

PANEL DISCUSSION

The IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC) and latest IPCC Assessment Report (AR6) highlight the recent environmental changes and their impacts in high mountain areas. Increase in surface temperature and changes in precipitation amounts and intensities lead to profound changes in the cryosphere of High Mountain Asia. These changes have severe repercussions on mountain social-ecological systems and include changes in river runoff, geomorphological changes, as well as alterations to terrestrial and aquatic ecosystems. Natural hazards such as flooding, landslides, and avalanches are projected to increase in magnitude and frequency and cascading hazards and combined hazards may become more likely.

Research in high-mountain areas has equipped us with high confidence about several aspects of environmental change in High Mountain Asia. Yet, there are still key gaps in our knowledge that impede efforts to quantitatively measure and predict trends.

The aim of this panel discussion is to spark conversation between a group of experts on needs and future directions of research in the Himalayan region, so that the audience can learn from their discourse and interaction. The panelists share facts, personal experiences, express and discuss opinions on diverse aspects of research on natural hazards and risks in the Himalayas. The discussion shall engage the audience and particularly Early-Career researchers.

Topic

Current and Future direction of Research in Himalaya: Learning from IPCC AR6

Moderators

Prof. Sumit Sen

Dr. Wolfgang Schwanghart

For questions:



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Panelists	Talk Titles
Prof. Sumit Sen	Understanding Eco hydrological and Fluvial Geomorphological Processes in the Indian Himalayas
Dr. Wolfgang Schwanghart	The Nexus of Climate Change, Water and Energy in the Himalayas
Dr. Santosh Nepal	Increasing Risk Of Cascading Disasters In The Himalayan Region
Dr. Simon Allen	Improving Our Understanding Of Glacial Lake Outburst Flood Risk In The Himalayas
Dr. Himanshu Kulkarni	Sub-Surface Water - The Need To Look Into Its Links With Natural Hazards In The Himalaya!
Prof. D. S. Arya	Climate Change and Water Availability in Upper Indus River Basin: Discord, Divergence and Challenges
Dr. Kristen Cook	Improving our understanding of extreme floods through new technologies and techniques

Future directions for research on Himalayan Region

Prof Sumit Sen, Head Centre of Excellence in Disaster Mitigation and Management (CoEDMM), IIT Roorkee

Dr. Wolfgang Schwanghart, Institute of Environmental Science and Geography University of Potsdam

Dr. Santosh Nepal, Himalayan Hydrology, Climate Change impact: Hydrological Modeling, ICIMOD

Dr. Simon Allen, Academic associate, Science and policy, engaged with IPCC, Universities of Geneva and Zurich

Dr. Himanshu Kulkarni, Executive Director and Secretary, Advance Centre for Water Resources Development and Management (ACWADAM)

Dr. Kristen Cook, Research scientist, GFZ Potsdam

Prof. D. S. Arya, Department of Hydrology, IIT Roorkee

The Nexus of climate change, water and energy in the Himalayas depends on various factors like rural development, resilience and vulnerability, energy security and food security which play a vital role in the use of these water resources. The changing climate is increasing the risks of hazards and disasters in this region. To study the present day hazards and risk, we need to know the history of their occurrence, understand the path dependence and link models better to long term landscape evolution. Dr. Arya highlighted that while simulating the output we should consider the data length, scale, resolution of the data, spatial variability of data, models we are using and which part of hydrograph. Ignoring these aspects lead to the contrast result which do not agreement with the observation. Dr. Himanshu Kulkarni highlighted that for several mountainous regions of India, it is required to bring spring water into the larger paradigm of water management in the mountains. There is a need to have a separate place for mountain aquifers in our practices and policies. They also stressed to understand the hydrology as well as dynamics of natural disasters in the Himalayan range which is poorly understood yet. There is a need to move away from the established paradigm and to narrow the gap between science and society, practice and policy so that we can be able to deal with challenges on the ground through the mechanism of science.

Prof. Sumit discussed that there are various ecohydrological base research questions which are need to be answered. For example, how the forest canopies to be linked with the hydrology. He also highlighted that the landscape changes are not happening only because of the forest or agriculture, but also because of the extreme events. There is a need to understand all the trade-offs between the two different ecosystem which are happening in this terrain. He suggested to install low cost sensors, as much as possible for gathering information of all those processes which are happening in the headwater in Himalayan region to work it out and to get more data to understand the process. He also stressed for the participation of the village level or the local community towards the science development which will narrow the gap between science and society and also the gap between science and practice and policy.

For involvement of these stakeholders, it is needed to equip researchers with better communication skills, with multiple skills of communicating on one side with peers, speaking the language of science, but also on the other side, communicating science with society. Dr. Wolfgang suggested to create better links to NGOs, organizations that work on a local level. Prof. Arya point out that for non-availability of data, there are proxies available and one can really find lots of metrological data available, not the observed data but synthesize data from the alternate sources. They also suggested to request few organizations such as ICIMOD, to publish their field data so that someone can work with models and validate the design or processes. Dr. Wolfgang pointed out that the destruction that has been caused to hydropower projects is mainly caused by debris that is coming down from hillslopes. It is important to understand the complex phenomenon of sediment and its transport in the Himalayan river. A large dataset is required to understand the process. He also highlighted another issue of measuring bed load in these systems which are highly energetic and very difficult to measure? Dr. Simon discussed that subsequent events should be given importance that can lead not only to the GLOF and also landslides in the Himalaya.

Dr. Santosh talked about the increasing risks of cascading disasters and climate change. He also discussed about how to reduce the risk from cascading disaster in the Himalayan regions. The current and future direction of research in Himalaya, climate change and climate extremes should be the focus which is already impacting different sectors, impact on water choices, future water availability, sectoral implications, which is very crucial for designing adaptation strategies. there is no documentation about how the climate changes can trigger these kinds of events, linkages between cryosphere-atmosphere-monsoon and hydrology.

we should make automated early warning system for disseminating information to downstream communities about this event. Dr. Santosh also supported the need to build a system the information can flow faster than the flood waves or the whatever the form the disaster is coming from the upstream. Dr. Wolfgang highlighted to design a framework for the Himalayas or India similar to the Water Framework Directive by European Union which combines eco-hydrological and fluvial geomorphological aspects, have similar frameworks been devised. They focused on the use of imagery from commercial satellites and use of new technologies.