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SIXTH ASSESSMENT REPORT (AR6) PRODUCTS

Special Reports

Proposed themes for Special Reports during the Sixth Assessment Report (AR6) cycle

(Submitted by the Acting Secretary of the IPCC)

SIXTH ASSESSMENT REPORT (AR6) PRODUCTS

Special Reports

Proposed themes for Special Reports during the Sixth Assessment Report (AR6) cycle

Background

At the 41st Session of the IPCC in Nairobi, Kenya, February 2015, the Panel decided (Decision IPCC/XLI-4) that the identification of Special Reports, including those with a focus on regional information and priorities, should be made as early as possible in the AR6 cycle and in the context of all of the deliverables of the cycle. The Panel further requested the IPCC Secretariat to invite Member States to submit views on potential themes for Special Reports during the AR6 cycle and to also seek input from the Working Group Co-chairs. The Panel agreed to further discuss the issue at its 43rd Session in early 2016.

By its correspondence of 6 July 2015, the IPCC Secretariat invited Member States and Observer Organizations to submit proposals for Special Reports.

At the 42nd Session of the IPCC in Dubrovnik, Croatia, October 2015, the Panel had in front of it the documents IPCC-XLII/INF.13, Corr.1, IPCC-XLII/INF.13, Corr.1, Add.1 and IPCC-XLII/INF. 13, Corr.1, Add.2, on proposed themes for Special Reports during the Sixth Assessment Report (AR6) cycle. During the consideration of agenda item 5.4. Expert Meeting on Scenarios, 18-20 May 2015, Laxemburg, Austria, at this 42nd Session of the Panel, the United States of America reflected on next steps to address the set of recommendations from the Expert Meeting, particularly how scenario-related work could be coordinated in a manner that ensures that a common set of scenarios are used across Working Groups (WGs) or that comparisons are made in case different scenarios are used, and urged the new members of the IPCC Bureau to consider the proposal for a Special Report from the Expert Meeting considering that it is not reflected in the list of proposals included in document IPCC-XLII/INF.13, Corr.1. The Working Group III Co-chair suggested that the proposal for a Special Report should be considered together with the other proposals which have already been submitted.

The Panel agreed that time was not enough to allow for an initial discussion on the subject and that the new IPCC Bureau should consider this issue during its session on 9 October 2015. Some delegations including Norway, Mexico, Switzerland and the United States of America asked that the new IPCC Bureau should consider the various themes that seem to be emerging from the submissions made on the Special Reports so far which could be submitted to the 43rd Session of the IPCC to help move that process forward.

At its 50th Session (Dubrovnik, Croatia, on 9 October 2015) the IPCC Bureau considered the topic of Special Reports (SRs) and agreed that this topic will be discussed and decided upon at the 43rd Session of the Panel. However, to assist the Panel in reaching an informed decision, it was agreed that:

- The Secretariat would prepare a document containing a synthesis of the proposals received for SRs clustering them by themes for submission to the 43rd Session of the Panel.
- The Co-chairs of each Working Group (WG), having consulted with their Vice-chairs and with the Co-chairs and Vice-chairs of the other Working Groups, will draft a commentary on the proposals for SRs taking into account the relevant guidance on scientific matters specified under the Decision Framework for Special Reports agreed at the 29th Session of the Panel (Geneva, Switzerland, 31 Aug. - 4 Sept. 2008) and later related decisions. These commentaries will be submitted for consideration by the IPCC Bureau at its next session in 2016. The commentaries will not prioritize any individual proposal.

Two additional proposals were received from Member States in November and December 2015: a proposal for a Special Report on Cities and Climate Change (SRCC) and a proposal for a Special Report on Climate Change and Mountains.

At the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change, from 30 November to 11 December 2015, in Paris, France, the Conference of the Parties invited “the Intergovernmental Panel on Climate Change to provide a special report in 2018 on the impacts of global warming of 1,5°C above pre-industrial levels and related global greenhouse gas emission pathways”.

Appendix 1 to this document contains a compendium of all proposals for Special Reports received by the IPCC Secretariat by 25 January 2016.

**Compendium of all proposals for Special Reports
received by the IPCC Secretariat by 25 January 2016.**

1) Summary Table

The proposed themes are presented in alphabetical order of proposing Member State or Observer Organization. Proposals received after the 42nd Session of the Panel listed in the summary table are attached as Annex 1 to 28.

Proposals by Member States			
Annex Number	Country	Title	Relations to other proposals
1	Algeria	Climate Change and Desertification	Related to the proposal from Saudi Arabia (Annex 10) and UNCCD (Annex 21)
2	China	Impact of Climate Change on the Cryosphere	Related to the proposals from South Africa (Annex 12) and from the USA (Annex 16)
3	China	Climate Change and Human Health	
4	China	Climate Change and Ocean	Related to the proposals from Monaco (Annex 8) and Spain (Annex 14)
5	Germany	Integrating adaptation and mitigation in comprehensive near term solutions to climate change	
6	Ireland	Special Report on Climate Change, Food and Agriculture	Related to the proposal by CAN International (Annex 17b)
7	Japan	Japan's view on potential themes for Special Reports	
8	Monaco	Ocean and Climate Change	Related to the proposals from China (Annex 4) and Spain (Annex 14)
9	Netherlands	Carbon Pricing	
10	Saudi Arabia	Special Report on Desertification with Regional Aspects	Related to the proposal from Algeria (Annex 1) and UNCCD (Annex 21)
11	South Africa	Special Report on Adaptation Costs in Developing Countries	
12	South Africa	Special Report on Antarctic/Southern Ocean Region	Related to the proposals from China (Annex 2 and 4), Monaco (Annex 8), Spain (Annex 14), and USA (Annex 16).
13	South Africa	Special Report on Managing the Diversity and Contradictions of Climate Change Data and Information	

14	Spain	Oceans and Climate Change: Special Report on the Evidences, Impacts and Adaptation to the Climate Change of the Oceans	Related to the proposals from China (Annex 4) and Monaco (Annex 8)
15	UK	Update of key policy-relevant messages in AR5 in support of review and assessment procedures in new UNFCCC agreement	
16	USA	Global and Regional Consequences of Changes to the Frozen World	Related to the proposals from China (Annex 2) and South Africa (Annex 12)

Proposals by UN and Observer Organizations

Annex Number	Organization	Title	Relations to other proposed themes
17a	CAN International	Decarbonisation and low carbon development (incl. on 1.5°C-warming scenarios)	
17b	CAN International	Food security and climate change	Related to the proposal from Ireland (Annex 6)
17c	CAN International	Sea level rise and glacial melting	Related to the proposal from the USA (Annex 16)
18a	European Union	Special Report on Aviation and Maritime	
18b	European Union	Special report on AFOLU	
19	State of Palestine	The Impact of Climate Change on National, Regional and International Security	
20	State of Palestine	Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation – Update	
21	UNCCD	Climate Change and Land Degradation – An Assessment of the Inter-linkages and Integrated Strategies for Mitigation and Adaptation	Related to the proposals from Algeria (Annex 1) and Saudi Arabia (Annex 10)
22	UNEP	Global Adaptation Outlook	

Additional Proposals

Annex Number	Country/Meeting	Title	Relations to other proposed themes
23	Norway	Mitigation, climate stabilization scenarios and sustainability	
24a	Expert Meeting on Scenarios, 18-20 May 2015, Laxenburg, Austria	Special Report on Scenarios	
24b	Expert Meeting on Scenarios, 18-20 May 2015, Laxenburg, Austria	Special Report on the Interaction between Adaptation, Mitigation and Sustainable Development	
25	South Africa	Special Report on Cities and Climate Change (SRCC)	

26	COP 21 - Paris	Special Report on the impacts of global warming of 1.5°C and related emission pathways	
27	Switzerland	Special Report on Climate Change and Mountains	
28	UNFCCC Secretariat	UNFCCC process	

2) Proposals

ANNEX 1

ALGERIA PROPOSAL: CLIMATE CHANGE AND DESERTIFICATION

Details of Submitting Official

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Title of proposed Special Report

Climate Change and desertification

Relevance of the topic for climate change

Climate change and desertification are closely linked. Climate change contributes to the land degradation which in turn affects climate change. The climate change, on the one hand, enhances land degradation, especially in arid venerable regions, and desertification, on the other hand, exacerbates climate change due to the diminution of vegetation cover.

Fertile soil and healthy ecosystems are known as an important global carbon sink thus minimizing the presence of CO₂ in the atmosphere. Healthy soils are important regulator to climate system. However, the capacity of soil as climate regulator is undermined by degraded land and arid ecosystem. It is also assumed that desert dust particles are also contributing to the warming of the planet.

The climate change and desertification nexus is particularly alarming considering that, in case of Africa, 65 % of the continent surface is occupied by arid zones and more than 85 % in North Africa. Therefore, climate change and desertification enhance the vulnerability of these regions and put the life of mankind, fauna and flora in the present and the future in hypothetical situation.

In line with the conclusions of **SBSTA 41 agenda item 8(a) Matters relating to science and review of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change**, Algeria invite IPCC to dedicate a Special Report on the link between climate change and desertification considering arid and semi-arid areas as vulnerable ecosystem regions deserving a special attention and not just embedded in what is mentioned as "land degradation". The impact of climate change through further enhancement of temperature increase and the intensification of drought and heat wave events in the arid and semi-arid regions are well scientifically established. In addition to the land degradation, the increase of the soil salinity and the advance of desert, the sand storms and the short and long-range transport of desert dust particles constitute another serious problem that many regions of the world are facing. The desert dust particles constitute the greater portion of the atmospheric aerosols, atmospheric components, in which the fifth IPCC assessment report outlined the highest uncertainty with regards to their positive and negative feedback to climate change as well as their warming or cooling capacity.

Particular attention should be given to examine in deep details what would be the warming or cooling capacity of desert dust particles and what would be their effects on precipitation and hydrogeological cycles, on human health and the degradation of ecosystems within the context of enhanced climate change.

The desert dust particles through modification of solar radiation and soiling and degradation of renewable energy equipments can harm the efforts of semi-arid and arid regions to curb carbon emissions and to make a successful transition to renewable and clean energy. Furthermore, it is now well established that enhancement of desertification due to climate change through the reduction of vegetation cover, the degradation of biodiversity and biomass, modifies the land surface and therefore impact the carbon sequestration capacity. On the other hand, the vulnerability of water resources is exacerbated by the evapo-transpiration and water salinity.

Desert dust particles influence the radiative balance of the planet, either directly by scattering and absorbing incoming solar radiation, or indirectly by changing the optical properties of clouds which are in turn an important player in the climate system. Desert dust particles also contain iron, an important fertilizer for the growth of phytoplankton, a significant global carbon sink. Desert dust not only affects climate, but also is influenced by it. Its generation and short and long-term atmospheric transport and dry and wet deposition are sensitive to climatic conditions.

Desert dust particles can also play an important role as a passive recorder of climate change under different climatic conditions in the past. Addressing and understanding the links between desert dust particles and climate in the past will be crucial to evaluate the future impacts of desert dust particles on the Earth's climate system in a warming world.

From the aforementioned exposure, it is clear that the link between climate change and desertification is cross linked topic that involves the three IPCC working groups. Scientific elements related to increasing temperature, hydrogeological cycles, extremes events, drought and heat waves exacerbated in arid regions along with the role of desert dust particles in warming climate among others, are all within the subject of WGI. The vulnerability of arid regions, the land degradation, the degradation of biodiversity and biomass, soil salinity, water scarcity,... can be covered by WGII while the WGIII can address the mitigation potential of arid regions and the effect of desertification on the deployment of renewable energy.

It is also important to underline that since several years, the number of peer-reviewed scientific paper and technical reports documenting the link between climate change and desertification is increasing dramatically. All these materials are qualitatively and quantitative sufficient enough deserving to be documented in an IPCC special report.

Relevance of the topic for policy making

Desertification and land degradation affect billion of people in particular in African countries. More than 130 countries are affected by desertification and land degradation. It has far reaching implication on the livelihood and well being of the poorest among the poor. It has an impact on food security and social, economical and political stability of the countries are affected. It is well recognized that climate change will lead to severe weather events including drought and heat waves. The countries affected by desertification have not contributed to climate change but will be most severely affected by its negative impacts. They will be also affected owing to the limited carbon sequestration capacities of the degraded land. African countries, in particular, will have to adapt to more arid and semi arid ecosystem and promote national adaptation plan to be mainstreamed into their national development strategies and economic priorities including at regional and local level. Desertification is an issue of outmost relevance to all African leaders.

The foreseen report should address the link of climate change and desertification under different climatic scenarios and underline the vulnerability of the impacted regions in terms of soil degradation, water scarcity, food security, population settlements, economical fragility, and political stability. The report should highlight the limited capability of many regions of the world to adapt to

the desertification and to sink carbon because of desertification. The development of renewable energy technology should consider the impact of desertification on the operation of renewable equipments (photovoltaic panels, thermal collector and receptor and wind turbines).

Justification of the need for a Special Report

If the relation between carbon sequestration and tropical forests is far well addressed, the link between climate change and desertification is not well documented in the previous IPCC reports as also outlined in the conclusions of SBSTA 41 agenda item 8(a) Matters relating to science and review of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, " The SBSTA noted that the AR5 identified some information gaps, including in developing countries, especially in Africa, and on emerging issues, such as the links between climate change and desertification." " The SBSTA invited the IPCC and relevant international and regional research organizations to inform Parties about efforts undertaken to address the information gaps identified in the AR5, including as referred to in paragraph 4 above, for example at the meeting of the research dialogue at SBSTA 42 (June 2015)."

IPCC has a leadership role to play in promoting a better scientific understanding between climate change and desertification. A special report on this issue is urgently required and will certainly provide a perfect synergy between two UN Conventions: Climate Change and Desertification.

Key issues proposed to be addressed in the Special Report

The special report may focus on the soil of the desert as a carbon sink as well as on the long term impact of climate change on the countries affected by desertification based on simulation model until the end of the 21st century. The study may also address the role played by desert dust particles on the warming of the planet as well as their role in fertilizing marine ecosystems.

The special report may address the following issues but not limited to:

- The warming scenarios in arid regions considering desertification,
- The impact of climate change on desertification and vice versa,
- The role of desert dust particles in warming the climate,
- The role of desert dust particles as fertilizers of the ocean ecosystems
- The vulnerability of arid and semi-arid region to desertification under the context of climate change
- The impact of desertification on the deployment of renewable energy

Potential Partner Organizations

The study can be undertaken in collaboration with the Algerian government as a host of the expert meeting in a desert area and in partnership with the relevant international organization dealing with desertification including scientific body of the United Nations Convention to Combat drought and desertification in particular in Africa.

Time schedule

216-2018

Budget estimates

To be determined latter

Possible donors

Relevant UN organizations, relevant research institutions, donors from governments,...

CHINA PROPOSAL: IMPACT OF CLIMATE CHANGE ON THE CRYOSPHERE**Details of Submitting Official**

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Title of proposed Special Report

Impact of Climate Change on the Cryosphere
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Relevance of the topic for climate change

- As one of the five spheres of the climate system, the cryosphere comprises important climate variables.
- Due to the regional characteristics of the climate change, changes of the cryosphere bear different features in different regions.
- Changes of the cryosphere at regional and global scales also influence the climate change, especially in the regions with sea ice, snow cover and permafrost.
- Changes of the cryosphere are closely related to sea surface, hydrology, ecology and carbon, all of which have certain impact on the climate system.

Relevance of the topic for policy making

1. Changes of the cryosphere have already influenced more than three fourth of the world population.
2. Changes of the cryosphere have posed great influence on many aspects of the socioeconomic development, including ocean sailing route, engineering and infrastructure projects in cold regions (railways, pipelines, ports, etc.), disasters (glacier collapse, blizzard, coastal ice crackling, etc.), fisheries, ecological protection, water supply, agriculture, culture and tourism, etc.

Justification of the need for a Special Report

- A comprehensive assessment report on the cryosphere, its impact, and the potential adaptation measures is still not available.
- A decision-oriented report on the cryosphere is greatly needed in many countries/regions, especially coastal regions, low lying countries and arid/semi-arid regions where melt water accounts for a large proportion of the total amount of water supply.
- The more accurate the understanding of the impact of the cryosphere is, the more the people will benefit in the 21st century at global and regional scales.

Key issues proposed to be addressed in the Special Report

- New understanding of the changes of the cryosphere at global and regional scales
- Assessment of the impact of the above changes
- Projection of the impact under the new scenarios of IPCC
- Potential adaptation and mitigation measures that are applicable and feasible

Potential Partner Organizations

- IPCC Working Group I, Working Group II and Working Group III
- World Glacier Monitoring Service (WGMS)
- IUGG International Association of Cryospheric Sciences (IACS- IUGG)
- IUGG International Association of Hydrological Sciences (IAHS-IUGG)
- International Permafrost Association (IPA)
- State Key Laboratory of Cryospheric Sciences (SKLCS) of Chinese Academy of Sciences

Time schedule

2016-2019

Budget estimates

Four working groups will be established with around 60 participants in each group and 300, 000 Swiss francs for each group. The total budget estimate is around 1.2 million Swiss francs.

Possible donors

CHINA PROPOSAL: CLIMATE CHANGE AND HUMAN HEALTH

Details of Submitting Official

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Title of proposed Special Report

Climate Change and Human Health

Relevance of the topic for climate change

Human health is the most direct key area that is influenced by climate change and other environmental factors, such as air, water and soil pollution, and the changes of natural ecosystems. Many institutions and research projects have studied the possible impact of the climate change on human health, such as the Climate Change and Human Health Program developed by WHO. IPCC needs to integrate long sequences of weather and climate data, environment index and socioeconomic conditions to strengthen the research on the impact of the climate change on human health.

Relevance of the topic for policy making

Human health will be most probably set as a critical development area in the Post 2015 Sustainable Development Goals (SDGs), which is to be formally adopted in September 2015. IPCC is supposed to put forward relevant advice and suggestions concerning the impact of the climate change on human health.

Justification of the need for a Special Report

The impact of the climate change on human health has been kept in a multi-scale, all round and multi-level manner. Data released by WHO on 25 March 2014 demonstrated that the death toll caused by air pollution-triggered diseases had reached approximately 7 million, which meant that 1 out of 8 deaths in the world was evoked by air pollution. The global climate change will also influence human health by aggravating the existing health problems, therefore making the already poor health conditions even worse in many regions, especially in Least Developed Countries (LDCs).

Key issues proposed to be addressed in the Special Report

- The latest development of the relationship between global/regional scale climate and human health
- Assessment of the impact of the observed climate change and extreme climate events on human health and its vulnerability
- Projection of the possible impact and risks of the climate change on human health under IPCC new scenarios
- Possible adaptation and mitigation measures taken on the global and regional scales

Potential Partner Organizations

World Health Organization (WHO)
International Association of National Public Health Institutes (IANPHI)

Time schedule

2015-2016: preparation period
2017-2018: compilation period
2019: reviewing and releasing period

Budget estimates

Around one million Swiss francs.

Possible donors

CHINA PROPOSAL: CLIMATE CHANGE AND OCEAN**Details of Submitting Official**

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Title of proposed Special Report

Climate Change and Ocean

Relevance of the topic for climate change

Oceans pose significant influences on global climate change through the ocean-atmosphere exchange of heat, energy and materials. Oceans and coastal zones are also critical areas for socioeconomic activities. Sea level rise and changes in marine environment, marine disasters, marine ecosystem and marine biodiversity, caused by the climate change, have brought enormous impact on socioeconomic activities. Therefore, it is necessary to assess the multi-scale, all-round and multi-level changes occurred in the ocean under the background of global climate change. It bears substantial significance for the understanding of the impact of climate change on the oceans as well as the response of the ocean to the climate change.

Relevance of the topic for policy making

The special report can inform decisions-makers to take ocean-oriented mitigation and adaptation measures to tackle the climate change.

Justification of the need for a Special Report

Being the key sphere constituting the earth's climate system, oceans are vital components of the earth resources and the environment. Changes of oceans bear enormous influence on the climate system and the socioeconomic development. Meanwhile, changes of the marine environment are also affected by the global climate change and anthropogenic activities. Protecting the climate goes hand in hand with protecting the ocean. The cause of understanding and responding to the changes of the marine environment needs to be carried out in a scientific, holistic and farsighted manner. The tasks of responding to marine disasters, preventing marine pollution, and preventing the deterioration of marine ecosystems and the reduction of marine biodiversity need to be dealt with effectively. All these aim to offer policy suggestions for decision-makers to take ocean-oriented mitigation and adaptation measures to tackle the climate change.

Key issues proposed to be addressed in the Special Report

1. Trends and risks of marine disasters under the background of the global climate change
2. The impact of and adaptation to sea level rise
3. The impact of climate change on coastal zones and vulnerability assessment
4. Changes of marine ecosystems
5. Ocean acidification and its ecological effects
6. Marine pollution and its response
7. Marine management
8. Oceans in 2100: the projection of marine environment changes

Potential Partner Organizations

International Maritime Organization (IMO)
Global Ocean Observing System (GOOS)
ICSU Scientific Committee on Oceanic Research(SCOR-ICSU)
UNESCO Intergovernmental Oceanographic Commission(IOC-UNESCO)
Intergovernmental Ocean Carbon Coordination Project (IOCCP)
Surface Ocean – Lower Atmosphere Study (SOLAS)
IUGG International Association of Meteorology and Atmospheric Sciences (IAMAS-IUGG)
IUGG International Association for the Physical Sciences of the Oceans(IAPSO-IUGG)
IUGG International Association of Hydrological Sciences(IAHS-IUGG)

Time schedule

2015-2016: preparation period
2017-2018: compilation period
2019: reviewing and releasing period

Budget estimates

Around one million Swiss francs.

Possible donors

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GERMANY PROPOSAL: INTEGRATING ADAPTATION AND MITIGATION IN COMPREHENSIVE NEAR TERM SOLUTIONS TO CLIMATE CHANGE

Details of Submitting Official

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Title of proposed Special Report

Integrating adaptation and mitigation in comprehensive near term solutions to climate change

Relevance of the topic for climate change

- This Special Report would provide a scientific assessment of the climate policy options and experiences available for implementing solutions that include both adaptation and mitigation in the next decades and that correspond to the ultimate objective of the UNFCCC and the long term global goal specified by the Paris Agreement.

Relevance of the topic for policy making

- This Special Report would provide information on the effectiveness of climate policy measures and support policy makers in prioritizing and deciding about mitigation and adaptation actions in the next decades.
- It would provide information on how to create synergies between adaptation and mitigation measures, and on how to avoid tradeoffs and conflicts between them.
- It would provide a scientific basis for assessing policy and technology options within the context of the UNFCCC.
- It should also help understanding the relevance and potentials of various initiatives and the growing engagement of both state and non-state actors bearing in mind that a range of actors' actions could form an integral part of the contributions to UNFCCC and allow Parties to become more ambitious post 2020.

Justification of the need for a Special Report

- The Fifth Assessment Report of the IPCC has shown that urgent and ambitious action is needed to avoid dangerous anthropogenic interference with the climate system. The motivation for this proposal for a Special Report is the urgent need of comprehensive and reliable scientific information on near term actions and solutions to the climate change challenge. This proposal provides the basic conceptual idea for a Special Report that would provide such information.
- It is expected that a comprehensive assessment of this topic needs particular attention from all WGs, in particular by WG2 and WG3. This cross cutting approach can best be implemented within a Special Report. The key findings of the Special Report could then be capitalized by all WGs in their contributions to the Sixth Assessment Report of the IPCC.

- In addition, an integrated perspective on mitigation and adaptation to reduce climate change risk in line with the ultimate objective of the UNFCCC and in the context of sustainable development could also enhance cross-cutting conceptual work between the IPCC-WG communities, which would provide the basis for future integrated research in this field.

Key issues proposed to be addressed in the Special Report

Initial list of topics:

- Understanding mitigation and adaptation experiences and activities to reduce climate change risk in line with the ultimate objective of the Convention and in the context of sustainable development
- Interactions and integration of mitigation and adaptation in key sectors and regions in different institutional contexts
- Human dimensions: understanding the roles of different actors across regions, considering values, cultures, goals, risk perceptions, and behaviors
- Drivers, enablers, barriers and risks of transformation
- Empowering decision making under uncertainty
- Foundations for implementing appropriate action, for monitoring and evaluating policies, and technology options for adaptation and mitigation

Time schedule

To be adopted by 2018/19, taking into account the needs of the UNFCCC.

IRELAND PROPOSAL: SPECIAL REPORT ON CLIMATE CHANGE, FOOD AND AGRICULTURE



Comhshaol, Pobal agus Rialtas Áitiúil
Environment, Community and Local Government



Mr. Martin-Novella,
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20th August 2015

Re: Proposed Special Report on Climate Change, Food and Agriculture

Dear Mr. Martin- Novella,

The Government of Ireland wishes to welcome the report on the Expert Meeting on Climate Change, Food, and Agriculture which was held in Dublin from the 27-29 May 2015. The report reflects a wide range of new information that has emerged from the scientific community since the publication of the IPCC 5th Assessment Report (AR5). The report also indicates that it would be timely to produce a Special Report on this topic.

Following the Expert Meeting's report and discussions relating to the Report, I wish to inform you that the following Governments jointly support the submission of a Special Report on Climate Change, Food and Agriculture:

- The Government of Ireland;
- The Government of Tanzania;
- The Government of New Zealand; and
- The Government of Costa Rica.

Adequate and robust food production systems are central to human survival and development. The AR5 has identified evidence that climate change is already impacting on food production systems and that these systems are likely to be increasingly vulnerable to future impacts. Food production systems are themselves direct and indirect sources of greenhouse gas emissions and a key driver of land use change. There is a need for better understanding of these impacts, the measures required to enhance the adaptive capacity and resilience of agricultural systems to climate change, and an understanding of the challenges and opportunities associated with reducing emissions and enhancing sinks in the agricultural sector. Through the production of a Special Report on the topic of Climate Change, Food and Agriculture the IPCC can make a significant contribution to advancing global understanding of these issues and potential solutions that might apply.

At a policy level the threat that climate change poses for food production is recognised in the objectives of the UNFCCC. It is self-evident that a Special Report on this topic would be of interest for the Parties to the UNFCCC and can complement its work in this area and inform its future actions.

The report from the Expert Meeting has identified a number of key issues that could be addressed in a special report. These come under the remit of all three Working Groups. The topic can therefore provide an integrating framework to address areas of fundamental science, impacts and adaptation, and mitigation of climate change.

We consider that a number of potential partner organisations can contribute to this report. The FAO has a particular role in this area and could be involved in informing and supporting the provision of a Special Report. The Global Research Alliance on Agricultural Greenhouse Gases, with 46 member countries, could also be approached to assist with mobilising global expertise.

In relation to the time schedule and costs, we would wish and expect that the IPCC should at its session in October 2015 mandate the new bureau to produce a scoping document for such a Special Report. This scope should be available for a decision in early 2016. The secretariat should also provide details on costs for the production of the report at that time so that Governments can make an informed decision. It is our view that the SR would be progressed in 2016 and aim to be completed in early 2018.

Yours sincerely

John O Neill
Head of Delegation
Government of Ireland

JAPAN'S VIEW ON POTENTIAL THEMES FOR SPECIAL REPORTS

Previous Special Reports have played an important role in the IPCC, providing the latest scientific findings to policymakers in the world by supplying information focused on specific topics prior to the publication of the comprehensive assessment report in each assessment cycle. Special Reports within the next assessment cycle should also be based on maintaining appropriate themes and timings.

Special Reports should be prepared in an efficient manner, taking into account the limitations of financial resources and the burden on the authors, as well as avoiding unnecessary duplication. Therefore, the publication should be limited to those truly needed.

The topics of future Special Reports should be selected from areas in which new scientific knowledge has been accumulated after the cut-off date of reference documents for the Fifth Assessment Report (AR5). It would be beneficial to consider the following aspects when taking up each topic for the theme of future Special Reports.

If the Special Report on the Ocean, requested at the 41st Session by the Principality of Monaco, is to be approved, it should have a clear focus, based on scientific advancement and social needs. Notably in recent years, governance for sustainable use of the ocean has been a subject of international attention. Accordingly, research is becoming more transdisciplinary, building upon enhanced knowledge of the ocean's physical, chemical and biological dynamics and reflecting inputs from multiple stakeholders in order to provide a comprehensive understanding of the impacts of anthropogenic activities on ocean systems. In this light, it would be extremely useful for the Special Report to focus on "ocean sustainability", with an aim to acquire knowledge needed to benefit from marine and coastal ecosystem services. Such report could help us better predict, mitigate and adapt to future changes in the ocean and their impacts on human societies and the environment.

Collaboration with relevant international organizations such as UNESCO/IOC, the Global Ocean Observing System (GOOS), Global Climate Observing System (GCOS), Future Earth, the World Climate Research Programme (WCRP) and the Group on Earth Observations (GEO) would be essential in making the proposed Special Report on the Ocean.

If the Panel decides to initiate the process to produce a Special Report on Climate Change, Food and Agriculture, regarding which the experts had a fruitful discussion at the meeting in Dublin at the end of May, further consideration should be carefully given in scoping of the report in order to select meaningful topics and keep the focus of the report from becoming blurred. In terms of structure, the report should discuss mitigation and adaptation in a balanced way.

On equilibrium climate sensitivity (ECS), the AR5 WGI Report found a likely range of 1.5-4.5°C, which is larger than the ECS concluded by the AR4 WGI, and indicated no best estimate. Despite this large uncertainty, the WGIII/Table SPM.1 assumed a value of 3.0°C, and important policy decisions have been made recently based on this value (e.g. G7 Elmau Summit). Given that ECS has wide policy implications, it is desirable to promptly discuss and further analyze, amongst others: the current limitation of future projection due to uncertainty, studies on reducing its uncertainty (such as studies on radiative forcing of aerosols which largely affects this uncertainty) and ways to interpret and have it reflected in long term scenarios.

Considering impacts from climate change are place-and context-specific, and some regions might face more severe impacts than other regions, climate change impacts on especially vulnerable regions could be a theme of future reports. If the Parties agree to produce such a report, cooperation with existing international organizations/networks should be considered to collect scientific data and information in an effective and comprehensive manner.

MONACO PROPOSAL: OCEAN AND CLIMATE CHANGE

1. Details of Submitting Official

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2. Title of proposed Special Report

“Ocean and climate change”

Background

As a part of a much larger system, the ocean plays a key role in climate mechanisms. It provides many crucial ecosystem services but, at the same time, numerous inhabitants of the planet are affected by the impacts of climate changes on ocean, particularly those living in coastal areas, in islands and developing countries. As it is facing huge adaptation challenges, particularly in coastal areas, and providing mitigation opportunities, there is an urgent need to update scientific knowledge on the critical roles of the ocean and the associated challenges. This would provide a useful reference point for policy makers and organizations managing global marine issues, particularly marine ecosystems and maritime activities; enabling the implementation of policies that ensure sustainable development of populations and preserve our main legacy.

A Special Report on “Ocean and Climate Change” would, in a cross-working group approach, address for the first time this important component of the Earth System. The Report would integrate and update the assessment of AR5 using the abundant new literature published since the cut-off dates, bringing new information into one place. Moreover, this will accelerate the production of science and will be a stepping stone facilitating the preparation of AR6.

At its 41st session in Nairobi (24-27 February 2015), the IPCC examined the official request put forward by the Government of Monaco for the establishment of a Special Report on the Ocean. Twenty or so countries expressed their opinion during the session, providing their support for a special report on the Ocean. However, several countries requested that further information be provided with regard to the project.

The present proposal addresses this request. It has been produced with the cooperation of numerous experts and scientists including several Coordinating Lead Authors (CLAs) and Lead Authors (LAs) of the 5th Assessment Report.

3. Relevance of the topic for climate change

The Ocean stretches across 70% of the earth’s surface. It is also a critical part of the whole climate system, driving weather systems, stabilizing global temperature, and regulating atmospheric gas content. It plays a crucial role in life on Earth, through its impacts on terrestrial ecosystems, as well

as the marine ecosystems. Regarding climate change issues, the challenge is not to think of the ocean as its own independent system but as a vital part of a much larger system.

By exchanging huge amounts of heat, water, oxygen and greenhouse gases with the atmosphere, the ocean plays a fundamental role in climate variability across multiple time-scales, as exemplified by its role in the recent warming hiatus. One of the largest limitations in our ability to predict the timing of climate change impacts is linked to our understanding of ocean processes and ocean interactions with other components of the Earth System, such as the atmosphere and cryosphere. An improved and sustained monitoring of the global ocean is, therefore, imperative to the development of future projections of our weather and climate.

It has recently been estimated that the annual “gross marine product” (GMP) – equivalent to a country’s annual gross domestic product – is at least US\$2.5 trillion; the total “asset” base of the ocean is at least US\$24 trillion. Underpinning this value are direct outputs (fishing, aquaculture), services enabled (tourism, education), trade and transportation (coastal and oceanic shipping) and adjacent benefits (carbon sequestration, biotechnology). It is estimated that 3 billion people obtain at least 20% of the protein requirements from the ocean.

The ocean is home to 226,000 described eukaryotic species, including 35 animal phyla, 14 of which are exclusively marine. Marine ecosystems also support livelihoods of people through fisheries, aquaculture, coastal protection, tourism, and related activities. An estimated 3 billion people receive at least 20% of their protein needs from oceanic organisms.

The inertia of the ocean to change is huge, yet IPCC AR5 concluded with high confidence that the current rate of change in ocean temperature and chemistry is the fastest it has ever been in the last 65 million years, if not 300 million years. These changes represent huge challenges to organisms and ecosystems.

An important portion of the Earth’s total carbon is also stored in the ocean reservoir. The ocean carbon inventory is more than 60 times larger than the inventory of the preindustrial atmosphere and oceanic processes and thus, dictates the natural CO₂ concentration of the atmosphere. Prior to the Industrial Revolution, this reservoir was in a relatively steady state.

The ocean acts as a climate integrator. It has stored more than 90% of the Earth’s additional heat resulting from the increased greenhouse effect since the 1970s, offsetting much atmospheric warming but increasing ocean temperature and sea level. It also slows down the greenhouse effect by absorbing about 30% of anthropogenic emissions of carbon dioxide.

This buffering process is not without consequences for the ocean physics, chemistry, life and ecosystem services of the ocean, as well as the whole climate system. The ocean is getting warmer, sea ice is melting, and sea level is rising. Seawater pH decreases due to CO₂ absorption and it is less oxygenated due to surface warming and increased stratification.

Such changes in ocean properties have strong impacts on organisms, ecosystems and subsequently people’s well-being through effects on fisheries, aquaculture, tourism, and other economic activities associated with the ocean. These changes will also have an on-going impact on the global climate system and, therefore, terrestrial ecosystems and life on earth.

Climate change impacts in the ocean and ocean change impacts on the global climate system will continue to intensify in the 21st century, especially if the future emissions of greenhouse gases continue following “business-as-usual” scenarios. Particularly high risk of impacts are expected for sensitive ecosystems such as coral reefs or Arctic sea-ice systems and for dependent human communities.

Thus, there is an urgent need for mitigation and adaptation measures.

The ocean provides potential mitigation options, which have not yet been explored to any great extent. On technological aspects, solutions have begun to be tested in maritime transport, renewable marine energy and carbon sequestration. Taking into account that the ocean is acting as a carbon sink, nature-based mitigation solutions are also emerging, such as marine protected areas in coastal zones and in the high seas.

Given its importance to the Earth system, as well as the present and projected changes, an advanced and integrated understanding and monitoring of the ocean is required to predict the evolution of our global climate and the effect of climate change in the ocean and its services.

4. Relevance of the topic for policy making

The ocean is one of, if not the most important regulator of climate on Earth. Without the ocean's role in making the planet habitable, human life would not be possible. Yet, for most people, the ocean seems too large to be affected by human activities. In addition, even though the ocean provides critical services for all people, including those living far from the coast, the ocean is insufficiently understood and is underrepresented in discussions about climate change policies.

A Special Report would be of considerable interest and relevance to a very wide audience of international organizations and decision-makers.

First, the UNFCCC, whose parties agreed to *“promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases not controlled by the Montreal Protocol, including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems”*, to *“Cooperate in preparing for adaptation to the impacts of climate change; develop and elaborate appropriate and integrated plans for coastal zone management”* and to *“give full consideration to what actions are necessary under the Convention, (.../...) to meet the specific needs and concerns of developing country Parties arising from the adverse effects of climate change and/or the impact of the implementation of response measures, especially on: (a) Small island countries; (b) Countries with low-lying coastal areas; (.../...)”*¹. Nevertheless, compared to the terrestrial ecosystems, there are few references to the ocean in discussions relating climate change policies.

Many UN bodies are committed to ocean issues related to climate change and could benefit from a report on ocean.

According to its mandate of the UN specialised organisation in oceanography, IOC-UNESCO is compiling the Global Ocean Sciences Report, is the lead agency on the Global Ocean Observing System, and, together with WMO, runs a number of marine services. IOC-UNESCO is also promoting marine spatial planning, coastal zone management, ocean disaster risk reduction (all of which are strongly dependent on climate) and facilitates ocean data exchange, education, capacity development and transfer of marine technology that may help ocean assessments and related adaptation and mitigation.

UNEP and IOC-UNESCO are collaborating with international and local partners to develop ecosystem-based solutions to mitigate and adapt to impacts of climate change. Enhancing sequestration by and reducing emissions of “blue carbon” from carbon-rich coastal ecosystems provide opportunities for addressing mitigation challenges. Ecosystem-based adaptation and disaster risk reduction activities are developed for long-term climate change resilience and adaptive capacity of ecosystems and humans. Many of these activities are undertaken under the auspices of the Regional Seas Programme. A Special Report would help state parties to Regional Sea Conventions to set up new additional Climate Implementing Agreements.

¹ Articles 4. 1. d), 4. 1. e), and 4.8. of the Convention.

Other activities that strive to increase the resilience of marine and coastal ecosystems to the effects of climate change and ocean acidification include the Convention on Biological Diversity (CBD). It facilitates the implementation of the Strategic Plan for Biodiversity 2011-2020 and achievement of Aichi Biodiversity Targets in marine and coastal areas. Especially, target 15, related to *“the contribution of biodiversity to carbon stocks (.../...) thereby contributing to climate mitigation and adaptation”*; target 10, related to minimizing *“the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification”*

The United Nations Development Programme (UNDP) and the International Maritime Organization (IMO) are cooperating in a global effort to transition the shipping industry towards a lower carbon future, through the GloMEEP project.

The FAO is assisting States to increase the knowledge base on climate change implications for fisheries and aquaculture, and adaptation options relevant to the sector. The FAO and other members of UN-Oceans also participate in the Global Partnership on Climate, Fisheries and Aquaculture (PaCFA). The FAO is also assisting the fisheries sector to understand its own climate footprint and supports the sector in the transition towards energy efficiency and blue carbon potentials.

The post-2015 development agenda and the Sustainable Development Goals (SDG) will be adopted during the United Nations summit in September 2015, in New York. One of these SDGs, Goal 14, aims to *“Conserve and sustainably use the oceans, seas and marine resources for sustainable development”*. A special report on the ocean will be particularly relevant for the implementation of Goal 14.3 which aims to: *“Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels”* And Goal 14a which aims to *“Increase scientific knowledge, develop research capacity and transfer marine technology, ...in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries”*.

The Report would also enable governments, cities and local authorities in coastal areas, in particular in Small Islands Developing States and Least Developed Countries to implement adaptation activities and proceed confidently in a systematic and well targeted fashion.

It would also provide ocean economy stakeholders (fishing, shipping, tourism, insurance...) with the relevant information to anticipate appropriate steps, on technical and economic aspects facing adaptation and mitigation challenges.

It would identify key knowledge gaps that need to be addressed, helping governmental and private funding institutions to support the observation and science programs to fill those gaps.

At the international level, a Special Report would send a very strong signal, encouraging the international community to continue its efforts to understand the ocean especially in response to climate change impacts and in its good governance and preservation. At regional levels, it would provide very helpful information for policy makers in order to face the huge challenges linked to the impacts of climate change on ocean and coastal areas, and to implement the most accurate adaptation measures.

5. Justification of the need for a Special Report

Fundamental large-scale changes have been detected in the ocean, despite the fact that the thermal inertia of the ocean system is extremely large. Despite these changes, most of the literature on climate change has focused on terrestrial and atmospheric questions, with only 5% of the literature being focused on the oceans². Even if this literature is growing fast, there is consequently,

² Hoegh-Guldberg and Bruno 2010 (Science).

a great and urgent need to rapidly catch up on our understanding of the ocean's role in climate change and the impacts of climate change on the world's ocean.

An integrated perspective is required to address the immediate need for increased understanding of ocean systems. A Special Report on the ocean should be cross-cutting through the physics, impacts, mitigation and adaptation, rather than following the current structure of the three working groups of the IPCC. It should integrate information and understanding that is currently spread across the three IPCC working groups and at least two other IPCC products^{3,4}.

The current treatment of the ocean across multiple chapters and products from the IPCC misses the opportunity to treat the ocean as a complete system and understand the associated dynamics. Given the centrality of these dynamics to the evolution of the climate, as well as to mitigation and adaptation options, it is essential that oceans are understood, first as a complete system and not just as a coastal fringing area and, second, as an integral part of a whole climate system.

There has been an exponential growth of literature on climate warming and acidification since the cut-off dates for inclusion in AR5 (starting mid 2012 for WG I). This literature covers peer-reviewed literature, academics' reports and literature that produced by agencies and NGOs. The Report would integrate and update the assessment of AR5 using this literature, bringing new information into one place. Moreover, it would help to prepare and set the stage for AR6.

Since the AR5 there has been significant advances in our understanding of:

- a. An overarching picture of climate change in the ocean as well as impacts in the oceans and a wider assessment of risks for natural and human systems. Thus, is a new set of tools that has become available at the end of AR5 that could be used widely for a more detailed and sophisticated assessment of climate change and impacts on the ocean.
- b. Clarification regarding ocean heat content and the mechanisms underlying the putative warming hiatus.
- c. Ice sheet dynamics and the magnitude of sea level rise, with projections of changes in ocean currents becoming more realistic and prospects for predicting regional sea-level rise and its impacts.
- d. Impacts on the thermohaline circulation of the ocean are now being detected, whereas the evidence was equivocal during the IPCC fifth assessment report cycle.
- e. Deoxygenation, and the role of oxygen as a dominant climate-change variable affecting deep-sea biodiversity in large oceanic regions.
- f. The role of the ocean in modulating tropical cyclones and extratropical storms ocean in climate anomalies.
- g. Ocean as a source of climate predictability.
- h. The biological carbon pump, especially its microbial component.
- i. Impacts of ocean acidification are increasingly better constrained through studies that explicitly consider communities rather than individual, genetic adaptation, and multiple drivers.
- j. Harmful algal blooms and related risks to people and ecosystems.
- k. How the interactive effects of changes in multiple climate variables such as warming, deoxygenation and ocean acidification, impact ocean natural and human systems.
- l. The evolutionary potential in some groups (especially for species with a short generation time such as bacteria and phytoplankton) under climate change and ocean acidification and its implications for ocean ecosystem dynamics.
- m. The interaction of climate drivers with other local and regional human impacts such as overfishing, eutrophication and pollution.

3 IPCC. 2011. Special Report on Renewable Energy Sources and Climate Change Mitigation.: - Ottmar Edenhofer, Ramón Pichs-Madruga, Youba Sokona, Kristin Seyboth, Patrick Matschoss, Susanne Kadner, Timm Zwickel, Patrick Eickemeier, Gerrit Hansen, Steffen Schloemer, Christoph von Stechow (Eds.) Cambridge University Press, 1075 pp.

4 IPCC, 2005 Special Report on Carbon Dioxide Capture and Storage. - Bert Metz, Ogunlade Davidson, Heleen de Coninck, Manuela Loos and Leo Meyer (Eds.) Cambridge University Press, UK. 431 pp.

- n. Characterization and valuation of ecosystem services in the context of climate change, with specific relevance to ecosystem-based adaptation.
- o. The economic impact of climate change on sectors of key human interest, as well its implications for food security. A detailed analysis of regional issues now becomes possible.
- p. The potential for regulation/engineering and mitigation involving the oceans, more so than represented in AR5.
- q. Nature-based solutions for mitigation and adaptation.
- r. The specific efficacy of mitigation measures, such as atmospheric CO₂ removal, for addressing ocean climate change issues.

In the AR5, there was a great improvement from AR4, with several chapters in WGI and WGII dedicated to the ocean (none in the WG III), and several others in which some ocean issues are addressed. But at the same time, these chapters have paved the way and illustrated the need for more detailed information according to relevant sectors and regional issues as well as associated human interests in the riparian countries, which a Special Report on ocean would provide. Hence, there are key gaps in important issues that are critical to address to enable the discussion about impacts, mitigation and adaptation. A Special Report would address important topics such as:

- a. The roles of the oceans and ocean currents in global and regional climate regulation.
- b. The climate-induced changes in upwelling systems need to be clarified, due to their importance for regional climate and ocean productivity.
- c. The extent and impact of deoxygenation and stratification.
- d. Sea level rise at a regional scale.
- e. Changes and implications of ocean circulation changes, particularly changes to the thermohaline circulation and its consequences.
- f. The information provided by the paleo record on climate variations and their impacts on the ocean.
- g. The extent and impact of climate change in deep sea ecosystems.
- h. Projections of biodiversity changes, abundance and distribution, in fisheries productivity and associated food security, including changes in ocean primary productivity.
- i. The physiological mechanism underlying tolerance of organisms and the role of genetic processes in setting and limiting the capacity of organisms to adapt to climate change.
- j. The need to detail quantitative knowledge for individual sectors in the ocean and to develop commonly agreed approaches to accomplish quantitative projections (e.g. fisheries and aquaculture productivity).
- k. The need to identify and quantify the role of climate change-related processes on small islands.
- l. Assessments of global aspects of ecosystem services, and economic sectors associated with the oceans.
- m. Methods and technologies to assess the regional ocean carbon sinks that some countries "may propose" to include in their INDCs, as they do for forests.
- n. The assessment of human adaptation strategies.
- o. An understanding of how to better structure policy and legislative frameworks in order to drive adaptation as well as mitigation actions within the ocean.
- p. How natural oceanic process that play a regulatory role in global climate can be used in mitigation approaches and diverse strategies of climate engineering.

An important part of the Special Report should be firmly focused on regional changes to help guide a better understanding of vulnerability, especially in islands and costals areas, as well as the adaptation and policy development opportunities. This would provide critical regional information that was omitted from AR5 due to the capacity constraints of producing such an overarching report.

The Special Report is expected to be complementary and contribute greatly to other international assessments under the above policy context, such as the Global Environmental Outlook 6 (GEO6) and the Global Biodiversity Outlook 5 (GBO5).

The World Ocean Assessment (WOA) which is to be discussed by the General Assembly of the UN in September 2015 and published by the end of 2015 under the auspices of the UNGA aims to provide a “*Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects*”. In this report, among 45 chapters, only two chapters (the 5th on the Water Cycle and 6th on Sea/air interactions) will be dedicated to climate, and it will be “*draw heavily on the work of Intergovernmental Panel on Climate Change*”³. In this case, the WOA will provide information from the AR5 and would not overlap a Special Report on ocean.

Finally, the proposed Special Report is consistent with the IPCC framework and criteria for establishing priorities for IPCC reports⁴. By undertaking this Report, “*IPCC would strive to serve the policy community (UNFCCC and other) with relevant information in a pro-active fashion*”. There is “*relevance of the subject for policy considerations including methodologies and other inputs for decision-making*”, and there is both “*availability of sufficient scientific literature*” and “*experts*”.

6. Key issues proposed to be addressed in the Special Report

A Scoping Group would be tasked to fully develop an outline for the Special Report. At this stage, without prejudging the scoping process, here are some issues to be addressed in the Special report:

Global Ocean, a transversal overview of the major issues, including:

1. Ocean heat content and transport, ocean currents and sea level, ice sheet dynamics, upwelling systems. Climate regulation, Coastal dynamics and land sea exchange.
2. Ocean carbon uptake, ocean biogeochemistry including response to warming, acidification and oxygen loss and potential mitigation strategies, interactions of climate with regional human drivers.
3. Impacts on and adaptation of ecosystems, changes in biodiversity, invasive species, conservation issues, harmful algal blooms, shifts in ecosystem function: Comparison of physical/biological subregions.
4. Food-webs, fisheries, aquaculture and food security.
5. Developing more effective policy frameworks and cooperation at international level,
6. Global economic aspects (open ocean beyond national jurisdiction, deep sea mining, transportation, sea routes, international law, and finances).
7. Mitigation and adaptation aspects both in coastal areas - especially in islands - and in the high seas (blue carbon, nature based solutions/MPAs, marine renewable energy, marine transport, carbon dioxide capture and storage).

Regional Oceans: there are several possible options to regionally divide the ocean, each with its own pros and cons.

- **Regional human-interest zones**: Atlantic (North and South), Pacific (North and South), Indian Ocean, Polar Oceans (Arctic and Antarctic), Coral triangle and Caribbean, Semi-enclosed seas (Baltic, White Sea, Mediterranean, Black Sea, Red Sea, possibly others), and the Deep Sea.

³ See : « Regular process for global reporting and assessment of the state of the marine environment, including socio-economic aspects ; ANNEX C : Possible outline for a global integrated assessment of the state of the marine environment, including socio-economic aspects »

⁴ IPCC, 29th Session, 2008. DECISION FRAMEWORK FOR SPECIAL REPORTS, METHODOLOGY REPORTS AND TECHNICAL PAPERS

- **Physical/biological regions (as previously adopted for AR5):** High-Latitude Spring Bloom Systems (HLSBS), Semi-Enclosed Seas (SES), Coastal Boundary Systems (CBS), Eastern Boundary Upwelling Ecosystems (EBUE), Subtropical Gyres (STG), Deep Sea (DS; >1000 m).

Within each region, the following issues would be addressed:

- a. Projected physical and chemical drivers of change:
 - Changes in ocean heat content and the reasons behind the warming hiatus.
 - Changes in ocean chemistry: salinity, acidification, deoxygenation.
 - Changes in ocean structure: stratification, mixing, circulation and ocean-atmosphere interactions.
 - Regional scale sea level rise and its implications.
- b. Threats and impact factors of physical and chemical changes to populations, ecosystems, economies:
 - Current impacts of multiple human stressors, (e.g. low pH, low oxygen, changes to physical structure, changes to environmental extremes, reduced food supply), on ecosystems at the habitat scale.
 - Projection of future impacts on marine biodiversity, ecosystems and ecosystem services such as fisheries, and quantification of their risks of impacts.
 - Identify key regional vulnerabilities and potential for biological adaptation.
 - Interactions between non-climate factors and those associated with climate change.
 - Importance of understanding cumulative stress across multiple factors.
- c. Outline and assess policy options for mitigation and adaptation potential both in coastal areas and the high seas:
 - Coastal and open ocean carbon (mangrove, seagrass, plankton).
 - Renewable energies, desalination, geoengineering.
 - Establishment of MPAs and reduction of local stressors.
 - Genetic manipulation of population and community tolerance.
 - Adaptation potential, (e.g., changes to infrastructure, stakeholder practices and potential relocation options).
- d. Policy development and international collaboration:
 - Existing intervention points.
 - Drivers of international collaboration.
 - Legislation and policy frameworks.
 - Industry and public-private partnerships.

7. Potential Partner Organizations

A large number of organizations involved in research and information efforts concerning climate and the ocean could take part in this initiative, in particular: IOC-UNESCO, IAEA, WMO, WCRP, SCOR, Future Earth, IUCN, and national research institutes.

8. Time schedule

Proposed timeline

October 2015/ 1 st quarter 2016	Decision by IPCC plenary for a scoping meeting on the Special Report
1 st half 2016 2016 2016	Scoping workshop for the Special Report in Monaco Approval of scoping paper by plenary Selection of authors by the IPCC Bureau
2016 2017 2017/18 1 st half 2018	First lead authors meeting First draft, expert review Expert and Government review Approval by plenary

9. Budget estimates

An accurate budget cannot be established at this stage. It could be adjusted once the scoping group meeting has developed an outline of the Report and specified the number of CLAs, LAs and other contributors to be involved in producing this Report.

10. Possible donors

- The Government of Monaco proposes to host the meeting of the Scoping Group which would be held in 2016.
- The Prince Albert II of Monaco Foundation places particular importance on lending support to young researchers from developing countries and this is the reason why, in partnership with the Cuomo Foundation, it has backed the IPCC Scholarship Program since 2011. For the same reason the Foundation is offering to support financially a part of the expenses of researchers from developing countries as part of their contribution to the Special Report.
- The Prince Albert II of Monaco Foundation would also prompt other private foundations to support part of the costs to produce, print and distribute this Report.

NETHERLANDS PROPOSAL: CARBON PRICING

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Title of proposed Special Report

Carbon Pricing

Relevance of the topic for climate change

Carbon pricing in various forms is a much-used instrument for climate policy and can play a role in achieving transformative change in climate-relevant sectors such as energy and transportation. It is used on the international level (in the Kyoto Protocol for instance), domestically, at the subnational level and in companies.

Relevance of the topic for policy making

At the moment, numerous countries, regions, cities and companies are implementing or considering carbon trading schemes. At the recent UN Secretary General's meeting on climate change action in September 2014, a Carbon Pricing Initiative attracted more than a hundred signatures. Carbon pricing is a potential part of the ADP Workstream 2 discussions in the UNFCCC. Various institutions are providing support for carbon pricing, for instance in the World Bank's Partnership on Market Readiness.

Justification of the need for a Special Report

There is a wealth of literature from different disciplines on carbon pricing, varying from critical to supportive. Economics, political science, business administration, finance, public affairs, international relations and environmental sciences are among the most prominent disciplines. However, carbon pricing also crosses disciplines; it plays a role in the energy and emissions modelling literature, in game theory, and in behavioural science, to name but a few. Given that carbon pricing in various forms has been operational for some 15 years now, empirical literature is also amply available.

Notwithstanding this wealth of information and the demand for a rigorous and reliable assessment, an overall, balanced assessment is lacking. It got sparse assessment in the AR5. It is therefore suggested that the IPCC Panel requests that IPCC WGIII prepares a Special Report on Carbon Pricing.

Key issues proposed to be addressed in the Special Report

There is a wealth of literature from different disciplines on carbon pricing, varying from critical to supportive. Economics, political science, business administration, finance, public affairs, international relations and environmental sciences are among the most prominent disciplines. However, carbon pricing also crosses disciplines; it plays a role in the energy and emissions modelling literature, in game theory, and in behavioural science, to name but a few. Given that carbon pricing in various forms has been operational for some 15 years now, empirical literature is also amply available.

Various actors have become involved in carbon pricing: of course, states and regulatory agencies, but also financial institutions, project developers, NGOs, certification companies and manufacturing industries. Businesses seeking legitimation for climate action are explicitly asking for a carbon price.

Topics may include:

- Review of carbon pricing initiatives: carbon taxes, emissions trading schemes, shadow prices, sector- or economy-wide trading schemes and project-based mechanisms.
- Criticism, e.g.: ease of implementation, political feasibility, distributional effects and functionality.
- Conditions under which carbon pricing can be an effective climate policy tool
- Impacts of various forms of carbon pricing on sustainable development, technology transfer and transformational change
- Linking and harmonisation of carbon pricing schemes

Potential Partner Organizations

World Bank
ICAP
IETA
UNFCCC

Time schedule

Finalization by October 2018

Budget estimates

PM

Possible donors

PM

SAUDI ARABIA PROPOSAL: SPECIAL REPORT ON DESERTIFICATION WITH REGIONAL ASPECTS

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Title of proposed Special Report

Special Report on Desertification with Regional Aspects

Relevance of the topic for climate change

Desertification is a change in the soil properties, and vegetation which result in a persistent loss of ecosystems that are fundamental to sustaining life (Ouda, 2013). Due to the land degradation and increasing population, the desertification has been a severe stress on the population. Desertification is commonly understood as the loss of biodiversity and its services. This loss reduces carbon sequestration capacity thus contributing to climate change. Moreover, climate change itself may increase desertification. Therefore, whether cause or result, desertification is related to climate change. As such, efforts to address desertification should contribute to minimize the adverse impacts of climate change.

Desertification is a global phenomenon with wide implications on the global population. Nevertheless, desertification finds its origins in dry land regions, primarily in Africa and Asia, where its most severe impacts are experienced. Therefore, a regional approach is key to addressing to desertification.

Relevance of the topic for policy making

The Intergovernmental Panel on Climate Change (IPCC) predicts that the arid and semi-arid areas will expand between 5 and 8% under a range of future climate scenarios (IPCC, 2007). Climatic changes are both a consequence and a cause of desertification. The destruction of natural grass and woody vegetation cover in dry areas affects the top soil temperature and air humidity, and consequently influences the movements of atmospheric masses and rainfall. Furthermore, the drying of the soils and the destruction of soil cover encourage wind erosion. Even though the cycles of drought years and climatic changes can contribute to the advance of desertification, it is mainly caused by changes in the ways man uses the natural resources, mainly by overgrazing, land clearance, over-cropping and cultivation of marginal lands and uprooting of woody plants, and more generally using land in a way that is inappropriate for the local conditions. A substantial amount of carbon stored in the vegetation in the dry zones, averaging about 30 ton/ha/year, declines when the vegetation is depleted or disappears. Furthermore, carbon-rich soils, which are frequently found in dry zones, store an important amount of carbon (practically half the total quantity of carbon is stored in the organic matter in soil). The destruction of these soils has a very powerful effect on the carbon cycle and boosts the greenhouse effect as a result of the depletion of carbon.

Climate change coupled with demographic growth will profoundly affect the availability and quality of water resources. Acceleration in the hydrological cycle will likely make droughts longer and rainfall events more variable and intense, raising probabilities of flooding and desertification. Over-extraction of groundwater aquifers and their contamination, salinization of agricultural land, and urban water shortages have put pressure on decision-maker in policy reforms in vulnerable regions and developing countries (Sowers, 2010).

Desertification negatively impacts the health and well being of dry land populations. Dust storms and water scarcity are among the factors contributing to these negative impacts. Proactive land and water management awareness and policies can help minimize these impacts and allow affected populations to cope with desertification. Doing so will also help alleviate pressures on other regions brought about by migration of affected populations that will further strain other ecosystems.

Justification of the need for a Special Report

Desertification ranks among today's greatest environmental challenges with clear social and economic consequences involving dry land populations and beyond. These challenges have been growing rapidly along with their consequences. Addressing these challenges has been hampered by information gaps in some regions.

The negative impacts of desertification are experienced regionally as well as globally. However, the scale of assessments is usually too large to effectively capture regional aspects where the impacts of desertification are most severe.

Key issues proposed to be addressed in the Special Report

1. Environmental impacts of desertification.
2. Adaptation to climate change and desertification.
3. Mitigation co-benefits.
4. Climate change linkages with water resources, drought and desertification.
5. Economic and social consequences of desertification.
6. Policies to combat desertification.
7. Modeling and climate scenarios.

Potential Partner Organizations

1. United Nations Convention to Combat Desertification (UNCCD)
2. The Convention on Biological Diversity (CBD)
3. United Nations Environmental Program
4. Related academic and research institutes

Time schedule

2 to 3 years.

Budget estimates

Approximately CHF 500,000.

Possible donors

1. Governments
2. Private sector

References:

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Ouda, O. K. (2013). Water demand versus supply in Saudi Arabia: Current and Future challenges. *International Journal of Water Resources Development*,. DOI:10.1080/07900627.2013.837363

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SOUTH AFRICA PROPOSAL: SPECIAL REPORT ON ADAPTATION COSTS IN DEVELOPING COUNTRIES

Details of Submitting Official

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Title of proposed Special Report

Special report on adaptation costs in developing countries

Relevance of the topic for climate change

Developing countries are particularly vulnerable to the impacts of future climate change, due to their relatively low adaptive capacity. In order to sustain and further economic growth within these countries, it is crucial to estimate the costs their economies are to incur with respect to adapting to climate change and from the direct impacts of extreme weather events under climate change. These combined costs will be referred to as “adaptation costs” in the remainder of this proposal. Future adaptation costs are directly linked to mitigation policies and in particular the success or failure in reaching the Long Term Global Goal (LTGG) of the UNFCCC (this is currently set to keep the global increase in surface temperatures below 2 °C, compared to pre-industrial temperatures). It is important for adaptation costs to be estimated for both low and high mitigation futures. In this regard, obtaining estimates for 1 °C, 2 °C, 3 °C and 4 °C worlds will be of most value for planning and to assess the suitability of the LTGG for developing countries.

Relevance of the topic for policy making

Adaptive capacity is relatively low in developing countries, yet significant investments are most likely needed to harness their economies against the impacts of future climate change. It is therefore of crucial importance for these countries to obtain plausible estimates of adaptation costs for both low and high mitigation futures, in order to identify the relevant adaptation gaps and to obtain the required international funding to implement adequate adaptation strategies. In addition to this, particularly for the case of low mitigation futures, it should be taken into account that no adaptation strategy can fully prepare countries (even developed countries) against the expected increased impact of extreme weather events (e.g. tropical cyclones, wide-spread drought). As a consequence, the changing economic costs of such events under climate change also need to be estimated. The estimation of adaptation costs is therefore a problem in climate science and econometrics that is central to global climate change policies of the UNFCCC, including the

suitability of LTGG and the Global Goal on Adaptation (GGA) for developing countries. Moreover, it is of direct relevance for the realistic formulation of the Adaptation Intended Nationally Determined Contributions (A-INDCs) of developing countries.

Justification of the need for a Special Report

As motivated in the sections above there is a clear and urgent need for realistic estimates of the adaptation costs in developing countries, to inform on the extent of the adaptation gap and the acquisition of international funding to harness developing economies (to the largest extent possible) against the future impacts of climate change. This requires for a significant body of knowledge to be generated and presented under the auspices of an IPCC Special Report. Firstly, a comprehensive description of the latest insights into future climate change over developing countries is needed, including detailed projections of future changes in the frequency of occurrence and intensity of extreme (high-impact) weather events (with associated uncertainty estimates). Secondly, it is necessary to systematically document the different methodologies available to calculate adaptation costs for developing countries. This requires the analysis of available data on the existing costs of extreme events, as well as integrated assessment modelling approaches of various degrees of complexity, to estimate the efficiency of adaptation investments to reduce future costs of extreme events. This includes estimating the direct and indirect (downstream) costs of future high-impact weather events for both low and high-mitigation futures.

Although AR5 and presumably also AR6 does/will provide an analysis of the projected future changes in extreme events over developing countries, there is very little information available on the quantification of adaptation costs for these countries. Moreover, there is currently no clear guidance on coordinating and internationally standardizing of methodologies used to calculate the adaptation costs. This presents a clear case for an IPCC Special Report, to fill this void that is so crucial to develop and evaluate both international (e.g. LTGG and GGA) and national (A-INDCs) climate change policies.

Key issues proposed to be addressed in the Special Report

- A comprehensive analysis of projected changes in extreme and high-impact weather events affecting developing countries, using the latest available high-resolution regional climate model projections in combination with CMIP6 global model projections.
- The systematic description of the different methodologies available to calculate adaptation costs in developing countries. This will include an analysis of the present-day costs associated with climate variability and extreme events from observed data, and the discussion of integrated-assessment modelling approaches of various degrees of complexity, which can be used to calculate adaptation costs.
- Probabilistic estimates of adaptation costs for developing countries, on a national/regional level, based on the latest projections of future climate change in

combination with adaptation cost estimation-methodologies. These projections should be presented for both low and high mitigation futures, and for various global temperature worlds, e.g. 1 °C, 2 °C (LTGG), 3 °C and 4 °C worlds.

- An analysis of the implication of the projected costs in terms of the adaptation gap and the LTGG and GGA for developing countries.
- Guidelines on how transparency of adaptation support for developing countries can be improved

Potential Partner Organizations

CSIR Natural Resources and the Environment (proposer)

Time schedule

All the special reports should be completed by 2017/18

Budget estimates

IPCC Secretariat / TSU to advise

Possible donors

IPCC Secretariat / TSU to advise

SOUTH AFRICA PROPOSAL: SPECIAL REPORT ON ANTARCTIC / SOUTHERN OCEAN REGION

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Title of proposed Special Report

Special Report on Antarctic / Southern Ocean region

Relevance of the topic for climate change

The Antarctic / Southern Ocean region is key for both global and regional climate through its role in bottom water formation, carbon sequestration, and the mid- to high latitude atmospheric and ocean circulation of the Southern Hemisphere. It is also a region of high biodiversity, unique on the planet. The gradients in surface fluxes set up by the distribution of sea and land ice, and the topography of the continent are fundamental for driving this circulation as well as the weather systems that directly impact on southern Africa, Australia and South America. The Southern Ocean is thought to play a key role in the take up of carbon dioxide from the atmosphere. Another motivation for focusing on the Antarctic is that the climate change signals here are more complex than those observed to date in the Arctic and the region is less well understood than that of the north polar region.

Relevance of the topic for policy making

In addition to its importance for the global climate system, as the only uninhabited continent, there is an international responsibility to maintain the pristine environment and fragile ecosystems of the Antarctic and the neighboring Southern Ocean. While there are international treaties concerning human activities on the continent itself, the Southern Ocean is far less protected. Many areas of the Southern Ocean experience substantial fishing pressure from numerous countries which may be unsustainable for the long term health of the ecosystem. In addition, there are areas which may be exploited for oil and gas extraction as well as mining of the sea floor. AR5 projected that the Antarctic and Southern Ocean are regions of high impact under climate change in the coming decades. The impacts of such change, as well as that of climate modes (e.g., ENSO and the Southern Annular Mode) in the region, motivates the need for sensitive and carefully considered international policy regarding the Antarctic.

Justification of the need for a Special Report

Many aspects of the regional climate in the Antarctic / Southern Ocean and their interactions with the global climate system remain poorly understood. Existing climate models used in AR5 do not capture all the salient details of sea-ice formation / melt, ice sheet – ocean interactions, iceberg calving, water mass formation on the shelves and the subsequent sinking to form deep and bottom water masses, frontal zones in the Southern Ocean, katabatic winds and their impacts on the shelf ice and water, air-sea-ice flux exchanges, polar lows and mesoscale weather systems, cryospheric processes on the continent etc.

Although the observational data base in the Southern Ocean is being improved with the increasing deployment of Argo floats on an operational basis and with gliders, CPIES and other instrumentation through dedicated research cruises, these data are still insufficient to adequately test regional models. Assessing the ongoing improvements in model and observational capacity and our ability to detect and attribute climate signals in the Antarctic requires the need for a special report

Key issues proposed to be addressed in the Special Report

The key issues that should be addressed include:

- Improvements to the observing system (consultation with SOOS and national plans)
- Ability to detect and attribute climate change in the Antarctic and Southern Ocean
- Evaluation of the capacity of climate and earth system models to represent the essential components of the regional climate and their interactions with each other as well as with the global climate system
- Ability to reduce uncertainty in climate change projections for the region
- Regional impacts and change concerning sea level, Antarctic ice sheets, glaciers, sea-ice extent and volume, polynyas, iceberg processes, regional atmospheric circulation, katabatic winds, cyclone / anticyclone track and intensity over the Southern Ocean, Antarctic Bottom Water, Antarctic Intermediate Water, Antarctic Shelf Water, sub-Antarctic Mode Water, ocean heat content, Antarctic Circumpolar Current and regional gyres, Southern Ocean frontal zones, carbon and other biogeochemical cycling, surface gas exchange, ocean acidification etc.

Potential Partner Organizations

IPCC Secretariat/TSU to Advice

Time schedule

TSU to Advice

Budget estimates

IPCC Secretariat/TSU to Advice

Possible donors

IPCC Secretariat TSU to Advice

SOUTH AFRICA PROPOSAL: SPECIAL REPORT ON MANAGING THE DIVERSITY AND CONTRADICTIONS OF CLIMATE CHANGE DATA AND INFORMATION

Details of Submitting Official

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Title of proposed Special Report

Special report on managing the diversity and contradictions of climate change data and information

Relevance of the topic for climate change

Climate data exists in some countries. However, this information is not availed internationally, incorporated into national/regional development planning or in disaster reduction strategies. Limited human resource to produce, analyze and interpret and disseminate climate data as a result of poor investment into scientific research on climate change impacts, adaptation, and mitigation; biodiversity and ecosystems; and weak governance and surveillance of natural resources especially forests weaken the region's capacity to adapt to climate change.

Relevance of the topic for policy making

For developing nations interests especially, there is a critical need for a special report on managing the diversity and contradictions of climate change data and information (deliberately splitting those two terms, as they are not equivalent) in relation to the specific scales of decision making, risk management, and IAV assessment (e.g. cities, water catchments, agriculture regions, etc.). At these scales the available information is, in many cases, nearly useless, and presents a challenge that I colloquially call a "data distillation dilemma" faced by users.

Justification of the need for a Special Report

The inability of policy makers to solve sub Saharan food insecurity problems has been linked to be the core reason as to why the region fails to achieve food security with food emergency cases more than tripling since 1980s despite the fact that the region sees some of the countries growth taking upward trajectories (UNCEA, 2013). Climate change and poorly developed agriculture only make the acute problem worse. Habtzion (2009) cites limited capacity of LDC's to employ tools and methods designed by UNFCCC process to access, understand, and apply climate data to design relevant adaptation policies legislations and strategic pathways.

Key issues proposed to be addressed in the Special Report

The upcoming 2015 TGICA Expert meeting on how to use climate information to support adaptation/climate risk management, and the WG1 proposed expert meeting on using regional climate projections in impacts and risk analysis studies. These meetings, supported by the emerging grand challenges foci of the WCRP, establish the pressing need to comprehensively assess the value and usability of regional projections at scales of relevance to decision makers -- an assessment that would hugely benefit from a special report early on in the assessment cycle. Consequently policy and governance constraints continue to devastate Africa's rich biodiversity and vast natural resources. Decisive confrontation of underlying governance issues with the envisioned future in mind. Policy that is inclusive, sound and directional is required to address the linkages that limit growth and development, environmental issues and climate change (UNEP, 2007).

Potential Partner Organizations

The world Bank
International Monetary Fund

Time schedule

TSU to advice

Budget estimates

TSU to advice

Possible donors

The world Bank
International Monetary Fund

SPAIN PROPOSAL: OCEANS AND CLIMATE CHANGE – SPECIAL REPORT ON EVIDENCES, IMPACTS AND ADAPTATION TO THE CLIMATE CHANGE OF THE OCEANS

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Title of proposed Special Report

OCEANS AND CLIMATE CHANGE: Special Report on the evidences, impacts and adaptation to the climate change of the Oceans.

Relevance of the topic for climate change

Oceans tend to mitigate climate change by storing large amounts of carbon dioxide in both the water column and the sediments. However, as a consequence of this process, its chemistry is changing at very rapid pace making water masses more acidic and, as consequence, altering the biodiversity, structure and functioning of marine ecosystems. About 25% of the greenhouse gases emitted to the earth atmosphere from the beginning of the industrial era have been absorbed by the oceans. The constant acidification of the oceans has reduced 30% their ability to absorb more GHGs. This reduction is expected to be 80% by the end of this century.

From the physical point of view, there are scientific evidences that sea level, the heat stored by the ocean, sea surface temperature and ocean acidity have increased during the last decades. The impact of these effects on the ecology of marine species and ecosystems is without any doubt unprecedented in the recent history of earth.

Relevance of the topic for policy making

The development and implementation of adaptation strategies is one of the major chores of policy makers regarding climate change. Dealing with the impacts of climate change in the oceans is an issue of particular relevance worldwide and an advanced understanding of these impacts and the different options to handle them is needed everywhere.

The effects of climate change on the oceans imply impacts con coastlines, fisheries, biodiversity and many other sectors, but they can also alter the role of the oceans in the mitigation of climate change itself and thus affect mitigation policies as well as adaptation strategies.

Justification of the need for a Special Report

Oceans cover about 70% of the Earth's surface. They influence the weather from local to global scales, and are also impacted by climate change. Approximately 40% of the world population lives within 60km near the coastline and this number is expected to continue increasing. The economy of hundreds of countries depends on the oceans (for 1000 millions of persons, fish is the main protein source; and 150 millions of jobs depend on fishing (FAO 2005)). The physical, chemical and biological alterations to which 75% of the area of our planet is been forced would lead to future scenarios, not easily predictable, that would justify by themselves the preparation of a Special Report on the evidences, impacts and adaptation to the climate change of the Oceans.

Key issues proposed to be addressed in the Special Report

- Analysis of trends for climate change in the ocean.
- Physical, chemical and biological evidences of the impacts of climate change on the oceans with particular attention to the effects of changes in ocean circulation, vertical mixing patterns, ocean warming, ocean acidification and alteration of marine biodiversity, species distribution and food web dynamics.
- Strategy of adaptation to climate change; mitigation
- Unknown issues that should be tackled and their prioritization

Potential Partner Organizations

Several Spanish research institutions address the investigation of climate change in the oceans: the two main marine research institutions in the country, the Spanish Oceanographic Institute (*Instituto Español de Oceanografía, IEO*, www.ieo.es/en/home) and the Higher Spanish Research Council (*Consejo Superior de Investigaciones Científicas, CSIC*, www.csic.es/home), a number of universities organized around Campus of International Excellence as well as a number of government departments such as our national port authority (*Puertos del Estado*, www.puertos.es/en-us/Pages/default.aspx) have a consolidated reputation as promoters of high quality research in this area.

One of the Spanish Campuses of International Excellence, *Campus do Mar* (campusdomar.es/?lang=en), aggregates several of the above mentioned organizations. Led by the University of Vigo and promoted by the three Galician universities, the Spanish Oceanographic Institute (IEO) and the Higher Spanish Research Council (CSIC), Campus do Mar aims at bringing together the socio-economic agents and marine researchers from the Galicia-Northern Portugal Euroregion, in order to harness the best possible potential and optimize the available resources. It sets out to energize a cross-border network comprised of research, teaching and technology transfer units, with a view to training the best professionals and researchers in the field of Marine Science, in its different economic and social aspects, and thus generate quality research and international impact, in order to provide the industry with the best tools for competing on a global scale. Research in Campus do Mar is organized around four main research clusters where the critical mass of investigators is high enough as to be competitive at the global scale. One of these clusters is "Ocean Observation and Global Change" a cluster deeply involved in the study of climate change in the ocean, as manifested in its strategic plan (see campusdomar.es/investiga-en-campus-do-mar/?lang=en).

Campus do Mar is the leading organization of the Spanish network of marine-related Campus of International Excellence (www.ceimar.net), formed also by the *Campus CEIMAR* led by the *University of Cadiz* (www.campusdelmar.es), *Campus Atlántico*, led by the *University of Las Palmas de Gran Canaria* (www.ceicanarias.com) and *Campus Mare Nostrum* led by the *University of Murcia* (www.campusmarenostrum.es).

Time schedule

One-year to elaborate it and present the main conclusions to the community, plus half a year to edit the final version.

Budget estimates

Possible donors

UK PROPOSAL: UPDATE OF KEY POLICY-RELEVANT MESSAGES IN AR5 IN SUPPORT OF REVIEW AND ASSESSMENT PROCEDURES IN NEW UNFCCC AGREEMENT

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Title of proposed Special Report

Update of key policy-relevant messages in AR5 in support of review and assessment procedures in new UNFCCC agreement

Relevance of the topic for climate change

Climate change presents a unique set of challenges due to its global scope, its long-term implications, the complexity of the climate system and the breadth of the expected impacts. As set out in Article 2, the ultimate aim of the UNFCCC is the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. To ensure that international action to tackle climate change is consistent with this aim, it is essential that targets are informed by the best available scientific, technical and socio-economic knowledge on climate change, its causes, potential impacts and response. This report would provide the latest scientific consensus on a range of cross-cutting, policy-relevant issues, synthesizing and distilling information from across all three Working Groups to provide an update to the key messages in the AR5 Synthesis Report. As such the proposed topic is relevant to all aspects of climate change from observations, climate projections and impacts through to adaptation and mitigation.

Relevance of the topic for policy making

One of the key roles of the IPCC is to provide objective scientific and technical advice to the UNFCCC. In a recent Decision (Decision 12/CP.20), the UNFCCC acknowledged that the Fifth Assessment Report provides the scientific foundation for the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) and urged Parties to make use of the information contained in the report in their discussions under all relevant agenda items. The ADP process is expected to conclude in December 2015 with the adoption of a new political agreement. This agreement is likely to include provisions for the review and assessment of emission reduction commitments and the periodic updating of Nationally Determined Contributions (NDC). It is important that the IPCC continues to provide the scientific foundation for this new phase of work under the UNFCCC.

Justification of the need for a Special Report

In Nairobi in February 2015, the IPCC decided (Decision IPCC/XLI-4) that it would continue to prepare comprehensive Assessment Reports every 5-7 years. As a result, the Sixth Assessment report is likely to be published over a 12-18 month period between 2020 and 2022. The Panel also agreed that *in determining its future reports and their timing the IPCC will take into account the work of the United Nations Framework Convention on Climate Change (UNFCCC)*.

In order to have most relevance and impact on future decisions on increasing action to tackle climate change, new information needs to be available 1-2 years prior to a decision point. The details of the review and assessment process in the new UNFCCC agreement have not yet been agreed but are likely to include a review around 2020 which would be before the publication of the IPCC 6th Assessment Report.

By 2018, the AR5 will be 4-5 years old and although many messages will remain largely unchanged, some key datasets will require updating and messages revising to reflect the latest scientific consensus. An IPCC Special Report updating, and if necessary augmenting, the main findings from the AR5 Synthesis Report would provide an essential route for the IPCC to deliver the latest scientific consensus relevant to the UNFCCC at the most appropriate time.

Key issues proposed to be addressed in the Special Report

Until the details and timing of the review and assessment process in the new UNFCCC agreement have been agreed, it is not possible to set out in detail the proposed content of the Special Report. However, a number of key characteristics can be identified at this stage and these are set out below.

The report would be self-contained and short (no more than 20 pages). It would focus on providing updates where new information takes the science forward. It would not repeat existing messages. The report would provide an update *inter alia* on observed changes and their causes; the relationship between cumulative emissions, temperature change, and projected impact; and on the characteristics of mitigation and adaptation pathways for different levels of future warming. The report should be key part of the delivery of the 6th Assessment Report, integrated into the development of Working Group Reports, not additional to them.

Potential Partner Organizations

To be determined

Time schedule

Dependent on timescales agreed in new UNFCCC agreement but likely to be published in 2018/19

Budget estimates

To be determined

Possible donors

To be determined

USA PROPOSAL: GLOBAL AND REGIONAL CONSEQUENCES OF CHANGES TO THE FROZEN WORLD

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Title of proposed Special Report

Global and Regional Consequences of Changes to the Frozen World

Relevance of the topic for climate change

Earth's cryosphere (i.e., its "frozen world") is being dramatically affected by climate change. Prominent changes include the loss of sea ice and land ice (glaciers and ice sheets), reductions in snow cover, and the warming and thawing of permafrost. These changes have numerous impacts both globally and locally.

At the global level, known and hypothesized consequences of a changing cryosphere include (but are certainly not limited to): (1) increases in atmospheric GHGs from the permafrost-carbon feedback; (2) accelerated heat absorption from reduced albedo due to snow and ice melt and retreat; (3) rising sea levels from land-ice loss; (4) potential disruption of mid- and low-latitude weather patterns from shifts in the jet stream induced by polar changes; (5) feedbacks between cryospheric change and the local physical and biogeochemical responses that result in rapid changes in the polar regions; and (6) feedbacks between the polar region and global climate through cryosphere impacts on polar/extra-polar interactions.

Permafrost thaw not only threatens the release of massive amounts of carbon dioxide and methane into the atmosphere, but also has potentially dramatic impacts on human infrastructure (e.g., roads, pipelines, buildings), and threatens coastal villages because of accelerated coastal erosion and, more globally, because of rising sea levels. Declining snowpack and glacial ice threatens freshwater supplies "downstream" from the cryosphere, including those used for drinking water and hydropower in many places, while also exacerbating the threats posed by drought and other water-related issues.

In addition, huge amounts of methane are stored around the world in the sea floor (and many lake bottoms) in the form of solid methane hydrates. While these hydrates represent a large lower-carbon energy reserve that could be tapped, climate warming, could cause the hydrates to destabilize. As a result, methane would escape unused into the atmosphere and could accelerate climate change.

While Chapter 4 (Observations: Cryosphere) and Chapter 13 (Sea Level Change) of the WGI report and Chapter 28 (Polar Regions) of the WGII report of the AR5 provided a robust, traditional assessment of some of these issues, a cross-cutting look at how cryospheric changes (not just polar, but worldwide) affect ecosystems and societies around the world, including implications for

transformation pathways, energy systems and agriculture (i.e., WGIII), is needed. An IPCC Special Report on these and related topics would provide a much-needed synthesis both at a global scale and on smaller spatial scales to help inform policymakers.

There are many gaps in our understanding of the changes in the cryosphere and what they mean for humanity and ecosystems that are ripe for assessment. Moreover, significant advances in the science have been published on these topics since the publication cut-off dates for the reports of the 5th Assessment cycle. Examples include the potential linkage between Arctic warming and mid-latitude weather patterns or the potential irreversible retreat of glaciers in West Antarctica. The 2014 report by the U.S. National Academy of Sciences, *The Arctic in the Anthropocene – Emerging Research Questions*, could provide an excellent foundation on which to base a Special Report on this topic.

Relevance of the topic for policy making

Permafrost in the Arctic contains almost twice as much carbon as is currently in the atmosphere and 3-4 times more carbon than all vegetation globally. As the earth warms, permafrost thaws and some of its carbon is released to the atmosphere as carbon dioxide or methane. Recent syntheses (e.g., UNEP 2012; Schuur et al. 2015) have suggested that carbon release from thawing permafrost by 2100 could have significant implications for transformation pathways consistent with the long-term global goal of limiting warming to no more than 2C above pre-industrial levels.

Subsea reservoirs of methane – in the form of methane hydrates - are also present in many regions and warming their environment could lead to the destabilization of these deposits and ultimately contribute to a feedback cycle in which the methane contained in these hydrates gets released to the atmosphere, amplifying global warming.

The non-existent or limited treatment of many of these phenomena in climate models is part of the reason why the policy community has not considered them adequately. This has implications for the timescale over which emissions reductions may be needed to achieve various temperature targets. Moreover, thawing terrestrial permafrost poses serious challenges to communities whose infrastructure is being affected by these permafrost changes.

Similarly, loss of land ice (Greenland, West Antarctic Ice Sheet – WAIS, and glaciers) and freshwater incursion on a massive scale would have profound global impacts through sea level rise, biochemical alteration, and changes in the salinity of marine waters. Though this topic has received much more attention than the permafrost-carbon feedback, there is still much uncertainty about the processes responsible for ice sheet changes and how much and how quickly: (a) sea level would rise and (b) water chemistry could change, under different emissions scenarios or concentration pathways. Understanding the timing and magnitude of sea level rise and biochemical change will provide policymakers with important findings for informed decisionmaking. In addition, best practices for coastal planning could be assessed.

Emerging science suggests that changes at the poles may significantly alter the behavior of large scale atmospheric (and oceanic?) circulation patterns, potentially disrupting weather patterns including additional periods of extreme weather. Implications for community preparedness could be considered.

Millions of people in every region of the world depend on glacial ecosystems for their livelihoods – whether it's freshwater for agriculture or reservoir water to drive hydropower production. With dramatic changes already occurring in glacial basins around the world – tropical, mid-latitude and polar – communities need to understand how to thrive in these rapidly changing environments. Assessing the policies, measures and community-level actions that are working can provide valuable insights for people all over the globe, while helping to minimize maladaptation.

In addition, underwater methane hydrates pose both another possibility for lower carbon energy production, as well as a possible addition to warming temperatures if they begin to volatilize into the atmosphere.

An IPCC Special Report on this topic would help bridge the gap between cryospheric science, ocean policy and climate policy, particularly as many policymakers appear to be unaware of these connections, as well as their regional and global consequences on both physical and societal systems.

Justification of the need for a Special Report

It is essential that climate policy be informed by the best available science. Yet with respect to the changing cryosphere, there is a large gap between the state-of-the-art scientifically and climate policies at all scales. This Special Report would synthesize our current understanding of the global and regional impacts associated with a changing cryosphere, highlighting the risks and informing appropriate mitigation and adaptation strategies. This report would also highlight numerous areas of scientific uncertainty, potentially motivating essential research to narrow the gaps in our understanding.

In addition, the topics covered effectively cut-across the scope of the three Working Groups – assessing the physical science of cryospheric changes; the impacts from and adaptation practices to a changing cryosphere; and how a changing cryosphere might affect energy generation, as well as the implications for global mitigation efforts and transformation pathways.

Moreover, a significant body of literature exists on this topic, which has not been assessed in a cohesive way during AR5. Much of this literature has been published after the publication cut-off date for the various reports of the 5th Assessment cycle.

Key issues proposed to be addressed in the Special Report

Permafrost-Carbon Feedback: How much carbon is contained in permafrost? Where is it? How vulnerable is it? How much carbon is likely to be released to the atmosphere from permafrost thaw over the coming years, decades, and centuries (assuming different emissions scenarios or representative concentration pathways), with what effects on overall rates of warming? How much will be released as carbon dioxide versus methane? What mitigation and adaptation strategies are possible? How might increasing wildfires in the Arctic exacerbate changes to permafrost?

Methane Hydrates: How much carbon is contained in methane hydrates? Where is it? How vulnerable is it to release in the atmosphere? Can any of it be safely harvested as a lower carbon energy source?

Ice Sheet & Sea Ice Loss and Glacial Retreat: What are the relative contributions to global ice mass loss from glaciers, Greenland and the Antarctica? Are there thresholds beyond which further ice loss is inevitable (i.e., associated with dynamical interdependencies involving ice sheets, hydrology at the interface of ice sheets and bedrock and geomorphology of bedrock), and have we already crossed any of those thresholds? How will primary productivity change with decreasing sea ice and snowcover? What surprises are hidden within and beneath the ice? What can “break or brake” glaciers and ice sheets? To what extent will feedback loops from ice sheet and sea ice loss accelerate warming?

Sea Level Rise: How much is sea level likely to rise over the coming years, decades, and centuries (assuming different emissions scenarios or representative concentration pathways)? There is also the issue of the very long time (centuries) between the commitment to large amounts of sea level rise and the realization of that sea level rise.

Ocean Circulation: How would melting sea ice and terrestrial ice (i.e., sheets and glaciers) affect ocean circulation, salinity and biochemistry and what are the impacts of that? How could the Meridional Overturning circulation be affected due to the increased melting of terrestrial and sea ice

Teleconnections: How might rapid Arctic warming change the jet stream and affect weather patterns at lower latitudes, including weather extremes such as hurricanes/typhoons? How would moisture transport from low- to high-latitudes be affected?

Societal Impacts (Agriculture, Power Generation, Cultural Practices, etc.): How can declines in snowpack be effectively managed by hunters, farmers and utilities (e.g., hydropower)? What new and/or updated management approaches have been successful?

Transformation Pathways: How do these changes impact possible transformation pathways?

Potential Partner Organizations

Woods Hole Research Center; International Cryosphere Climate Initiative; Arctic Council

Time schedule

We could envision the following timeline for delivery of this first Special Report (SR) of the AR6 cycle (drawing upon the historic timeline for recent Special Reports), though other options could be explored:

Oct 2015 – Initial discussion of SR topic proposal at the 42nd Session of the IPCC

Feb 2016 – Decision on SR topic at the 43rd Session of the IPCC

Apr 2016 – Scoping meeting for the SR

May 2016 – Call for expert nominations

July 2016 – Expert nominations due

Sept 2016 – SR author notifications issued

Nov 2016 – SR First Lead Author Meeting

Feb 2017 – SR Second Lead Author Meeting

May – June 2017 – Expert Review of FOD

Sept 2017 – SR Third Lead Author Meeting

Dec 2017 – Jan 2018 – Government & Expert Review of SOD

Mar 2018 – SR Fourth Lead Author Meeting

May – June 2018 – Government Review of FGD

Oct 2018 – SR Approval Session

Budget estimates

IPCC Trust Fund expenses would most definitely need to be re-evaluated pending the outcomes of a Scoping Meeting and a derived outline (i.e., how many chapters; how large the authors teams are; meeting costs; etc.). With that large caveat and building upon recent historical precedent, one can envision something of this magnitude:

Developing Country / Economies-in-Transition Travel

- Scoping Meeting (15 trips): 60,000

- Lead Author Meeting 1 (20 trips): 80,000

- LAM 2 (20 trips): 80,000

- LAM 3 (25 trips): 100,000

- LAM 4 (25 trips): 100,000

- Approval session (10 trips): 40,000

SUBTOTAL: 460,000

Other Expenditure

- Scoping Meeting: 10,200
 - LAM 1: 13,600
 - LAM 2: 13,600
 - LAM 3: 17,000
 - LAM 4: 17,000
- SUBTOTAL: 71,400**

Publication: 55,000

Translation: 125,000

Distribution: 20,000

Outreach: 100,000

TOTAL PROJECTED COST: CHF 831,400

These line items correspond with existing categories in the approved and forecast IPCC Trust Fund budgets. Other aspects (e.g., developed country travel, voluntary scientist costs, etc.) are not in this budget.

Possible donors

We have not identified possible donors for this Special Report topic.

CAN INTERNATIONAL PROPOSALS: DECARBONISATION AND LOW CARBON DEVELOPMENT (INCL. ON 1.5°C-WARMING SCENARIOS); FOOD SECURITY AND CLIMATE CHANGE; AND SEA LEVEL RISE AND GLACIAL MELTING



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18/08/2015

Carlos Martin-Novella
Deputy Secretary
Intergovernmental Panel on Climate Change
7bis Avenue de la Paix
C.P. 2300
CH- 1211 Geneva 2, Switzerland

RE: Proposals for Special Reports in the Sixth Assessment Cycle of the IPCC

Dear Mr. Carlos Martin-Novella,

Thank you for your letter ref: 5297-15/IPCC/GEN dated 6 July, 2015 on potential themes for Special Reports of the IPCC.

I am writing on behalf of Climate Action Network International (CAN) to offer CAN's views in this respect.

As a worldwide network of over 950 Non-Governmental Organizations in more than 100 countries working to promote government and individual action to limit human-induced climate change to ecologically sustainable levels, CAN welcomes the invitation of the IPCC to submit proposals for Special Reports to be prepared and concluded during the Sixth Assessment cycle (AR6) of the IPCC.

CAN is of the view that the IPCC's Special Reports play an extremely valuable role in informing the international climate debate, and that they should continue to provide solid, science-based, and policy relevant support to the UNFCCC in the future. In doing so, the IPCC's Special Reports should be guided by the priorities of the most vulnerable and provide scientific insights that would otherwise not easily gain the necessary prominence.

In line with this, CAN proposes three Special Report themes for the IPCC's work in AR6. As these Special Reports are part of AR6 of the IPCC, their key findings should also be included in a potential Synthesis Report at the end of the sixth cycle to be published before 2020.

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CAN would welcome Special Reports that address the following themes during the coming cycle:

i. Decarbonisation and low carbon development (incl. on 1.5°C-warming scenarios).

All the scenarios that limit warming at 2 degrees or below have in common that they decarbonise economies at a significant rate., Numerous countries including the G7 have recognized and committed themselves to decarbonization of the global economy over the course of this century to address climate change.

Taking an integrated approach, the proposed Special Report should demonstrate the pathways available to achieving ambitious emission reductions towards full decarbonisation while promoting sustainable development. Such a Report should in particular take into account recent technological developments and cost decreases of low- and zero-emission mitigation options, in particular renewable energy solutions, and how this can facilitate accelerated decarbonisation pathways. It should also include empirical evidence on which mitigation as well as adaptation measures have been effective, and which have failed.

Like many of the world's most vulnerable nations, CAN strongly believes that global average temperature rise should be limited to 1.5, rather than 2 degrees Celsius (the current objective of the Climate Change Convention). This view was recently corroborated by the findings of a Structured Expert Dialogue organized by the UNFCCC, which concluded that a warming of 2 degrees would already lead to catastrophic impacts, slow down economic growth and hinder poverty reduction efforts considerably.

CAN recognises that there was not enough data available during AR5 for the IPCC to examine 1.5° degree scenarios in sufficient depth, but is of the view that such scenarios should be developed as a matter of urgency before the window of opportunity for limiting global warming to this level closes completely. If the IPCC were to announce a Special Report which pays particular attention to this theme, in the context of decarbonisation analyses, the necessary research would surely continue and intensify.

Therefore, although the IPCC has previously already examined in-depth scenarios where average global warming does not exceed 2 degrees compared to preindustrial levels, we propose that the IPCC dedicate a Special Report to decarbonisation and low carbon development, including paying special attention to 1.5° degrees warming limitation scenarios.

ii. Food security and climate change.

Climate change forms a clear risk to all aspects of food security (availability, access, stability, utilization to contribute to nutrition). Food insecurity adversely affects health, wellbeing, peace and stability, negatively impacting the ability of countries and vulnerable populations to advance sustainable development and secure dignified livelihoods and has even been linked to crises like the current one in Syria.

Climate change and food insecurity are complex and interrelated, yet solutions, are manifold and diverse. This special report should contribute to the understanding of how climate change, its risks and associated loss and damage, affect all aspects of food security, including the nutritional value of food produced, in different regions and agricultural contexts, and among different populations. The report should consider the potential impact on food security of changes in land use to reduce emissions. It should highlight solutions and adaptation strategies, building off the outcomes of the agriculture workshops to be held at SB44.

Adaptation strategies explored should address all aspects of food security and could include: ways to sustainably increase food production, particularly among small scale food producers. Strategies should go beyond food production to examine the underlying causes of vulnerability to climate change and food security, and the ways in which food *systems* can better support food and nutrition security in the context of climate change.

Adaptation strategies might also include policies and approaches (1) to increase access among food insecure populations, especially small scale food producers, to resources and information to enable them to adapt; (2) to support and promote more sustainable and nutritious production and consumption; (3) to reduce food waste and loss; and (4) to address gender equitable access to resources, including financial, natural, information, health, family planning and contraception.

In addition, the report should consider research in relation to loss and damage, due to climate change, beyond what can be reduced or addressed through mitigation or adaptation. The report should consider research into tipping points – when loss and damage related to food and nutrition security will occur, such as desertification or ocean acidification that will render agriculture- or fisheries-based livelihoods unviable. The report should also explore approaches to address loss and damage related to food and nutrition security.

Finally, the report should draw from previous work and discussions of the Committee on World Food Security. Ireland and Tanzania have already undertaken considerations on food security and climate change and have organised an expert meeting on this issue. CAN supports this approach.

iii. Sea level rise and glacial melting

A better scientific understanding of sea level rise and glacial melting is necessary in order to accurately estimate risks and inform adaptation policies and strategies, in particular for those most vulnerable to sea level rise. Although the question of quantification of sea level rise was addressed in AR4 and AR5, it was not adequately looked into yet, and therefore warrants further examination.

CAN is aware that Monaco has proposed an IPCC Special Report on Oceans. Given the strong interlinkages between the issues, we suggest expanding this proposal to include sea level rise and glacial melting.

Thank you again for the opportunity to contribute to this process and your consideration.

Sincerely,



Ria Voorhaar
IPCC Focal Point on behalf of
Climate Action Network-International

EUROPEAN UNION PROPOSALS: SPECIAL REPORT ON AVIATION AND MARITIME; AND SPECIAL REPORT ON AFOLU

The European Union⁵ would like to propose to revisit two topics that were looked at in previous special reports, and broaden their scope to reflect recent policy concerns and needs. The first, one is the 1999 *Special Report on Aviation and the Global Atmosphere*. The second one is the 2000 *Special Report on Land Use, Land-Use Change and Forestry*.

Both topics are of particular interest to policy makers that need to implement climate change policies. By the time any special report is finalized, it will be almost two decades since the release of the last reports. In 20 years, knowledge and science have evolved, and at the same time both topics are of clear importance to develop future climate change policies, which we believe can benefit from the thorough review in a special report.

Regarding the special report on aviation this topic could be extended to maritime, given that there are analogies and interconnections between sectors and that both sectors are of interest to the global policy community, both are sectors where not all emissions are attributed to specific countries but rather categorized under international bunkers, and both are sectors where the interactions with other pollutants and impacts on climate are also of importance. Having better knowledge on this will help significantly future policy preparations and their implementation.

Regarding the special report on Land Use, Land-Use Change and Forestry, we note that is a sector representing a large share of global net GHG emissions. Furthermore it is a sector closely linked to agriculture, and policies developed on these issues will need to take into account interactions between the two, notably because some of the mitigation options at hand, such as biomass for energy production impact both sectors, and because in the longer term it is an important sector in terms of carbon dioxide removal technologies. Therefore we consider it of interest to revisit this sector, but expand any special report to include also Agriculture, or rather the whole range of AFOLU sectors (Agriculture, Forestry and Other Land Use).

Relevance of the topic for climate change policy preparation and key issues to be addressed

1) Special Report on Aviation and Maritime

AR5 estimated that Aviation and Maritime emissions represent around 24% of total GHG transport emissions, or the equivalent of more than 1.5 giga ton of CO₂-eq. emissions (AR 5, WG III, chapter 8). These sectors represent fast growing emissions, for instance ICAO forecasts that by 2050 aviation fuel consumption could increase by 4 to 6 times compared to 2010⁶. Similarly, maritime CO₂ emissions are projected to increase significantly in the coming decades. Depending on future economic and energy developments, the projections show an increase by 50% to 250% in the period to 2050⁷.

Furthermore both aviation and maritime emissions have their own particularities in relation to impacts on climate change, in part depending on the type of pollutants produced (for instance the amount of other aerosols produced), in part dependent on the location that this pollution impacts the

⁵ Represented as special observer to the IPCC by the European Commission, without prejudice of opinions of single EU Member States as IPCC members.

⁶ <http://cfapp.icao.int/Environmental-Report-2013/>

⁷ <http://www.iadc.org/wp-content/uploads/2014/02/MEPC-67-6-INF3-2014-Final-Report-complete.pdf>

atmosphere (for instance the different impact of aviation emissions due to release in the upper troposphere and lower stratosphere). Mitigation options exist for both sectors and initiatives and policies have been undertaken to address GHG emissions of these sectors, but also other pollutants.

A special report should give an update of the most recent science of the emissions related to these sectors and their impact on climate, including non-CO₂ climate impacts. The report should give insights into the expected emission profiles, also taking into account initiatives and policies undertaken to reduce emissions and pollutants from these sectors. The report should also give insights into mitigation options available for these sectors; point out areas of interest to further develop technologies and explore what type of policies can be most efficient at achieving future mitigation potential.

2) Special report on AFOLU

Net GHG emissions from Agriculture, Forestry and Other Land Use (AFOLU) cover an even more significant share of global GHG emissions. The exact share varies depending on sources. The estimate as included in the IPCC AR5 SPM puts the share at around 21% of global GHG emissions. Emissions and absorptions from these sectors originate from all regions and approaches to measuring, reporting and accounting these emissions vary widely. These sectors are seen as a direct source of emissions, as well as an avenue for mitigation through for instance afforestation or the use of biomass for energy. Policies related to these sectors will also play an ever more important role as they are linked to the challenge of food security and other demands for raw materials from, as well as over the long term the implementation of carbon dioxide removal technologies.

There is a need to assess the current state of knowledge concerning AFOLU and in particular aspects such as: its full contribution to climate change (due to carbon balance alteration, changes in emissions/uptake of N₂O, CH₄ and short-lived climate forcers, changes in surface albedo and energy balance), climate change impacts, uncertainties in historical and future land use and land-cover change emissions, as well as its potential contribution to mitigation and adaptation action. A special report can help to improve methodology for emissions estimates based on a synthetic review of the available literature, determine emission trends, and examine their distribution (e.g. across regions and land use & forest types). It could determine which types of action are most important for mitigation both in the short and the long term (e.g. afforestation, avoided deforestation, climate-smart agriculture), identify which regions or sectors are most important, and identify impacts on other sectors. It could also identify the types and regions of land and land use that would be particularly vulnerable to climate change and those where there is greatest potential to adapt to the impacts. Finally, the report will provide a unique opportunity to bring together and synthesize knowledge on the trade-offs and win/win aspects of AFOLU practices and policies, as land-use and land-use change alters not only the climate-regulation services of ecosystems but also has huge impact on other ecosystem services such as food and timber supply, water resources, pollution, recreation, and biodiversity.

STATE OF PALESTINE PROPOSAL: THE IMPACT OF CLIMATE CHANGE ON NATIONAL, REGIONAL AND INTERNATIONAL SECURITY

Details of Submitting Official

Title	Full Name	Member State or Observer Organization	
Minister's Advisor for Climate Change	Nedal Abdelqader Abdallah Katbehbader	State of Palestine / Observer State	
Address Minister's Advisor for Climate Change National Focal Point/UNFCCC National Focal Point/IPCC Environment Quality Authority (EQA) El-Bireh, P.O.Box 3841 Ramallah, Palestine			
Email	Work Telephone	Work Fax	Mobile
-mail: n72065@hotmail.com	+972 2 2403495	+972 2 2403494	+972 599 201541

Title of proposed Special Report

The Impact of Climate Change on National, Regional and International Security

Relevance of the topic for climate change

Taking into consideration many current and previous tensions worldwide and its close relation and root causes that is strongly or weakly related to climate change and in order to draw the attention of the world leaders to this relation I recommend to produce such a report.

UN Security Council clearly addressed Climate Change as one of the threats for the international security.

Lots of studies and research were conducted in that regard.

Wealth of information are available as well.

Relevance of the topic for policy making

It is of utmost importance to draw the attention of world leaders and policy makers to this relation between CC and security in order to enhance their willingness to take serious actions now and in the future and in order to let this understanding translated into some kind of agreements/conventions,.....

Justification of the need for a Special Report

Having a special report will attract attention and shed more light and focus on the matter which is urgently needed at the current time taking into consideration the prevailing tensions worldwide.

Key issues proposed to be addressed in the Special Report

Root causes of current tensions and how it is related to CC.
Socio-Economic Impact of CC and how this is reflected and enveloped into security threat.
UN Security Council and CC.
USA, and other countries published their own reports on the CC and their impact on national Security.
Middle East tensions and its relation to CC.

Potential Partner Organizations

London School of Economics / Grantham Institute
IISD
UN Security Council
UN University
Many other could be highly interested.

Time schedule

Sorry that I am not well aware of expected schedule / time frame. IPCC expert are kindly requested to help in that regard.

Budget estimates

Sorry that I am not well aware of expected budget. IPCC expert are kindly requested to help in that regard in light of earlier special reports.

Possible donors

USA, Multilateral Funds, UK, Denmark, Norway, EU, EC,.....
Many other could be highly interested.

STATE OF PALESTINE PROPOSAL: MANAGING THE RISKS OF EXTREME EVENTS AND DISASTERS TO ADVANCE CLIMATE CHANGE ADAPTATION - UPDATE

Details of Submitting Official

Title	Full Name	Member State or Observer Organization	
Minister's Advisor for Climate Change	Nedal Abdelqader Abdallah Katbehbader	State of Palestine / Observer State	
Address Minister's Advisor for Climate Change National Focal Point/UNFCCC National Focal Point/IPCC Environment Quality Authority (EQA) El-Bireh, P.O.Box 3841 Ramallah, Palestine			
Email	Work Telephone	Work Fax	Mobile
-mail: n72065@hotmail.com	+972 2 2403495	+972 2 2403494	+972 599 201541

Title of proposed Special Report

Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation - Update

Relevance of the topic for climate change

Taking into consideration latest new records on CC and extreme weather events recorded after publishing the SREX report in a manner that very strongly support earlier understanding and in the same way of developing and aggregating knowledge and information on CC in the periodical Assessment Reports on CC, I highly recommend to publish such a report.

Lots of studies and research were conducted in that regard.

Wealth of information are available as well.

Relevance of the topic for policy making

It is of utmost importance to draw the attention of world leaders and policy makers to this relation between CC and extreme weather and climate events in order to enhance their willingness to take serious actions now and in the future and in order to let this understanding translated into some kind of agreements/ conventions,.....

Justification of the need for a Special Report

Having a special report will attract attention and shed more light and focus on the matter which is urgently needed at the current time taking into consideration the very serious extreme events the world witnessed lately.

Key issues proposed to be addressed in the Special Report

In a manner that benefit from earlier experience on SREX.

Potential Partner Organizations

Partners joined efforts on the original SREX report.

Time schedule

Sorry that I am not well aware of expected schedule / time frame. IPCC expert are kindly requested to help in that regard.

Budget estimates

Sorry that I am not well aware of expected budget. IPCC expert are kindly requested to help in that regard in light of earlier special reports.

Possible donors

Earlier Donors in addition to any new interested ones.

UNCCD PROPOSAL: CLIMATE CHANGE AND LAND DEGRADATION – AN ASSESSMENT OF THE INTERLINKAGES AND INTEGRATED STRATEGIES FOR MITIGATION AND ADAPTATION

Details of Submitting Official

Title	Full Name	Member State or Observer Organization		
Dr.	Victor Castillo	United Nations Convention to Combat Desertification (UNCCD)		
Address		UN Campus, Platz der Vereinten Nationen 1 53113 Bonn, Germany		
Email	Work Telephone	Work Fax	Mobile	
vcastillo@unccd.int	+49-228-8152865			

Title of proposed Special Report

Climate change and land degradation – An assessment of the interlinkages and integrated strategies for mitigation and adaptation

Relevance of the topic for climate change

Land degradation is generally defined as a reduction in the potential of land to provide ecosystem services, specifically as regards biological and economic productivity. The final stage of land degradation in arid, semi-arid and dry sub-humid areas is referred to as desertification. Land degradation results from unsustainable land use practices and is exacerbated by climatic factors. Hence, **climate change is recognized as a major driving force of land degradation**. Increasing temperatures, changing precipitation patterns and increased frequency and magnitude of extreme weather events exacerbate the erosion of soils through wind and water as well as biological and chemical degradation processes⁸. The intensification and acceleration of land degradation processes through climate change impairs biodiversity and the provision of ecosystem services with severe consequences for food production, water regulation, livelihoods and human wellbeing. The effects of climate change on land degradation and the provision of ecosystem services are **highly ecosystem-specific**. Areas already experiencing land degradation and desertification are likely to be particularly sensitive⁹. Given the manifold direct and indirect impacts of climate change on land degradation there is a **vast potential for land-based climate change adaptation**. Adapting land use to changing climatic conditions and making wise use of ecosystem services are widely considered to be key in building resilient societies and agro-ecosystems. In addition, land-based adaptation strategies such as sustainable land management (SLM) also render considerable co-benefits in terms of supporting rural livelihoods and preserving biodiversity¹⁰.

At the same time, **land degradation is a major driving force of climate change**. It has been estimated that 60% of terrestrial carbon stores from soils and vegetation have been lost since the 19th century through land degradation processes¹¹. These carbon releases contribute significantly to global warming. Currently, the AFOLU sector as a whole accounts for around one-quarter of all anthropogenic greenhouse gas emissions¹². This also means that the **potential for mitigating**

⁸ IPCC (2014): Climate Change 2014: Impacts, Adaptation, and Vulnerability. Cambridge.

⁹ Reed M, Stringer L et al. (2015): Climate change and desertification: anticipating, assessing and adapting to future change in drylands. Impulse Report for the 3rd UNCCD Scientific Conference, 9-12 March 2015.

¹⁰ Cowie A et al. (2011): Towards sustainable land management in the drylands: Scientific connections in monitoring and assessing dryland degradation, climate change and biodiversity. In: Land Degradation & Development 22:248-260.

¹¹ Houghton RA (1995): Changes in the storage of terrestrial carbon since 1850. In: Lal R, Kimble J, Levine E, Stewart BA (Eds): Soils and Global Change. Boca Raton.

¹² IPCC (2014): Climate Change 2014: Mitigation of Climate Change. Cambridge.

climate change by reducing land degradation and restoring or rehabilitating degraded land is vast. Soils alone have the capacity to sequester between 1 and 3 GtCO₂e annually¹³. Also the potential of land to sequester carbon is highly ecosystem specific (varying between forests, drylands, wetlands, agro-ecosystems etc.). Whereas the potential of forests and peatlands is well recognized, the mitigation potential of other terrestrial ecosystems received less attention and has not been systematically utilized so far. It has, however, been recently shown that semi-arid ecosystems have dominated the trend of the global land carbon sink over the last decades as their carbon balance is strongly associated with circulation-driven variations in both precipitation and temperature.¹⁴

The interlinkages between climate change and land degradation are characterized by complex feedback loops. Such processes can be self-reinforcing, e.g. when climate change induced land degradation increases greenhouse gas emissions through the further loss of vegetation cover or when rising temperatures increase soil respiration. Other feedback processes can have a mitigating effect such as the increased albedo of degraded lands or increased primary productivity due to CO₂ fertilization. In general, the combined effects of land degradation and climate change as well as the associated feedback processes are characterized by **high uncertainties** and vary significantly between different ecosystems¹⁵.

Relevance of the topic for policy making

The challenges of climate change and land degradation continue to be top priorities on the international environmental and development agendas as expressed in the proposed **Sustainable Development Goals (SDGs)**: SDG 13 addresses climate change and SDG 15 calls for halting and reversing the degradation of terrestrial ecosystems. More specifically target 15.3 calls for a land degradation neutral world. The concept of **Land Degradation Neutrality (LDN)** is expected to guide the future implementation of the UNCCD.

In parallel, the land sector is expected to be a **critical element of a future climate agreement**. There is growing recognition that limiting global warming to 2°C above pre-industrial levels can only be realized if the mitigation potential of terrestrial ecosystems is utilized much more comprehensively, including the reduction of land degradation and the restoration of degraded ecosystems¹⁶. In fact, the only way many developing countries can act on climate change is through land-based activities. However, to date climate negotiations have not adequately accounted for the land sector's contribution to mitigation and adaptation.

It is increasingly recognized that **these global goals can only be achieved if the interlinkages between climate change and land degradation are fully taken into account**. This will have to be based on authoritative scientific assessments which can inform respective policy making processes. Such an assessment is currently absent. The importance of fully accounting for the interlinkages between climate change and land degradation was expressed, inter alia, by the Parties of the UNCCD during the Third UNCCD Scientific Conference¹⁷ and the Science-Policy Interface (SPI) of the UNCCD¹⁸.

¹³ IPCC (2007): Climate Change 2007: Mitigation. Cambridge.

¹⁴ Ahlström A et al. (2015): The dominant role of semi-arid ecosystems in the trend and variability of the land CO₂ sink. In: Science 348: 895-899.

¹⁵ Heimann M and Reichstein M (2008): Terrestrial ecosystem carbon dynamics and climate feedbacks. Nature 451: 289-292.

¹⁶ Boucher D and Ferretti-Gallon K (2015): Halfway There? What the land sector can contribute to closing the emissions gap. Union of Concerned Scientists. Cambridge.

¹⁷ UNCCD (2015): Report of the Committee on Science and Technology on its fourth special session (Third UNCCD Scientific Conference) (ICCD/CST(S-4)/3).

Against this background, there is **growing policy demand for integrated strategies** which simultaneously address climate change and land degradation. To achieve LDN and the other SDGs, climate change, land degradation and biodiversity loss must not be addressed separately but through integrated strategies which **identify and maximize synergies while realizing and optimizing trade-offs**. Such synergistic approaches would also foster the closer cooperation between the three Rio Conventions.

Eventually, the policy relevance of the topic is reinforced through the immense financial implications of land degradation and climate change. Land degradation alone is estimated to cause global costs of nearly USD 66 billion per year. At the same, activities for halting and reversing land degradation come at comparatively low costs and render significant benefits for food security, climate change adaptation and mitigation as well as biodiversity¹⁹.

Justification of the need for a Special Report

The interlinkages and feedback processes between climate change and land degradation are highly complex and depend on specific ecosystem characteristics. There are a large number of case studies on such interlinkages with different, often diverging conclusions²⁰. However, **a meta-analysis which provides a comprehensive and balanced overview of the current state of knowledge is needed**. In particular, there is the need to differentiate more clearly between land degradation processes which are predominantly driven by direct land use activities and those in which the impacts of climatic change are the prevailing force.

The existing IPCC assessments and special reports provide excellent insights into the interlinkages between climate change and agriculture, land use change and forestry. However, a detailed analysis regarding the feedbacks between climate change and land degradation which disaggregates for specific ecosystem types is currently absent. The strong representation of forestry in existing IPCC reports could be complemented by a more detailed analysis of the feedback processes between climate change and other terrestrial ecosystems.

It is expected that **an IPCC special report on climate change and land degradation could fill these knowledge gaps** and provide essential guidance for further research and policy-making. Against the background of the post 2015 development agenda and the SDGs such an assessment would **meet the demand for an authoritative scientific assessment** of the combined effects of land degradation and climate change including associated feedback processes. Moreover, the assessment could provide the very **scientific basis for developing strategies for the integrated implementation of the SDG agenda**. Such strategies would need to clearly reveal and analyze the synergies and trade-offs between the SDGs on climate and land. In this sense, the **combination of mitigation and adaptation aspects in one IPCC special report** would underline the need for and the potential of integrated approaches acknowledging the multifunctionality of land.

¹⁸ UNCCD (2015): Outcomes and policy-oriented recommendations of the UNCCD 3rd Scientific Conference. Report by the Bureau of the Committee on Science and Technology (ICCD/COP(12)/CST/2).

¹⁹ UNCCD (2015): Reaping the rewards: financing land degradation neutrality.

²⁰ Reed M, Stringer L et al. (2015): Climate change and desertification: anticipating, assessing and adapting to future change in drylands. Impulse Report for the 3rd UNCCD Scientific Conference, 9-12 March 2015.

With regard to the UNCCD and its Parties, a special report on climate change and land degradation would be **essential for ensuring that policy making processes for LDN are linked to the climate agenda**, thus enhancing synergies between the Rio Conventions. The work of the UNCCD's Science-Policy Interface (SPI) on land-based practices for climate change mitigation and adaptation could be closely linked with the elaboration of an IPCC special report for mutual benefit²¹.

Eventually, an IPCC special report on land degradation would ideally complement the on-going efforts of the Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES) to develop an assessment on land degradation and restoration. This assessment focuses primarily on the direct drivers and consequences of land degradation in terms of land use practices and biodiversity loss, whereas the detailed analysis of the interlinkages between climate change and land degradation is beyond the scope of this assessment.

Key issues proposed to be addressed in the Special Report

Drivers and feedback processes

- Climate change as a driving or exacerbating force of land degradation (globally and in different ecosystems)
- Land degradation (globally and in different ecosystems) as a driving or exacerbating force of climate change
- Positive and negative feedbacks between climate change and land degradation

Options and strategies for land-based adaptation and mitigation

- Options and strategies for land-based adaptation to climate change
- Options and strategies for land-based mitigation of climate change
- Synergies and trade-offs: options for combining the fight against land degradation with adaptation and mitigation activities

Potential Partner Organizations

- United Nations Convention to Combat Desertification (UNCCD)
- United Nations Framework Convention on Climate Change (UNFCCC)
- Food and Agriculture Organization (FAO)
- United Nations Environment Program (UNEP)
- World Meteorological Organization (WMO)
- Convention on Biological Diversity (CBD)
- International Union for Conservation of Nature (IUCN)
- Convention on Wetlands (Ramsar)
- Universities and research institutions

Time schedule

Budget estimates

Tentative estimation: € 800,000

²¹ UNCCD (2015): Science-Policy Interface: progress report and work programme 2016-2017 (ICCD/COP(12)/CST/6).

Possible donors

Funding opportunities will be explored with, inter alia, EU commission and member countries as well as Switzerland, Norway and Korea.

The identification of possible donors might be supported by the fact that during the 41st session of the IPCC in February 2015 Algeria proposed an IPCC special report on climate change and desertification. This proposal was supported by Egypt, Saudi Arabia, Kuwait, Jordan, Mali, Chad, Switzerland, Spain and Peru.

UNEP PROPOSAL: GLOBAL ADAPTATION OUTLOOK

Details of Submitting Official

Title	Full Name	Member State or Observer Organization	
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Title of proposed Special Report

Global Adaptation Outlook

Relevance of the topic for climate change

Climate change results in multiple impacts on human society and natural systems and some of them are unavoidable. Society should adapt to them in a most effective way. In order to understand and address the associated risks and opportunities, governments and other stakeholders need clear understanding of what is going on now and what they could expect in future. An adaptation outlook, a global integrated assessment of the issue, will combine robust science with explicit consideration of adaptation options and “adaptation trajectories” depending on the emissions trajectories. Analysis of knowledge gaps in adaptation science will also be undertaken in the assessment.

Relevance of the topic for policy making

Whereas aggressive and immediate mitigation action is a fundamental precondition for avoiding unmanageable climate risks and impacts, comprehensive inclusion of adaptation as part of the global strategy on climate change is required to reduce social costs of unmanageable climate change and unavoidable impacts. In its 2014 Adaptation Gap Report UNEP showed that there was likely to be a significant adaptation gap after 2020 that could only increase by 2050 if the world fails to reduce emissions to the levels required to limit global temperature rise less than 2° Celsius above pre-industrial.

Depending on the emissions trajectory the “adaptation trajectory” will vary so will the adaptation gap. An integrated assessment of adaptation trajectories (the “adaptation outlook”) is necessary to help decision-makers make informed decisions on future mitigation and adaptation action.

Integrating knowledge from different sources and making it available to decision-makers in the form of the assessment report is one of the most effective ways to engage stakeholders into action. In addition a powerful science-policy interface will be created through an integrated assessment process that will allow successfully integrating the best available knowledge and delivering findings to decision-makers in the format and language they require.

Justification of the need for a Special Report

- Adaptation is a cross-IPCC WG theme of high interest to policymakers where science rapidly evolves
- There is a need to assess observed impacts, vulnerability and exposure and adaptation experience and discuss plausible future scenarios

Key issues proposed to be addressed in the Special Report

-Adaptation challenges depending of the RCP:

- 1.5 deg C
- 2 deg C
- 4 deg C

And by sector: health, energy, food security, disaster management...

-Solution space

-Adaptation gap

-Synergies and trade-offs of integration of mitigation measures and adaptation measures

-Technologies and technology transfer

-Regional adaptation

-Best practices

-Socio-economic impact of identified adaptation measures

-Maladaptation

-Links with sustainable development

-Knowledge gaps

Potential Partner Organizations

-UNEP (DEWA, DEPI, DTIE, DRC, collaborating centres)

-FAO, WHO, UNDP, ISDR, WB, GEF, IEA etc.

-Global/regional networks and initiatives such as GAN, PROVIA, IPBES..., regional initiatives

-Private sector and civil society

Time schedule

2 years starting in early 2016

Budget estimates

USD1 mil +in kind contribution from partners

Possible donors

Member states

NORWAY PROPOSAL: MITIGATION, CLIMATE STABILIZATION AND SUSTAINABILITY**Relevance of the topic for climate change**

This Special Report will provide an integrated scientific assessment of policy options for meeting both medium and long-term climate goals. It could also support the newly adopted Sustainable Development Goals (SDGs) that are most relevant for climate change. The assessment will focus on the potential, efficiency and feasibility of a broad set of emission reduction options and possible policy measures and instruments.

Relevance of the topic for policy-making

The Special Report will provide timely and easily available information that will support policy-makers and business in prioritizing and implementing mitigation measures in upcoming decades. It will provide transparent and specific information on how transition to low-emission pathways can be achieved and provide a scientific basis for assessing policy options in the context of the UNFCCC. The Special Report would also be useful for assessing how mitigation options can be seen in relation to developing sustainable adaptation strategies. It will provide a sound scientific foundation for implementing the Paris agreement and the evolving future needs of the UNFCCC, and a more detailed scoping of such a report should therefore be done after we see the outcome of the Paris summit.

Justification for the need of a Special Report

The AR5 showed that mitigation options are available in every major sector. Mitigation can be more cost-effective if using an integrated approach that combines measures to reduce energy use and the greenhouse gas intensity of end-use sectors, decarbonize energy supply, reduce net emissions and enhance carbon sinks in land-based sectors. The AR5 WGIII stated that: "At the global level, scenarios reaching about 450 ppm CO₂-eq are also characterized by more rapid improvements in energy efficiency and a tripling to nearly a quadrupling of the share of zero- and low-carbon energy supply from renewables, nuclear energy and fossil energy with carbon dioxide capture and storage (CCS), or bioenergy with CCS (BECCS) by the year 2050". It is further stated that: "There are strong interdependencies in mitigation scenarios between the pace of introducing mitigation measures in energy supply and energy end-use and developments in the AFOLU sector (high confidence). The distribution of the mitigation effort across sectors is strongly influenced by the availability and performance of BECCS and large scale afforestation".

The Special Report could explore and update these issues further in an integrated context. This may include an assessment of how sustainable mitigation strategies can be developed and how they may support various sustainable development goals. For instance, the relationship between the increased need for renewable biological resources, food security, water availability and biodiversity. It will require input from all three workings-groups, such as: climate sensitivity, limitations on cumulative CO₂ emissions and other gases, scenarios, the associated impacts and risks, adaptation, emission reductions, economic costs, measures and instruments.

In summary, the report will provide a transparent and integrated perspective on a set of climate stabilization targets, the corresponding emission reductions and possible technology and policy measures and instruments. A Special Report involving all three working groups will be the best way to give an integrated perspective on emission reductions, in a format that is easily accessible and well-timed for policy-makers.

Key issues proposed to be addressed in the Special Report

This Special Report integrates perspectives from several of the proposed themes relating to mitigation and similar issues in the Inf. document prepared by the secretariat for IPCC-42 (IPCC-XLII/INF.13).

Key issues:

- Linking emission reductions compatible with stabilization targets to technology and policy measures.
- Analyzing various climate stabilization pathways in combination with other sustainable development goals, including co-benefits between climate policies, health and human welfare.
- Mitigation options in relation to developing sustainable adaptation strategies in key sector and regions.
- Integration of sectoral knowledge on emission reduction options with cross-sectoral options and integrated scenarios.
- Feasibility, timing and potential related to possible economic measures and instruments.
- International cooperation, such as global, regional and sectoral agreements and initiatives, including INDCs.
- Further quantifying the relationship between limitations on cumulative CO₂ emissions and reductions of other greenhouse gases (such as, CH₄ and N₂O and other Kyoto gases).
- Identifying and assessing the physical, environmental, technological and economic potential and constraints related to options for emissions reductions, including measures with negative emissions.

Time schedule

To be adapted by 2018/19, taking into account the needs of the UNFCCC. The scoping of such a report should be done after we see the outcome of the Paris summit.

MEETING RECOMMENDATIONS: EXPERT MEETING ON SCENARIOS, LUXEMBURG, AUSTRIA, 18-19 MAY 2015**Recommendations to the IPCC****1. Scenarios should play a key role during the Sixth Assessment Cycle in improving the integration of knowledge across the IPCC Working Groups.**

- a) An **IPCC Special Report** on the integrative use of scenarios across all three Working Groups could ensure a cohesive assessment of the relationship between mitigation, adaptation, and residual impacts from climate change in Sixth Assessment Report (AR6) that goes beyond the AR5. Participants considered two viable alternatives for the report:
- i) A dedicated *Special Report on Scenarios* (assessing the literature on socio-economic pathways to emissions, climate change, impacts, including sustainable development linkages);
 - ii) A more broadly framed *Special Report on the Interaction between Adaptation, Mitigation and Sustainable Development* with the integration of scenario-based evidence across all three IPCC Working Groups at its core.

Possible drawbacks to such Special Reports were highlighted, including the timing during the sixth assessment cycle and the ongoing scenario related activities in the community, and the workload imposed on scenario experts. The possibility of a *Community-based Scenario Assessment* should be considered if no IPCC Special Report is commissioned (see also the recommendations for the community further below).

SOUTH AFRICA PROPOSAL: SPECIAL REPORT ON CITIES AND CLIMATE CHANGE (SRCC)**Details of Submitting Official**

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Title of proposed Special Report

Special Report on Cities and Climate change (SRCC)

Relevance of the topic for climate change

On this “planet of cities” (Angel, 2012), 55% of the world’s population is urban and it is anticipated that up to two-thirds of the world’s population will live in urban areas by 2050 (UNDESA, 2014). Every week, the global urban population increases by about 1 million (UN WUP, 2014). Every day, an 80 sq.km area of the planet becomes urban (Seto et al., 2012).

During this period of rapid global urbanisation, it is anticipated that annual urban infrastructure investments will rise from \$10 trillion to more than \$20 trillion by 2025, with cities in the global South being the focus (Dobbs et al., 2012). The urban share of global investments and earnings will also grow during this period and reinforce the centrality of cities to the global economy. Only 600 cities produce 60% of global GDP (McKinsey Global Institute, 2011), yet, many of these lie in climate hot spots, including low-elevation coastal zones (McGranahan et al., 2013).

The aggregate impact of cities on the global climate is significant. Cities account for over 70% of global fossil fuel CO₂ emissions and are the primary driver of climate change. Recognizing the importance of cities in both driving global emissions and as vulnerable hotspots of climate change impacts, the IPCC Fifth Assessment Report (AR5) included a chapter on urban adaptation to climate change (Ch. 8 of WGIII) and for the first time included a chapter on the role of spatial planning and urban areas in mitigating climate change (Ch 12 of WGIII) role of cities. Yet, these chapters only scratch the surface in assessing the scientific understanding of climate change mitigation and adaptation in urban areas. Moreover, a dominant sectoral was used in WGII and WGIII, although cities offer opportunities for solutions at greater scale than the sum of individual sectors.

With more than half of humanity living in urban areas and the bulk of global economic productivity originating from cities, there is an urgent need to assess the myriad strategies that protect the lives of millions of urban residents and to safeguard one of the world’s most economically productive systems, build resilience to climate change impacts and to contribute to the much needed reduction in greenhouse gas emissions.

To do this, IPCC must strategically build on the science and momentum in AR5 and develop a Special Report on Cities that will engage directly with one of the most important scientific and policy challenges of our times: sustainable urbanisation. This would examine more closely how to address deepening climate challenges, using the momentum of urbanisation in many of the poorest parts of the world to enable a low-carbon economic and energy transition combined with transformative adaptation. This will build on the mandate provided by the Sustainable Development Goals (SDGs), the Sendai Framework for Disaster Risk Reduction (DRR), the prospective outcomes of COP21 and the further definition of the 'new urban agenda' at Habitat III in 2016.

Addressing climate change in cities and within the framework of sustainable urbanisation, provides a unique opportunity to realise co-benefits from coordinated mitigation and adaptation action e. g. enabling deep decarbonisation of urban and energy systems; reducing vulnerability via the universal provision of basic services, safe housing, sustainable livelihoods and resilient ecosystem services; and reducing climate risk exposure and impact via inclusive and integrated planning (AR5). Cities are not only local climate hot spots; they also provide potential opportunities for concentrated fast-track climate action that can be propelled by the momentum of investment, institutional capacities and potential for social, economic and technological innovation. Cities across the world, have demonstrated their leadership in climate action and its convergence with DRR and SDG implementation.

Relevance of the topic for policy making

The UN Sustainable Development Goals (SDGs) define a global consensus around universal development goals to be met over the 2015-30 period. The 17 SDGs include an explicit standalone Urban SDG 11 "*Make cities and human settlements inclusive, safe, resilient and sustainable.*" When read with SDG 13 "*Take urgent action to combat climate change and its impacts*" and SDG 7 "*Ensure access to affordable, reliable, sustainable and modern energy for all,*" this provides a policy frame of goals, targets and evidence based monitoring of progress towards urban sustainability and climate action at local, national and global scales.

No global UN-supported baseline report or framework to address the Cities and Climate nexus exists. This is in spite of the progress made in IPCC AR5 and independent research publications (Bartlett and Satterthwaite, 2015; Rosenzweig et al., 2015)

The SDGs provide: a unique universal development frame committed to leaving no-one behind, involving all people in all countries, especially the most vulnerable; a spatially explicit frame to operationalize climate action; a mandate to span the artificial partitioning of the rural and the urban; and a crucial connection between the natural and built environments.

They signify substantial national (and global) commitments to: end extreme urban poverty (for over 500 million people); provide meaningful work (to over 600 million); universal education, healthcare and basic services including low carbon energy (to 5 billion urban residents); and improve the housing and living conditions of those in slums and informal settlements (over 1 billion people) by 2030. None of these SDGs and linked Targets will be possible without a proximate and strong focus on Climate action in cities.

The nexus between sustainable urban and infrastructure development and deep decarbonisation, new urban forms and climate mitigation and adaptation has been well established (IPCC, 2014). Some attempts have been made to estimate the order of magnitude of efforts, time and investments to make this possible and the role of cities in this (New Climate Economy Report, 2015). As a consequence, climate finance and social and technological innovation have become key contemporary concerns. Yet, the trade-offs, co-benefits, and impacts of different strategies for urban climate action at national and local levels have yet to be fully explored. Furthermore, the full solution space that incorporates the range of possible strategies at multiple urban scales, from building to region, has not been sufficiently mapped. Despite intense preparation for the UN Conference on Financing for Development (FfD, Addis Ababa, 2015) estimated financing needs and potential fiscal, financial and institutional arrangements to deliver the urban and linked-infrastructure SDGs are still unclear. Addressing urban climate mitigation and adaptation in an integrated manner and enabling convergence with the SDGs and Sendai DRR framework has the potential to provide a breakthrough in climate policy in the world's metropolises and city-regions as well as in smaller urban centres,

The Sendai Framework for Disaster Risk Reduction (2015) outlined a new agenda for the reduction of disaster risk and losses in lives, livelihoods and health. It pointed to the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries who were at risk. The role of cities and regions are central to their implementation. Though individual cities and some countries have demonstrated the effectiveness of such joined-up action, a bridge between short and medium-run DRR interventions and climate change actions is still to be adequately conceived at global scale (IPCC, 2014; UNISDR, 2015).

Habitat III (2016) will develop a 'new urban agenda' that should bring together sustainable development, disaster risk reduction, resilience building and climate change adaptation and mitigation within a 21st century governance frame for an 'urban planet'. Building on the recommendations of Habitat III Policy units could provide the opportunity to link the IPCC AR6 framework with implementable post-2016 Climate actions.

A series of recent international convenings including the UN Climate Summit and Mayors Compact (September 2014); the Vatican Mayors Convening (July 2015); the Mayors conclave at the UN SDG Summit (September 2015) and prospective Mayors Summit at CoP21 (Dec 2015) have established a leadership role for city and regional governments at the forefront of climate commitments and action.

Hence, an IPCC Special Report on Climate and Cities that clarifies the linkages, potential governance, policy, financial options and instruments to support mitigation and adaptation actions at multiple-levels, will be a significant opportunity to simultaneously advance scientific knowledge, policy and action. This will strengthen the SDG and UNFCCC processes, clarify implementation linkages to the Sendai and FfD processes and provide a framework for national climate action over the 2015-30 period.

Justification of the need for a Special Report

More than half the world's population, two-thirds of its economy and much of the infrastructure for development are located in urban areas. Much of the risk resulting from climate change are concentrated in cities (IPCC, 2014). Over two-thirds of the world's carbon emissions also come from urban areas but there are also urban areas that combine a high quality of life with low carbon emissions (IPCC, 2014). Hence, urban systems could potentially contribute significantly to local and global Climate mitigation and adaptation (IPCC, 2014).

Most of the urban infrastructure expected to be in place by 2050 have yet to be built. Hence, there is significant opportunity to map out solutions today that prevent or reduce carbon lock-in into the future. However, these windows of opportunity continue to close as infrastructure is built and energy consumption patterns become established. Much of the opportunities to foster sustainable low-carbon urbanisation will be located in urban areas of many low and middle income countries of Asia, Africa and Latin America over the next three decades. This provides an opportunity to dramatically reduce carbon intensity and climate risk if appropriate technological and institutional choices are made in current and ongoing urbanisation processes. Without concerted climate action in cities and regions, the potential for both deep decarbonisation and transformative adaptation will be limited. At the same time, urban infrastructures in mature and established cities in North America and Europe are aging and there will be new opportunities to rebuild and redevelop these taking advantage of the latest scientific and technological advances.

From a global environmental perspective this wave of urban-focused growth and development offers a unique, large scale opportunity to leap-frog past unsustainable development trajectories and put in place transformative development pathways focused on the implementation of low-carbon local and regional climate resilient development.

Nevertheless, the nexus between cities and climate change is an under-represented high impact area in previous IPCC assessments. This is in spite of the very large increase in the scientific literature on this theme (AR5) and in adaptation and mitigation action especially at community, city and regional levels (AR5). It was only in AR5 that the IPCC gave special emphasis to urban adaptation and mitigation. Yet, in spite of special efforts to build an integrated assessment framework, via an indicative set of consultations between Working Groups II & III in a special convening (Kolkata, 2013) – the discussion of adaptation and mitigation for cities was not integrated.

This Special Report, would attempt to close knowledge gaps via an integrated assessment of urban climate adaptation and mitigation drivers, exposure, risks and impacts. It could also help define the potential for urban deep decarbonisation and transformative adaptation within an UN-mandated urban SDG frame. It would help define new areas to deepen climate science, especially in helping identify spatially explicit drivers, risks and impacts at city and urban scale.

It would use the opportunity to engage with local, regional and national governments, key city networks and urban climate research institutions to craft a deeper scientific understanding of viable mitigation and adaptation pathways. This includes: governance and policy measures; fiscal and financial instruments; and institutional, social and technological innovation to enable effective climate action.

Key issues proposed to be addressed in the Special Report

The Special Report will build on and update (over the 2014-17 period) the extensive review of peer reviewed and grey literature on Cities and Climate change contained in AR5. It would assess the state of scientific knowledge, policy and practice across IPCC regions, urban centres in different size categories over the short (2015-30), medium (2030-50) and long term (2050-2100) in relation to climate variability, extreme events and climate change. It will seek to be policy relevant and SDG implementation oriented, while taking into account longer-term scientific and social science concerns.

It would do so in the context of global and regional Sustainable Development and urbanisation trends and the dynamics of urban and regional systems (including rural-urban linkages). It would carefully examine the drivers of climate change (e.g. via GHG emissions, land use change, expanded production and consumption, economic and social vulnerability, mal-development and mal-adaptation) and impacts driven by climate risks (e.g. via heat stress and heat island effects; drought, extreme precipitation and GLOPHs; fluvial, pluvial and coastal flooding, extreme wind and storm surge; and sea level rise). It would do so around twelve broad themes/chapters:

1. **Deepening climate science & urban mitigation and adaptation linkages:** including improving the spatial and governance resolutions of AR5 RCP analyses to improve our current understanding of urban emissions; intensive and extensive risks and impacts on regional ecosystems and urban systems; local and regional scale dynamics and identification and analysis of hotspots; linkages with prospective geospatial SDG tracking and monitoring systems, including intra-urban forms and structure, urban land use, spatial planning, urban metabolism and resource use.
2. **Estimating climate exposure, differential vulnerability and risk:** to various classes of cities and human settlements; populations, especially poor and vulnerable communities; socioecological and economic, built and infrastructure systems (including green infrastructure, the built environment, health and social services; water, waste-water and sanitation, energy, mobility, telecommunications systems) across the rural-urban continuum, in the context of the SDGs
3. **Identification of climate change & extreme event impacts on:** temperature rise, drought and water scarcity, coastal flooding, storm surge and sea level rise, inland flooding and urban geohydrological hazards and urban health impacts – and their impacts on regional, ecological and urban systems. Also the responses to these including spontaneous, planned and transformatory mitigation, adaptation and resilience building actions by diverse stakeholders at multiple levels of governance. Also, assessment of measures to accelerate and scale these over the short and medium-run
4. **Identification of the nexus between climate mitigation & adaptation and the SDGs:** including the impact of urban form and spatial planning; urban and linked regional ecosystem dynamics; urban metabolism, energy and resource throughput and efficiency; local and regional economic and infrastructure development; technological and social innovation and their differential impact on biodiversity, lifeline systems and vulnerable populations
5. **Identification of Deep Decarbonisation Pathways (DDCP) for Cities and Regions:** including focal urban systems and thresholds (e.g. energy, transportation and buildings); technological options for low-carbon development appropriate to local and regional socioecological and economic context; technological innovation and transfer options; and key policy levers, incentives and instruments to enable synergies between local and national DDCPs.

6. **Identification of Urban and Regional Adaptation Options:** for key urban and lifeline infrastructural systems, ecosystem services, economic and social systems, especially livelihood-related systems (for poor and vulnerable populations and communities); improved governance, institutional arrangements, financial and implementation capacities and incentives to accelerate and scale spontaneous and planned adaptation measures in the direction of transformative adaptation
7. **Identification of contradictions, conflicts and potential synergies:** between the SDGs, disaster risk reduction and resilience building agendas; and climate adaptation and mitigation options at local, regional and national levels and mechanisms to achieve coherence between them, deep decarbonisation and transformative adaptation. Also attention to the identification of residual limits to adaptation
8. **Estimation of economic, ecological and social costs of climate change for urban populations and benefits of mitigation & adaptation:** Estimation of the economic, social and environmental costs of climate variability and change over the short and medium-run to various classes of cities and human settlements by geography; and costs and benefits of particular mitigation and adaptation measures
9. **Assessment of governance, legal, regulatory & institutional capacities:** to enable urban climate change adaptation and mitigation within local, regional and national governments across various types of settlements in the context of SDG and DRR implementation; including local and national mitigation and adaptation policy development, planning, budgeting, implementation and monitoring
10. **Assessment of Climate Financing needs, frameworks and instruments:** to enable local, regional and national urban climate change adaptation and mitigation; including intergovernmental financing, fiscal and financing mechanisms and institutional capacities, incentives and instruments needed to encourage and support relevant public and private investments and behaviour change among households, communities and enterprises
11. **Assessment of Implementation, Monitoring & Learning Capacities:** to enable urban climate change mitigation and adaptation within the SDG frame at local, regional and national levels, via multiple stakeholders including governments, enterprises, communities and households
12. **Case studies of successful implementation and scaling up of climate action:** based on good practices that involves local, regional and national governments and engages enterprises, communities, urban poor groups and their organisations to enable knowledge creation, capacity development, learning and scaling-up across all relevant size categories and classes of urban areas

Potential Partner Organizations

This Special Report will bring together a wide range of UN agencies, multilateral and bilateral institutions, scientific and research institutions, global and regional urban networks and institutions working across the climate, development, disaster risk and urban spaces.

A unique partnership will need to be forged around institutions and individuals who have prior experience of the IPCC process to provide continuity and leadership, ensure high standards of analysis and scientific rigour; and given the short time-cycle required to deliver this, to produce a document that is not policy-prescriptive but policy and implementation relevant. A long list of potential partners, (in alphabetic order by cluster) is presented below:

United Nations Environment Programme ([UNEP](#))

United Nations Human Settlement Programme ([UN-Habitat](#))

United Nations International Strategy for Disaster Reduction ([UNISDR](#))

World Meteorological Organisation ([WMO](#))

UN SG's Special Envoy for Cities and Climate Change

UN Sustainable Development Solutions Network ([UNSDSN](#))

United Nations Commission for Latin America & the Caribbean ([UNECLAC](#))

Asian Development Bank ([ADB](#))

Global Environmental Facility ([GEF](#))

Inter-American Development Bank ([IDB](#))

Organisation for Economic Cooperation & Development ([OECD](#))

World Bank ([WB](#))

Asian Cities Climate Change Resilience Network ([ACCRN](#))

Cities Alliance ([CA](#))

Cities Climate Leadership Group ([C40](#))

International Council for Local Environmental Initiatives/Local Governments for Sustainability ([ICLEI](#))

United Cities and Local Governments ([UCLG](#))

African Centre for Cities (ACC)

African Climate & Development Initiative ([ACDI](#))

Asian Institute for Technology (AIT)

Commonwealth Scientific and Industrial Research Organisation ([CSIRO](#))

Department of Geography, [Durham University](#)

Indian Institute for Human Settlements ([IIHS](#))

Institute for Sustainable Development and International Relations ([IDDRI](#))

International Centre for Climate Change and Development ([ICCCAD](#))

International Institute for Environment and Development ([IIED](#))

National Centre for Atmospheric Research ([NCAR](#))

National Institute for Environmental Studies ([NIES](#))

Overseas Development Institute ([ODI](#))

Potsdam Institute for Climate Change (PIK)

Public Systems Group, Indian Institute for Management, Ahmedabad ([IIM-A](#))

School of Environment, Tsinghua University ([SOE](#))

Stockholm Resilience Centre ([SRC](#))

Urban Climate Change Research Network ([UCCRN](#))

Yale School of Forestry & Environmental Studies ([FES](#))

Time schedule

Initiated in mid-2016; formally announced by IPCC at Habitat III (17-20 October 2016). Work programmed to be completed over a period of 24 months. Report to be published in mid-2018.

Budget estimates

\$ 1.5 million. Estimated breakdown: Travel & Meetings (75%); Commissioned Research (15%); Secretariat & Publication (10%)

Possible Donors

A mix of donors may be required to bring together the expertise and the interest of UN, multilateral and bilateral donors and international Foundation who have programme and policy interests in the convergence between urbanisation, cities, DRR and Climate change. Three clusters of potential donors are listed below:

Multilateral Donors

Global Environment Facility ([GEF](#))
Green Climate Fund ([GCF](#))
Global Green Growth Institute ([GGGI](#))
World Bank ([WB](#))

Bilateral Donors

Agence Francaise de Development ([Afd](#))
Climate and Development Knowledge Network ([CDKN](#))
Department for International Development ([DFID](#))
Gesellschaft für Internationale Zusammenarbeit ([GIZ](#)/BMD)
International Development Research Centre ([IDRC](#))
Swedish International Development Cooperation ([SIDA](#))

International Foundations

[Bill and Melinda Gates Foundation](#)
[Bloomberg Philanthropies](#)
Children's Investment Fund Foundation ([CIFF](#))
[David and Lucile Packard Foundation](#)
[Ford Foundation](#)
[Rockefeller Foundation](#)

COP 21 PROPOSAL: SPECIAL REPORT ON THE IMPACTS OF GLOBAL WARMING OF 1.5°C AND RELATED EMISSION PATHWAYSFCCC/CP/2015/L.9/Rev.1

reducing emissions to 40 gigatonnes or to 1.5 °C above pre-industrial levels by reducing to a level to be identified in the special report referred to in paragraph 21 below;

18. *Also notes, in this context*, the adaptation needs expressed by many developing country Parties in their intended nationally determined contributions;

19. *Requests* the secretariat to update the synthesis report referred to in paragraph 16 above so as to cover all the information in the intended nationally determined contributions communicated by Parties pursuant to decision 1/CP.20 by 4 April 2016 and to make it available by 2 May 2016;

20. *Decides* to convene a facilitative dialogue among Parties in 2018 to take stock of the collective efforts of Parties in relation to progress towards the long-term goal referred to in Article 4, paragraph 1, of the Agreement and to inform the preparation of nationally determined contributions pursuant to Article 4, paragraph 8, of the Agreement;

21. *Invites* the Intergovernmental Panel on Climate Change to provide a special report in 2018 on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways;

SWITZERLAND PROPOSAL: SPECIAL REPORT ON CLIMATE CHANGE AND MOUNTAINS**Relevance of the topic to climate change**

Mountains cover a quarter of the Earth's terrestrial surface and provide an extraordinary level of goods and services not only to residents, but even more so to lowland societies. Mountain regions are sensitive to climate change and thus climate change puts at risk the panoply of ecosystem services accruing to a significant fraction of humanity. Mountains are increasingly observed and modelled. This information is crucial for these regions of the planet often inaccessible which renders difficult the implementation of sound adaptation strategies. Available data suggest that climate change may be proceeding more rapidly in mountain regions, further exacerbating impacts.

Mountains are a major component of the terrestrial surface, covering roughly 24% thereof, (Huddleston et al. 2003). Mountains are distributed on all continents with 99 countries having more than 25% of their territory in mountain areas. Even in countries where mountains cover less than 25%, mountain regions frequently provide essential ecosystem services without which lowland economies and cultures could not persist.

Mountains are indispensable to economies and societies around the world. Mountains have often been called the Third Pole due to the importance of their cryosphere, extending over a surface twice as large as the Arctic region. They also differ from the sparsely settled polar regions in that mountain regions are home to about 12% of the global population (about 915 million people; of these, 835 million or 90% live in developing countries), with a much larger number of people benefitting directly or indirectly from mountain ecosystem services. Mountain regions have their own complex, often globally connected economies but also generate numerous ecosystem services, essential to downslope societies. Mountains play a critical role in water supply first by typically receiving higher precipitation than adjacent lower areas, and second by storing precipitation as snow and ice as well as in hillslope and montane wetlands for later release, thus regulating aquifers, seasonal floods and water scarcity for downstream regions. Freshwater discharge from mountain regions is estimated to comprise between 32% and 60% of total discharge, and up to 95% in arid regions (Viviroli and Weingartner 2004). Mountains are thus extremely important for domestic and municipal water use, lowland irrigation in support of global food security, and play an important role in the production of hydropower, a dominant form of renewable clean energy worldwide.

Mountains provide key ecosystem services beyond water supply, including provisioning, supporting, regulating and cultural services. Mountain forests, with large fraction (28%) of global forest areas, have a dominant role in carbon sinks and reservoirs. They provide wood, fibre and non-timber forest products but also regulate the movement of water and sediment downslope. As with discharge, mountains are focal points of global biodiversity (both flora and fauna), very rich in biodiversity (Körner 2004), and host more than half of the world's biodiversity hotspots including a high percentage of endemic species. Mountain regions are centres of cultural, biological and agro-biological diversity, including the genetic pool of major global staples (e.g. maize, potatoes, barley, sorghum) and important agricultural commodities (e.g. tea, coffee). Six of the 20 plant species that provision 80% of the world's food originate in the mountains. Mountains are home to several thousand minority ethnic and tribal groups. A sizeable portion of mountain people live in poverty (meaning their resilience and adaptive capacity in the face of climate change is limited). Mountains are the second most popular tourist destination after coastal zones, accounting for 15-20% of annual tourism with an annual value of \$70-90 billion (UNEP 2007).

For all the services that they provide, mountains are nonetheless highly sensitive to climate change, thus threatening the provision of essential ecosystem services. Mountains typically display an extreme range of climatic conditions over short distances, leading to highly specialized social-ecological systems, coupled with important flows of matter and energy through these systems along altitudinal gradients. In addition, the 0° isotherm often runs through mountains, creating a cryosphere, the location and nature of which strongly influence the hydrologic, geomorphic and

ecological processes from which spring the mountains' essential ecosystem services. Mountains and in particular their cryosphere are primary indicators of climate change. In fact, rapid and unprecedented changes of the cryosphere (snow, glaciers, permafrost) are already evident and thus climate change is expected to have strong impacts on water resources (Mankin et al. 2015; Viviroli et al. 2011) especially by changing the timing and volume of discharge with impacts far beyond the mountains themselves. Changes in the frequency of extreme events are expected to have major repercussions on losses of life and property in and adjacent to mountains. Similarly, climate change is expected to change the patterns of biodiversity in mountains (Pauli et al. 2012). More broadly, climate change is expected to reverberate through the complex causal networks characteristic of mountain social-ecological systems, leading in many case to surprising, if not dismaying, outcomes.

The uncertainty of climate change impacts in mountain regions arising from the complexity of mountain social-ecological systems is further exacerbated by our relatively poor understanding of the status and trend of climate change within mountains regions. Mountains have been chronically underrepresented in the global observing system, hindering our ability to characterize accurately key parameters such as temperature and precipitation as well as their rates of change. Nonetheless, there is growing evidence that the rate of warming is amplified with elevation (Mountain Research Initiative EDW Working Group 2015), which may in turn accelerate or increase the already uncertainty impacts of climate change. Trends for precipitation change at high elevations have been assessed only in a limited way, thus increasing the uncertainty not only of discharge but also of a host of ecological and geomorphic processes.

References:

Huddlestone et al. 2003, FAO, Rome.

Körner 2004, *Ambio*.

Mankin et al. 2015, *Environmental Research Letters*

Mountain Research Initiative EDW Working Group 2015, *Nature Climate Change*

Pauli et al. 2012, *Science*.

UNEP 2007, Nairobi/Paris.

Viviroli and Weingartner 2004, *Hydrology and Earth System Sciences*.

Viviroli et al. 2011, *Hydrology and Earth System Sciences*.

Relevance of the topic for policymaking

Growing energy demand in industrializing nations (e.g. BRICS) many of which have significant undeveloped hydropower potential will force an examination of what will be possible under different climate scenarios and energy transformation pathways. As water and energy are very closely associated with mountain regions throughout the world, a better understanding of the current status and trends, and likely future scenarios of key climate variables like temperature and precipitation will also inform policies and investment decisions related to water supply, water quality, and water-related hazards. For instance, loss of water storage in the form of snow pack and glaciers has already led to discussions regarding new reservoir construction in many countries, with important implications for ecosystems and human livelihoods. Adaptation policies to increase or recover regulating functions of mountain ecosystems are essential in relation with water resources and risks under growing socio-economic pressure.

Beyond water and energy, the full suite of environmental goods and services provided by mountains – and likely to be altered by climate change – implicates numerous key policy issues. For instance, forest policy, in terms of timber production, hazard management, carbon sequestration and forest impacts on water supply require a better understanding of potential futures. The conservation of biodiversity, which due to habitat juxtaposition along altitudinal gradients is typically higher in mountains than adjacent lowlands, will be strengthened through better information on climate change impacts by a Special Report. Economic livelihoods, from subsistence farmers on tropical and subtropical mountains to strong tourism economies in the Alps and in the Pyrenees to fully developed urban centres in or adjacent to mountain regions in the Andes, Himalayas or elsewhere, will all be strongly influenced by changing climate. Migration from mountains has been an issue for many decades but effects of climate change will likely exacerbate migration stresses on both mountain and lowland regions.

The importance and density of environmental goods and service arising in mountains is not just leading to separate sectoral impacts as listed above but also to conflicts between competing sectors, within as well as between countries. Conflicts are particularly acute with respect to water supply in places such as Central Asia, the Nile Basin, and in the river basins draining through South and South East Asia or parts of the Andes, where water source areas are distinct from water use areas downstream. Expanding use by upstream nations coupled with climate change will exacerbate these existing conflicts.

Ecosystem services such as water resources, timber or recreation are consumed and managed by a wide range of actors. Changes in such services due to climate change and coupled with other drivers of socio-economic development pose a challenge to institutional arrangements of service allocation and management. While some of the institutions may be quite apt for adaptation, there is the strong likelihood that many are not up to the task of fitting growing demands within the planetary boundaries expressed in the world's mountain regions. On the other hand, traditional institutions existed for centuries prior to the emergence of modern state may hold some lessons for institutional innovation aimed at lessening conflict and increasing sustainability.

In summary, mountains have key relevance for policy making in sectors including energy, agriculture, tourism, urbanization and migration. The high exposure and sensitivity of mountains to climate change, their fragility and often marginality were already recognised in Chapter 13 (Managing fragile ecosystems: sustainable mountain development) of the 1992 Earth Summit Agenda 21, and also in the UN Framework Convention of Climate Change (Preamble and Article 4.8) and make them highly relevant for the 2015 Sustainable Development Goals and risk reduction policies.

Justification of the need for a Special Report

The high importance of mountains in terms of global and regional climate, cryosphere, water resources, carbon storage on land, biodiversity, global tourism and cultural diversity, all of which are closely linked to climate change, starkly contrasts with a poor documentation, knowledge and understanding which makes mountains a primary focus of an IPCC Special Report. Mountains have not been a specific focus of IPCC reports since a dedicated chapter was included in the Second Assessment Report (1996). Subsequent advances in ground-based and remote monitoring, regional climate, scenario building and impact modelling, together with important development in local and regional research capacities in many mountain nations, and a richness of adaptation and mitigation experiences, with important new but poorly assessed findings on local knowledge, provide now a timely opportunity for IPCC to deliver a comprehensive scientific consensus on physical changes in climate, impacts, risks and adaptation and mitigation related issues in mountain regions.

Mountains, their ecosystems and people are strongly exposed and sensitive to climate change. Thus, while populations in mountain regions have often contributed little to anthropogenic greenhouse gas emissions, they are disproportionately affected by climate change. Gaps in knowledge and understanding need to be filled or reduced, and an IPCC Special Report represents an excellent opportunity in this context.

While observations on climate and impacts in mountains continue to suffer from gaps in time and space,

it is worth mentioning that the past years and decades have seen significant improvements in the global coordination of climate, cryosphere and hydrological monitoring, through programs such as the Global Climate Observing System (GCOS), with the definition of Essential Climate Variables (ECV) in the Terrestrial and Atmosphere domains. The Global Terrestrial Networks Glaciers, Permafrost, Hydrology (GTN-G, GTN-P, GTN-H, including the World Glacier Monitoring Service, WGMS, GLIMS and NSIDC for GTN-G) have accumulated a substantial body of data of high relevance for a mountain region synthesis. Furthermore, UNESCO's International Hydrological Programme (IHP) provides data, information and tools focusing on snow, glaciers and water

resources. Progress in satellite-based products and analyses are particularly important for remote mountain regions, for all atmospheric and terrestrial domains (including among other the Global Land Ice Measurement from Space, GLIMS).

Mountains are present on all continents and provide a high diversity of goods and services, and a wide range of legal, political and cultural contexts. Over the past, high variability of and exposure to climate implied the need for development of locally diversified adaptation strategies, and many mountain regions can be considered laboratories of adaptation. Climate change and its impacts, however, are now exceeding the historical experience, leaving people, communities and institutions with enormous challenges. For instance, mountain (subsistence) agriculture, critical for local livelihoods, is highly weather dependent and many mountain regions already face water stress resulting in substantial reduction in agricultural yields. This is likely to be further exacerbated by climate change, and thus represents a major challenge for poverty reduction and several other Sustainable Development Goals.

Hence, there is a great need for an IPCC Special Report to assess, on the one hand, existing adaptation experiences, and on the other hand, provide the basis to manage the adaptation challenge of the future of mountain regions and their lowland areas. Mountains furthermore offer high potential for renewable energies, such as hydropower, wind and solar energy and can play an important role in the energy transformation processes. Capitalizing on the potential and experiences of mountain regions thus has additional value for other geographic and socio-economic and environmental contexts.

In summary, mountains on all continents have been strongly under-represented in past IPCC Reports, and a more appropriate consideration of mountains in the context of climate change within IPCC is overdue. A Special Report provides a unique opportunity to meet the recent goals of IPCC, i.e. to improve the coverage of regional issues (given the existence of mountain on all continents and in a large number of countries), and to improve the involvement of scientists from developing countries in the assessment process (given the critical importance of mountains to regions such as the Himalaya-Hindu Kush, the Andes, various regions across Africa, Central and Southeast Asia and others). The diversity of relevant issues in mountains suggests this would be a cross-Working Group Special Report. Furthermore, a Special Report on Mountains offers a major opportunity to link important international policy frameworks and instruments in a tangible way, namely UNFCCC and IPCC, the Sendai Framework for Disaster Risk Reduction, the Sustainable Development Goals and the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES).

Key issues proposed to be addressed by the Special Report

1) Mountains in the climate system: physical understanding

- Amplification of global warming at high elevations, including changes in extreme temperatures, under various global average warming temperatures.
- Understanding changes in precipitation patterns in hydrologically significant mountain regions.
- Observed and projected changes in large-scale modes of climate variability (e.g, monsoon), and related impacts on mountain climate, including extremes of key climate variables
- Changing cryosphere - loss of glaciers, permafrost thawing, and decreasing snow cover. Improved regional perspective on observed and projected changes.
- Climate related impacts on regional hydrology, both in terms of high-flow and low-flow events.
- Climate related impacts on slope instability, erosion, and sediment delivery to river systems.
- Climate related impacts on forests and natural ecosystems, including biodiversity.

2) Mountains, impacts and adaptation: approaches, investments, technologies

- Water supply investments to counter losses of storage and changes in timing or runoff, especially in consideration of observed and projected changes in natural storage reservoirs such as snow and glaciers or wetlands. Moreover, in the future, artificial storage systems might be developed, implemented and monitored.
- Disaster risk reduction and management at regional scales (disasters do not respect boundaries). In particular, investments and policies to address flood and mass movement hazards, including those related to changes in the cryosphere and ecosystem and related slope instabilities (which often threaten regional important transportation and energy infrastructure)
- Policies for forests, grasslands and wetlands to balance multiple functions (agro-pastoral products, carbon storage, protection, landscapes) in the light of climate change and thus related to ecosystem-based adaptation options.
- Biodiversity policy and programs, especially for organisms with catastrophic loss of habitat, exposure to evolutionarily novel climates and introduction of exotics and pathogens.
- Investments or adaptation programs in the tourism sector to deal with loss of snow in winter and growing influx in summer in response to climate warming in lowlands.
- Migration between mountain and lowland areas under stresses of climate and global change. In particular, the resulting gender imbalance can be highly critical for sustainable development (incl. food security, education, etc.) in the mountain regions as well as in cities and also lead to conflicts at several levels.
- Learning from and assessing existing adaptation experiences in mountain regions to inform adaptation policies
- Loss of cultural identity, and related consequences for adaptation policies.
- Loss of local and indigenous knowledge.

3) Mountains and mitigation: human activities

- Investments and management of hydropower under changing climate and hydrological regimes in mountains; expansion of renewable energy infrastructure in conflict with landscape and biodiversity values.
- Air pollution and linkages to climate change. Unlike water, which flows downhill, pollution generally are emitted in the plains and distribute horizontally and vertically. Air pollution can have multitude of impacts at local and regional levels, with the impact on cryospheric melting due to albedo-feedbacks being well documented.
- Expansion of mining and industrial agriculture with consequent changes in water supply and quality and local biological and food resources as well as social conflicts.
- Global carbon cycle in mountains (e.g. changes in carbon storage, global feedbacks, mitigation) and related policies

4) Integrated approaches and sustainable development

- Forest policy to balance multiple functions of mountain forests (timber, protection, carbon sequestration, landscape) in the light of climate change, including disturbance regimes such as wildfire and pests/pathogens.
- Profound changes in pastoral and agro-pastoral resources with impacts on local livelihoods.
- Transboundary water supply with conflicts between water source and water use areas and also transboundary risks (such as from glacier lake outburst floods).
- Security of livelihoods under multiple pressure in mountains, loss of cultural identity and diversity.
- Status, potential and achievement of SDG's in mountains

Potential partner organizations

A large number of potential partner institutions are identified for this Special Report, including but not limited to:

- United Nations Environment Programme (UNEP), including the Global Resource Information Database (GRID), UNEP's environmental information centres
- United Nations Educational, Scientific and Cultural Organization (UNESCO), including International Hydrological Programme (IHP) and Man and the Biosphere Programme (MAB)
- Food and Agriculture Organization of the United Nations (FAO)
- World Meteorological Organization (WMO)
- United Nations Development Programme (UNDP)
- United Nations Office for Disaster Risk Reduction (UNISDR)
- World Climate Research Programme (WCRP)
- Global Climate Observing System (GCOS)
- World Glacier Monitoring Service (WGMS)
- National Snow and Ice Data Center (NSIDC)
- Global Land Ice Measurements from Space (GLIMS)
- Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)
- Mountain Partnership (MP)
- Future Earth and its core projects, including MRI (Mountain Research Initiative), PAGES (Past Global Changes), GMBA (Global Mountain Biodiversity Assessment)
- International Council for Science (ICSU)
- International Social Science Council (ISSC)
- Inter-American Institute for Global Change Research (IAI)
- International Centre for Integrated Mountain Development (ICIMOD)
- Consortium of the International Agricultural Research Centers (CGIAR)
- The Mountain Institute (TMI)
- International Mountain Society (IMS)
- Union Internationale des Associations d'Alpinisme (UIAA)

Time schedule

April 2016:	Decision at IPCC 43 to elaborate the SR
May 2016:	Scoping meeting for the SR
June 2016:	Experts nominations
July 2016:	Experts chosen
October 2016:	First Lead Author Meeting
March 2017:	Second Lead Author Meeting
June/July 2017:	Expert Review of FOD
September 2017:	Third Lead Author Meeting
Till end of January 2018:	Government and Expert Review of SOD
March 2018:	Fourth Lead Author Meeting
June/July 2018:	Government Review of FGD
October 2018:	SR Approval Session

Budget estimates

The cost indicated here a rough estimate based on IPCC practice and experience. They are subject to review depending on the outcome of the scoping process for the Special Report. Costs are expressed in Swiss Francs (CHF).

Scoping Meeting (15 trips)	60'000
Lead Author Meeting 1 (20 trips)	80'000
" " " 2 (20 trips)	80'000
" " " 3 (25 trips)	100'000
" " " 4 (25 trips)	100'000
Approval session (10 trips)	40'000
Publication	55'000
Translation	125'000
Distribution	20'000
Outreach	100'000
Contingency	50'000
Total estimated cost	CHF 690'000

Possible donors

To be determined.

PROPOSAL FROM THE UNFCCC SECRETARIAT REGARDING THE UNFCCC PROCESS



United Nations
Climate Change Secretariat

Nations Unies
Secrétariat sur les changements climatiques

Mr. Carlos Martin-Novella
Deputy Secretary of Intergovernmental Panel on Climate
Change
Officer in Charge

Date: 20 August 2015
Reference: HT/ah
Direct line: +49 228 815-1853

Dear Mr. Martin-Novella,

I refer to your letter of 6 July 2015, inviting Parties and Observer Organizations, to submit views on potential themes for Special Reports to be prepared and concluded during the sixth assessment cycle (AR6) of IPCC, in accordance with the Panel's decision IPCC/XLI-6, paragraph 2 and in the context of the Panel's Decision IPCC/XLI-4, paragraphs 1 and 2.

In this regard, I would like to thank you for your invitation and stress the importance of the Special Reports that the Panel may decide to prepare during AR6 for supporting the UNFCCC process, including for the implementation of the Paris agreement, to be adopted by the Conference of the Parties at its twenty-first session. While noting that the negotiations on this agreement are still in progress, I believe that the timeframes and processes related to contributions and other matters related to implementation and ambition will play a key role in future.

In this context, I would like to stress that monitoring the aggregated progress made towards maintain global warming below the internationally agreed upper limit and the science based management of the pathway of global emissions will continue to be of high importance to Parties as they engage in the implementation of the Paris agreement and that the IPCC could play a key role in providing a solid scientific foundation for policy making on this matter through the preparation of targeted special reports.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'Halldor'.

Halldór Thorgeirsson
Director for Strategy