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## **Climate Change, Glaciers, and Water Resources in the Himalayan Region: Adaptation to Climate Change Concerning the Impact of Melting Glaciers**

### **I. What Gap Does ICIMOD Concrete Initiative Fill In?**

Scientific information and applicable knowledge are necessary to develop policies for adaptation to climate change in the Himalayan region. There is a lack of good data and information on hydrology and meteorology for the region. For this reason, in the IPCC AR4 report, the region does not show up on the global scale due to lack of data and is seen as a 'white spot'. Given the global and ecological significance of the region, it is essential to provide support to create databases, tools and methodology for data analysis. It is also essential to strengthen the capacity of national governments for preparing appropriate strategies and action plans to contain the adverse impacts of climate change. Furthermore, there is a need to promote regional cooperation in development and exchange of data, information and knowledge for improved monitoring, forecasting, and risk assessment and for designing appropriate adaptation measures, such as early warning systems. To this end, ICIMOD launched a concrete initiative at the First Asia-Pacific Water Summit held at Beppu City, Japan, in December 2007.

### **II. What is the Objective of the ICIMOD Concrete Initiative?**

The specific objectives of the ICIMOD initiative to be carried out in the Hindu Kush-Himalaya (HKH) region are as follows:

1. Development of monitoring and assessment schemes for cryosphere and water resources in a regional scale and strengthening national capacities for the monitoring and assessment of cryosphere and water resources on both national and field-based scales
2. Capacity development among ICIMOD's regional member country (RMC) partners to deal with multi-hazard risk assessment, including vulnerability assessment at community levels and the development and application of early warning systems and other preparedness measures.
3. Development of regional information sharing mechanisms, including the establishment of a regional water database and the development of basin-wide scenarios on climate change and its consequences for water availability and flood hazards.

### **III. Who is ICIMOD's Client?**

ICIMOD's clients are professionals and policymakers in its eight regional member countries of the HKH region and the global scientific and professional community with interest on water resources and climate change adaptation.

### **IV. Update on annual progress of the work**

ICIMOD has prepared an action plan for 2008-2012 and an annual work plan for 2010. Some of the highlights of the activities conducted by ICIMOD during the reporting period (July 2009-June 2010) towards meeting Objectives 1, 2 and 3 of the concrete initiative are as follows:

#### Objective 1:

An inventory of glaciers in Afghanistan, Bhutan, Myanmar and Nepal is completed based on LANDSAT satellite images. With the help of ICIMOD's knowledge partner in China, the second inventory of Glacier database of China has been prepared. The preparation of an inventory of glaciers in Pakistan and India is in progress. Also, the mapping of glacial lakes for the entire Hindu Kush-Himalaya region is in progress. Such an inventory of glacial lakes has been the basis for the identification of potential GLOF lakes in Nepal. The experiences from Nepal is planned to be transferred to other countries in the region as well. Multi-disciplinary detailed field investigations were carried out in Lake Tsho Rolpa, Lake Imja, and Lake Thulagi (a) to improve the knowledge on the GLOF hazard on those lakes and (b) to develop and improve the methodological approach for field based studies. A recent ICIMOD publication in this area is 'Formation of Glacial lakes in the Hindu Kush-Himalayas and GLOF Risk Assessment', which can be downloaded from the ICIMOD website, <http://books.icimod.org>.

#### Objective 2:

ICIMOD embarked on a research to improve the understanding of the on-going climate-related changes in the region through two regional projects on 'Too much and too little water: adaptation strategies to climate induced water stress and hazards in the greater Himalayan region' and 'Feasibility study of Himalayan climate change impact and adaptation assessment'. The Centre worked with national partners in China, India, Nepal and Pakistan to document adaptation strategies to droughts and floods in five selected mountain communities in order to make this knowledge available for policy makers and provide a basis for supporting communities in climate change adaptation. While it is too soon to report on the impact of the study on policies and community support, the work to carry out the research has had a clear impact on the capacity of our partner organizations and their staff. The research has been published by ICIMOD in 'Local Responses to Too Much and Too Little Water in the Greater Himalayan Region' which can be downloaded from [http:// books.icimod.org](http://books.icimod.org).

#### Objective 3:

ICIMOD, in collaboration with WMO and the six regional partner countries from Bangladesh, Bhutan, China, India, Nepal and Pakistan, has recently initiated a collaborative project to establish a regional flood information system in the Hindu Kush-Himalaya (HKH) region. The project is based on the results of the preliminary phase of the project that was implemented from 2001 to 2005 and included a series of consultative meetings with representatives from the regional member countries. The overall objective of the project is to minimize loss of lives and livelihoods by reducing flood vulnerability in the HKH region. The project seeks to develop and strengthen a regional framework for cooperation on sharing flood data and information between and amongst participating member countries through a common platform to be facilitated by ICIMOD. To this end, ICIMOD, working closely with WMO and the partner countries, will establish a flood observation network in selected river basins in the participating countries.

To sum up, ICIMOD is committed to the concrete initiative launched at the First Asia-Pacific Water Summit. It has a suitable organization structure for implementation and management of the activities related to the initiative through the three action areas within its Integrated Water and Hazard Management (IWHM) programme. Within the region and internationally, it has a good network of partner organizations necessary for successful implementation of the initiative. Through its role as an APWF Regional Knowledge Hub, ICIMOD plans to document the reproducibility of its initiative for mountainous areas in other parts of the Asia-Pacific region. And, it has been successful in raising funds for financial sustainability of the initiative.