



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.

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Key Message

Actors and contexts drive adaptation choices. HI-AWARE has used multi-stakeholder processes to prioritise context specific adaptation options, allowing for holistic planning around persistent risks in study basins of the Hindu Kush Himalayan (HKH) region. These prioritised options include, among others, water storage, high efficiency irrigation systems (HEIS), mixed cropping, preservation of local seeds (seed banking) and knowledge on local techniques for cardamom cultivation, and early-warning systems, in the Indus, Gandaki, Lower Teesta, Upper Teesta, and Upper Ganga river basins respectively.



Introduction

Social vulnerability, which varies across stakeholder groups and scales, intersects with changing climatic trends, leading to precipitated impacts that are non-linear, differentiated, and magnified through the prevailing socioeconomic conditions. Accounting for these variations in regional adaptation planning is critical to addressing the vulnerabilities of the most vulnerable and underprivileged. Adaptation planning also needs to incorporate differing priorities across stakeholders, and ensure that varied worldviews embedded in different realms of disciplinary as well as traditional/indigenous knowledge systems are included.

Multi-stakeholder processes can help in enabling an atmosphere of inclusivity that would address the above concerns. Moreover, such processes can also ensure the robustness of adaptation interventions in the long run. Such planning helps identify priority options based on good practices on the one hand, and ensure incorporation of expert and experiential knowledge on the other, making planning robust and encompassing.

HI-AWARE has, through the help of multiple participatory tools employed in various study basins of the Hindu Kush Himalayan Region, identified adaptation strategies that reflect the collective priorities of different stakeholders in the regions. First, broad adaptation actions were identified through an extensive literature review. This was succeeded by understanding context-specific criteria that could help evaluate these adaptation actions. These included efficiency, sustainability, and political and economic feasibility, among others. Understanding the effectiveness and need for these adaptation options vis-à-vis identified criteria aided in assimilating and coping with differing preferences among stakeholders.



Major Findings

Our context driven stakeholder engagements have helped identify the following needs and responses:

Indus Basin

Context: The Indus Basin where HI-AWARE works comprises of mountain, mid-hills and plain areas. The geographical location of each area has faced extreme events in a changing climate. Events like glacial lake outburst floods, flash floods and reducing snow are on rise in Upper Indus Basin, resulting in damage to infrastructure and fruit crops production. Changing weather pattern and erratic rainfall is perceived in the mid hills of Pothohar plateau as significantly impacting the yield of rainfed wheat, maize and millet crops. Whereas increasing frequency and intensity of droughts, floods, fog, smog and erratic rains in greater Indus plain has led to groundwater exploitation and decrease in crop yields.

Pressing needs

Enhancing water storage (large, medium and small) dams to meet water shortages for irrigation throughout the year and to reduce groundwater pumping in the lower plains;
Solar based sprinkler and drip irrigation systems (HEIS) to supplement irrigation for rainfed crops in midhill region and adoption of HEIS in plain areas can bridge the water availability and demand gap;
High value agriculture (greenhouse tunnels for vegetables) to sustain weather shocks and training and raising awareness of communities at pilot sites to adopt new technologies like solar pumping and efficient irrigation systems to help in enhancing crop productivity.

Gandaki Basin

Context: The Gandaki basin where HI-AWARE works comprises of mountain, mid-hills and the plain areas. The geographical location of each area has faced extreme events in a changing climate. Erratic rainfall is common in the study areas where drought seems to be a common problem. In the high altitude region, diminishing snowfall has led to a decrease in crops like millet.

Pressing needs:

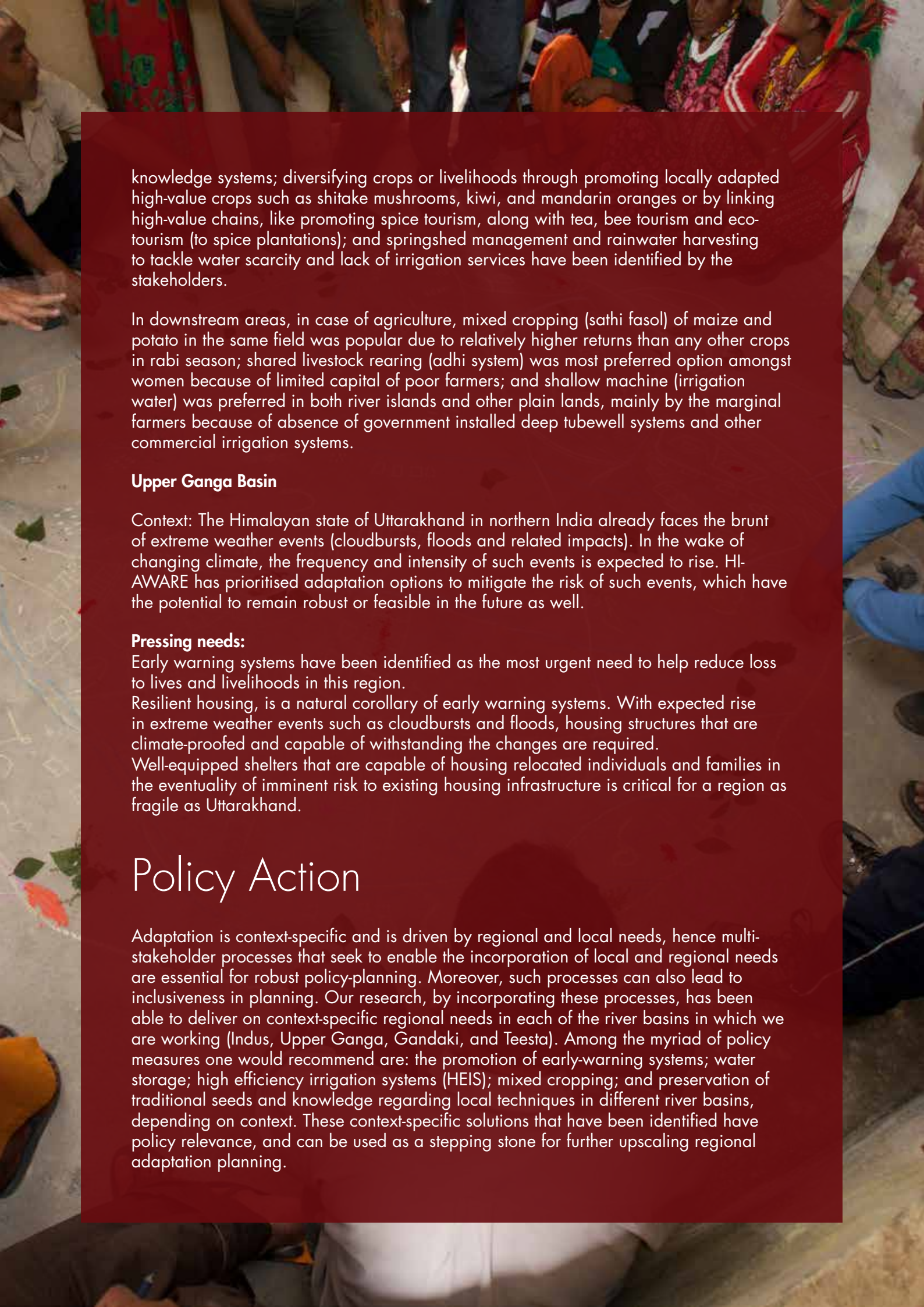
Water storage/irrigation schemes has been identified as an adaptation measure to fight the negative impacts that the communities are facing;
Collection centres for agricultural products could be helpful in improving the livelihood of the communities. Without easy access to public infrastructure the agriculture market has not been able to grow in the rural areas.
Flood resilient infrastructure could help in building resilience of the downstream communities of Chitwan (Nepal) and Bihar (India). These could include elevated houses, safe shelters and early warning systems.

Teesta Basin

Context: Teesta basin is home to around 30 million people, 2% in Sikkim, 27% in West Bengal, and 71% in northwest Bangladesh, of which 78% are rural and 22% urban. Sikkim (upstream and midstream of Teesta), is reliant on agroecosystems as a source of livelihood. The plains in Teesta face recurrent flash and seasonal floods, riverbank erosion, heat and cold waves, thunderstorm and hailstorm each year.

Pressing needs:

In upstream and midstream areas, preservation of local seeds (seed bank) and enhancing knowledge on local techniques for cardamom cultivation through increased participation and integration of



knowledge systems; diversifying crops or livelihoods through promoting locally adapted high-value crops such as shitake mushrooms, kiwi, and mandarin oranges or by linking high-value chains, like promoting spice tourism, along with tea, bee tourism and eco-tourism (to spice plantations); and springshed management and rainwater harvesting to tackle water scarcity and lack of irrigation services have been identified by the stakeholders.

In downstream areas, in case of agriculture, mixed cropping (sathi fasol) of maize and potato in the same field was popular due to relatively higher returns than any other crops in rabi season; shared livestock rearing (adhi system) was most preferred option amongst women because of limited capital of poor farmers; and shallow machine (irrigation water) was preferred in both river islands and other plain lands, mainly by the marginal farmers because of absence of government installed deep tubewell systems and other commercial irrigation systems.

Upper Ganga Basin

Context: The Himalayan state of Uttarakhand in northern India already faces the brunt of extreme weather events (cloudbursts, floods and related impacts). In the wake of changing climate, the frequency and intensity of such events is expected to rise. HI-AWARE has prioritised adaptation options to mitigate the risk of such events, which have the potential to remain robust or feasible in the future as well.

Pressing needs:

Early warning systems have been identified as the most urgent need to help reduce loss to lives and livelihoods in this region.

Resilient housing, is a natural corollary of early warning systems. With expected rise in extreme weather events such as cloudbursts and floods, housing structures that are climate-proofed and capable of withstanding the changes are required.

Well-equipped shelters that are capable of housing relocated individuals and families in the eventuality of imminent risk to existing housing infrastructure is critical for a region as fragile as Uttarakhand.

Policy Action

Adaptation is context-specific and is driven by regional and local needs, hence multi-stakeholder processes that seek to enable the incorporation of local and regional needs are essential for robust policy-planning. Moreover, such processes can also lead to inclusiveness in planning. Our research, by incorporating these processes, has been able to deliver on context-specific regional needs in each of the river basins in which we are working (Indus, Upper Ganga, Gandaki, and Teesta). Among the myriad of policy measures one would recommend are: the promotion of early-warning systems; water storage; high efficiency irrigation systems (HEIS); mixed cropping; and preservation of traditional seeds and knowledge regarding local techniques in different river basins, depending on context. These context-specific solutions that have been identified have policy relevance, and can be used as a stepping stone for further upscaling regional adaptation planning.

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

Goodrich, C.G, Udas, P.B., Prakash, A (eds) (Forthcoming 2018) Conceptualizing and Contextualizing Gendered Vulnerabilities to Climate Variability in the Hindu Kush Himalayan Region, Special Issue, Environment and Development, Elsevier

Udas, P. B., Prakash, A., & Goodrich, C. G. (2018). Gendered Vulnerabilities in Diaras. Economic & Political Weekly, 53(17), 47.

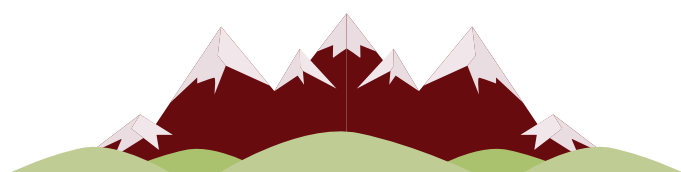
Goodrich, C. G., & Namchu, C. V. (Forthcoming 2018). Implications of local political dynamics on gender vulnerabilities in the face of climate change In A. Hans, N. Rao, A. Prakash & A. Patel (Eds.), EnGendering Climate Change: Learnings from South Asia Routledge

Vani Rijhwani, Roshan Rathod, Mini Govindan, Divya Sharma (Forthcoming 2018): Climate Change and Gender Dynamics: Mapping the Linkages in the Upper Ganga Basin in Uttarakhand, India In A. Hans, N. Rao, A. Prakash & A. Patel (Eds.), EnGendering Climate Change: Learnings from South Asia Routledge

Zakia Naznin, Jannatul Ferdous, Musharrat Mehejabeen and Dwijen Mallick (Forthcoming, 2018): Gendered Vulnerability to Climate Change in Teesta Floodplains in Bangladesh: The Role of Social Drivers In A. Hans, N. Rao, A. Prakash & A. Patel (Eds.), EnGendering Climate Change: Learnings from South Asia Routledge

Saqib Shakeel Abbasi, Nusrat Habib, Muhammad Zubair Anwar (Forthcoming, 2018): Climate Change Vulnerabilities and Role of Women towards Resilience in Indus In A. Hans, N. Rao, A. Prakash & A. Patel (Eds.), EnGendering Climate Change: Learnings from South Asia Routledge

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