



TSG 3.3.2: “By 2015, develop a set of internationally recognized methodologies to assess and handle uncertainties of impacts of climate change on surface and groundwater and identify priorities of awareness-raising to improve integrated water resources management, in close partnership with IPCC, UNFCCC, IHAS and other relevant organizations; establish a network of river basins and implement specific methodologies in at least 10 river basin in key vulnerable regions.”

Seminar: “Raising awareness and enhancing the adaptive capacity of water resources planning and management to climate change impacts”
November 14 - 15, 2011 - UNESCO, Paris

CONCLUSIONS

The conclusions of this seminar will be held as the proposal of TSG 332 to the 6th World Water Forum. They have been reviewed by the steering committee of the TSG and the speakers of the seminar.

FOREWORD

In preparation for the 6th World Water Forum, International Hydrological Programme (IHP) of UNESCO and the French Water Academy co organized an international seminar dedicated to identifying difficulties and opportunities for water managers to deal with uncertainty related to climate change impacts on water resources. This seminar contributes to the thematic Priority for Action "Respond to climate and global changes in an urbanizing world" of the 6th World Water Forum to be held in Marseille, in March 2012. The seminar also contributes to the United Nations Conference on Sustainable Development (UNCSD, Rio+20) to be held in June 2012.

This two-day seminar gathered over 70 water and climate experts, managers and scientists from all over the world, and discussed techniques, methodologies, approaches and tools to better define global and climate change impacts on water resources and strategies for water resources planning and management.

This event has highlighted a wide range of operations and studies, including the current scientific capacity to address risk and uncertainties considering global and regional climate variability and change, land use and demographic changes, as well as changing water demands stimulated by other anthropogenic changes. The session also addressed how adaptive management needs to and can be developed through an explicit emphasis on risk assessment and prediction to support adaptive management.

As key outcomes of the seminar, draft recommendations and a draft action plan are presented in this document. The seminar discussed several issues related to uncertainty in water resources management in the context of global and climate change. The workshop took note of the IPCC statement that information about the impacts of climate change on water resources is currently inadequate and results are not sufficient to encompass the whole range of impacts and situations that the field of water resources management might face in the context of global changes.

The seminar further emphasized that the planet Earth is witnessing a period of tremendous and unprecedented changes with complexity and uncertainty with over two billion people living in severely water stressed areas. The participants highlighted that climate and land use change is challenging for current and future water management. They further emphasized that the need to enhance access to water resources for human and productive uses has become more crucial than ever in terms of both quantity and quality that incorporates the fast increasing risks and uncertainties involved.

Besides, they noted the importance to add hydrological variability and uncertainty to the decision-making process. The workshop further emphasized for continued development of Global and Regional Climate Models (GCM and

RCM respectively), testing for adaptation and management as those models require considerable scientific improvement before they can be useful for water management. The workshop also indicated limitations of GCM and RCM applications to current water resources management and planning purposes.

The seminar called to create a platform for exchange between IPCC scientists and water planners, in order to inform the water community of the timeline of the IPCC AR5 and to encourage them to participate actively in the review process, especially on under-represented topics including groundwater, water quality and transboundary water issues. The seminar highlighted the need to create a platform for the water community to channel water knowledge and expertise into climate change-related political processes, including the future process of the UNFCCC Nairobi Work Programme, and facilitate the increased participation of water experts in climate change meetings and political processes.

Furthermore, the workshop participants called for setting up a network of basin organisations in order to exchange, share and collect best practices and experience evaluation, with a view to develop multi-sector and multi-actor approaches at a basin level, and invent mechanisms to link these sectors and actors to develop a common long-term vision.

The seminar supported the view that water resources management and development underpins “Green Economy”. Thus, in the view of upcoming Rio +20, organizers also recalled Agenda 21 Chapter 18 of the UN Conference on Environment and Development (UN CED) in 1992 which called for “the application of integrated approaches to the development, management and use of water resources”.

Finally, discussions of the seminar provided a set of draft proposals driving for actions, results and leading to solutions as a key contribution to the 6th World Water Forum, which will be organized in Marseilles, in March 2012.

DRAFT PROPOSAL

→ Which priorities for knowledge improvement to match the needs and expectations of surface or groundwater managers?

1. Emphasize continued development of Global and Regional Climate Models (GCM and RCM respectively), testing for adaptation and management as these models require considerable scientific improvement before they can be useful for water management. The workshop indicated limitations of GCM and RCM applications to current water resources management and planning purposes.
 - *Proposed Lead: UNESCO-IHP*
 - *Other partners to be associated:*
 - *Example of solution proposal:*
 - In cooperation with basin authorities and national institutions, analyze downscaled hydro climatic parameters (at basin and sub basic scale) obtained through the use of GCM and RCM. Government authorities and international programmes such as IHP to facilitate such activities

2. Ensure that project-oriented development and testing of climate assessment tools and procedures are carried out with water managers and hydroclimatologists working together on the same problem set. Enhance communication and coordination between climate modeling experts and the water community.
 - *Proposed Lead: UNECE (tbc)*
 - *Other partners to be associated:*
 - *Example of solution proposal:*
 - Develop a communication strategy between climate modeling and water resources planning focused on the use of climate products and assessment tools. Organize 5 regional workshops to facilitate communication between the two communities.

3. As an immediate priority, greater focus on upgrading short-term weather forecasts techniques, including the use of satellite-based systems for real-time prediction and impact evaluation as the most effective measure for adaptive management in the transition period of GCM improvements.
 - *Proposed Lead: WMO, Météo France (tbc)*
 - *Other partners to be associated:*
 - *Example of solution proposal:*
 - Support ongoing effort related to short-term weather forecasts including the use of satellite based and real-time prediction.
 - Start an activity in climate proofing and scenario work in deltas

4. Support the expansion of Global Framework of Climate Services (GFCS) and upgrade and coordinate worldwide hydromet system. Promote bridging climate (meteo + hydro) information provision with user in water management and water services including weather and decadal time scales in support of the GFCS.
 - *Proposed Lead: UNESCO-IHP to coordinate with WMO*
 - *Other partners to be associated:*
 - *Example of solution proposal:*
 - Expand the use of UNESCO's G-WADI Geoserver which provides several online data access and visualization tools that allow water resources planners to access high resolution precipitation estimates in real and near-real time that are customized, to suit the needs of Member States in terms of the ability to both view and subset the data by country, administrative unit, and at basin sub basin scale.

5. Promote research on better understanding of groundwater recharge in the context of climate change and the relevance of groundwater resources for climate change adaptation. Research needs to focus on developing better groundwater-surface water-climate interaction models to reduce uncertainty in decision making.
 - *Proposed Lead: UNESCO-IHP and IGRAC*
 - *Other partners to be associated:*
 - *Example of solution proposal:*
 - Carry out at least two case studies testing and evaluating groundwater-based climate change adaptation measures by 2015.

6. Highlight climate change ecohydrology, ecosystem services as part of climate vulnerability assessments and develop methodological protocols for such assessments.
 - *Proposed Lead: IUCN, IRD (tbc)*
 - *Other partners to be associated:*
 - *Example of solution proposal:*

→ Expectations and recommendations towards the IPCC AR5 and the United Nations Framework Convention on Climate Change (UNFCCC)

7. Create a platform for exchange between IPCC scientists and water planners, in order to inform the water community of the timeline of the IPCC AR5 and to encourage them to participate actively in the review process, especially on under-represented topics including groundwater, water quality, and transboundary water issues. Bring those issues to the attention of the IPCC AR5 (lead) authors by presenting information as a comprehensive but condensed compilation of relevant literature, derived conclusions and recommendations and supported by concrete case study examples and results.
 - *Proposed Lead: UNESCO-IHP and French Water Academy*
 - *Other partners to be associated:*

- *Example of solution proposal:*
 - A scientific review and synthesis on the impacts of climate change on groundwater resources will be compiled by UNESCO-IHP in the framework of its GRAPHIC¹ project and brought to the attention of the IPCC reports authors.
8. Provide a platform for the water community to channel water knowledge and expertise into climate change-related political processes, including the future process of the UNFCCC Nairobi Work Programme, and facilitate the increased participation of water experts in climate change meetings and political processes. Water knowledge related to adaptation and mitigation shall inform and guide the UNFCCC subsidiary bodies, based on the expertise of the water community, and shall be adequately addressed under financial mechanisms.
- *Proposed Lead: Water and Climate Coalition² (tbc)*
 - *Other partners to be associated:*
 - *Example of solution proposal.*
 - Develop a funding mechanism for scientific research and data exchange in developing countries, and integrate this facility into the guidelines of the UNFCCC funding mechanism.

→ *Methodological recommendations to enhance the recognition of climate and implement a methodology for uncertainty management in water planning and management, relying on an international sub-network of river basins*

9. Set up a network of basin organisations in order to exchange, share and collect best practices and experiences evaluation in order to develop multi-sector and multi-actor approaches at a basin level, and invent mechanisms to link these sectors and actors to develop a common long-term vision.
- *Proposed Lead: INBO, UNECE, Dutch Government (tbc)*
 - *Other partners to be associated:*
 - *Example of solution proposal:*
 - The Dutch Initiative Water Mondiaal established a cooperation network on climate resilience with the Mekong, Zambezi, Nile and Yamuna in Bangladesh.
10. Focus on flexibility and adaptive management, in particular when exploring several possible futures. Identify and set up flexible procedures in the planning process, to facilitate the shift from one plan to another, depending on system evolutions and contextual difficulties, to back up a long-term vision in spite of immediate requirements.
- *Proposed Lead: INBO, etc. (tbc)*
 - *Other partners to be associated: UNESCO-IHP, UNECE*
 - *Example of solution proposal:*
 - Develop a guideline based on gathered information and lessons learned from the network of basin organizations on adaptation and the water planner / climate experts' one.
11. Enhance public participation in order to get a better recognition and evaluation.
- *Proposed Lead:*
 - *Other partners to be associated:*
 - *Example of solution proposal:*

¹ Groundwater Resources Assessment under the Pressures of Humanity and Climate Change:
<http://www.unesco.org/new/en/natural-sciences/environment/water/ihp/ihp-programmes/graphic/>

² <http://www.waterclimatecoalition.org/>

DRAFT ACTION PLAN

1. **A scientific review and synthesis** on the impacts of climate change on groundwater resources will be compiled by **UNESCO-IHP** in the framework of its GRAPHIC project and brought to the attention of IPCC authors by UNESCO-IHP. The French Water Academy and UNESCO-IHP will facilitate case studies on “Managing water under uncertainty”.
2. **By June 2012**, set up a **network of basin organisations** in order to exchange, share and collect best practices and experiences on the implementation of climate change adaptation strategies in the field of water resources planning and management, focusing in particular on key issues such as vulnerability, the assessment of climate change impacts on water resources and water-related domains, and adaptation plan development. This network could be subdivided into several sub-networks taking into account different climatic and geographic criteria (deltas, groundwater, transboundary waters, glaciers, plain rivers...)
3. **By the end of 2012**, create a **network of researchers and water managers** in order to exchange and share the approaches, tools and methodologies developed to address water and climate change issues.
4. **By 2015** (7th World Water Forum), develop a **guideline** based on gathered information and lessons learned from both networks.

In order to develop those two networks, a Task Force will be set up **by March 2012**, with several key partners involved in water and climate change issues, such as INBO, UNECE, EC, UN-Water, IPCC, ...

In coordination of this process, **INBO** could take the initiative to identify key partners and get their commitment to work within the task force. Other contributors willing to co-lead this process are most welcome.

The task force will prepare a roadmap for the period 2012 – 2015 which will be presented during the 6th World Water Forum in Marseilles, in March 2012. This roadmap will specifically identify the relevant Basin Organisations to be part of the network.

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