

Water, The Essential Resource

Besides the growing demand, climate change is the main factor influencing the availability of water, and is resulting in a less regular and more erratic access to this resource. As a result of climate change, the incidence and intensity of water-related hazards and disasters are expected to increase in the Himalayan region, with more frequent and damaging cycles of floods and drought.

The regions' countries need a good scientific understanding of the ongoing rapid changes in the climate and their impact on the region's ice and snow resources, which are essential for storing water and equilibrating water discharge. In 2009, ICIMOD has worked to build up the knowledge base with a long-term perspective, promote immediate adaptations to change, and enhance the resilience of mountain communities.

In the past, ICIMOD has used remote sensing to map snow cover and document its evolution. We have now made an analysis of critical glacial lakes in Nepal and their immediate potential danger. The actual status of three glacial lakes and the extent to which they pose an immediate threat, and the downstream socioeconomic vulnerability, was assessed in field studies. The results of this comprehensive study will be published in 2010. We hope that this work will contribute to the establishment of a robust methodology applicable in other countries. Thanks to the initiative of The Mountain Institute (TMI), an exchange was initiated to learn from Latin American experiences in mitigating the dangers of glacial lake outbursts.

We have endeavoured to learn how to deal with water stress, both from too much and from too little water, from the communities who have been adapting to these hazards for generations.

Interdisciplinary linkages: Understanding the capacity of the rural population to live with 'too little' and 'too much' water has been part of a comprehensive effort by five field teams in four countries to document case studies and understand how people in the Hindu Kush-Himalayan region respond to water stress and

climate variability. The study focused on improving the methods of gathering and analysing both qualitative and quantitative data for understanding the socioeconomic issues of water-induced hazards and impacts of environmental, and especially climatic, change on human health and water availability. The results of the case studies show that effective use of existing capabilities and enabling conditions, coupled with access to livelihood options and opportunities, can enhance the capacity to respond to water stress and hazards. However, responses to water stresses and hazards can be considered adaptive only if they build resilience to change and variability over the long term. The synthesis report of the study was launched at the COP15 event.

Transboundary cooperation: The analysis of watershed management in the Upper Brahmaputra river basin has led to the development of a river basin information system (RBIS) and integrated water resources management toolset for use by partner institutions and stakeholders. During 2009, work proceeded on the development of a scheme to monitor ice and snow through regional consultation.

Furthermore, funding support has been received to scale up a preliminary project and work closely with the World Meteorological Organisation (WMO) and the partner countries to develop and strengthen a regional framework to improve flood forecasting and disaster preparedness, improve regional cooperation in flood risk reduction, and strengthen upstream-downstream linkages, thus helping to reduce loss of lives and livelihoods.

These endeavours aim to show the relevance of these factors on the livelihoods of the mountain population and on the 1.3 billion people living downstream in the water basins. Our findings concerning GLOFs are of immediate use for the design and planning of hydropower plants. The need for transboundary cooperation led to the declaration of interest in long-term monitoring of the water resources in the Indus and Koshi basins, where ICIMOD is working in partnership with local and regional actors. Training courses on disaster risk mitigation have led to the design of a master's course in disaster risk management at the University of Peshawar.

Research on 'Too much and too little water' – Building the capacity of partner organisations

In 2009, ICIMOD embarked on research to improve our understanding of the ongoing 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'.

ICIMOD worked with national partners to document adaptation strategies to droughts and floods in 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 organisations and their staff.

Partha Das of AARANYAK in Assam, India

"Working with the ICIMOD has helped our team strengthen our capacity to work in a better and more effective way in the field of water management, climate change, and disaster risk reduction. Although we were observing adaptation mechanisms of indigenous communities before, the work on 'Too Much and Too Little Water' was a good opportunity to learn about innovative new methodological tools and apply them during our fieldwork. The interactions in the three workshops in Kathmandu were very useful in consolidating our concepts and ideas. Interacting with the staff from ICIMOD and collaborating institutions who visited our field sites in Assam contributed significantly towards the capacity building of our team especially in field research methods and building perspectives on larger issues."

Shahid Nadeem of Aga Khan Rural Support Programme in Chitral, Pakistan

"AKRSP and ICIMOD have had many previous partnerships to implement tangible projects but this was the first partnership to conduct a study. It really helped AKRSP to build our capacity to conduct research and knowledge management interventions. This has expanded the scope of our work and provided AKRSP with a new way of looking at the current development issues. Since the completion of this study, our views on climate change have weight in the debate on climate change at the national level."

At the individual level, working with ICIMOD was a great learning opportunity for all of us. The exposure we got from the planning workshop, field data collection, and the reporting was incredible. The writeshop provided us with techniques and skills for synthesising the information and making a precise and complete document. Since the subject was new for us, it was hard at first to understand the issue and explain it to others for effective data collection. However, we put in our best efforts and finally succeeded. I think the biggest thing that I learned from this study is 'working under pressure'."



Majgaon, India



Danda bazaar, Nepal

Assessing glacial lakes – Building skills to bridge the knowledge gap

Glacial lakes have formed in many places in the area left at the termini of retreating valley glaciers. More rapid melting of glaciers throughout the Hindu Kush-Himalayas may be contributing to the expansion of glacial lakes, creating additional dangers of outburst floods in the future. Adequate monitoring of glaciers and their lakes is vital for appropriate management of these water resources and disaster mitigation in the downstream river basins.

In 2009, ICIMOD and its partners made progress on a regional GLOF lake inventory and regional GLOF risk assessment, which built on an inventory compiled in 2001. The interdisciplinary team developed a GLOF risk assessment methodology and desk-based criteria to select critical GLOF lakes for field investigations. The basin-wise inventory utilised satellite images, aerial photographs, and topographic maps. It includes glacial lakes in the region for Afghanistan, Bhutan, China, India, Myanmar, Nepal, and Pakistan (excluding areas north of the Brahmaputra river).

The project completed flight observations to examine the priority GLOF lakes in Eastern Nepal. It also procured the necessary scientific equipment for upgrading of the capacity of its partner institution.

In April to June 2009, the team field tested the methodology in four pilot catchments in Nepal on the selected critical glacial lakes and associated mother glaciers. The field investigation examined the stability of the moraine and surroundings at the selected GLOF lake sites and completed detailed socioeconomic GLOF risk vulnerability assessments for possible inundation areas downstreams of the Imja, Thulagi, and Tsho Rolpa glacial lakes.

The project also offered training on mass balance of glaciers. It is continuing consultations with partners for country level regional status reports on GLOF risk assessment.

Mapping Thulagi glacial lake, Nepal





Thulagi lake, Nepal



Imja lake, Nepal

Karma, Department of Geology & Mines, Bhutan

“Through ICIMOD’s initiative, many activities were carried out. All the methods, such as preparing glacier inventory and risk assessment, are according to international standards although some changes are required to fit into our own regional needs. The most significant activity is the publication of a book with our glacier and glacial lake inventory. Based on this, we are implementing so many other activities. Besides, we really appreciate ICIMOD’s involvement in the development of our human resource capacity through various training events and workshops. Their initiatives to bring together the various experts in the region and to work together towards a common goal in solving problems in the region is highly appreciated. ”



Syangboche, Khumbu, Nepal