

Promoting Science-Based Diplomacy in the Upper Indus Basin through a Research Network

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Second Upper Indus Basin Network India Chapter Meeting—Strengthening Science and Socioeconomic Linkages

What: Forty members of the India chapter of the Upper Indus Basin Network, with expertise in climate change modeling and adaptation research, met in New Delhi to discuss opportunities to complement potential science and the socioeconomic agenda of the basin.

When: 13 December 2019

Where: New Delhi, India

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The Upper Indus Basin Network

In a recent assessment of the world's mountain systems, the role of key "water towers" (Immerzeel et al. 2020) as water suppliers for downstream communities was examined. Of the 78 water towers, the Indus basin was found to be the most vulnerable and "most important storage unit" (Amos 2019) in the world. Along with increasing climate forces and corresponding impacts in the basin, the shared nature of the 1.12 million km² (FAO 2011) basin warrants for conducive future decisions for the vulnerable communities that depend on the basin for important ecosystem services and other needs. Informed decision-making would be needed to bridge the science–policy gap that is characteristic of the basin and hinders regional cooperation among the basin countries.

These issues were discussed in a second country chapter meeting of the Upper Indus Basin Network (UIBN) cohosted by the Jawaharlal Nehru University (JNU) and International Centre for Integrated Mountain Development (ICIMOD), with program support from the Department of Foreign Affairs and Trade (DFAT), Australia, and the Swiss Agency for Development and Cooperation (SDC). A previous meeting had been held in New Delhi, in April 2019, where along with familiarizing the concept of the network with participants, the working group topics and leads were finalized. The workshop was in a series of collaborative engagements planned and held since the inception of the network in 2012. Following a structure that focuses on developing basin country chapters (ICIMOD 2019a), the UIBN functions as a voluntary body of researchers and policymakers. Each of the four basin member countries, that is, Afghanistan, China, India, and Pakistan, have established respective country chapters in early 2019.

Bringing together the expertise of 40 researchers, practitioners, funders, and government agencies, the aim of the workshop was to identify interdisciplinarity among the working groups and by extension the key working areas, as identified by the India chapter: data collection and standardization; climate change, air pollution, and black carbon; cryosphere monitoring and modeling; surface and groundwater hydrology and water availability and demand; understanding and managing hazards and risks; and managing gendered socio-economic impacts through adaptation measures (ICIMOD 2019b). The meeting was broadly divided into four sessions that examined the existing knowledge gaps within the basin, a panel discussion on proposed research needs, focused presentations on ongoing research within the chapter that contributed to studying basin-level impacts, and a future plan of action for the network.

Strategic need of the network

The value addition of the India country chapter is in the key insights its science-based approach can bring in to increase understanding of ongoing dynamics in the upper region of the Indus basin. The opening session highlighted this by focusing on how the network can contribute to better understanding of upstream-downstream linkages within the basin. Future impacts predict that, "Population within the basin is projected to increase—with resulting higher water demands" (Laghari et al. 2012). This brings in the notion of shared risk, as densely populated downstream regions and particularly, "downstream food security" (Immerzeel et al. 2010) will be impacted by upstream water availability. As was noted by DFAT representative, the importance of the India chapter, and by extension, the network is the "opportunity for knowledge transfer and cross-learning ... [and] a collective ability to use science to influence policy."

A presentation focusing on glacial loss in the Satluj basin conveyed the sense of urgency regarding cryosphere changes in the upstream part of the Indus basin. As referenced by the speaker a study published in 2019 found that the Satluj's "more than 50% of the annual flow ... is contributed by snow and ice melt" (Prasad et al. 2019). Under an RCP8.5 scenario, it is projected that from 55% to 97% of the glaciers in the basin could disappear by 2090 (Prasad

2019). The session raised pertinent questions on downstream impacts especially on key hydro power projects and associated agricultural infrastructure in downstream Indian states.

Existing knowledge and linkages needed in the basin

The following session looked at interacting with working group leads and understanding the presiding knowledge gaps in the region. A speaker from a government agency, the Indian Institute of Tropical Meteorology (IITM; Pune), focused on the need to understand climate change projections within the basin through the use of existing datasets—sources such as India Meteorology Department (IMD), Asian Precipitation–Highly-Resolved Observational Data Integration Toward Evaluation (APHRODITE), and the Global Precipitation Climatology Project (GPCP) among others were recommended. With special reference to understanding temperature and precipitation change within the basin, it was suggested that a suite of statistically downscaled models be used. With reference to projections, an example shown was the general increase in the mean number of warm nights through the century, with an increase in the mean number of nights under RCP8.5 scenario. Similar results were shown for warm days—here the speaker observed that these results have significant ramifications on agriculture and water resources within the basin. A further link to the need to study socioeconomic components within the basin was examined in a glacial lake outburst flood (GLOF) study. Assessing the total number and spatial distribution of glacial lakes within the basin, it was recommended that GLOF issues need to be addressed on transboundary scale. Further, contextualizing of GLOF issues at a country level is also needed to consider its implications on sectors such as road networks and human settlements. The Hindu Kush Himalaya (HKH) region, which the Indus basin is a part of, is in the midst of experiencing, “climate warming and the creation of new glacial lakes and their sometimes very rapid expansion.” as found in GLOF risk assessment report carried out by ICIMOD, the United Nations International Strategy for Disaster Reduction (UNISDR), and World Bank. As further cited in the study, the need to establish “firm scientific base” (Ives et al. 2010) in order to create robust policies is the need of the hour. As the speaker cited the example of the 1929 GLOF of Chong Kumdan Lake, a flood that allegedly traveled a distance of 1,500 km, the downstream implications of a GLOF event stands to impact the hundreds of villages, cultivated lands, and infrastructure (road networks and irrigation canals) that are characteristic of the upper reaches of the basin. Furthermore, as discussed in a later session, changing temperature regimes are also giving rise to pests such as locust (*Locusta migratoria*) attacks (Down to Earth 2015). For a region that is marked by high altitude regions with limited agricultural productivity, this poses unique challenges to communities.

Community perspectives

The example of the locust infestation brings in a unique challenge of balancing local religious sentiments that prefer not to exterminate the locust population with the use of pesticides, with that of the decision of district-level administrative authorities that prefer the use of insecticides. A technical working group on understanding socioeconomic and gender vulnerabilities exists separately within the country chapter to study these types of challenges. However, as reiterated during other UIBN meetings, findings from other working groups need to intersect and support any research activities of this socioeconomic working group. As raised by speakers in previous sessions focusing on the physical sciences, an undercurrent on focusing on the socioeconomic components was present from earlier sessions as well. These were also separately addressed in individual presentations. One particular speaker focused on the changing ecosystem in Ladakh profiling the community’s response to changing climatic factors. The need to assess adaptation strategies in face of changing climatic, cultural, and economic contexts is a key premise to understanding the rapid changes that

communities are facing. For example, along with a recognition of the benefits that tourism has brought into the region (Chhabra 2010), there is also a need to understand the added pressures this brings into the region. Along with climate models, it is also important to look at participatory exercises such as, “scenario building [which] would enable authorities and NGOs for future development” (Le Masson and Nair 2012). As noted by the speaker, these macrolevel impacts and insights found by other working groups would be essential in understanding how to formulate informed decisions and thinking around policy.

This need informing policy requirements was further explored by a speaker in the afternoon session where in-depth sessions on UIB research were being conducted. One speaker recognized that the innovativeness that came with the need to understand social dynamics linked to agriculture were in congruence to a national discourse to combat climate change and address farmer’s distress [National Mission For Sustainable Agriculture (NMSA); NMSA 2019]. Here the suggestion was to carry out cross-sectional econometric analysis of household-level data carried out through surveys. This would allow for assessing social resilience, community networks, and the ability of communities to adjust against the backdrop of extreme weather and water-related disasters in the basin. This backdrop was further explored in another speaker’s session that focused on an ethnographic study carried out of the Changthang community residing in Ladakh. Community practices such as nomadic forms of pastoralism and linked sociocultural traditions were shown to be impacted by other forms of livelihoods ranging from agriculture to tourism. Areas that the Changthang community found to be religiously significant could be threatened in the future as land-use patterns and economic practices shift. Although strategies like youth initiatives have been set up to better train, educate and preserve the traditional knowledge that is characteristic of Ladakhi communities, more interventions are necessary.

Future course of action and collaboration

One of the key areas of focus during this chapter meeting was the need to assess future prospects whether it be in conducting research, ideating roadmaps for the working groups, and even possible collaborative support from donor and government agencies. A representative of the Ministry of Environment, Forest and Climate Change, Government of India, commented on the timeliness of an intervention such as the country chapter. Introducing the National Mission on Himalayan Studies, the speaker suggested that the approach of the network should be to formulate demand-driven projects. This would mean projects with a strong science component that are also aligned with the Twelfth Plan goals of the Government of India covering the areas of “environment; forests and livelihood; wildlife, ecotourism and animal welfare; and ecosystem and biodiversity” [National Mission on Himalayan Studies (NMHS); NMHS 2020]. Although official figures need to be clarified, the available corpus for such projects could stand at approximately 28 million U.S. dollars.¹

Against this backdrop, future plans of action were presented for each of the working groups. For example, the group on “climate change, air pollution variability, and black carbon” focused on preparing a manuscript that looked at climate change projections at specific warming levels. The methodology suggested was to look at a suite of models like the NASA Earth Exchange Global Daily Downscaled Projections (NEX-GDDP). A novel approach would be to also include new indices on hydrology, climate change, and the contribution of wettest days to total rainfall. Another group focused on contributing to a status report that would assess the surface and groundwater availability in the basin. Carrying forward the earlier message of risks and hazard management as explored in the morning session, there was suggestion of exploring the impacts of water and land related hazards such as landslides, landslide lake outburst floods (LLOFs), GLOFs.

¹ Based on exchange rate figures as of 15 January 2019.

In a prior session, cross-country collaboration measures were also explored. As a means of increasing cross-country coordination, the country chapters are encouraged to develop joint research proposals. One speaker floated the idea of a comparative study on water and vulnerability in two sites in Pakistan and India. Originally conceptualized as a National Geographic Story Grant, the aim is to conduct a comparative analysis of two study sites in Ladakh (India) and Gilgit (Pakistan) to better understand how communities are adapting to the challenges of water resource and its accompanying management issues.

Thinking of the need of policy relevance, members suggested that results from these hazard assessments be linked to the state disaster management plans as well as the country-level National Disaster Management Agency (NDMA) plan. All groups presented on the possibilities of interthematic collaborations as well—collaborating among other working groups in order to provide data and other quantitative or qualitative support.

Another source of possible collaboration came in the form of representation from the German Research Foundation (DFG). Presenting a series of funding principles to the chapter, the speaker from DFG differentiated between the project and funding types that the DFG supports. These range from individual research projects based in Germany, to ones that focus on intensifying bilateral cooperation, and joint small- and large-scale research projects.

An important point of discussion was also the decision to publish research results of the Indus chapter—the suggestion made by the country chapter lead and supported by all members was to publish a compendium of research articles as a direct result of the various working group proposals.

A need for standardization

As summarized by the lead of the country chapter, the concept of the UIBN was established to promote interdisciplinary research to reduce data gaps and to promote a better understanding of the scientific and societal components being impacted by the changing climate process within the Indus basin. As noted by DFAT in an earlier session, the timeliness of the network in the presiding political context, which has moved farther away from encouraging scientific discourse, the India chapter has also been established to promote knowledge transfer within the Indian context, and possibly at a regional level in the future. Through repeated interactions not only at the country chapter, but broader network level, the issue of data variation and data quality has been repeatedly noted. A future course of action could be the standardization and consensus for the use of an ensemble of datasets that would support and cross-reference findings among all working groups. The UIBN India chapter stands to set an example among the working group country chapters in the progress it has achieved and the opportunity to demonstrate this at future regional-level UIBN forums.

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