Short summary open science seminar

Open Science Seminar “ Future of Water Resources in India under a Changing Climate” 13 and 14 of May 2009, New Delhi, India By Eddy Moors and Richard Harding On 13 and 14 May 2009 the Open Science Seminar “ Future of Water Resources in India under a Changing Climate” took place at the India Habitat Centre in New Delhi. This seminar aimed to discuss the state-of-the-art knowledge on glacier retreat and changing monsoon patterns affecting the water resources of the Ganga river basin. At the same time the seminar was the kick-off of the EU funded HighNoon project (www. u-highnoon. org) as well as the starting point for the collaboration in India of the Watch project (www. eu-watch. org), which is also EU funded. The HighNoon project will assess the impact of Himalayan glaciers retreat and explore possible changes of the Indian summer monsoon on the spatial and temporal distribution of water resources in Northern India. WATCH provides the first platform to combine global water cycle and resource modeling frameworks for both global and regional scales.

Both projects aim to provide a greater understanding of water resources in the region as well as outlining strategies for strengthening the incentive for adaptation to hydrological extreme events. Ms Daniele Smadja (European Commission’s Ambassador to India) during her opening speech. Left to right, Mr Ashok Jaitly (Director Water Resources Devision, TERI), Mr Tasos Kentarchos (European Commission, Climate Change and Environmental Risks Unit), Mr Stefan Agne (European Commission, DG-ENV) and Mr Eddy Moors (Alterra Wageningen UR, The Netherlands, Coordinator HighNoon).

Water resources and hydrological extremes (namely floods and droughts) are important issues affecting India and its economic development, security

and social well being. Improvements in understanding the climate-water cycle will benefit adaptive planning of infrastructure, and efforts to mitigate climate change in India, Asia and globally. Increasing CO2 levels and temperature are intensifying the global water cycle, with an overall net increase of rainfall, runoff and evapotranspiration.

The predictions of future rainfall regionally are fairly uncertain: there are indications that, for example, the Indian region will see increases of rainfall. Seasonality may also change, causing new and, sometimes, unexpected vulnerabilities. Intensification of the water cycle is likely to cause an increase in extremes events, such as floods and droughts. This especially has important impacts on the agricultural sector which relies on the success or failure of irrigation schemes.

The hydrological system of Northern India is based on two phenomena, the monsoon precipitation in summer and the growth and melt of the snow and ice cover in the Himalayas. Increasing greenhouse gases are expected to change these phenomena and, in particular, will have a profound impact on snow cover, glaciers and its related hydrology and water resources availability, especially in the perennial river basins Ganga, Indus and Brahmaputra, where snow and glacier melt form a great part of the rivers’ flow.

The main findings of the four science sessions of the seminar are briefly summarised below. Glacier and snow melt in the Himalayas: • Temperatures are increasing across Nepal (~0. 5 degree per decade), with extremes increasing even faster. This is leading to widespread glacial retreat; •

Glaciers provide a very useful function in smoothing seasonal and inter-annual variations; • How glaciers will respond to change will depend on area/mass relationships which are uncertain.

Predicted changes in Indian monsoon: • Monsoon and glacial melt interact – so there is a need to know how both will change; • Rainfall simulations for this area are poor and contradict each other; • There is a lack of verification data. Impacts on the hydrological cycle and water resources: • Prediction of the response of river flows requires the modelling of interacting processes (e. g. iming of snow fall effecting melt) and need to include human influences; • There is a need for a regional approach to assess local changes; • Local communities can adapt but it is more difficult for larger institutions to adapt. Water resources: scenarios and adaptation: • Adaptation measures need to be sustainable and thus not contradict mitigation efforts; • Transdisciplinary approach is needed – combining tacit knowledge with scientific discovery; • Decision makers need the courage to tell people they need to change.

Based on these findings, in a lively panel discussion questions such as “ What kind of policy measures to regulate demand and allocation are necessary to successfully adapt to change? ” were discussed between policy makers and scientists. Examples of statements and questions raised are: Policy makers can help to make data available that are urgently needed to improve the scientific results. On the use of water pricing: “ There are real interest e. g. can you raise the price for water if t is a human right? ”. Although no direct solutions were found, this discussion improved the understanding between policy makers and scientist and will eventually help to come up with sustainable adaptation options for the Ganga basin.

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