



Floods Need Not Spell Doom if Planning and Management are Inclusive



About HI-AWARE

HI-AWARE aims to enhance the adaptive capacities and climate resilience of the poor and vulnerable women, men, and children living in the mountains and flood plains of the Indus, Ganges, and Brahmaputra river basins. It seeks to do this through the development of robust evidence to inform people-centred and gender-inclusive climate change adaptation policies and practices for improving livelihoods.

The HI-AWARE consortium is led by the International Centre for Integrated Mountain Development (ICIMOD). The other consortium members are the Bangladesh Centre for Advanced Studies (BCAS), The Energy and Resources Institute (TERI), the Climate Change, Alternative Energy, and Water Resources Institute of the Pakistan Agricultural Research Council (CAEWRI-PARC) and Wageningen Environmental Research (Alterra). For more details see www.hi-aware.org.

This series is based on the work of the Himalayan Adaptation, Water and Resilience (HI-AWARE) consortium under the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA) with financial support from the UK Government's Department for International Development and the International Development Research Centre, Ottawa, Canada. CARIAA aims to build the resilience of vulnerable populations and their livelihoods in three climate change hot spots in Africa and Asia. The programme supports collaborative research to inform adaptation policy and practice.

Production team

Nagraj Adve, Samuel Thomas (Editors)
Debabrat Sukla (Communication officer, HI-AWARE)
Mohd Abdul Fahad (Graphic designer)

Photo Credits

Eklavya Prasad, Megh Pyne Abhiyan

Copyright © 2018

Himalayan Adaptation, Water and Resilience (HI-AWARE)
All rights reserved. Published 2018

Disclaimer: The views expressed in this work are those of the creators and do not necessarily represent those of the UK Government's Department for International Development, the International Development Research Centre, Canada or its Board of Governors.

In addition, they are not necessarily attributable to ICIMOD and do not imply the expression of any opinion by ICIMOD concerning the legal status of any country, territory, city or area of its authority, or concerning the delimitation of its frontiers or boundaries, or the endorsement of any product.

Creative Commons License

This brief is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. Articles appearing in this publication may be freely quoted and reproduced provided that i) the source is acknowledged, ii) the material is not used for commercial purposes, and iii) any adaptations of the material are distributed under the same license.

This publication is available in electronic form at www.hi-aware.org

Key Message

Farmers in South Asia historically appreciated moderate seasonal floods, as these brought sediments with nutrients, water for irrigation, replenished groundwater and revived water bodies. But, scenarios have changed, and flooding is becoming more destructive.

Floods need not spell doom if river management, including planning and control, take into account people's concerns, experiences and skill sets. This requires an approach that focuses on balanced interaction between the ecology and human systems at basin level in the Hindu Kush Himalayan (HKH) region.

Climate and Flood Resilient (CFR) housing on the floodplains, consisting of raised and protected plinths, provisions for safe drinking water, EcoSan toilets and solar power, can prevent displacement and maintain health conditions during floods. These low-cost innovations can equip communities to become resilient to extreme and frequent riverine and flash floods.



Introduction



Peoples and floods

Water plays an important role in the lives and livelihoods of communities across the river basins in the HKH region. Farmers lived with moderate floods because flood waters brought sediments and nutrients, recharged groundwater and replenished water bodies that would later be used for irrigation and other purposes. These days, the same region encounters floods that cause riverbank erosion, sedimentation and sand casting. In the dry season, the same region faces drought and water scarcity.

The poor living in the floodplains and chars (river islands) built houses which used to be resilient earlier, but the transformed character of floods has made them less resilient to floods. During floods these houses get inundated, people lose assets and are forced to abandon their habitations and farms in search of other opportunities. Many a time, they are likely to end up living in inhuman conditions and without livelihood options at a new location. Marginal and landless people who temporarily migrate for work, normally return to their villages to work on family farms or as agricultural labourers during the sowing and harvesting periods. Poor families, including women, children and the old are vulnerable to displacement caused by recurring riverine and flash floods.

Changing patterns of rainfall and melting snow and ice are altering freshwater systems, affecting the quantity and quality of water available in the HKH region. Riverine and flash flood patterns in the HKH region will be further impacted by climate change, which in turn will influence flooding of settlements and infrastructure, heat-related deaths, and food and water shortages. The changes in temporal and spatial patterns of rainfall have consequences for runoff, surface and groundwater storage, and river flow regimes. HI-AWARE research indicates greater likelihood of extreme floods in the Indus, Ganges and Brahmaputra basins.

Water diversions in the upstream parts of river basin may lower the availability of water in the downstream region and may deprive the population living in that region from fully meeting their water needs. If this is the case, the upstream region is harvesting the benefit equivalent to the similar amount of loss incurred by the water deprived region. This results in a “zero net gain” at basin or sub-basin level, or a “zero-sum game” in terms of resource distribution and utilization. Zero-sum games are the opposite condition of win-win situations, where one player’s gain is the other’s loss. Consequently, larger socio-economic gain in the river basin is missed if zero sum game exists and water conflict arises.



Rivers, sediments and people

Riverbank management and capital dredging may enhance water carrying capacity and navigability of rivers for a short period of time. However, recurring sedimentation and braiding of the river is a huge basin level problem driven mostly by dynamic delta processes and human activities in the catchment. Riverbank management need not always involve large infrastructure. Small to medium infrastructure with soft solutions need to be explored along with larger interventions. Communities could be engaged in small to medium scale riverbank management efforts. Small spurs or other such appropriate infrastructure and participatory afforestation along riverbanks and chars may be an effective and sustainable option for living with floods, in combination with elevated prefabricated houses tested by HI-AWARE and livelihood options preferred by the communities.

Water follows no boundary

Rivers do not follow human-made political borders and flow freely across countries. In terms of hydrology, one can argue that the rivers of South Asia bind the states and societies into a composite whole: Nepal and India share the Mahakali-Ganges Basin; India and Pakistan share the Indus Basin; Bangladesh, China and India share Brahmaputra, while Bangladesh and India share the Ganges and Meghna basins. However, political relations among countries revolve around riparian positions, people's perceptions and government priorities. Treaties and agreements on sharing of river waters are often made with strategic priorities without addressing the views and needs of dependent communities particularly women, children, elderly and disabled. Therefore, communities are largely ignored in river management and transboundary water governance, resulting in more vulnerability.

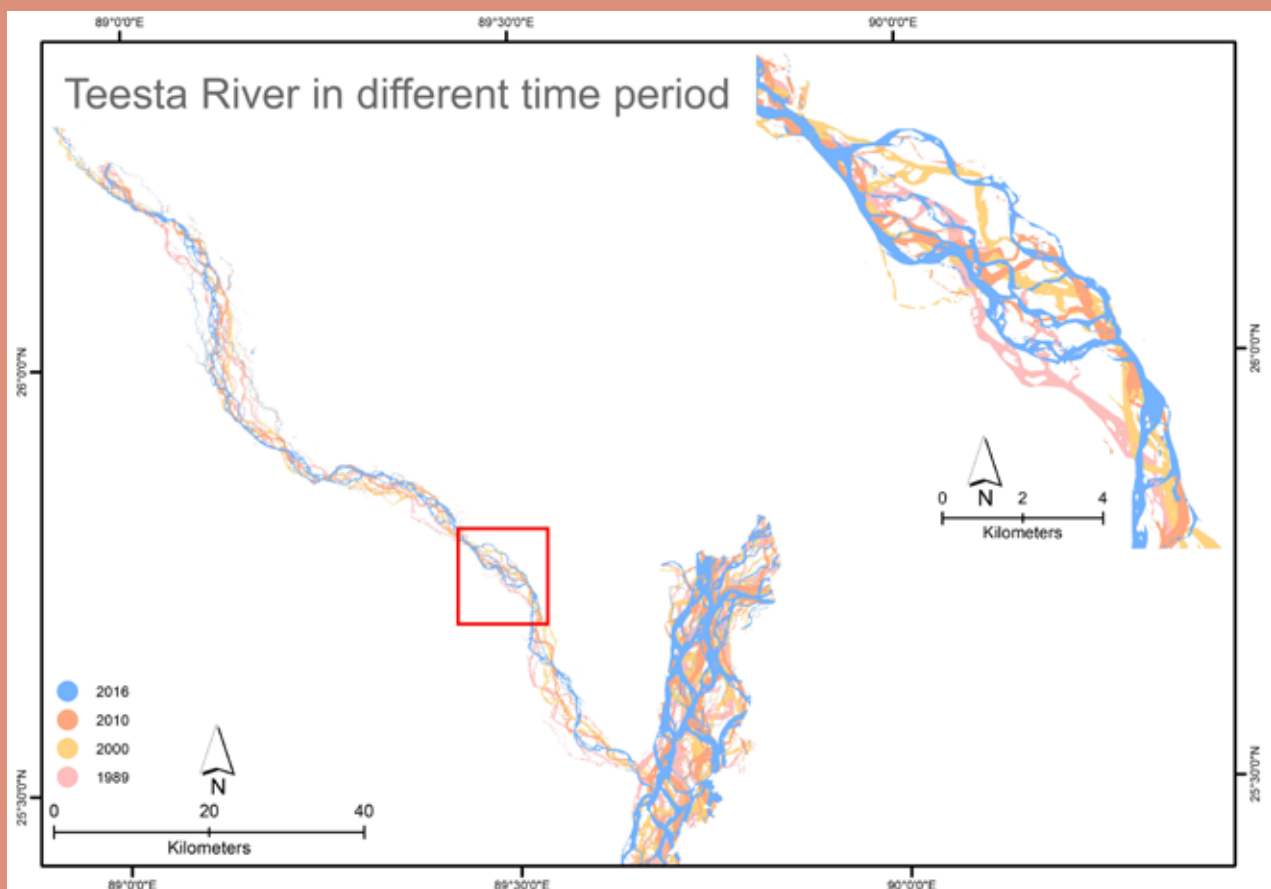
Major Findings

A holistic basin level river management approach is needed to minimise the risks and vulnerabilities due to floods, drought and riverbank erosion. The current institutional framework for river basin management does not fully address the needs of communities and ecosystems in the floodplains. Therefore, it should be recognised that floodplains of the rivers in the HKH are characterized by conflicting scenarios of water availability, demand and use. High population density and extreme poverty makes people vulnerable in various ways and climate change induced extreme events exacerbate the vulnerabilities of people due to the unique geographical position of the HKH region.

Policy Action

Conventional approaches (of structural solutions) to mitigate the risks of floods, drought and riverbank erosion have not been able to adequately address these vulnerabilities. A softer approach using participatory methods and involving communities in small to medium scale riverbank management efforts may be able resolve the problem better. A mix of appropriate hard and soft solutions specific to the ecosystem may be effective and sustainable.

Regional cooperation needs to be enhanced to accommodate the solutions. Countries in the HKH region have their own national and sub-national policies which often influence or govern transboundary river management. For example, in India, it is the states rather than the central government that have primary jurisdiction over the management of water within state borders. This requires that the governments of Nepal, Bhutan and Bangladesh should negotiate (formal and informal discussions on mutual interests) with Indian states in addition to the central government. This adds an extra layer of politics, bureaucracy and difficulty to transboundary water governance in the HKH region. Therefore, there is an urgent need to harmonise policies of countries in the HKH region and any large infrastructure planning may be discussed in a common platform. However, it requires strong political will and policy intervention from the highest policy making bodies.



Conclusion

Riverine and flash flood patterns in the HKH region will be impacted by climate change resulting in floods, heat-related deaths, and food and water shortages. HI-AWARE research indicates greater likelihood of extreme floods in the Indus, Ganges and Brahmaputra basins.

The current institutional framework for river management does not fully address the needs of communities residing in the floodplains and river islands of the Indus, Ganges and Brahmaputra (IGB) river basins. A holistic basin level river management approach is needed to minimise the risks and vulnerabilities due to floods, drought and riverbank erosion and to address the needs of communities and ecosystems in the floodplains. Further, there is a need for regional cooperation for transboundary river management.

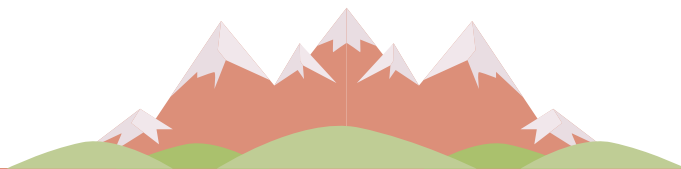
Only capital dredging, riverbank management and river training in the downstream parts of a river cannot solve the problem of floods and erosion. Communities should be engaged in small to medium scale riverbank management efforts. At the same time, Climate and Flood Resilient (CFR) housing and other low-cost innovations for water, sanitation and energy can equip communities to become resilient to extreme and frequent riverine and flash floods.

This brief is based on the following HI-AWARE publications:

Arfanuzzaman, M., & Syed, M.A., (2017), Environment, Development and Sustainability; Water Demand and Ecosystem Nexus in the Transboundary River Basin: A Zero-sum Game, Environment, Development and Sustainability (2017). doi:10.1007/s10668-017-9915-y;

HI-AWARE, (2016), Proceedings of the 1st CCAPS Conference, ICIMOD, Kathmandu.

Wijngaard RR, Lutz AF, Nepal S, Khanal S, Pradhananga S, Shrestha AB, et al. (2017) Future changes in hydro-climatic extremes in the Upper Indus, Ganges, and Brahmaputra River basins. PLoS ONE 12(12): e0190224. <https://doi.org/10.1371/journal.pone.0190224>



Contributors: Md. Abu Syed¹ and Eklavya Prasad²

For more information, please contact Md. Abyu Syed at mabusyed@gmail.com

¹ Bangladesh Centre for Advanced Studies, Bangladesh

² Megh Pyne Abhiyan, India



© HI-AWARE 2018
 Himalayan Adaptation, Water and Resilience
 (HI-AWARE) Research
 c/o ICIMOD
 GPO Box 3226, Kathmandu, Nepal
 Tel +977 1 5275222
 Email: hi-aware@icimod.org; Web: www.hi-aware.org

Consortium
Members



ICIMOD



WAGENINGEN
UNIVERSITY & RESEARCH

Strategic
Partners



FutureWater
Research and consultancy for a
sustainable future of our water resources



THE MOUNTAIN INSTITUTE INDIA
CONSERVATION. CULTURE. COMMUNITY.