HI-AWARE

Himalayan Adaptation, Water and Resilience Research on Glacier and Snowpack Dependent River Basins for Improving Livelihoods

Flip Wester
Principal Investigator HI-AWARE
Chief Scientist Water Resources Management ICIMOD
Introduction to HI-AWARE

- HI-AWARE funded through CARIAA (IDRC / DFID)
- Proposal development March to Sept 2013
- 4 consortia funded, 2 in semi-arid regions, 1 in deltas, 1 in basins
- Glacier + Snowpack dependent river basins hotspot = HI-AWARE consortium members, FutureWater and partners in the region
- Inception Phase from April – Sept 2014, implementation to Sept 2018
12 HI-AWARE STUDY AREAS
IN 4 STUDY BASINS

- Indus
- Upper Ganga
- Gandaki
- Teesta

- Hunza
- Soan River Basin
- Chaj Doab
- Plains Upper Ganga Basin
  - Mandakini Watershed
  - Mid-Hills Upper Ganga Basin
- Rasuwa, Gandaki Basin
- Sikkim, Teesta Basin
- Mid-Hills, Teesta Basin
- Mid-Hills Gandaki Basin
- Chitwan and West Champaran
- Jalpaiguri District, India and Nilphamari District, Bangladesh
Consortium Members

- Bangladesh Centre for Advanced Studies (BCAS)
- International Centre for Integrated Mountain Development (ICIMOD), based in Nepal
- Pakistan Agricultural Research Council (PARC)
- The Energy and Resources Institute (TERI), based in India
- Wageningen University and Research, based in the Netherlands
**Strategic Partners**

- Centre for Ecology Development and Research (CEDAR)
- FutureWater
- LEAD – Pakistan
- Megh Pyne Abhiyan (MPA)
- Practical Action Nepal
- The Mountain Institute (TMI) India
Universities

- Free University Amsterdam, the Netherlands
- Karakoram International University, Pakistan
- National University of Science and Technology (NUST), Pakistan
- Rajshahi University, Bangladesh
- Sikkim University, India
- TERI University, India
- Tribhuvan University, Nepal
Research Question

How to develop timely adaptation measures and approaches to respond to rising temperatures, seasonal shifts in glacier and snowmelt induced runoff, and increased frequency of extreme events in the HKH mountains and floodplains in order to improve the resilience of livelihoods of the poor and vulnerable women, men and children in the region?
Achievements to Date

- Situational Analysis in 12 Study Areas
- External KMC Strategy
- Data Management Policy
- 6 fully supported PhDs (3 women, 3 men)
- 4 partially supported PhDs
- 2 PhD thesis completed
- 16 MSc students (8 women, 8 men)
- 9 journal articles
- 1 Working Paper (9 in pipeline)
- 25 stakeholder engagement events
- 32 blogs
- RiU Strategy
- Use of Touchables in RiU
High-resolution historical climate dataset

Dataset properties

- 1981-2010, daily P, Tavg, Tmax, Tmin, ETref
- 5x5 km for upstream IGB
- 10x10 km for total IGB
Climate modeling

Future scenarios (2010-2100)

• Daily, P, Tavg, Tmax, Tmin, ETref
  – Entire IGB at 10x10 km resolution
  – Upstream IGB at 5x5 km resolution

• 2 RCPs x 4 GCMs = 8 scenarios, covering broad range of projected changes in climate

• RCP4.5: temp increase of 1.7 to 3.5 °C (2071 to 2100 vs 1971 to 2000)

• RCP8.5: temp increase of 3.6 to 6.3 °C (2071 to 2100 vs 1971 to 2000)
Study Areas in Pakistan

- High Mountain Study Area (Hunza River Basin)
- Mid-Hill Study Area (Soan River Basin)
- Flood Plain Study Area (Chaj Doab)
Hunza Basin Study Sites

03 sites:
- Passu-Gulkin
- Nagar Valley
- Shimshall Valley
Hunza Basin action research and demonstration

- Improved water management & agronomic practices (tunnel farming, organic farming)
- Solar pump irrigation introduction
- Microhydel
- Processing and value addition (solar drying, packaging etc.)
- Rehabilitation of traditional irrigation system
- *Hydrological Monitoring of one glacier in Shimshal valley*

- Nagar Valley
- Passu-Gulkin
- Shimshal Valley
Soan Basin Study sites
Major Issues of Mid Hills

- Degraded watersheds
- Loss of runoff water
- Under utilization of harvested water
- Lacking innovations for livelihood
- Conventional energy scarcity
  - Low adaptation capacity:
    - Knowledge and technology gaps
    - Resource constraints
    - Lack of awareness
  - Land use changes (haphazard urbanization)
- Lack of data and information sharing
Soan Basin action research and demonstration

- Pilot Farm at Chakri for improving water management through solar innovations (solar water pumping, portable solar irrigation systems, integration of solar pumping with existing HEIS)
- Perennial water management for farm productivity enhancement (portable solar & small hydel irrigation systems)
- Water harvesting & kitchen gardening
- Nurseries development
- High value agriculture tunnels for off season vegetables
- Awareness, training and learning site
Pico hydel Power Generator

The total head of falling water is nearly 1.5 meter a water wheel turbine runs at 3000 rpm and then supplied to DC generator.

Utilization package is being designed including:
- Drip
- Micro-sprinkler
- Street lighting
Chaj Doab Area

Flood Prone Areas of Chaj Doab

Legend
- Mona (Study Site)
- Lower Jhelum Canal
- Upper Jhelum Canal
- <all other values>
- Tehsil Chaj
- Pak_rivers
- Rivers/Water Bodies
- Chaj_Boundary
- Flood Prone Areas
Major Issues of Plains

- Frequent floods
- Rising temperatures and heat leading to reduced agricultural productivity
- Reduction in river flows availability due to CC and upper riparian abstractions
- Increased stress between upper and lower riparian regions in relation to sharing of water resources
- Low land and water productivity
- Waterlogging and salinity
- Convectional irrigation & farming practices
  - Low adaptation capacity:
    - Knowledge and technology gaps
    - Resource constraints
    - Lack of awareness
Thank you

Supported by the UK’s Department for International Development (DFID) and Canada’s International Development Research Centre (IDRC)