

SUMMARY OF THE 27TH SESSION OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE: 12-17 NOVEMBER 2007

The 27th session of the Intergovernmental Panel on Climate Change (IPCC) was held from 12-17 November 2007 at the Museo de las Ciencias in Valencia, Spain, to finalize its Fourth Assessment Report (AR4). Nearly 450 participants attended the meeting, including Lead Authors and representatives from governments, UN agencies, non-governmental organizations, industry and academia. Following an all-night session and many long discussions, the meeting approved and adopted the AR4 Synthesis Report (SYR) late on Friday night, 16 November. On the final day of the meeting, UN Secretary-General Ban Ki-moon addressed the Panel.

During the session, delegates considered the AR4 Synthesis Report (SYR), with a view to approve the Summary for Policymakers of the SYR and adopt the Longer Report of the SYR. Participants also discussed a process for considering the future of the IPCC, membership of the IPCC Bureau and the Task Force Bureau, the IPCC programme and budget for 2008-2010, and heard progress reports on the IPCC Task Force on National Greenhouse Gas Inventories, Future Work on Scenarios, Technical Paper on Climate Change and Water, Task Group on Data and Scenario Support for Impact and Climate Assessment, and Outreach.

Following years of work, the adoption of the new assessment on climate change was accompanied with mixed feelings of relief over its completion and apprehensive concern about the grave challenges that lie ahead.

A BRIEF HISTORY OF THE IPCC AND AR4

The IPCC was established in 1988 by the World Meteorological Organization (WMO) and the UN Environment Programme (UNEP). The purpose of the IPCC is to assess scientific, technical and socioeconomic information relevant to understanding the risks associated with human-induced climate change. The IPCC does not undertake new research, nor does it monitor climate-related data, but bases its assessments on published and peer-reviewed scientific and technical literature.

The IPCC Secretariat is located in Geneva, Switzerland, and is staffed by the WMO and UNEP. The IPCC has three working groups: Working Group I (WGI) addresses the scientific aspects of the climate system and climate change; Working Group II (WGII) addresses the vulnerability of socioeconomic and natural systems to climate change, negative and positive consequences of climate change, and adaptation options; and Working Group III (WGIII) addresses options for limiting greenhouse gas emissions and otherwise mitigating climate change.

The IPCC has a Task Force on National Greenhouse Gas Inventories. The Task Force 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 greenhouse gas emissions and removals, and to encourage the use of this methodology by countries participating in the IPCC and by parties to the UN Framework Convention on Climate Change (UNFCCC). The IPCC Bureau, comprised of 30 members elected by the Panel, assists the IPCC Chair in planning, coordinating and monitoring the work of the IPCC. Rajendra Pachauri (India) was elected Chair of the IPCC in 2002.

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Since its inception, the IPCC has prepared a series of comprehensive assessments, special reports and technical papers subject to extensive review by experts and governments, providing scientific information on climate change to the international community, including policymakers and the public. This information has played an important role in negotiations under the UNFCCC and in framing national and regional policies.

The IPCC completed its initial comprehensive assessment of climate change in the First Assessment Report in 1990 and the Second Assessment Report in 1995. The IPCC's Third Assessment Report (TAR), completed in 2001, addresses policy-relevant scientific, technical, and socioeconomic dimensions of climate change, and concentrated on findings since 1995 at both the regional and global levels. The TAR includes a comprehensive assessment by each of the three IPCC working groups, Summaries for Policymakers (SPM) and Technical Summaries of each working group report, and an overarching Synthesis Report.

Recent special reports prepared by the IPCC include the Special Report on Safeguarding the Ozone Layer and the Global Climate System, accepted at IPCC-23 (8 April 2005, Addis Ababa, Ethiopia) and the Special Report on Carbon Dioxide Capture and Storage, accepted at IPCC-24 (26-28 September 2005, Montreal, Canada). The IPCC Guidelines for National Greenhouse Gas Inventories were first released in 1994, and a revised set was completed in 1996. The Panel has also approved additional good practice guidance reports in 2000 and 2003, and the 2006 IPCC Guidelines.

AR4: The IPCC decided to continue preparing comprehensive assessment reports at IPCC-18 (24-29 September 2001, London, UK). Subsequent meetings discussed the timing and other details of the next report, with participants agreeing to late 2007 as the completion date for the AR4. The overall outline of the working groups' contributions to the AR4 was accepted at IPCC-21 (19-21 February 2003, Paris, France). That same year, the scope and outline of AR4 were developed during two scoping meetings (April in Marrakesh, Morocco, and September in Potsdam, Germany), and the author teams were assembled.

The AR4 is structured in three volumes, one for each working group. Each working group's contribution comprises the underlying assessment report, a Technical Summary, Executive Summary, and SPM, all of which undergo a thorough review process. The review process generally takes place in three stages: a first review by experts, a second review by experts and governments, and a third review by governments. In addition to the three working groups' contributions, like the SPMs of the working groups, the AR4 SYR SPM is approved line-by-line by the IPCC. More than 2500 expert reviewers, 800 authors, 450 lead authors, and 130 governments have participated in the elaboration of the AR4.

The Co-Chairs of WGI are Dahe Qin (China) and Susan Solomon (US). The Co-Chairs of WGII are Osvaldo Canziani (Argentina) and Martin Parry (UK). The Co-Chairs of WGIII are Ogunlade Davidson (Sierra Leone) and Bert Metz (the Netherlands). The Co-Chairs guide the working groups to fulfil the mandates given to them by the Panel, and are assisted by Technical Support Units. The tenth session of WGI met from 29 January to 1 February 2007, in Paris, France, to consider the WGI SPM. The eighth session of WGII met from 2-6 April

2007, in Brussels, Belgium, to consider the WGII SPM. The ninth session of WGIII was held from 30 April to 3 May 2007, in Bangkok, Thailand, to consider the WGIII SPM. All three working groups accepted their respective contributions to the AR4, including the SPMs, Technical Summaries and underlying reports. At its 26th session, held on 4 May 2007, in Bangkok, Thailand, the IPCC accepted the actions taken by the three working groups.

AR4 SYR: Following initiation of the AR4 SYR scoping process by the IPCC Bureau at its 31st session in April 2004, IPCC-22 (9-11 November 2004, New Delhi, India) agreed on the SYR outline of topics to be addressed. At its 35th session, the IPCC Bureau agreed on the composition of the Core Writing Team and Review Editors for the SYR, and the list was presented to the Panel at IPCC-25 (26-28 April 2006, Port Louis, Mauritius).

The SYR represents the final integrated product of the AR4, covering relationships between the causes of climate change, its effects and response options and other policy-relevant aspects based on scientific advances since the publication of the TAR in 2001. A major component of the AR4 SYR is the assessment of impacts of anthropogenic climate change and possible responses in a development context. The SYR Core Writing Team is composed of lead authors and Co-Chairs from all working groups. The SYR was reviewed by experts, governments and organizations between May and October 2007.

The SYR SPM highlights the most relevant aspects of the AR4 underlying reports from WGI, WGII and WGIII, and is supported by the SYR Longer Report.

IPCC-27 REPORT

On Monday morning, 12 November, IPCC Chair Rajendra Pachauri opened the session, welcoming participants.

Rita Barberá, Mayor of Valencia, highlighted public officials' interest in the SYR and congratulated the Panel for its Nobel Peace Prize. Janos Pasztor, speaking on behalf of UNEP Executive Director Achim Steiner, noted the unprecedented anticipation with which the AR4 is awaited, and stressed the opportunities for cost-effective mitigation presented in the draft report. Yan Hong, on behalf of WMO Secretary-General Michel Jarraud, noted results from the Working Groups' contributions to AR4 and the low capacity of least developed countries and small island developing states to adapt, and emphasized the need to strengthen the capacity of meteorological services and promote better understanding of impacts.

Yvo de Boer, UNFCCC Executive Secretary, stressed the IPCC's role in providing the basis for key UNFCCC decisions, such as the Berlin Mandate and the Kyoto Protocol. He emphasized that the IPCC's message is clear on climate change, its causes, impacts and affordable ways to deal with it, and that political will is needed for enhanced multilateral action. He said that inaction would be "criminally irresponsible." Maria Teresa Fernández de la Vega, Vice President of Spain, noted Spain's reductions in greenhouse gas emissions even with high economic growth, and said problems such as climate change or sea level rise ignore national borders and require international action. She underscored inequality of climate risk, with those polluting the least suffering the most, and said Spain prioritizes climate change in its international development cooperation strategy.

Francisco Camps Ortiz, President of the Government of Valencia, outlined policies on energy efficiency, renewable energies and water conservation in the region of Valencia.

Thanking everyone for their contributions over the years, Chair Pachauri stressed that the Nobel Peace Prize was awarded to “an extremely large constituency,” encompassing members of the IPCC Bureau, contributing scientists, governments, civil society and the media. He emphasized that the SYR must adhere to the same high quality as the rest of the AR4, since the entire report will be referred to “for years and years” and guide future research.

Delegates then adopted the agenda (IPCC-XXVII/Doc.1).

During the week, plenary sessions met each day, including an all-night session on Thursday, 15 November, that concluded at 7:29 am on Friday morning, 16 November. Contact groups were convened on new material under Topic 3 (figures) and on reasons for concern. Informal discussions were held throughout the meeting, convening to discuss wording, individual figures or sections of text. This summary is organized according to the agenda of the meeting.

APPROVAL OF THE DRAFT REPORT OF IPCC-26

On Friday, IPCC Secretary Renate Christ introduced the report of the IPCC’s 26th meeting (IPCC-XXVII/Doc.2) and invited comments. Belgium requested, and the plenary agreed, that the IPCC-26 report should include the IPCC’s decision to subject the report on the meeting on new emissions scenarios that took place in the Netherlands in September 2007 to peer review, and that the cover of that latter report will make explicit mention of the peer review.

CONSIDERATION OF THE AR4 SYR

Consideration of the AR4 SYR took place in two parts: from Monday to Friday morning, delegates approved the Summary for Policymakers of the Synthesis Report (SYR SPM) line-by-line; and on Friday they adopted the Longer Report page-by-page. The approval of the SYR SPM was based on a revised draft by the Core Writing Team incorporating government comments during their fourth meeting, immediately preceding IPCC-27 on 8-10 November 2007 (based on IPCC-XXVII/Doc.3a) and the Longer Report (IPCC-XXVII/Doc.3b).

The SYR is organized around six topics. Topic 1 presents observed changes in climate and their effects on human and natural systems. Topic 2 summarizes causes of the observed changes. Topic 3 discusses climate change and its impacts in the near and long term under different scenarios. Topic 4 covers adaptation and mitigation options and responses, and the inter-relationship with sustainable development, at the global and regional levels. Topic 5 addresses the long-term perspective, in particular scientific and socioeconomic aspects relevant to adaptation and mitigation, consistent with the objectives and provisions of the UNFCCC, and in the context of sustainable development. Finally, Topic 6 highlights robust findings and key uncertainties.

The discussions on the six topics were introduced by brief presentations by Core Writing Team members (Authors) on each topic. Throughout the discussions, the Working Group Co-Chairs and the relevant Authors supported discussions with scientific advice.

In the following summary, discussions on the SYR SPM are followed by discussions on the same Topic in the Longer Report. References to figures and tables refer to the numbers in the final accepted documents. Text in italics refers to confidence levels and likelihood. Numerous changes were made to the draft text, reflected in the summary below. Many paragraphs were also approved without discussion or with minor amendments.

INTRODUCTORY COMMENTS: On Monday, delegates made general comments on the length and content of the SYR. Belgium stressed the need for clarity on the length before entering into discussions on the substance, noting that the IPCC plenary can alter the decision made by IPCC-22 in 2004 regarding the length (5 pages for the SPM, 30 pages for the Longer Report). Lamenting the brevity of the document, Germany, supported by Belgium, the Netherlands, Austria, Italy and Hungary, called for flexibility regarding its length. The US, supported by Saudi Arabia, underscored that the SYR should be as concise as possible, and urged abiding by the guidelines decided by IPCC-22

Germany requested inclusion of new figures and substantive text in various sections. Belgium suggested adding new figures pertaining to reasons for concern. The UK, with Slovenia, proposed adding an introductory paragraph to the SYR SPM stressing overall progress in scientific understanding of climate change since the Third Assessment Report (TAR). Saudi Arabia and Switzerland pointed to the difficulty of capturing all the developments since the TAR in a paragraph. The Netherlands, supported by Austria, called for making the section on robust findings and key uncertainties more substantial, explicit and visible in the report.

India, supported by Australia, Kenya and Saudi Arabia, proposed adding preambular text indicating that the SYR SPM is a not a stand-alone document but a compilation of three working group SPMs, and is supported by these underlying documents. Delegates agreed to include text that explains that the SPM is based on the assessment by the three working groups, provides “an integrated view of climate change” and that a complete elaboration of the topics are contained in the SYR and the underlying reports by the three working groups. The final SYR SPM contains 23 pages with text and figures.

TOPIC 1 – OBSERVED CHANGES IN CLIMATE AND THEIR EFFECTS: This section of the SPM was considered on Monday and Tuesday.

On Monday, the Authors presented this section, highlighting, *inter alia*, that: warming of the climate system is unequivocal; between 1900-2005, precipitation has changed; and heat waves, heavy precipitation events and extreme high sea levels have *likely* become more frequent.

SYR SPM: On **increased drought** discussion focused on what regions were covered by a statement noting increase of drought-affected areas, and agreement was reached on text noting that “globally” the area affected by drought has increased.

On **North Atlantic cyclone activity**, Mauritius suggested adding that the intense tropical cyclone activities have increased “only” in the North Atlantic. Madagascar proposed importing more specific text from the WGI SPM, opposed by Austria, France, the UK, the Netherlands, Norway and Benin. The US, supported by Madagascar and New Zealand, and opposed by France, Belgium and Japan, proposed to indicate that “multidecadal variability complicates detection

of trends.” The UK, supported by Japan, proposed reference to data limitations. WGI Co-Chair Susan Solomon, supported by Kenya and Madagascar, suggested “multidecadal variability and data limitations complicate the detection of long-term trends, particularly prior to 1970 and in other regions.” The UK, with Norway, Japan, Mauritius, Hungary, Belgium and Sweden, argued that “multidecadal variability” is not readily comprehensible and of limited value to policymakers. The UK, supported by Norway and others, proposed referring to cyclone intensity and cyclone numbers in separate sentences. After informal consultations, text was agreed on Tuesday morning, with the inclusion of language on the difficulty to ascertain longer terms in cyclone activity and pointing to increased tropical cyclone activity in the North Atlantic and limited evidence of increases elsewhere.

On **changes in algal, plankton and fish abundance** due to rising water temperatures, the US, opposed by the UK, Switzerland, Belgium, Germany and Spain, proposed adding “in high-latitude oceans.” Delegates agreed to refer to “some” marine systems. Delegates also agreed to include reference to changes in ice cover, salinity, oxygen levels and circulation.

On **lack of geographic balance in data and literature**, the Gambia, Belarus, Switzerland, Sweden and others proposed more specific language on areas with data gaps, with Switzerland suggesting “southern hemisphere” instead of “developing countries.” China stressed the importance of indicating that there is no data on many regions but, with Saudi Arabia, Chile, Brazil, Sudan and others, supported keeping the sentence as proposed in the draft. Ghana proposed specifying regions with data rather than those without data. Text was agreed as originally presented in the draft.

On the emergence of other effects of regional climate change on natural and human environments, the US, opposed by the Netherlands, proposed removing “natural.” Germany, France, Hungary, the Netherlands, Japan, Norway, Belgium and Spain, opposed by the US, Saudi Arabia and Egypt, urged keeping detailed examples of such effects. Delegates agreed to retain the detailed examples.

LONGER REPORT: This section of the longer report was approved on Friday with minor amendments.

Final SYR SPM Text: The final text says, *inter alia*:

- warming of the climate system is unequivocal;
- eleven out of the last 12 years rank among the warmest in record;
- sea level is rising;
- Arctic sea ice has shrunk by 2.7% per decade since 1978;
- from 1990-2000 precipitation has increased in North and South America, northern Europe, and north and central Asia, but declined in the Sahel, Mediterranean, southern Africa and parts of southern Asia;
- tropical cyclone activity has increased in the North Atlantic since 1970;
- many natural systems are being affected by regional climate changes, particularly temperature increases;
- changes in snow, ice and frozen ground have increased the number and size of glacial lakes;
- effects of regional climate change are difficult to discern due to adaptation and non-climatic drivers; and
- there are other emerging effects of regional climate change, including in agriculture, forestry, and human health.

The text also includes two figures, one depicting changes in temperature, sea level and Northern Hemisphere snow cover (Figure SPM 1), and another showing changes in physical and biological systems and surface temperature for the period 1970-2004 (Figure SPM 2).

TOPIC 2 - CAUSES OF CHANGE: This section of the SPM was considered in plenary on Tuesday.

In their presentation on Tuesday, the Authors highlighted that: global annual greenhouse gas emissions grew by 70% between 1970-2004, with CO₂ being dominant and having grown by 80%; carbon dioxide and methane concentrations by far exceed the natural range over the last 650,000 years; and changes in atmospheric concentrations alter the energy balance of the climate system. The Authors also emphasized progress since the TAR in attributing climate change, noting that most global warming is *very likely* due to an increase in anthropogenic greenhouse gas concentrations and that other seemingly plausible explanations are proven to be inconsistent with observed climate changes.

SYR SPM: In the introduction, China proposed inserting text to specify that the section considers both natural and anthropogenic drivers of climate change. Following informal consultations, existing text was placed at the beginning indicating that “changes in atmospheric concentration of greenhouse gases and aerosols, land cover and solar radiation alter the energy balance of the climate system.”

Concerning text on the **growth of global greenhouse gas emissions** between 1970 and 2004 from 28.7 to 49 GtCO₂-eq (Gigatonnes of CO₂ equivalent), China proposed adding a reference to emissions growth since pre-industrial times, and delegates agreed. The Russian Federation noted lack of scientific understanding of climate change in the period 1910-1945, and suggested adding concrete figures on quantities of CO₂ for that period. Saudi Arabia suggested omitting numbers on the growth in emissions in terms of GtCO₂-eq. After informal consultations, new text was brought to the plenary. Saudi Arabia continued to oppose indicating the growth of emissions in absolute terms. China proposed deleting the years as this information is contained in Figure SPM 3 on global anthropogenic greenhouse gas emissions. Switzerland, Germany and others stressed the importance of retaining the absolute figures in the text.

Delegates agreed to indicate the growth in terms of absolute emissions in Figure SPM 3. Saudi Arabia, opposed by the UK, proposed deleting wording on the growth of “annual” emissions. After discussion, delegates approved language indicating that global greenhouse gas emissions “due to human activities have grown since pre-industrial times, with an increase of 70% between 1970 and 2004.”

Discussing the figure on global anthropogenic greenhouse gas emissions (**Figure SPM 3**), the UK, supported by Hungary, suggested deleting wording in the caption explaining that the figure illustrates global emissions of “principal” anthropogenic greenhouse gases, pointing out that the figure pertains to all gases. Belgium opposed, stressing that tropospheric ozone is a significant greenhouse gas but not included in the figure. The text was approved without the word “principal.”

On **Footnote 3** detailing greenhouse gases included in Figure SPM 3, delegates discussed various formulations to indicate that the figure only covers gases under the UNFCCC but not those under the Montreal Protocol on Substances that Deplete

the Ozone Layer. The footnote was approved with language indicating that it covers “only” gases listed by name “whose emissions are covered by the UNFCCC.”

On text indicating that global **increases in CO₂ concentrations** “are due primarily to fossil fuel use and land-use change,” Saudi Arabia lamented the lack of precision about their relative contributions. Brazil, with Hungary and Peru, noted that fossil fuel use contributes three times more than land-use change. Delegates agreed to indicate that “global increases in CO₂ concentrations are due primarily to fossil fuel use, with land-use change providing another significant but smaller contribution.”

Delegates also discussed a sentence stating that “**increases in CH₄ and N₂O** are primarily due to agriculture.” The UK, supported by Sudan, Uruguay, Egypt, Austria and others, highlighted that the main source of CH₄ growth was not agriculture but energy and waste. New Zealand, supported by Hungary, proposed stating that increases in CH₄ have been relatively static in recent years. India and Belgium proposed using language from the WGI SPM that the source was “due predominantly to agriculture and fossil fuel use.” Switzerland suggested having separate sentences on CH₄ and N₂O, indicating sources for each of them. India suggested including information on the stabilization of growth rates of these gases. They agreed that “it is *very likely* that the observed increase in CH₄ concentration is predominantly due to agriculture and fossil fuel use,” that “methane growth rates have declined since the early 1990s, consistent with total emission... being nearly constant during this period” and that “the increase in N₂O concentrations is primarily due to agriculture.”

On text indicating that “the **global net effect of human activities since 1750** has been one of warming,” the UK, supported by Hungary, suggested adding a footnote detailing the net effect and the relative role of radiative forcing. Following informal consultations with the Authors, the UK presented additional text comparing the net warming effect of human activities since the pre-industrial era with that resulting from changes in solar irradiance. Saudi Arabia, opposed by Austria, Colombia, New Zealand and Switzerland, suggested removing exact figures. After further consultations, delegates agreed to a footnote indicating that increases in greenhouse gases tend to warm the surface while the increase in aerosols tends to cool it. The figure given for the net effect for human activities since the pre-industrial era is +1.6 Watts per square meter (W/m²) with a range of +0.6 to +2.4 W/m² compared to the “small” warming effect of solar irradiance of +0.12 (+0.06 to 0.30 W/m²).

LONGER REPORT: During the discussions, Belgium enquired about consistency in the reference to “mixture” of greenhouse gases when defining CO₂-eq emissions. Upon clarification by an Author that a uniform definition was not possible, delegates agreed to insert a footnote explaining the mixture composition. Other parts of the text were approved with minor editorial changes.

Final SYR SPM Text: The final text indicates that:

- global greenhouse gas emissions due to human activities have grown since pre-industrial times, with an increase of 70% between 1970 and 2004;
- CO₂ is the most important anthropogenic greenhouse gas;
- in 2005, atmospheric concentrations of CO₂ and CH₄ “exceed by far the natural range over the last 650,000 years”;

- the net effect of human activities since 1750 has been one of warming;
- the observed temperature increase since the mid-20th century is *very likely* due to the observed increase in anthropogenic greenhouse gas concentrations;
- during the past 50 years, the sum of solar and volcanic forcings would likely have produced cooling;
- apart from temperature, discernible human influence extends to other aspects of climate, including sea level rise, changes in wind patterns, increased temperatures of extreme hot nights, cold nights and cold days, and heat waves, droughts and heavy precipitation events;
- anthropogenic warming has *likely* had a discernible influence on observed changes in many physical and biological systems; and
- complete attribution of observed natural system responses to warming is limited by short timescales of impact studies.

The section also includes a figure showing global anthropogenic greenhouse gas emissions (Figure SPM 3), and another showing observed and simulated temperature changes at the global and continental scales (Figure SPM 4).

TOPIC 3 – PROJECTED CLIMATE CHANGE AND ITS IMPACTS: This section of the SPM was considered on Tuesday and Wednesday. On Tuesday, the Authors presented on emissions scenarios, projections of future changes in climate, impacts of future climate changes, and risks of abrupt or irreversible changes.

SYR SPM: On a figure depicting **non-mitigation scenarios for greenhouse gas emissions from 2000-2100**, Austria and Belarus proposed using the latest available information, instead of 2000 as starting year. Belgium, with New Zealand, proposed merging the figure with one on projections of surface temperatures. After the contact group on new material considered the proposal, delegates accepted the figure without changes and without the merger.

On text indicating **warming in the next two decades**, India, Saudi Arabia and Switzerland suggested, and delegates agreed, adding a sentence on warming at constant 2000 concentrations. The UK suggested moving the text to a later section on unavoidable impacts. Austria, supported by Kenya, said the move would give a wrong message to policymakers as these effects depend on adopted climate policies. Delegates agreed to retain the text in section 3. Saudi Arabia preferred reverting to text from the WGI SPM, which describes expected warming even with concentrations of greenhouse gases and aerosols kept constant at 2000 levels. Japan questioned the usefulness of the longer text for policymakers. Following informal discussions, delegates agreed to revert to the original language in the WGI SPM, indicating that even if concentrations of all greenhouse gases and aerosols are kept at 2000 levels, a warming of 0.1°C per decade would be expected.

Regarding text on **increased Greenland and Antarctic ice flow**, the UK, supported by Belarus, Switzerland and Austria, suggested deleting “but this could increase or decrease in the future.” Saudi Arabia and India opposed, noting that the statement accurately reflects existing scientific uncertainties. Armenia suggested referring to the rate of change. The Netherlands suggested removing the entire sentence. In the final text, the sentence was retained without changes.

On a paragraph describing **regional-scale changes**, delegates discussed a bullet point on *very likely* river runoff increases in high latitudes. Australia proposed, and the Panel agreed, to replace it with a new paragraph from the WGII SPM on *high confidence* that river runoff and water availability are projected to increase in high latitudes and decrease in some dry regions in the mid-latitudes and tropics, and that many semi-arid areas will suffer a decrease in water resources.

Delegates then considered new text indicating that **ocean acidification** due to increasing atmospheric CO₂ is already occurring. Highlighting the importance of the issue and his earlier proposal to address ocean acidification in the SYR SPM, Japan proposed clarifying the text. Chair Pachauri, supported by France and Norway, suggested inserting language from the WGII SPM. Australia proposed also adding text from the WGI SPM on uptake of carbon since 1750 having led to ocean acidification. India opposed adding new text at this late stage of the proceedings and Saudi Arabia stated that the text tried to combine everything on ocean acidification from the WG SPMs. Chair Pachauri stressed that this responded to an earlier request by Japan and comments by several governments to add text on ocean acidification. WGII Co-Chair Martin Parry highlighted that this is the first time that the IPCC states something on ocean acidification. The agreed text indicates, *inter alia*, that: uptake of carbon since 1750 has led to the ocean becoming more acidic; and that increased CO₂ concentrations lead to further acidification.

Delegates debated at length whether to include a **figure on projected relative changes in runoff** by the end of the 21st century. Saudi Arabia, with India, China and the US, opposed inclusion of the figure, questioning its scientific basis and the accuracy of its projections, and arguing it is not expert-reviewed and not part of the approved WGII SPM. Chair Pachauri noted the figure has undergone expert review, and was a revised and improved version of the one considered by WGII. The Russian Federation, the Netherlands, Brazil, Indonesia, Germany, Japan, Spain, Belgium, Slovenia, Egypt, Norway and Chile supported the figure. The Netherlands described it as the “most important” figure in the SPM. Australia said the figure contains information that is highly policy-relevant, and stressed that withholding the figure from policymakers would have a “devastating implication” for the credibility of the IPCC. An informal group convened on Wednesday to discuss the issue. The figure was excluded from the SPM and included in the Longer Report.

On **specially affected systems, sectors and regions**, the US proposed adding text and an informal group was convened. Discussions centered on whether a list of systems and sectors are “likely,” “expected,” or “projected” to be especially affected. The group agreed to use “likely.” Informal consultations took place on a statement that the “magnitude and timing of impacts will vary with the amount and timing of climate change, development pathway and, in some cases, the capacity to adapt.” Delegates approved a chapeau providing that “some systems, sectors and regions are likely to be especially affected by climate change,” followed by a footnote as well as headers and bullet points detailing the affected systems, sectors and regions.

On text stating that **warming appears unavoidable at about 0.6°C** by the end of the century relative to 1980-1999 global average temperature even if atmospheric greenhouse gas concentrations remain at 2000 levels, the UK, supported by

Japan, Austria, the Netherlands and Denmark, and opposed by China, Saudi Arabia and Brazil, urged that 0.6°C is misleading, because it presents a hypothetical scenario. Chair Pachauri suggested text noting that even if concentration of all greenhouse gases and aerosol concentrations had been kept constant at 2000 levels, further warming of about 0.1°C per decade would be expected. Opposing the suggestion, Germany said this warming only refers to the next two decades, and Australia said this text does not deal with socioeconomic inertia. The UK and Japan suggested adding reference to inertia in the chapeau of the text. Chair Pachauri suggested language from the WGII SPM stating that “past emissions are estimated to involve some unavoidable warming (about a further 0.6°C by the end of the century relative to 1980-1999) even if atmospheric greenhouse gas and aerosol concentrations remain at 2000 levels,” which Australia rejected because it was “a million miles in interpretation” from the previous text, cautioning that policymakers will not understand that this is hypothetical. One of the Authors recommended removing the entire text, and delegates agreed.

On text referring to **river runoff and water availability**, delegates held informal consultations until early Friday morning, when they considered new text noting the “marked decrease” of run-off in the Mediterranean region. An Author said the language was not acceptable. Spain, supported by France and Italy, said the information contained in the runoff figure was crucial for the SPM, and in particular for the Mediterranean region. Belgium noted some reference in the technical summary that could be used. After lengthy informal consultations, this was the last outstanding issue left to resolve in the SPM. New text was presented noting high confidence that some areas, including the Mediterranean basin, will suffer a decrease in water resources. Delegates approved the text.

On **species extinction**, the US proposed and delegates agreed to replace wording that 20-30% of species assessed so far “would be” at increasing risk of extinction if warming exceeds 1.5-2.5°C relative to 1980-1999, with “are likely to be” in line with the approved language in the WGII SPM. The Russian Federation questioned scientific evidence on “significant” species extinctions around the globe for warming above 4°C. Sweden highlighted that the evidence had been considered and approved also under the Convention on Biological Diversity. The US proposed and delegates agreed to language from the WGII Technical Summary indicating that for warming of 4°C above pre-industrial levels, “model projections suggest significant extinctions (40-70% of species assessed) around the globe.” The UK proposed to state that model projections suggest significant extinctions if the temperature increase “exceeds about 3.5°C,” to make the timescale consistent with the previous sentence referring to the 1980-1999 period, and delegates agreed.

On a sentence referring to **changes in the meridional overturning circulation (MOC)** stating that the changes can feed back to the climate system, the Netherlands, with Germany, proposed adding more detail on feedbacks. The US proposed either deleting the sentence or clearly linking it to the preceding sentences on the MOC that were agreed without discussion. After informal consultations, the section was approved as presented.

On a table giving examples of possible impacts of climate change due to changes in **extreme weather and climate events** (Table SPM 3), the US questioned why only part of the table was proposed, and an Author explained that the table

had been included in response to comments by reviewers and was shortened for space reasons. WGII Co-Chair Martin Parry highlighted the importance of the table that synthesizes information from WGI and WGII. The US proposed, and delegates agreed, to include the full table from the WGII SPM.

On a header citing **abrupt or irreversible climate change**, Authors proposed stating that anthropogenic climate change “and its impacts” could be abrupt or irreversible. India questioned the origin of the proposed language. An Author explained that this was new synthesis language. India argued that the statement is too alarmist and, supported by the US, questioned its scientific basis. The Author said the scientific basis is explained in WGI Chapter 10. The US suggested that “anthropogenic climate change” is “awkward” as impacts of anthropogenic and natural climate change cannot be disaggregated. She preferred stating that “some large-scale climate events have the potential to cause very large impacts, especially after the 21st century.” The Russian Federation supported deleting “irreversible” climate change. An Author objected, noting that Greenland’s ice sheet would not re-grow if it melts, and noted other irreversible impacts such as species extinction. Colombia, supported by New Zealand, stressed that the term “irreversible” had already been used in the SYR SPM and should be retained. The final approved text states that “anthropogenic warming could lead to some impacts that are abrupt or irreversible.”

LONGER REPORT: Regarding text describing future unavoidable impacts at low levels of warming, Germany with Belgium, New Zealand, France and Norway, and opposed by the US, India, Saudi Arabia and Australia, supported retaining the text in the Longer Report, as it had been struck from the SYR SPM, and requested the Authors to clarify the robustness of the text. WGII Co-Chair Martin Parry recommended removing the text. The US said the text could only appear if associated with a statement acknowledging the link with socioeconomic and climatic inertia and take into account adaptation. Delegates agreed to remove the text.

The rest of the Longer Report was adopted with minor editorial changes.

Final SYR SPM text: The section in the approved SPM states, *inter alia*, that:

- there is *high agreement* and *much evidence* that with current mitigation policies, global greenhouse gas emissions will continue to grow over the next few decades;
- continued emissions at or above current rates would cause further warming and *very likely* induce many changes larger than those observed during the 20th century;
- for the next few decades, a warming of about 0.2°C per decade is projected for a range of Special Report on Emissions Scenarios (SRES) emissions scenarios;
- there is now higher confidence than in the TAR concerning projected patterns of warming and other regional-scale features;
- regional-scale changes include: disappearance of Arctic late-summer sea ice by the latter part of the 21st century; increase in the frequency of heat waves, and heavy precipitation; increase in tropical cyclone intensity; and annual river runoff and water availability increase at high latitudes and decrease in some dry regions in the mid-latitudes and tropics;

- some systems, sectors and regions are *likely* to be especially affected by climate change, including, *inter alia*, boreal forests, coral reefs, agriculture in low latitudes, the Arctic, Africa and small island states;
- anthropogenic warming and sea level rise would continue for centuries due to the timescales associated with climate processes and feedbacks, even if greenhouse gas concentrations were to be stabilized;
- contraction of the Greenland ice sheet is projected to continue to contribute to sea level rise after 2100;
- climate change is *likely* to lead to some irreversible impacts. There is *medium confidence* that approximately 20-30% of species assessed so far are *likely* to be at increased risk of extinction if increases in global average warming exceed 1.5-2.5°C; and
- based on current model simulations, the meridional overturning circulation in the Atlantic Ocean will *very likely* slow down during the 21st century, but is *very unlikely* to undergo a large abrupt transition.

The approved SPM also includes a figures on projected greenhouse gas concentrations and surface temperature (Figure SPM 5), one on the geographical pattern of surface warming (Figure SPM 6), one on examples of impacts associated with global average temperature change (Figure SPM 7) and another on estimated multi-century warming relative to 1980-1999 for AR4 stabilization categories (Figure SPM 8). It also includes tables on examples of some projected regional impacts (Table SPM 2) and one on examples of possible impacts due to changes in extreme weather and climate events (Table SPM 3).

TOPIC 4 - ADAPTATION AND MITIGATION

OPTIONS: This section of the SPM was addressed on Wednesday and Thursday.

On Wednesday, an Author presented Topic 4, noting the key messages on adaptation, mitigation, policies and synergies with sustainable development. He highlighted two new figures for consideration: one on mitigation potential in 2030 compared with emissions increase from SRES scenarios (Figure SPM 9); and another on economic mitigation potential until 2030 (Figure SPM 10).

SYR SPM: Delegates discussed a paragraph stating that although societies have a long record of managing climate-related risk, **additional adaptation will be necessary even with mitigation** and that non-climate stresses can exacerbate vulnerability. Belgium, supported by Jamaica, Grenada, Cuba, Sweden, Pakistan, Peru, St. Lucia and Sudan, opposed by Australia and the US, suggested including examples of non-climate stresses. An Author proposed reverting to text from WGII SPM, which outlines stresses that exacerbate vulnerability, including, *inter alia*, poverty, food insecurity, conflict and HIV/AIDS. The UK, supported by India and Canada, suggested that this list of stresses could be replaced by “development pathway.” Delegates agreed to indicate that “climate change can be exacerbated by other stresses” and to list the examples as proposed by the Author.

Concerning text stating that **adaptation can reduce vulnerability especially in the short term**, India suggested deleting reference to “short term” and delegates agreed. Regarding integrating adaptation into sectoral initiatives, Switzerland suggested “embedded within broader sectoral initiatives,” and delegates agreed. Regarding *high confidence*

in the possibility to implement adaptation at low cost, the UK, supported by Switzerland, suggested noting that there may not be feasible or cost-effective adaptation options to deal with all impacts, especially in the long term. The US suggested language from WGII Chapter 17 noting limited estimates of adaptation costs, to which delegates agreed.

On a table containing **selected examples of planned adaptation by sector** (Table SPM-4), Chair Pachauri explained that it had been included in response to governments' requests to have more information on adaptation. India, with the US, preferred the longer version of the table as presented in the WGII SPM, which also includes a column on key constraints and opportunities. Many countries supported the table, but not all supported the longer version. Chair Pachauri asked an informal group to discuss it, after which delegates agreed to include the longer table, and to add to a footnote on early warning systems.

On a paragraph regarding evidence of substantial **economic mitigation potential**, France, opposed by the US and UK, proposed specifying the price range associated with the mitigation potential. The UK, supported by the Netherlands and Pakistan, suggested deleting a footnote defining market mitigation potential and economic mitigation potential. France, Finland, Canada, the US and Benin insisted on retaining the footnote, and delegates agreed.

Delegates discussed a sentence stating that the economic mitigation potential can only be achieved when adequate government **policies** are in place. The UK suggested listing examples of such policies. Saudi Arabia noted that these are not necessarily government policies. The US, supported by Saudi Arabia, proposed deleting "government" and retaining "adequate policies." India suggested adding removal of barriers. Switzerland said that achieving the mitigation potential requires enabling environments created through both government and non-governmental policies. The final approved text reads "when adequate policies are in place and barriers removed."

On **future energy infrastructure investment decisions**, India requested text indicating that "the widespread diffusion of low-carbon technology may take many decades even if early investments in these technologies are made attractive," and delegates agreed. The UK, supported by Germany, proposed adding information from the WGIII SPM on mitigation opportunities with net negative costs that "have the potential to reduce emissions by around 6 GtCO₂-eq /yr in 2030." India, supported by China, argued that language proposed by the UK must be read together with the sentence in the WGIII SPM indicating that "realizing these requires dealing with implementation barriers." Belgium, Switzerland and others, opposed by Australia, supported adding the second sentence. China proposed deleting both additions and said that if they were approved, sending a balanced message would require adding more information. After further discussion, China proposed and delegates agreed to combine the sentences proposed by the UK and India and include them in an earlier paragraph.

On a table on selected examples of **key sectoral mitigation technologies, policies and measures, constraints and opportunities** (Table SPM-5), the US, supported by Canada and Austria, objected to references to potential synergies and tradeoffs between adaptation and mitigation, and preferred copying the table directly from the WGIII SPM. The table was accepted without the references as presented in the WGIII SPM.

On a chapeau paragraph stating that a **wide variety of national policies and instruments are available** to governments to create the incentives for mitigation action, India, supported by Saudi Arabia, China, Peru and Canada, suggested adding that their applicability depends on national circumstances and an understanding of their interactions. Germany, Norway and the Netherlands opposed, saying that this was not a balanced summary. The UK proposed adding "within a national context" as a compromise. After informal consultations, delegates agreed to note that "their applicability depends on national circumstances and sectoral context."

Delegates considered text on the **impacts of Annex I countries' actions** on the global economy and global emissions. Finland and Canada requested including a sentence on equilibrium models from Topic 4 in the Longer Report. Delegates agreed on a footnote pointing to further information in the Longer Report.

On a sentence on the **contributions of changes in lifestyle and behavior** to climate change mitigation, Saudi Arabia, supported by Egypt, Iraq and Libya, and opposed by Australia, Germany and others, proposed inclusion of language on spillover effects. The issue was referred to informal consultations, following which Saudi Arabia, supported by Sudan and opposed by Germany, proposed text stating that, as in the TAR, mitigation policies may result in lower demand and prices, and lower gross domestic product (GDP) for fossil-fuel exporting nations, and the extent of spillover depends strongly on the assumptions related to policy decisions and oil market conditions. After informal consultations, delegates agreed to include the text.

On text referring to **achievements of international cooperation on adaptation and mitigation**, the US noted the achievements were more on mitigation than on adaptation. The Russian Federation said it was premature to praise the Kyoto Protocol, and, with Peru, and opposed by Brazil, proposed removing the word "notable" before achievements of the UNFCCC and Kyoto Protocol. Chair Pachauri proposed removing reference to adaptation. Egypt, Brazil, Austria and others supported keeping a reference to adaptation, with India noting that if international cooperation produced no achievements on adaptation that in itself is worth mentioning. Delegates approved the paragraph without reference to adaptation and informal consultations were convened to produce an additional sentence to refer to adaptation. Following discussions, delegates approved adding language stating that progress had been made.

On text referencing **climate change impacts on the Millennium Development Goals (MDGs)** by mid-century, Sweden, Jamaica, Germany, Chile and others supported reference to the MDGs, opposed by the US and Saudi Arabia, who noted the MDGs are for 2015, not 2050. Belgium underscored the MDGs are broader than the 2015 target. France proposed adding similar language such as "reduction of poverty goals" instead of MDGs. Following discussions, delegates approved language stating that "over the next half century, climate change could impede achievement of MDGs."

The rest of the text was approved with minor changes.

LONGER REPORT: This was considered on Friday morning. On a sentence listing other non-climate stresses and factors that exacerbate vulnerability, Sweden asked for inclusion

of “gender inequity.” The sentence was approved as originally presented. The rest of the text was adopted without amendment.

Final SYR SPM text: The final SYR SPM text on Topic 4 discusses adaptation and mitigation. On adaptation, it states that:

- a wide array of adaptation options is available, but more extensive adaptation than is currently occurring is required to reduce vulnerability to climate change;
- there are barriers, limits and costs to adaptation, which are not fully understood;
- additional adaptation will be required even with mitigation;
- there is *high confidence* that there are viable adaptation options that can be implemented in some sectors at low cost, but costs and benefits of adaptation are limited; and
- adaptive capacity is intimately connected to social and economic development but is unevenly distributed across and within sectors.

On mitigation, it states that:

- there is *high agreement* and *much evidence* of substantial economic mitigation potential at the global level over the coming decades, but at the sectoral level there are considerable differences;
- the economic mitigation potential can only be achieved when adequate policies are in place and barriers removed;
- future energy infrastructure investment decisions will have long-term impacts on greenhouse gas emissions;
- returning global energy-related CO₂ emissions to 2005 levels by 2030 would require a large shift in investment patterns;
- a wide variety of policies and instruments are available to governments to create the incentives for mitigation action, and their applicability depends on national circumstances and sectoral context;
- an effective carbon-price signal could realize significant mitigation potential in all sectors;
- there is *high agreement* and *much evidence* that mitigation can result in near-term co-benefits that may offset mitigation costs;
- there is *high agreement* and *much evidence* that developed countries’ actions may affect the global economy and emissions;
- there is *high agreement* and *much evidence* that notable achievements of the UNFCCC and Kyoto Protocol are the establishment of a global response to climate change, stimulation of national policies, and the creation of an international carbon market and new institutional mechanisms that may provide the foundation for future mitigation efforts;
- progress in addressing adaptation within the UNFCCC has been made and international initiatives have been suggested;
- in several sectors, climate response options can be implemented to realize synergies and avoid conflicts with other dimensions of sustainable development; and
- decisions about macroeconomic and other non-climate policies can significantly affect emissions, adaptive capacity and vulnerability.

The section also includes figures on comparisons between global economic mitigation potential and projected emissions increase in 2030 (Figure SPM 9), and on economic mitigation potentials by sector in 2030 estimated from bottom-up studies (Figure SPM 10). Two tables in the section address selected examples of planned adaptation by sector (Table SPM 4), and

selected examples of key sectoral mitigation technologies, policies and measures, constraints and opportunities (Table SPM 5).

TOPIC 5 - THE LONG TERM PERSPECTIVE: This section of the SPM was considered in plenary from Thursday to early Friday. A contact group, co-chaired by David Wratt (New Zealand) and Yadowsun Boodhoo (Mauritius), convened seven times between Monday and Thursday to address the sub-section on “reasons for concern.”

The topic was presented to plenary on Thursday morning, with Authors highlighting risk management techniques and key vulnerabilities, and explaining that the “reasons for concern” outlined in the TAR remain a viable framework for considering key vulnerabilities. The Authors also highlighted that responding to risk requires both adaptation and mitigation, and drew attention to the benefits of mitigation and broader sustainability issues. The section on “reasons for concern” was presented in an informal lunchtime session on Monday, where the Authors gave an overview, clarified questions and explained the rationale and choice of wording, including criteria for defining “key” vulnerabilities.

SYR SPM: After informal consultations, delegates agreed to retain reference to UNFCCC Article 2 (objective of the Convention) in the chapeau paragraph referring to “dangerous anthropogenic interference.”

Differences emerged on language on **key vulnerabilities** noting that there are sharp differences across regions and that those in the weakest economic position are frequently the most susceptible to climate-related damages. Delegates debated whether to say most susceptible to “climate change” or “climate-related damages.” An informal group met to discuss wording. Following discussions, the US proposed, and delegates agreed, to substitute the existing text with a sentence from WGII Chapter 19 explaining that “key vulnerabilities may be associated with many climate-sensitive systems, including food supply, infrastructure, health, water resources, coastal systems, ecosystems, global bio-geochemical cycles, ice sheet and modes of oceanic and atmospheric circulation,” explaining that this helps make the link with text on “reasons for concern.” South Africa and Colombia expressed disappointment that the new formulation removes the notion that the poor are the most sensitive to climate change.

On a statement that **mitigation is necessary** because unmitigated climate change is *likely* to exceed systems’ capacity to adapt, the US, Saudi Arabia and India supported deletion of “mitigation is necessary,” while Germany and Norway insisted on retaining the phrase. The phrase was deleted and the final text states that “unmitigated climate change would, in the long term, be *likely* to exceed” the capacity of systems to adapt.

Regarding language acknowledging that in some cases there are **barriers, limits and costs to adaptation**, Belgium and Germany proposed to delete “in some cases.” Australia, with Slovenia, preferred “limitations” to “limits.” Chile supported “formidable barriers,” while Egypt suggested “significant.” The US proposed “these are not fully understood.” The final text reads: “There are barriers, limits and costs, but these are not fully understood.”

On **costs of impacts of climate change**, France, the UK and Austria, urged retaining a sentence stating that “impacts of climate change are *very likely* to impose net annual costs which

will increase over time as global temperatures increases.” The text was retained. Regarding estimates of the social cost of carbon, the US proposed, and delegates agreed, to add that “the large ranges are due to differences in assumptions.” Delegates also agreed to text listing the assumptions.

The draft SPM contained a sentence referring to Figure SPM 7 on “examples of risks that would be reduced by limiting global average warming.” After informal consultations, a new proposal was presented referring to **avoided impacts of climate change**. The US opposed, proposing to indicate that the figure provides “examples of impacts associated with projected global average surface temperature in the 21st century.” An Author disagreed, highlighting that the text is one of the “fundamental new issues” in the AR4, and provides policymakers ways to infer avoided impacts by comparing stabilization scenarios. The US argued that the figure does not address “avoided impacts.”

Following informal consultations early on Friday morning, Chair Pachauri, supported by China and the US, proposed deleting the sentence, explaining that no consensus seemed possible and that there was no need to refer to the figure in the section. France and Germany opposed the deletion, stressing the need to point to possibly avoidable impacts. The UK, opposed by China and the US, proposed alternative language on “impacts which might be avoided for given ranges of temperature, noting that adaptation also needs to be taken into account.” Belgium proposed language combining the two “equally correct perspectives,” which was supported by an Author and opposed by China and India. The UK suggested accepting the sentence that had been proposed by the US, but Chair Pachauri stressed that it had been opposed by the Authors. Noting, once again, that no consensus was possible, Chair Pachauri suggested omitting the contested sentence from the SPM, and it was deleted. Germany opposed the deletion and requested recording her opposition. The US stressed that they had followed the IPCC rules and consistently and expressed their opposition to this concept already in their written comments.

During contact group discussions on **reasons for concern**, the US argued that the section did not conform to the outline previously agreed at IPCC-22 and questioned the mandate of the contact group, saying the issue was linked to the question of key vulnerabilities and risk addressed elsewhere in the SYR SPM. In opposition, Austria, Germany, Belgium, the UK and others stressed the importance of the section as a cross-cutting and policy-relevant issue, responding to guidance from IPCC-22. The US suggested that the section did not fit in Topic 5 and Australia responded that it could not be addressed earlier in Topic 3 or Topic 4 as it would appear premature. In the final SPM, it remains in Topic 5.

The US objected to the concept of **key vulnerabilities**, saying that it was a new and complicated term, not robust enough to be carried to the SPM SYR. She questioned the criteria for selecting examples of key vulnerabilities. The Authors explained that they were chosen on the basis of the robustness of the findings and to illustrate progress since the TAR. Australia proposed, and delegates agreed, to add text explaining the basis on which the examples in the section were chosen. France, supported by Germany, and opposed by the US, stressed the importance of considering not only findings with the highest confidence, but also matters of very high consequence and risk.

On a sentence explaining why the “reasons for concern” are assessed to be stronger than in the TAR, the US called for removing “especially” when referring to especially vulnerable systems, sectors and regions, noting that the word was not clearly defined nor was it fully addressed by WGII. Germany, the UK, the Authors and others opposed, with the UK noting that the issue was not addressed by WGII precisely because it was considered a cross-cutting issue to be addressed in the synthesis. The Authors explained that the expression “especially vulnerable” was widely used in the WGII report as a relational operator, meaning “more compared to others” as in English common usage and that “vulnerability” is defined in the AR4 glossary. The word was retained.

At Belgium’s request, delegates also discussed the inclusion of a figure showing past and future reasons for concern. The Authors noted the difficulty of producing such a figure. Delegates agreed to the inclusion of Figure TS.6 from the WGII Technical Summary on projected risks due to critical climate change impacts on ecosystems for different levels of global mean annual temperature rise, noting that this covered the same point.

On **risks to unique and threatened systems**, South Africa, supported by Norway, Germany, Austria and Denmark, suggested text stating that “confidence has increased from medium to high that a 1-2°C increase in global average temperature above 1990 levels poses significant risks to many unique and threatened systems, including some biodiversity hotspots.” China objected to including a confidence level, noting that the WGII SPM qualifies this as “medium confidence.” Belgium suggested removing “from medium to high.” An Author suggested indicating with “medium confidence” that “approximately 20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperatures exceed 1.5-2.5°C over 1980-1999 levels,” and with “high confidence” that “a 2°C increase in global average temperature above 1990 levels poses significant risks to some biodiversity hotspots.”

China opposed the second part of the statement, arguing that it had not been subject to government review, invoking limits to the length of the SPM, and saying that the information not particularly relevant for policymakers. WGI Co-Chair Susan Solomon responded that biodiversity hotspots had been thoroughly discussed and that the information had been reviewed by governments.

India said that statements with only medium confidence level should not be included in the SYR SPM. Germany, supported by Japan, Austria and others, stressed that policymakers need information on large-scale impacts even if the confidence level is not high or very high.

Chair Pachauri proposed to replace the second part of the sentence with language from the WGII Technical Summary, and delegates agreed. The approved text notes that “confidence has increased.” Delegates also agreed to a proposal by China during contact group discussions to quote directly from WGII SPM and refer to more frequent coral bleaching events and widespread mortality “unless there is thermal adaptation or acclimation by corals.

On **distribution of impacts and vulnerabilities**, delegates discussed text stating that low-latitude and less-developed areas face the greatest risk, particularly in dry areas and megadeltas. Colombia, supported by the US, and opposed by India

and Kenya, preferred to remove reference to specific regions. Delegates agreed to replace “greatest” with “greater” and retain the examples.

On language on **risks of large-scale singularities**, the US, opposed by the UK and others, proposed to change the bullet title from “risks of large-scale discontinuities: long-term and irreversible impacts” to “risks of large-scale singularities.” The Authors explained the reasons for using the proposed language, and noted that certain impacts, such as species extinction, were indeed irreversible and preferred retaining “irreversible impacts.” South Africa said irreversible changes are something policy-makers understand. After further discussion, the panel agreed to delete “long-term and irreversible impacts” as proposed by the US.

A sentence on **projected species extinction** was opposed by the US, saying that it was not discussed in the TAR, that it was addressed elsewhere in the SPM SYR, and that it did not represent a discontinuity or a large-scale change. South Africa, the Authors and others disagreed, stressing species extinction as a prime example of a discontinuity and of irreversible and large-scale change. The reference was retained.

On a sentence stating high confidence that global warming over many centuries would lead to sea level rise that is projected to be much larger than observed over the 20th century, WGI Co-Chair Susan Solomon explained that sea level rise due to ice sheet loss had medium confidence, while the sentence proposed referred to sea level rise due to thermal expansion, for which there is high confidence. South Africa suggested, and delegates agreed, to clarify that the sea level rise mentioned with high confidence was “due to thermal expansion alone.” The US questioned whether sea level rise represented a discontinuity and called for focusing on what is new since the TAR. Australia and Ireland proposed, and delegates agreed, to add reference to “associated coastal loss and damage” as examples of discontinuity.

The contact group also discussed whether to include in the reasons for concern only statements with high confidence level, or others with important consequences but lower confidence. Noting that plenary had not made a decision to include only high confidence statements in this section, Germany and others supported referring also to high risk events. After further discussion, the Authors proposed, and delegates agreed, to add that there is a risk that larger sea level contributions from both the Greenland and Antarctic ice sheets than is projected by ice sheet models could occur on century time scales, because dynamical processes not included in current ice sheet models, but seen in recent observations, could increase the rate of ice loss.

LONGER REPORT: On a bolded statement noting that climate change can slow the pace of progress towards sustainable development, the US, opposed by Germany and Belgium, proposed using language from the WGII SPM instead, noting both how climate change can slow nations’ abilities to achieve sustainable development and how sustainable development can reduce vulnerability to climate change.

The Authors explained that the two-way connection between sustainable development and climate change impacts was fleshed out, and that language on how sustainable development can reduce vulnerability and enhance mitigative and adaptive

capacities was found in the subsequent paragraphs. The US suggested adding wording from WGII SPM and delegates agreed to use that language as an introduction to the rest of the text.

The rest of the topic was adopted with minor amendments.

Final SYR SPM Text: The SPM says that:

- determining what constitutes “dangerous anthropogenic interference” involves value judgments and science, and science can provide criteria to judge which vulnerabilities might be labeled “key”;
- the five “reasons for concern” identified in the TAR to consider key vulnerabilities are assessed to be stronger. These five “reasons for concern” are: risks to unique and threatened systems; risks of extreme weather events; distribution of impacts and vulnerabilities; aggregate impacts; and risks of large-scale singularities;
- neither adaptation nor mitigation alone can avoid climate change impacts but they can complement each other and together significantly reduce the risks;
- many impacts can be reduced, delayed or avoided with mitigation, with efforts over the next two to three decades having a large impact;
- stabilization levels can be achieved by deploying a portfolio of currently available or soon to be commercialized technologies, assuming appropriate and effective incentives;
- macroeconomic costs of mitigation rise with the stringency of the stabilization target, with global macroeconomic costs for mitigation towards stabilization between 710 and 445 ppm CO₂-eq in 2050 corresponding to slowing average annual global GDP growth by less than 0.12 percentage points; and
- responding to climate change involves an iterative risk management process including both mitigation and adaptation, taking into account damages, co-benefits, sustainability, equity and attitudes to risk.

The section also includes a figure on CO₂ emissions and equilibrium temperature increases for a range of stabilization levels (Figure SPM 11). It also has a table on characteristics of post-TAR stabilization scenarios and resulting long-term equilibrium global average temperature and the sea level rise component from thermal expansion (Table SPM 6) and a table on estimated global macroeconomic costs in 2030 and 2050 (Table SPM 7).

TOPIC 6 - ROBUST FINDINGS, KEY

UNCERTAINTIES: This section of the SPM was addressed briefly in plenary early on Friday morning. In the draft SPM, the only sentence under this topic indicated that “a selection of policy-relevant robust key findings and key uncertainties is provided in Topic 6 of the longer report.” During the week, a number of delegates called for expanding the section in the SPM by providing substantive lists of robust findings and key uncertainties. Germany proposed that the section be moved to the beginning of the SPM. Early on Friday morning, delegates agreed to delete the sentence and heading from the SPM, and only address robust findings and key uncertainties in the Longer Report.

LONGER REPORT: During the discussions on Friday evening, India, Saudi Arabia, China and others suggested referring to technology transfer and financing in a paragraph on incentives and barriers to mitigation. The Authors, supported by Canada, Austria and others, explained that although relevant,

these issues did not fit under the heading “robust findings.” Delegates agreed not to include them. The rest of the text was adopted with minor changes.

Final Longer Report Text: The final text defines “robust findings” and “key uncertainties.” It highlights that some findings may be policy-relevant even though they are associated with large uncertainties.

The text then lists robust findings on observed changes in climate and their effects and causes, including that:

- warming of the climate system is unequivocal;
- many natural systems on all continents and some oceans are being affected by regional climate changes;
- global greenhouse gas emissions have grown by 70% between 1970 and 2004;
- atmospheric greenhouse gas concentrations far exceed pre-industrial values; and
- most of the warming over the past 50 years is very likely due to anthropogenic greenhouse gas increases.

On key uncertainties, the text mentions that:

- data on some regions is limited and there is notable lack of geographical balance;
- analyzing extreme events is more difficult than climatic averages;
- effects of climate change on human and some natural systems are difficult to detect;
- difficulties remain in attributing observed temperature changes at smaller than continental scales; and
- magnitude of CO₂ emissions from land-use change remains uncertain.

On drivers and projections of future climate change and their impacts, robust findings include that:

- global emissions will continue to grow with current policies;
- a warming of 0.2°C is projected for the next two decades;
- continued emissions at or above current levels would cause further warming and very likely induce larger changes than in the 20th century;
- warming tends to reduce uptake of CO₂ by terrestrial ecosystems and oceans;
- anthropogenic warming and sea level rise would continue for centuries even if greenhouse gas concentrations are stabilized;
- some systems, sectors and regions are likely to be especially affected by climate change; and
- impacts are very likely to increase due to extreme weather events.

As key uncertainties, the text lists:

- uncertainty in equilibrium climate sensitivity creates uncertainty in the expected warming for a given stabilization scenario;
- considerably different modeling results on feedbacks;
- aerosol impacts;
- future changes in the Greenland and Antarctic ice sheet mass affecting sea level rise;
- large-scale ocean circulation changes beyond the 21st century;
- uncertainties surrounding regional projections hampering impacts research; and
- understanding of low-probability/high-impact events and cumulative impacts is generally limited.

On responses to climate change, the robust findings include:

- some planned adaptation is occurring and more extensive adaptation is required;

- unmitigated climate change would be *likely* to exceed adaptive capacity in the long term;
- a wide range of mitigation opportunities are available at costs ranging from net negative up to US\$100/tCO₂-eq;
- to stabilize greenhouse gas concentrations, emissions would need to peak and decline;
- the lower the stabilization level, the lower the risks;
- a range of stabilization levels can be achieved by using currently available technologies and those expected to be commercialized in coming decades;
- this requires appropriate and effective incentives and further research, development and dissemination;
- sustainable development paths can make major contributions to mitigation and adaptation; and
- seemingly unrelated macroeconomic and other policies can significantly affect emissions.

The key uncertainties include:

- understanding of how development planners incorporate information on climate variability and change in their decisions is limited;
- adaptive and mitigative capacity depends on socioeconomic development pathways;
- barriers, limits and costs of adaptation are not fully understood;
- estimates of mitigation potential and costs depend on various assumptions and uncertainty arises in particular concerning technology-related issues and effects of changes in behavior and lifestyles; and
- effects of non-climate policies on emissions are poorly quantified.

IPCC PROGRAMME AND BUDGET FOR 2008-2010

On Saturday, IPCC Secretary Renate Christ introduced the IPCC’s draft budget for 2008-2010 (IPCC-XXVII/Doc.4, Add.1). She highlighted a proposed increase for outreach activities and for translating the technical paper on climate change and water. The Netherlands expressed concern with year-to-year fluctuations in budget contributions and called for long-term planning based on a multi-year analysis of contributions. The Secretary agreed to refer the proposal for discussion at future meetings of the working group on finance. The UK supported the budget, stressing the importance of scoping meetings. The budget was approved without further discussion.

PROGRESS REPORTS

Progress reports were delivered on Friday morning.

IPCC TASK FORCE ON NATIONAL GREENHOUSE GAS INVENTORIES: Takahiro Hiraishi (Japan), Co-Chair of the Task Force on National Greenhouse Gas Inventories, updated the Panel on the work of the Task Force (IPCC-XXVII/Doc.11). He noted progress in the development of software for the 2006 IPCC Guidelines, including steps to test reporting of emissions from the energy sector at the end of 2007 and early 2008. He drew attention to current efforts to expand data in the Emissions Factor Database, including plans for two expert meetings in 2008 on energy and agriculture, and called for IPCC members to submit information on their emissions factors. On outreach, he noted the creation of an introduction to the 2006 IPCC Guidelines and leaflets on the database and inventory programs. Hiraishi also highlighted an expert meeting to be held in the first half of 2008 on the use of the 2003 Good Practice Guidance for

Land-Use Change and Forestry. Sweden, supported by Norway, drew attention to the role of black carbon in the loss of ice cover in Greenland and the lack of relevant data. They suggested that the Task Force develop guidelines and methodologies for reporting on black carbon to allow more accurate modeling and create a basis for action.

FUTURE WORK ON SCENARIOS: Richard Moss, Co-Chair of the Task Group on Data and Scenario Support for Impacts and Climate Analysis (TGICA), introduced a report on future work on scenarios (IPCC-XXVII/Doc.9). He highlighted an expert meeting on new scenarios held in Noordwijkerhout, the Netherlands, from 19-21 September 2007. Moss outlined the meeting's deliverable outcomes, including a proposed set of benchmark concentration scenarios, now known as "representative concentration pathways" and a plan to coordinate the work of the relevant research communities. He explained that the meeting report is still under preparation and will be open for review between 17 December 2007 and 23 January 2008.

Ismail Elgizouli (Sudan) reported on a plan for enhancing the involvement of experts from developing countries and economies in transition in the development of new scenarios, and noted the participation of 52 such representatives at the Noordwijkerhout workshop. He said the report will address this more fully, including questions related to institution and capacity building, financial matters and outreach.

Noting the lack of resolution on the low-stabilization scenario, Australia, supported by the US, stressed the need to develop new scenarios on clear scientific and technical grounds. Germany noted that the meeting's report mistakenly referred to a "representative" range of stabilization and reference scenarios, and with Belgium and France, called for strict adherence to the mandate of IPCC-26 with regard to the content and procedures for developing the new scenarios.

TECHNICAL PAPER ON CLIMATE CHANGE AND WATER: WGII Technical Support Unit Head Jean Palutikof (UK) presented a progress report on a technical paper on climate change and water (IPCC-XXVII/Doc.10), noting that revisions had been made to reflect comments from experts and governments. She said the revised text will be open for final government comments from 26 November 2007 to 2 January 2008. The US requested postponing the deadline. Palutikof promised to explore the possibility. France, with Egypt, recalled an IPCC-26 decision to have the paper translated in all UN languages. The Secretariat noted that the cost of translation would be CHF300,000.

TASK GROUP ON DATA AND SCENARIO SUPPORT FOR IMPACT AND CLIMATE ASSESSMENT (TGICA): Richard Moss presented a progress report and highlighted recent achievements and activities, including, *inter alia*: updating of the data distribution center; integration of available data sets; making data available to researchers interested in doing this work; and a meeting on integrating climate change and response options to foster dialogue among researchers (Nadi, Fiji, 20-22 June 2007). He announced TGICA plans to continue work on preparing technical guidelines, particularly on the development of socioeconomic scenarios on vulnerabilities and impacts of adaptation.

OUTREACH: IPCC Secretary Christ presented a progress report on outreach activities (IPCCXXVII/Doc.7). She highlighted, *inter alia*, regional briefings on the WGII report

and the launch of the new IPCC website that contains figures and the full WG reports. She called on national focal points in developing countries to increase travel support for their national experts to participate in international outreach activities.

The WGII Co-Chairs reported on recent activities, listing a series of workshops for disseminating information to specific target groups, the completion of a UNEP booklet providing a simplified version of the WGII contribution to AR4, and a scoping meeting on a possible IPCC special report on renewable energy.

New Zealand drew attention to regional activities in the South Pacific. Argentina highlighted the importance of increasing outreach to private enterprises. Ethiopia called for improving access of African countries to outreach initiatives.

Belgium expressed "strong regret" about the quality of the French translation of SPM drafts and said they contain serious scientific errors. In response, IPCC Secretary Christ said the translations were made by non-UN translators, and noted that the more elaborate translation arrangements for the TAR had prolonged the process by one year.

FUTURE OF THE IPCC

This issue was considered on Saturday morning. Chair Pachauri noted a paper on the future of the IPCC that would be circulated to governments, suggesting the need to assess opportunities for and expectations of the IPCC.

Belgium, supported by the UK and Netherlands, proposed a process for considering the future of the IPCC, suggesting written submissions for consideration at IPCC-28. Bangladesh, Cuba and China encouraged support for research capacity building in developing countries on climate change. Expressing concern about future demands on the IPCC, the UK described discussions with national IPCC scientists that have pointed to the need for synthesizing results across disciplines and to consider communication of results from the outset. The Russian Federation proposed considering Kyoto scenarios and including a broader range of factors and global environmental processes that trigger change. The Netherlands pointed to his country's submission that had not been included with the other submissions. He said that the submission raised questions about: improving the transparency, objectivity and scientific quality of the IPCC; generating and disseminating knowledge on management of climate change; and retaining and improving policy-relevant products. South Africa urged expanding the input of the social sciences in the next assessment and considering how to translate the assessment reports into information that triggers action. China underscored the need to improve the balance in choice and interpretation of literature, and Austria suggested more than three working groups to meet the future needs.

MEMBERSHIP OF THE IPCC BUREAU AND THE TASK FORCE BUREAU

This issue was considered on Friday evening. Delegates discussed a proposal from Venezuela to replace Bureau member Maria Martelo with Miriam Diaz (IPCC-XXVII/Doc.5). The Secretariat explained that, following the mandate given at IPCC-26, a letter had been sent to Venezuela to request further information on the reason for the replacement. In response, Venezuela had explained that Martelo had ended her relationship with the Government for personal reasons. Pointing to Rule 12 of the IPCC Election Procedures, Belgium said such a replacement

is only possible with clear evidence that the current IPCC Bureau member has resigned or is otherwise unable to complete assigned term of office. He said the information provided by Venezuela did not offer this evidence. South Africa suggested contacting Martelo directly, rather than through the Government. Australia supported Belgium and cautioned against setting a precedent where governments can remove dedicated Bureau members. WGI Co-Chair Susan Solomon underscored that this could go beyond Bureau members, for example if a government decided to remove a nominated Coordinating Lead Author, and urged direct consultations with Martelo, and delegates agreed.

IPCC OBSERVER ORGANIZATIONS

As there were no new organizations to consider, this issue will be taken up by IPCC-28.

OTHER BUSINESS

This issue was considered on Saturday morning. Delegates agreed to consider how to use of the money resulting from the Nobel Peace Prize at IPCC-28 (IPCC-XXVII/Doc.6).

DATE AND PLACE OF THE 28TH SESSION

IPCC Secretary Christ explained that IPCC-28 would be held in Budapest, Hungary, in early April 2008, with IPCC-29 taking place in the Geneva, Switzerland, during the first week of September 2008, to celebrate the IPCC's 20th anniversary. She said IPCC-30 would be hosted by Turkey in 2009, and Indonesia would host IPCC-31 in late 2009 or 2010.

CLOSING OF THE SESSION

IPCC-27 was gaveled to a close on Saturday at 10:50 am, and was immediately followed by an address by UN Secretary-General Ban Ki-moon. Chair Pachauri welcomed the Secretary-General, thanking him for positive references to the work of the IPCC, and underscoring the importance of the first address by a UN Secretary-General to the IPCC.

UN Secretary-General Ban Ki-moon congratulated delegates for completing the AR4. He said the new assessment sets the stage for decisive action and its overarching message is that threats are real and there are affordable ways to deal with climate change. He said he is "humbled" after having personally seen the impacts of climate change in Antarctica and the Amazon and stressed that the "challenge of our age" is to fight these threats. He highlighted that climate change can also push developing countries "back on the poverty track" and prevent the achievement of the MDGs.

Indicating that the worst catastrophe scenarios can still be avoided, the UN Secretary-General stressed the UNFCCC COP 13 in Bali as the opportunity to provide a policy response to the IPCC findings. He said policymakers "cannot afford to leave Bali" without a breakthrough in negotiations for a comprehensive new climate treaty by 2009. He highlighted that industrialized countries must assume leadership and developing countries need to join the efforts. He called for incentives for mitigation and adaptation, cleaner technologies and research and development cooperation and emphasized that the SYR answers scientific questions and Bali must translate its findings into action.

In closing, Chair Pachauri presented the UN Secretary-General with the first copy of the final SYR SPM.

A BRIEF ANALYSIS OF IPCC-27

AR4 SYNTHESIS REPORT: PAELLA OR JUST RICE?

Valencia's most famous dish is, without doubt, paella, a concoction of rice, saffron, vegetables, meat, and seafood. What makes paella different from just flavored rice? The three key secrets are: (1) a lengthy and elaborate cooking process; (2) varied ingredients; and (3) the special touch of the cook.

Like paella, the IPCC Fourth Assessment (AR4), and in particular its Synthesis Report, involved a long and elaborate preparation process, input from many disciplines in the natural and social sciences, and the touch of thousands of "cooks" – authors, reviewers and governments.

This brief analysis considers the process of elaborating the AR4 Synthesis Report, the way in which the IPCC has interpreted the recipe for a successful dish, and how it may influence the choice of ingredients in international climate change policy context, particularly at the UN Climate Change Conference in Bali in December.

USING THE RIGHT PAN...

The flat pan in which paella is cooked limits the quantity of ingredients and speeds up the cooking of the rice. In a similar manner, the Synthesis Report and its Summary for Policymakers (SPM) have been shaped by earlier decisions by the IPCC on its length and outline: the length of the SPM was agreed by IPCC in New Delhi in 2004, to ensure brevity and readability of the final document. However, during negotiations in Valencia, many delegations did not want to adhere to strict length limitations, noting that the self-imposed constraint forced them to leave out relevant material. For them, this was as unfortunate as a cook having to leave out the shrimp due to the small size of the pan. Other delegations, nonetheless, insisted that the limitation on length was essential to ensure the document's readability.

Beyond length, readability also requires a careful balance between accuracy and clarity. One seasoned delegate noted, however, that during the Valencia negotiations one of the main issues was whether the key findings were expressed in language that policy-makers and the public can actually understand or whether – in the name of accuracy – they were formulated in more complex scientific and technical terms.

The most heated debates pertained to what to leave out of the SYR and what particular words to choose in framing what stays in. As usual, language became the arena for politics, and debates reflected the political positions of key players. European countries generally sought a compelling text with detailed facts and clear phrases that convey a sense of urgency. Other nations, traditionally opposed to strong international action on climate change, sought a more general text with more complicated language. Under reasons for concern, for example, phrases such as "irreversible impacts" of climate change were removed and the text refers only to vague and less alarmist "large-scale singularities."

Also, the final document does not reflect the dilemma of using only high confidence statements or referring also to impacts of high consequence but for which there is lower confidence. For example, the melting of Greenland and the Antarctic ice sheets is so recent and rapid that it is not adequately covered in the scientific literature reviewed by the IPCC as of mid-2006, which means that attaching a high confidence level to it, in accordance

with IPCC standards, was complicated. However, the impacts of the melting would be of such magnitude that it deserved mention in the section on reasons for concern. Still, in the IPCC only the most robust scientific knowledge is appropriate. In this case, however, it wasn't a problem of models or studies, as the melting is clearly being observed.

... AND THE BEST INGREDIENTS

Paella uses the best ingredients from the sea, from the fields and from the farm. Likewise, those finalizing the Synthesis Report were able to draw from the best available science of its working groups on climate change, vulnerabilities, impacts and adaptation, and mitigation. It is this input from so many disciplines that makes the IPCC output so special. However, on occasion, poor interaction between the working groups makes integration quite difficult. Scientists from different disciplines have different approaches to knowledge, which was reflected, for example, in the assessment of uncertainty throughout the AR4. Another complicating factor was that the working groups do their assessments in parallel. Working Groups II and III (adaptation and mitigation) depend on results from Working Group I (science) for their own assessments, and often find themselves constrained by Working Group I's progress. For example, projections from Working Group I on sea level rise or changes in extreme weather are needed by Working Group II to estimate impacts and adaptation. Some have suggested that a staggered approach with working groups concluding work in different years would be more appropriate in a future assessment report.

The content of the AR4 had already been agreed by the working groups before Valencia. The assessment spells out many findings, with three key contributions to the political process under the UNFCCC. The first is the high level of scientific confidence in climate change, including its existence and anthropogenic drivers. The AR4 represents a giant leap from the TAR regarding increased certainty and robustness of findings. The fact that AR4 is approved by governments makes its political impact stronger, as no government can question it during future negotiations. The AR4 conveys a sense of urgency for action on climate change. Another key message is the affordable costs of mitigation and the need for both mitigation and adaptation. As UN Secretary-General Ban Ki-moon stressed in his speech before the IPCC, and many delegates pointed out, the availability of affordable policy options for reducing emissions is an added value of the AR4 and opens the way to decisive action.

Some of the AR4 findings have already found their way to the UNFCCC process. When discussing Annex I emission reductions for the post-2012 period, the *Ad Hoc* Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG) has referred extensively to Working Group III's findings. In Vienna in September 2007, the AWG noted Working Group III's finding that emissions need to peak within the next 10 to 15 years and be reduced well below half of 2000 levels by 2050 to achieve the lowest stabilization scenario analyzed by the IPCC. The AWG also referred to material from Working Group III as a basis for its conclusion that achieving the lowest scenario would require Annex I parties as a group to reduce their emissions by 25-40% from 1990 levels by 2020 and noted the Working Group II finding that the lower the stabilization level achieved, the lower the consequent damages.

COOK IT WELL

A good cooking process is one that extracts the intrinsic flavors of the ingredients and combines them into a unique dish. One of the main debates around the Synthesis Report has been precisely whether it was synthesizing anything or just summarizing the findings of the working groups. A dictionary defines synthesis as "a new unified whole resulting from the combination of different ideas, influences, or objects," but also as "the process of deductive reasoning from first principles to a conclusion." In Valencia, there were two well-defined sides, one that wanted to be able to add new language synthesizing findings, and another that wanted to stick to approved language from the working groups' SPMs. In the end, it was probably the latter approach that dominated the process. As one frustrated delegate expressed in plenary, "I cannot tell my minister that everything that we have been doing here is putting together sentences from the SPM." Expressions such as "compilation," "cut-and-paste," and "summary of summaries" were also used frequently throughout the week to describe the negotiations.

AND EAT WHILE IT'S WARM!

Many anticipate that the AR4 will have a significant impact on the upcoming climate change negotiations in Bali. In fact, the AR4 is expected to be so influential that its production schedule delayed the start of the Bali conference by four weeks. The timing of the Nobel Peace Prize is not incidental either, as the Nobel Committee has a history of influencing ongoing processes by awarding prizes to key players. Everyone involved in the elaboration of AR4 is aware of the political relevance of the Assessment Report, and countries have been openly mirroring their negotiation positions under the UNFCCC. A newcomer suggested that the IPCC had become politicized. A veteran observer argued, however, that the IPCC has always been politicized, and the only change is that this has been more explicit during the AR4 process.

AFTER THE FEAST

As soon as dinner is over, professional cooks start working on their next meal. Likewise, the IPCC started, if only briefly, to consider its future in Valencia. The IPCC has possibly been the most successful scientific body to inform political processes so far. With nearly every UN agency and international organization jumping on the climate change bandwagon (including the latest addition, OPEC), the future of the IPCC faces many scenarios. It is possible that the IPCC will thrive on the increased demand for climate-related knowledge – but it could also be that such demand will stress the IPCC beyond repair. The IPCC could also benefit from cooperation with numerous other organizations or, on the contrary, face increased competition for resources and expertise. What the future holds no one knows for sure, but many are already thinking about it.

CONCLUSION: RICE OR PAELLA, DOES IT MATTER?

The balanced mix of very different ingredients is difficult to attain, but in the complementary flavors lies the uniqueness of the dish. A great deal of effort has been put in the Synthesis Report to take the findings of the different working groups and blend them together. The fact that an entire IPCC session is devoted to elaborate a Synthesis Report, rather than, for example, asking each working group to produce five pages that

can be pasted together, shows the importance attributed to the SYR SPM, which is likely to be the most widely read document produced by the IPCC.

But is it paella or is it rice? While this can be an interesting debate for culinary aficionados and academics, if you ask someone who is hungry, what matters is having food on your plate. In this sense, the most important aspect of the AR4 Synthesis Report is not whether it synthesizes or compiles the working groups' findings, but whether it contains all the relevant information, including an end to uncertainty about climate change and its causes, the existence of multiple affordable options for mitigation and adaptation, and the urgency of action. And much of the world is hungry. Hungry for action on climate change.

UPCOMING MEETINGS

THIRTEENTH CONFERENCE OF THE PARTIES TO THE UNFCCC AND THIRD MEETING OF THE PARTIES TO THE KYOTO PROTOCOL: UNFCCC COP 13 and Kyoto Protocol COP/MOP 3 will take place from 3-14 December 2007 at the Bali International Conference Center and adjacent Nusa Dua facilities, Indonesia. These meetings will coincide with SB 27 and a meeting of the *Ad Hoc* Working Group on Further Commitments from Annex I Parties under the Kyoto Protocol. For more information, contact: UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.int; internet: <http://www.unfccc.int>

EXPERT SYMPOSIUM ON CLIMATE CHANGE: MODELLING, IMPACTS & ADAPTATIONS: This symposium is organized by the Tropical Marine Science Institute (TMSI) and Department of Civil Engineering of the National University of Singapore, and the British High Commission, Singapore, and will take place from 17-19 December 2007, in Singapore. In addition to the main Symposium, the Department of Civil Engineering of the National University of Singapore will be organizing a Workshop on "Climate Change and Slope Stability" to be held on 18 December 2007. For more information, contact: Integrated Meetings Specialist, tel: +65-6356-4727; fax: +65-6356-7471; e-mail: climatechange@inmeet.com.sg; internet: <http://climatechange2007.org/>

IPCC SCOPING MEETING FOR THE SPECIAL REPORT ON RENEWABLE ENERGY: This meeting will take place in Lübeck, Germany, from 21-25 January 2008. For more information, contact: IPCC Secretariat; tel: +41-22-730-8208; fax: +41-22-730-8025/13; e-mail: IPCC-Sec@wmo.int; internet: <http://www.ipcc.ch/>

FOURTH AUSTRIAN JI/CDM WORKSHOP: This workshop will take place in Vienna, Austria, from 24-25 January 2008. Addressing Joint Implementation (JI) and the Clean Development Mechanism (CDM) under the Kyoto Protocol, the workshop will bring together project developers, investors, validators and governmental authorities with the aim of updating participants about recent developments and future perspectives after the UN climate change conference in Bali. The workshop is aimed at companies and institutions interested in exchanging information and lessons learned. For more information, contact: Peter Koenigler, Kommunal Kredit; tel: +43-1-31-631; fax: +43-1-31-631-104; e-mail: p.koenigler@kommunkredit.at; internet: <http://www.ji-cdm-austria.at/en/portal/index.php>

LIVING WITH CLIMATE CHANGE: ARE THERE LIMITS TO ADAPTATION?: Organized by the Tyndall Centre for Climate Change Research and the University of Oslo, this conference will take place at the Royal Geographical Society in London, the UK, from 7-8 February 2008. The conference will consider strategies for adapting to climate change, in particular to explore the potential barriers to adaptation that may limit the ability of societies to adapt to climate change and to identify opportunities for overcoming these barriers. For more information, contact: Vanessa McGregor, Tyndall Centre for Climate Change Research; tel: +44-1603-593900; fax: +44-1603-593901; e-mail: adaptation2008@uea.ac.uk; internet: <http://www.tyndall.ac.uk/research/programme3/adaptation2008/index.html>

DELHI SUSTAINABLE DEVELOPMENT SUMMIT 2008: SUSTAINABLE DEVELOPMENT AND CLIMATE CHANGE: This Summit will take place in New Delhi, India, from 7-9 February 2008, and will offer a platform for leading figures from North and South to address the vital issues of climate change and sustainable development, and to set the stage for an intensified search for global solutions during the year. For more information, contact: Summit Secretariat, TERI; tel: +91-11-2468-2100; fax: +91-11-2468-2144; e-mail: dsds@teri.res.in; internet: <http://www.teriin.org/dsds/2008/>

WASHINGTON INTERNATIONAL RENEWABLE ENERGY CONFERENCE 2008: This conference will be held in Washington, D.C., US, from 4-6 March 2008. The event will aim to advance goals on energy security, climate change, air quality, and sustainable development, including agriculture and rural development. It will also seek to demonstrate global leadership in renewable energy research, policy development, technology innovation, commercialization and development, and to foster industry and government collaboration. For more information, contact: American Council on Renewable Energy; tel: +1-202-393-0001; fax: +1-202.393.0606; internet: <http://www.wirec2008.org/>

28TH SESSION OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE: This meeting is tentatively scheduled to be held in Budapest, Hungary, from 9-10 April 2008. For more information, contact: IPCC Secretariat; tel: +41-22-730-8208; fax: +41-22-7 30-8025/13; e-mail: IPCC-Sec@wmo.int; internet: <http://www.ipcc.ch/>

GLOSSARY

(G)(t)CO ₂ -eq	Giga tones CO ₂ equivalent
AR4	IPCC Fourth Assessment Report
IPCC	Intergovernmental Panel on Climate Change
MDGs	Millennium Development Goals
SPM	Summary for Policymakers
SYR	Synthesis Report
TAR	IPCC Third Assessment Report
TGICA	Task Group on Data and Scenario Support for Impact and Climate Assessment
UNFCCC	United Nations Framework Convention on Climate Change