

## **Generation of evidence and knowledge on the basin scale climate and environmental risks to the hydropower sector in Nepal**

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Organisers: Generation of evidence and knowledge on the basin scale climate and environmental risks to the hydropower sector in Nepal

Supporting sustainable energy development in the Hindu Kush Himalaya remains a challenge. Considering the increasing trend of extreme events and climate variability, hydropower infrastructure development is extremely vulnerable to these changes and has significant impacts on its economy and livelihood. This is especially pertinent in Nepal's case where hydropower contributes to 96% of installed capacity for electricity.

The hydropower sector in Nepal is facing several climatic environmental challenges. The changes in cryosphere, water availability and climate induced hazards pose a significant risk mainly in context of climate and environmental changes to the infrastructure in the river basins. In recent years, there has been an increase in extreme events resulting in major infrastructure and economic losses. The changes in glaciers, precipitation patterns and snow will also affect hydropower production due to changes in the seasonality of river flows to increased variability of flows. Hazards such as permafrost thaw, Glacier Lake Outburst Floods, Potentially Dangerous Glacier Lakes, landslides, floods, and sedimentation pose a significant risk to livelihoods, including to the energy sector and other dependent sectors.

These hazards are changing and increasing due to climate change. The number of potentially dangerous glacier lakes is rising, which has increased the risks for hydropower plants and other critical infrastructure. The damaging impact of these hazards has already been felt with the 2016 GLOF destroying the Bhote Koshi hydropower plant near the Nepal–China border. Similarly, a landslide in 2014 affected hydropower projects in the Jure area of central Nepal. This year in June, floods in the eastern districts of Taplejung, Panchthar, Sankhuwasabha, and Bhojpur districts also damaged 30 hydropower projects of 463 MW in total capacity.

Hence, designing and implementing hydropower projects that consider changing cryosphere and associated hazards ensures long-term resilience and sustainability in the face of climate change impacts. The findings of climate change impacts on cryosphere changes in water availability and climate related hazards can be transformed into climate-resilient guidelines to effectively mitigate hazards and enhance the safety and adaptability of hydropower

projects.

## **About the workshop**

ICIMOD's Action Area A – Managing cryosphere and water risks under the Strategic Group 1 - Reducing Climate and Environment Risks is implementing the project “Generation of evidence and knowledge on the basin scale climate and environmental risks to the hydropower sector in Nepal (GEM-Nepal), supported by the Government of Norway. In collaboration with the Water and Energy Secretariat(WECS), this project aims to understand the risks associated with changes in the cryosphere, water availability, and climate-related natural hazards on hydropower. With this understanding, the project intends to develop a Climate Resilient Hydropower Guideline for Nepal.

The goal is to generate and disseminate evidence and knowledge to support effective decision-making, policy formulation, and adoption of solutions to strengthen the management of the hydropower energy sector and inclusive mountain economies in Nepal. The project will also enhance the capacity of key national and local government institutions on climate and environmental risk assessment, specifically pertaining to renewable energy infrastructure, mainly hydropower.

In this regard, the Water and Energy Commission Secretariat (WECS), Government of Nepal and ICIMOD is organizing a one-day inception workshop of the project on “Green Energy Management for Mountain Economies in Nepal - GEM-NEPAL”

The workshop will bring together key stakeholders to discuss the project activity and objectives as well as to identify existing knowledge gaps and the capacity needs to incorporate risks into the development of climate resilient hydropower in Nepal.

## **Objectives**

- Understand present status of hazards, vulnerabilities and risks related to the cryosphere posed by future climate change.
- Review knowledge gaps on basin-scale climate risks and implication for hydropower infrastructure.
- Identification of partners for co-development of climate risk assessment framework/approaches and its implementation in the Narayani Basin.
- Exchange knowledge on guideline for climate resilient hydropower in Nepal and need for climate-resilient practices.

## Programme Agenda

Time	Programme	Speaker/resource person
<b>Opening session</b>		
9:00 – 9:30	Registration	Ashmita Shakya, ICIMOD
9:30 – 10:00	Opening remarks	Pema Gyamtsho, DG, ICIMOD Jan Erik Studsrød. Counsellor (Energy), Norwegian Embassy Sushil Chandra Tiwari, Secretary, WECS, Govt of Nepal
10:00 – 10:30	ICIMOD's past work on sustainable hydropower  GEM-Nepal component on Climate Risk and Resilient Hydropower and objectives of workshop	Arun B Shrestha, Strategic Group lead - Reducing Climate and Environmental Risks, ICIMOD  Neera Shrestha Pradhan, Action Area Coordinator, Managing cryosphere and water risks, ICIMOD
10:30 – 10:45	Tea Break, Photo	
<b>Session: Context and issues</b>		Arun B. Shrestha, Strategic Group lead - Reducing Climate and Environmental Risks, ICIMOD
10:45 – 11:45	IHA's sustainability standard  Policies and institutions for climate-resilient hydropower development - What does this mean for Nepal?  River basin Planning and Hydropower master plan in Nepal  Current practices on climate risk screening for hydropower planning and development processes in Nepal.	Sushil Pokharel, Vice Chair, IHA  Ramesh Ananda Vaidya, Advisor  WECS (TBD)  Prakash Gaudel, Assistant Manager, NEA
<b>Session: GEM Project Approach</b>		Dr. Kapil Gnawali, Senior Divisional Engineer, WECS
11:45 – 12:35	Climate Resilient Hydropower guidelines through climate risk assessment and hydroclimatic modelling	Divas B Basnyat, Team Lead NDRI

	Cryosphere Risks in the Narayani basin  Q&A	Prashant Baral, Cryosphere Analyst and Miriam Jackson, Intervention Manager, ICIMOD
12:35 – 13:30	Lunch	
13:30 – 14:30	Discussion in groups <ul style="list-style-type: none"> <li>- Knowledge gaps on the basin scale cryospheric and climate risk and its implication for hydropower infrastructure</li> <li>- Capacity building needs on climate risk assessments for hydropower planning and development</li> <li>- Integration of learning in the guideline for climate resilient hydropower and its adoption by the stakeholders</li> </ul>	Nisha Wagle, Research Associate, Water resource management Prashant Baral, Cryosphere Analyst and Sharad Joshi, Cryosphere Analyst, ICIMOD
14:30 – 15:00	Presentation from each group in the plenary	
15:00 – 15:15	Tea break	
Session: Way forward		Faisal M. Qamer, Intervention Manager, ICIMOD
15:15 – 16:00	Discussion in plenum. Way forward and action points	WECS MoEWRI NEA IPPAN
16:00 – 16:15	Closing remarks	ICIMOD WECS