



INTERGOVERNMENTAL PANEL
ON CLIMATE CHANGE

THIRTIETH SESSION
Antalya, 21-23 April 2009

IPCC-XXX/Doc.14
(6.IV.2009)

Agenda item: 5
ENGLISH ONLY

SCOPING PAPER – IPCC SPECIAL REPORT

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

(Submitted by Vicente Barros, Christopher Field, Co-Chairs of Working Group II
and Jean-Pascal van Ypersele, Vice-Chair IPCC)

SCOPING PAPER – IPCC SPECIAL REPORT
Managing the Risks of Extreme Events and Disasters
to Advance Climate Change Adaptation

Submitted by:

Vicente Barros, Christopher Field, Co-chairs of WG2

Jean-Pascal van Ypersele, Vice-chair IPCC

1. INTRODUCTION

At the 29th Session of the IPCC held in Geneva, Switzerland (September 2008), Norway introduced a proposal, prepared with the International Strategy for Disaster Reduction (ISDR), for a Special Report on *Managing the Risks of Extreme Events to Advance Climate Change Adaptation*. The Panel agreed in principle to convene a scoping meeting in 2009 to provide expert advice to the Panel on whether to develop a Special Report on this topic. At the 38th Session of the IPCC Bureau (November 2008, Geneva), a revised proposal was presented, and the Bureau agreed to convene a scoping meeting in the second half of March 2009. It was agreed that if the outcome of the scoping meeting was a recommendation for a Special Report, the meeting should also deliver a scoping paper, including a timetable and proposed outline for such a Special Report, for decision by the Panel at its 30th Session to be held April 21st - 23rd 2009 in Antalya, Turkey. This scoping paper is the result of the positive decision of the scoping meeting in favor of a Special Report.

2. SCOPING MEETING ON EXTREME EVENTS AND DISASTERS: MANAGING THE RISKS

From March 23rd – 26th, 2009, the IPCC scoping meeting on Extreme Events and Disasters: Managing the Risks was held in Oslo, Norway. A Science Steering Group (membership list provided in Annex 1) and the Co-chairs and Technical Support Unit (TSU) for IPCC Working Group II organized the meeting. The Norwegian Pollution Control Authority and ISDR provided significant support.

Seventy countries and fifteen observer organizations such as the International Red Cross nominated about 375 experts as meeting participants, including 115 nominated experts from developing countries and countries with economies in transition. The IPCC Trust Fund financed participation for 40 experts.

Approximately 140 experts were invited, of whom 117 from 51 countries participated, to represent the three communities whose expertise would be needed to scope a possible Special Report: climate scientists, experts on the impacts of climate change and adaptation policies to address extreme events and extreme impacts, and experts on disaster risk reduction. Fifteen major presentations were given and discussions were held covering all aspects of a possible Special Report. After extensive discussion of different possible approaches, the participating experts reached agreement on the basic structure presented in this document. This structure was elaborated by six breakout groups and an integration team (membership list provided in Annex 2), and was discussed at length by all experts present.

3. RATIONALE FOR PROPOSING A SPECIAL REPORT ON *MANAGING THE RISKS OF EXTREME EVENTS AND DISASTERS TO ADVANCE CLIMATE CHANGE ADAPTATION*

The mandate of the scoping meeting was to guide and support decision-making by the IPCC on a possible Special Report on *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*.

Background: The IPCC Fourth Assessment Report (AR4) concluded that climate change has begun to affect the frequency, intensity, and length of many extreme events, such as floods, droughts, storms, and extreme temperatures, thus increasing the need for additional timely and effective adaptation. At the same time, gradual and non-linear change to ecosystems and natural resources and increasing vulnerability further increase the consequences of extreme weather events. The AR4 recognized that reducing vulnerability to current climatic variability can effectively reduce vulnerability to increased hazard risk associated with climate change. However, the AR4 reviewed policies and measures that were specifically identified as adaptation and not the full range of activities undertaken to reduce the risks of extreme events and disasters.

Parties to the United Nations Framework Convention on Climate Change (UNFCCC) acknowledged the relevance of disaster risk reduction to advance adaptation in the December 2007 Bali Action Plan, which calls for enhanced action on risk management and risk reduction strategies, including risk transfer mechanisms such as insurance, and disaster reduction strategies to lessen the impact of disasters on developing countries.

Disaster risk reduction efforts are guided by *The Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters*, to which 168 Governments agreed in Hyogo, Kobe, Japan, in 2005. The Framework aims for “the substantial reduction of disaster losses, in lives and in the social, economic, and environmental assets of communities and countries.” As part of its text, Governments agreed to integrate climate change adaptation and disaster risk reduction through:

- (i) The identification of climate-related disaster risks;
- (ii) The design of specific risk reduction measures; and
- (iii) The improved and routine use of climate risk information by planners, engineers, and other decision makers.

Rationale: The participants concluded that a Special Report is needed for the following reasons:

- The Special Report would contribute to the goals of the UNFCCC and to the work of the Nairobi Work Programme on Impacts, Vulnerability, and Adaptation to Climate Change. The Nairobi Work Programme is structured around nine areas of work, including “Climate Related Risks and Extreme Events.” The objective of this area is to promote understanding of the vulnerability to and impacts of climate change, current and future climate variability and extreme events, and the implications for sustainable development.

At the UNFCCC Subsidiary Bodies meeting in Bonn in 2008, in the context of the Nairobi Work Programme, Parties requested further information on the inclusion of disaster risk reduction strategies into national policies and programs. The Special Report would complement and inform the work done within the Nairobi Work Programme on collecting and analyzing information on adaptation actions and advances towards integrating disaster risk reduction strategies and climate change adaptation into national policies and programs.

- Disaster risk reduction strategies and practice are primary approaches for reducing vulnerability and increasing resilience to extreme weather events. However, there has not been a comprehensive assessment of the guides, frameworks, and tools used by various institutions, organizations, and communities to build the capacity for reducing vulnerability and risk; to develop early warning systems; to strengthen community capacity and social resilience, particularly among the most vulnerable; to improve construction practices; and to establish preparedness to respond to inevitable climate impacts.

AR4 reviewed programs and activities on adaptation to climate change and not the wide range of efforts undertaken worldwide by Governments and communities to promote and implement disaster risk reduction, sustainable development, and environmental risk management. An in-depth assessment that identified successful practices, with information on appropriate contexts, cost, and social consequences, and potential constraints, would provide concrete guidance to Governments in planning and implementing adaptation activities. A systematic review would also enable Governments to identify those existing practices that should be strengthened because they provide important synergies. Governments, through the Nairobi Work Programme, have indicated that the increasing risks of extreme climate events are an immediate and urgent problem. A Special Report, completed before the Fifth Assessment Report (AR5), would help guide UNFCCC Parties in their development of disaster risk reduction and adaptation strategies, policies, and measures, thus reducing the extent to which extreme events result in disasters.

- To further assist the IPCC in its decision-making, Norway reviewed the humanitarian consequences of climate change and compiled a detailed bibliography of relevant literature, showing there is substantial literature that covers peer-reviewed literature, academic books, and reports, and literature that is produced by agencies and NGOs.

The proposed Special Report is consistent with the IPCC framework and criteria for establishing priorities for IPCC reports, in particular the aim to “strive to serve the policy community with relevant information in a pro-active fashion.” It also meets the other priority guidelines: sufficient scientific literature exists; the primary audience is the UNFCCC and the target is the development of the post-2012 agreement and adaptation plans; the scientific community is available; and the topic is specific in scope.

A Special Report could be finalized in the second half of 2011, thus providing the necessary information to Governments sooner than the AR5; the WGI

contribution is planned for completion in 2013 and the WGII and WGII contributions are planned for completion in mid-2014.

4. PROPOSED CONTENT AND STRUCTURE OF A SPECIAL REPORT

The expert participants recommended that the Special Report, if approved, should focus on climate change and its role in altering the frequency, severity, and impact of extreme events or disasters, and on the costs of both impacts and the actions taken to prepare for, respond to, and recover from extreme events and disasters. The emphasis should be on understanding the factors that make people and infrastructure vulnerable to extreme events, on recent and future changes in the relationship between climate change and extremes, and on managing the risks of disasters, over a wide range of spatial and temporal scales (Figure 1). The assessment should consider a broad suite of adaptations, ranging from early warning to insurance to altered infrastructure and social safety nets. It should also explore the limits to adaptation, the conditions that can transition adaptation into maladaptation, and the human and financial consequences of those limits. Finally, the assessment should build durable links and foundations for partnerships between the stakeholder communities focused on climate change and those focused on disaster risk reduction.

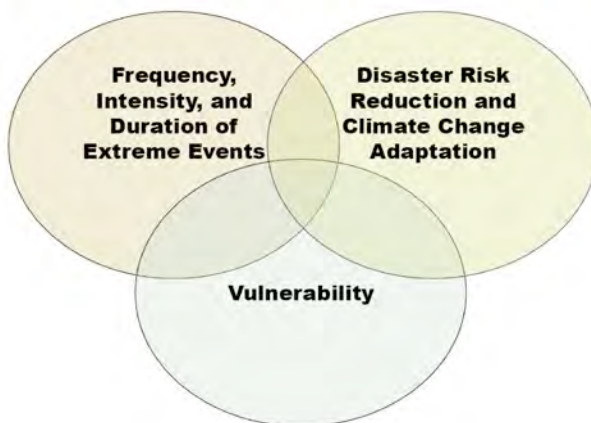


Figure 1: Conceptual model of the topics to be assessed in the special report and of the links among them. The focus will be on the part of the domain where all three spheres overlap.

The expert participants recommended that the special report focus on three kinds of extremes or disasters with the potential to be altered by climate change (Figure 2). The first includes extreme events for which climate change has amplified variability or may do so in the future. This category includes, among others, aspects of floods, droughts, windstorms, and extreme temperatures. A second category includes events in which trends outside the domain of climate increase exposure or vulnerability to climate-related extremes. Examples include coastal development increasing exposure to storm surges on top of sea-level rise or increasing urbanization amplifying exposure to heat waves in a warming climate. The third is new kinds of potentially hazardous events and conditions that may occur as a result of climate change. This category includes events like glacial lake outbursts and wildfire in forests that had historically been too wet to burn. Disasters of more complex origin such as landslides, wild land fires, and

insect infestations should also be considered, where there is the possibility of a consequential link with climate change.

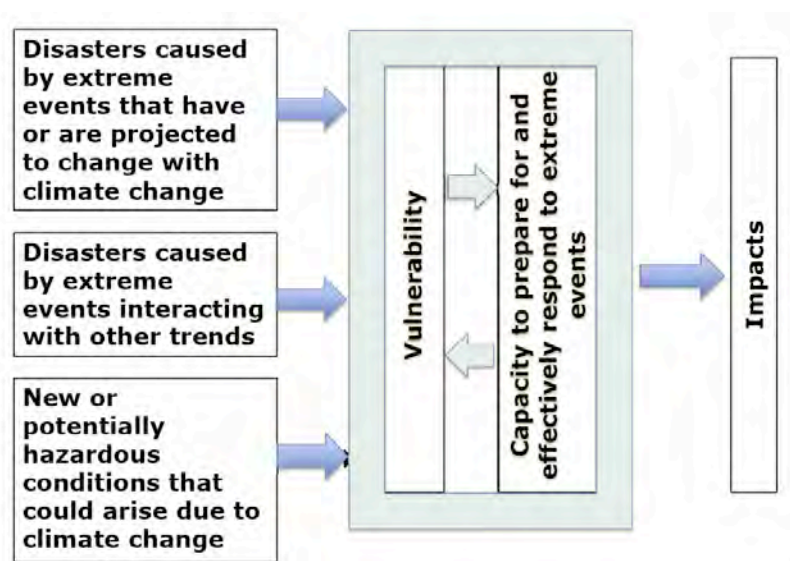


Figure 2: Conceptual model of the three kinds of links between climate change and disaster risk to be assessed in the special report.

The following outline was agreed by the expert participants to ensure the most informative treatment of the issues. If approved, the special report will begin with material that frames the issues, followed by an assessment of vulnerability, discussing the reasons that communities, businesses, and ecosystems are vulnerable. The next section, consisting of two chapters, will assess the role of past and future climate change in altering extremes and the impact of these on the physical environment, human systems, and ecosystems. A series of three chapters will then assess available knowledge on impacts and adaptation, focusing on the time period extending from a few years in the past to several years into the future, with separate chapters considering the very different literature, stakeholder relationships, and potential policy tools relevant to the local, national, and international scales. Longer term components of adaptation to weather and climate extremes and disasters will be assessed in the context of moving toward sustainability.

Case studies, examples focused on particular kinds of extremes, parts of the world, and modes of adaption, will appear in the report in three ways. Examples useful for illustrating specific points will be integrated into the chapters for which they are most relevant, in some cases as boxes. Two other case studies, one representing an extreme with a clear connection to climate change and one without, will form a thread that runs through all of the chapters. This thread of common case studies will provide a set of reference frameworks for exploring findings about managing the risks of extremes at many different levels, when the risks are known relatively well and relatively poorly. A third set of case studies will be collected in a separate chapter, at the end of the volume. These will be case studies that integrate themes across several chapters or are so unique that they need to be considered separately.

Each chapter will pose and address a limited number of carefully selected “Frequently Asked Questions” concerning key stakeholder concerns. The questions and the answers to them will constitute a component of the Special

Report that can encourage solid engagement and clear communication with a wide range of stakeholders.

The proposed outline, with chapter titles and first-order chapter topics, follows:

1. *Climate change: new dimensions in disaster risk, exposure, vulnerability, and resilience*
 - Risk reduction, risk management, risk transfer
 - Coping vs. adapting
 - Extreme events vs. extreme impacts
2. *Determinants of risks: exposure and vulnerability*
 - Dimensions of vulnerability
 - Vulnerability profiles
 - Coping and adaptive capacities
 - Assessment of and trends in vulnerability
 - Risk identification, risk accumulation, and the nature of disasters
3. *Changes in climate extremes and their impacts on the natural physical environment*
 - Weather and climate events related to disasters
 - Climate extremes and impacts: the changing landscape
 - Climate extremes and impacts: the causes behind the changes
 - Climate extremes and impacts: projected long-term changes
 - Climate extremes and impacts: confidence in the projections
4. *Changes in impacts of climate extremes: human systems and ecosystems*
 - Role of climate extremes in natural and socioeconomic systems
 - Nature of impacts and relation to hazards
 - Observed trends in system exposure and vulnerability
 - System- and sector-based aspects of vulnerability, exposures, and impacts
 - Regional aspects of vulnerability, exposures, and impacts
 - Costs of climate extremes and disasters
5. *Managing the risks from climate extremes at the local level*
 - Community coping, including migration
 - Community-based disaster risk management
 - Gender, age, wealth, and entitlements
 - Social transfers, including microfinance, cash transfers, benefit schemes, and cash for work
 - Risk transfers, including microinsurance
 - Data as input for risk management, including challenges
 - Costs of managing the risks from climate extremes
6. *Managing the risks from climate extremes at the national level*
 - Practice, including methods and tools
 - Approaches for managing the risks
 - Planning and policies
 - Strategies, including institutions, legislation, and finance
 - Perspective on the links between national and local scales
 - Costs of managing the risks from climate extremes

7. *Managing the risks: international level and integration across scales*

- International policy frameworks
- International humanitarian institutions and practice
- Other relevant international issues (health, food security, finance, security)
- International law
- Financing and (dis)incentives for risk reduction, costs and benefits of various approaches, and implications for financing flows
- Technology cooperation
- Risk transfer
- Perspective on links between local, national, and global scales
- Costs of managing the risks from climate extremes

8. *Toward a sustainable and resilient future*

- Disaster risk reduction as adaptation: relationship to development planning
- Synergies between short-term coping and long-term adaptation for sustainable development
- Interactions among disaster risk management, adaptation to climate change extremes, and mitigation of greenhouse gas emissions
- Implications for access to resources, equity, and sustainable development
- Implications for achieving relevant international goals
- Options for proactive, long-term resilience to future climate extremes

9. *Case studies*

This chapter will include up to 25 case studies selected to illustrate how extreme events and vulnerability interact to result in disasters, lessons learned on effective and ineffective approaches to preparing for, responding to, and reconstructing after extreme events. Possible case studies could address vulnerable regions (e.g., Bangladesh, Southern Africa), vulnerable kinds of settlements (e.g., large cities), particular kinds of extremes (e.g., intense rain, persistent heat waves), experience with particular risk management strategies (e.g., early warning systems), or integrated evaluations of particular events (e.g., European heat wave of 2003, Australian wildfires of 2009). The individual case studies will be written by contributing authors who will be identified in association with the case study each wrote. The chapter will be under the leadership of at least two coordinating lead authors.

5. PROPOSED MANAGEMENT WITHIN THE IPCC

The topic of the proposed Special Report draws on the expertise and perspective of all three working groups. Input from WGI is necessary to provide a state-of-the-science update on climate change and extreme events. Input from WGII is necessary for assessing vulnerability and impacts to extreme events and disasters, as well as assessing options for adaptation. Input from WGIII is necessary for evaluating the issues in a context that includes mitigation, especially in the chapter on moving toward sustainability. Operationally, it is proposed that WGII would have the lead, but with a structure and philosophy

that ensures full engagement and sharing of responsibility among all three working groups. Careful attention will be paid to avoid potential overlap between the final Lead Author meetings of a Special Report and the first Lead Author meetings for WGI.

6. TIME SCHEDULE AND PROVISIONAL BUDGET ESTIMATE

If the 30th Session of the IPCC in April 2009 decides to proceed with the preparation of a Special Report, a call for nominations of Lead Authors would be issued no later than June 2009. Approval and acceptance of the Special Report would be planned for the second half of 2011. In order to achieve this timetable, one Lead Author meeting would be held in 2009, two Lead Author meetings in 2010, and one Lead Author meeting in the first half of 2011. The planning would be designed to properly synchronize with the preparation of the AR5.

Budget 2009: assuming 1 Lead Author Meeting with 45 journeys of DC and EIT Lead Authors at 4.500 CHF per journey, plus 15% for other meeting costs, 232.875 CHF will be needed from the IPCC Trust fund.

Budget 2010: assuming 2 Lead Author Meetings with 45 journeys each of DC and EIT Lead Authors at 4.500 CHF per journey, plus 5 Review Editors for each meeting, plus 15% for other meeting costs, 517.500 CHF will be needed from the IPCC Trust fund.

Budget 2011: assuming 1 Lead Author Meeting with 45 journeys of DC and EIT Lead Authors at 4.500 CHF per journey, plus 5 Review Editors, plus 5 DC and EIT CLAs to the approval meeting, plus 15% for other meeting costs, 284.625 CHF will be needed from the IPCC Trust fund. In addition, assuming 4 days for the IPCC Plenary to approve the Summary for Policymakers, costs are projected to be approximately 820.000 CHF plus 27.000 for a preparatory meeting with 6 DC and EIT CLAs and their participation in the Session. The total budget for 2011 will then amount to approximately 1.131.625 CHF.

Costs for translation and purchasing of the Special Report, shipping costs, and outreach are to be included later.

7. LEAD AUTHOR SELECTION PROCESS

Nominations can be called for in a letter to governments, no later than June 2009. Based on the nominations, the IPCC Bureau will select the Coordinating Lead Authors, Lead Authors, and Review Editors.

Annex 1: Science Steering Group

Vicente Barros, Argentina (SSG Chair and WG2 Co-Chair)

Christopher Field, USA (WG2 Co-Chair)

Abdalah Mokssit, Morocco (WG1 Bureau)

Ajmad Abdulla, Maldives (WG2 Bureau)

Antonina Ivanova Boncheva, Mexico (WG3 Bureau)

Øyvind Christophersen, Norway (Norwegian Pollution Control Authority)

Jean Jouzel, France (WG1 Bureau)

Nirivololona Raholijao, Madagascar (WG2 Bureau)

Neville Smith, Australia (WG2 Bureau)

Francis Zwiers, Canada (WG1 Bureau)

Annex 2: Integration Team

Vicente Barros, Argentina

Reid Basher, New Zealand

Ian Burton, Canada

Øyvind Christophersen, Norway

Jeremy Collymore, Barbados

David Dokken, IPCC Working Group II TSU

David Easterling, USA

Kristie Ebi, IPCC Working Group II TSU

Christopher Field, USA

Zhahui Lin, China

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Coleen Vogel, South Africa

Francis Zwiers, Canada