **email:** adaptationfutures2014@inpe.br **www:** http://adaptationfutures2014.ccst.inpe.br/

46th GEF Council Meeting and GEF Assembly: The Global Environment Facility (GEF) Assembly will be held back-to-back with the 46th GEF Council meeting in Mexico. The CSO Consultation, GEF Council and LDCF/SCCF Council Meetings will convene from 25-27 May, with the Council meeting beginning on 25 May and overlapping for half a day, on 27 May, with the CSO Consultation. The Assembly will convene from 28-30 May. **dates:** 25-30 May 2014 **location:** Cancun, Mexico **contact:** GEF Secretariat **phone:** +1-202-473-0508 **fax:** +1-202-522-3240 **email:** secretariat@thegef.org **www:** http://www.thegef.org/gef/5th_assembly

Resilient Cities 2014: Fifth Global Forum on Urban Resilience and Adaptation: This event will address risk data and analysis, adaptation planning and policy, comprehensive adaptation approaches, collaborative and community-based adaptation, resilient infrastructure and city-region support systems, and governance and capacity building. **dates:** 29-31 May 2014 **location:** Bonn, Germany **contact:** Alice Balbo, ICLEI World Secretariat **phone:** +49-228-976-299-28 **fax:** +49-228-976-299-01 **email:** resilient.cities@iclei.org **www:** http://resilient-cities.iclei.org/bonn2014/resilient-cities-2014-home/

UNFCCC 40th Sessions of the Subsidiary Bodies: SBI 40 and SBSTA 40 will convene in June 2014. The fifth meeting of the second session of the ADP will also take place. **dates:** 4-15 June 2014 **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/upcoming_sessions/items/6239.php

Pre-Pre-COP Ministerial Meeting for UNFCCC COP 20 and CMP 10: This event is being organized by the Venezuelan Government and aims to examine: the role of local governments in climate change; how to engage local governments and citizens on the ground; and how local actions can be an integral part of the global agenda. **dates:** 15-18 July 2014 **location:** Caracas, Venezuela **contact:** Cesar Aponte Rivero, General Coordinator **email:** precop20@gmail.com

2014 Climate Summit: This event is being organized by UN Secretary-General Ban Ki-moon with the aim of mobilizing political will for an ambitious legal agreement through the UNFCCC process. **date:** 23 September 2014 **location:** UN Headquarters, New York **www**: http://www.un.org/climatechange/summit2014/

Climate Symposium 2014: This event will focus on the theme "Enhanced Understanding of Climate Processes through Earth Observation." It will help in developing an efficient and sustained international space-based Earth observing system; bring together international experts in climate observations, research, analysis and modeling; and emphasize the role of space-based Earth observations in improving knowledge of the climate at global and regional scales, and in assessing models used for climate projections. **dates:** 13-17 October **location:** Darmstadt, Hessen, Germany **www:** http://www.theclimatesymposium2014.com

Sustainability Science Congress: This meeting invites experts from a variety of disciplines to collaborate on sustainable solutions to global challenges, providing a platform for science-policy interface and solutions. **date:** 22-24 October 2014 **location:** Copenhagen, Denmark **www**: http://www.sustainability.ku.dk/iarucongress2014

UNFCCC ADP 2-6: The ADP will convene for the sixth part of the second session in October 2014. **dates:** 20-24 October 2014 (tentative) **location:** Bonn, Germany **contact:** UNFCCC Secretariat **phone:** +49-228-815-1000 **fax:** +49-228-815-1999 **email:** secretariat@unfccc.int **www:** http://unfccc.int

IPCC-40: This IPCC meeting will be held to adopt the AR5 Synthesis Report and approve its Summary for Policymakers. **dates:** 27-31 October 2014 **location:** Copenhagen, Denmark **contact:** IPCC Secretariat **phone:** +41-22-730-8208 **fax:** +41-22-730-8025 **email:** IPCC-Sec@wmo.int **www:** http://www.ipcc.ch/

Pre-COP Ministerial Meeting for UNFCCC COP 20 and CMP 10: This event, organized by the Venezuelan Government, aims to revisit the engagement of civil society in the UNFCCC negotiations. **dates:** 4-7 November 2014 **location:** Caracas, Venezuela **contact:** Cesar Aponte Rivero, General Coordinator **email:** precop20@gmail.com

UNFCCC COP 20 and CMP 10: The 20th session of the Conference of the Parties (COP 20) to the UNFCCC and the 10th session of the Conference of the Parties serving as the Meeting of the Parties (CMP) to the Kyoto Protocol will take place in Lima, Peru. **dates:** 1-12 December 2014 **location:** Lima, Peru **contact:** UNFCCC Secretariat **phone:** +49-228-815-1000 **fax:** +49-228-815-1999 **email**: secretariat@unfccc.int **www:** http://unfccc.int

For additional meetings and updates, go to http://climate-l.iisd.org/

GLOSSARY

AR5	Fifth Assessment Report
AR4	Fourth Assessment Report
CLA	Coordinating Lead Author
CO2	Carbon dioxide
GHG	Greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
LDCs	Least developed countries
RCP	Representative Concentration Pathway
RFC	Reasons for Concern
SPM	Summary for Policymakers
SREX	Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation
SRREN	Special Report on Renewable Energy Sources and Climate Change Mitigation
SYR	Synthesis Report
TSU	Technical Support Unit
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WG	Working Group
WMO	World Meteorological Organization