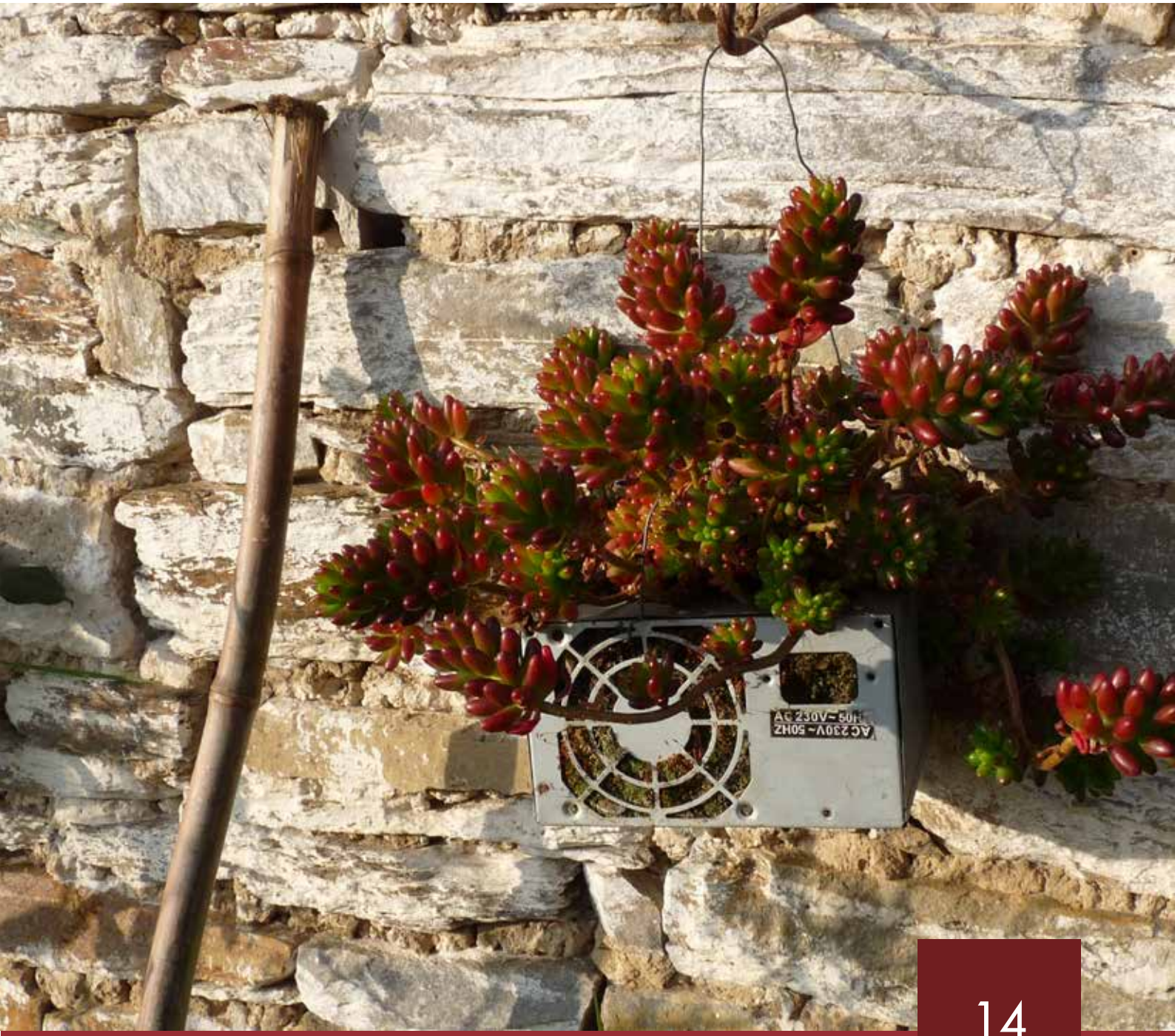
CARIAA
Collaborative Adaptation Research Initiative in Africa and Asia

HI-AWARE



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Adapt Before It's Too Late

Adaptation pathways in the Hindu Kush Himalaya

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.

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

Key Message

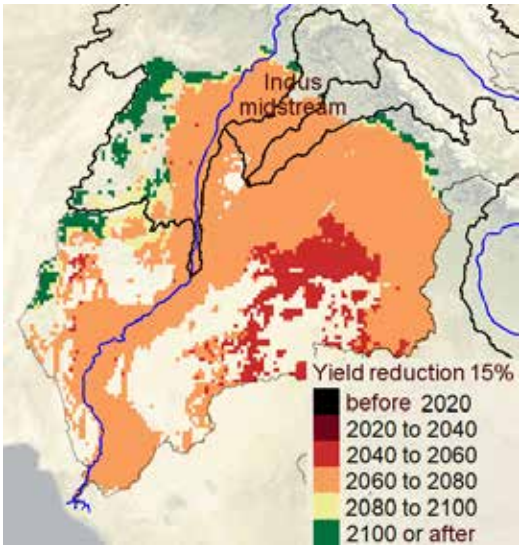
Adaptation requires careful consideration of what to do when in order to sustain development efforts over time.

Assessment of when people are most vulnerable guides adaptation to offer fit-for-purpose solutions to people in different socio-cultural contexts. Critical climate stress moments are already experienced across different sectors in the Hindu Kush Himalaya. People are coping, yet not prepared enough for future changes in climate. For timely adaptation it is crucial to assess when turning points for decision-making are reached.

HI-AWARE started the development of adaptation pathways in the Hindu Kush Himalaya region. Making adaptation pathways helps to assess whether development is sustainable within the context of climate change and when adaptations are needed. In order for development plans to be climate-resilient they need to include choices and actions that reduce climate change impacts to sustain development efforts over time. Participatory development of adaptation pathways helps to prepare for change and facilitate the transformation needed for adaptation.

Introduction

Development in the Hindu Kush Himalaya region is occurring against a backdrop of high vulnerability to climate change. Vulnerable communities are struggling to sustain their livelihoods. Strategies to counter risks and build on opportunities must take into account both short and long-term time horizons.

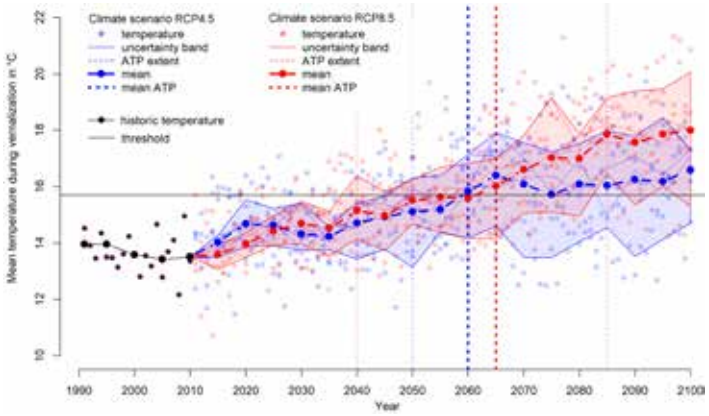


When to expect yield reduction of irrigated wheat in the Indus Basin (Mean yields for five climate models under high climate change scenario (RCP 8.5))

HI-AWARE has piloted decision-making approaches that explicitly take short and long-term developments into account. In particular HI-AWARE assessed critical climate stress moments, adaptation turning points and adaptation pathways. 'Critical climate stress moments' are those moments when households, communities, and the livelihood systems they depend on, are especially vulnerable to climate and weather-related risks and hazards. Their identification sheds light on the critical climate conditions, which people in the case basins experience. Together with literature review and a model study, this was used to show when decisive impacts of climate change are reached and when it is imperative to act. HI-AWARE then combined promising adaptation measures into adaptation pathways to reduce vulnerabilities and eliminate or postpone adaptation turning points over time. Adaptation pathways are a set of measures which can be implemented progressively, depending on how the future unfolds.

Findings

Indus Basin – Food security



How winter temperatures are becoming too high for vernalisation of wheat in the Indus (midstream site)

After 2050, climate change is projected to put wheat-based food security in the Indus Basin at risk, as rising temperatures suppress wheat yields in large parts of Punjab. Without adequate measures, by 2100 most of Pakistan as well as parts of India are expected to be affected. Already, too little rain after sowing and early rains during harvesting challenge winter wheat production. Looking towards the future we find that precipitation trends are not so clear; instead the real concern stems from high temperatures in winter, hindering vernalisation.

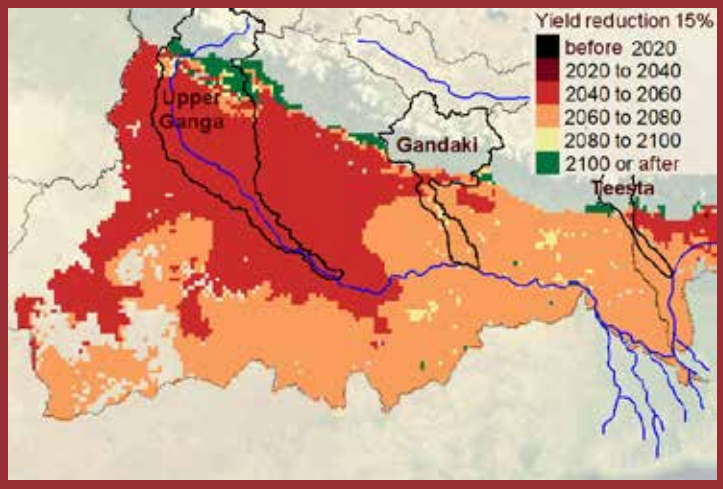
First, South Punjab will be affected, an d by the end of the century North Punjab is also expected to suffer. So, relying on production in the Northern, higher areas can help, but will also run into climate limitations. Importantly, in a high climate change scenario (RCP8.5) wheat production in both Pakistan and India is gravely affected, with temperatures above the lethal limit for wheat. This gives us some 30 years to rethink wheat-based food security. Alternative technologies can help sustain wheat production, as can breeding crop cultivars resistant to temperature and drought shocks. Supporting alternative crops will need to be given precedence over compensating losses in existing crops.

Upper Ganga Basin – Water security

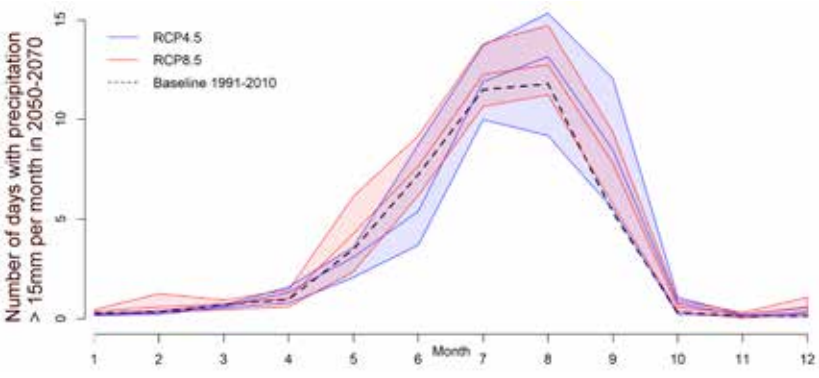
Population living in the mid elevations of Upper Ganga faces difficulties in accessing water. While demand increased, the supply was affected by reduced discharge rates and drying up of water sources, starting in the 1980s. Turning points were found wherein demands far exceed supply and current policies and measures do not suffice for adequate protection of water sources. Interventions are planned over time to assist in improving water availability. Protecting traditional water sources and springshed management were the options that received the highest priority in the stakeholder consultations. Targeted interventions, if taken in time, can sustain spring discharge, making sure that sources of water are protected and available to communities over longer durations.

Gandaki River Basin – Climate resilient development

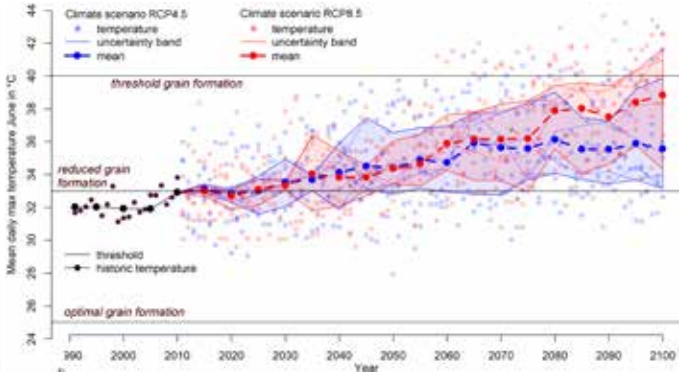
In the upstream and mid-stream reaches of the Gandaki Basin, after the 2015 earthquake, there is a window of opportunity for integrating reconstruction and climate resilient development. The primary focus of policy makers is on rebuilding. Adaptation pathways generated with communities focus more on current needs and climate variability such as increased dry spells, wind storms and increasing heat waves. Changing snowfall and rainfall patterns have already caused communities to alter livelihood activities and cropping patterns. In the downstream reaches, disasters, mainly floods, call for appropriate adaptation strategies. A good example are the EcoSan toilets, which HI-AWARE piloted in Bihar. Climatic conditions are projected to become less favorable for staple crops, such as rice, maize, wheat and millet.



When to expect yield reductions of irrigated rice in the Upper Ganga, Gandaki and Teesta Basins (mean yields for five climate models under a high climate change scenario (RCP 8.5))



Variability in rainfall in April and May and increased rain events at the end of the monsoon will intensify already experienced critical moments for rice production in the Gandaki Basin (Nuwakot site, Nepal). The climate conditions remain suitable for cardamom and selected forest products.



How June temperatures are entering the critical range for rice production in the Gandaki (Nuwakot site)

Teesta Basin – Recurring flooding and erosion

The Teesta Basin (India and Bangladesh) is challenged by both floods and periods of water shortage. Recurring sedimentation and river braiding is a significant basin level problem mostly driven by dynamic delta processes and human activities such as dam building and river bank protection. Chars (shoal islands) are formed due to landslides in the upstream areas and sediment processes. Already seasonal flood events and erosion disrupt the meticulously timed annual cycles of planting and harvesting in the floodplains and forces people to resettle frequently. For the future, irrigation systems are expected to experience water shortage and disruption of optimal operation, leading to changes in human health, wealth and food security. Climate resilient development pathways include location specific small to medium scale riverbank management efforts, such as participatory afforestation, prefabricated flood-proof housing solution along with structural measures. Pathways have to be developed in an overall institutional framework, from national down to community through subnational levels, to ensure that adaptation is more than merely handing down flooding and erosion issues to people living further downstream.

Policy Action

Climate change adaptation requires careful planning of when to do what. Climate-resilient development pathways are recommended to map choices and actions that reduce climate change and its impacts over time. Pathways also need to include actions to assure that adaptation can be implemented and sustained.

Given that the timing of climate change impacts differs across the HKH, there is substantial scope for exchange of practices and experience between regions.

We recommend integrating the future visions and pathways of different actor groups and to facilitate communities to have agency in anticipating regional development visions in order not to lose connection between county aspirations and community voices.

Conclusion

HI-AWARE has looked for solutions to problems that, in part, will occur in the long term. Climate change challenges current sustainable development and is a severe threat to sustaining development in the future. HI-AWARE recognizes that it is difficult and in many cases not advisable to already set down measures for the next 50-100 years. Solutions should be allowed to develop along with new insights and circumstances. That said, it is important to look ahead, so that solutions can be implemented when they are needed, and, in the short term, to take the first steps that are worthwhile in every scenario (no regret) and add to climate resilience.

HI-AWARE delivered 1) Climate-resilient development pathways in selected HI-AWARE study sites, 2) Guidance on how adaptation pathways development can help to plan and implement activities in an integral vision of development and climate change resilience. HI-AWARE confirmed that actions can be pursued now that will move us toward climate-resilient pathways while at the same time helping to improve livelihoods, and responsible environmental management. HI-AWARE encouraged an integral approach to adaptation planning to reduce the risk of over- or underinvestment in the future. The timing of adaptation becomes particularly relevant in the context of the already existing implementation deficit and development objectives. Unless timely action is taken recurrently, the adaptation deficit will increasing along with climate change. The participatory development of adaptation pathways helps communities to identify options available for navigating the future.

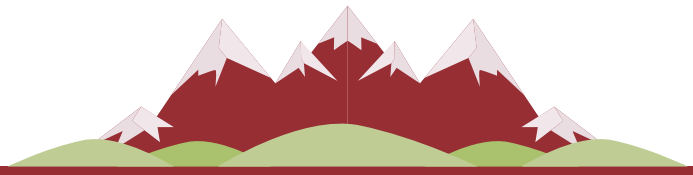
This brief is based on the following HI-AWARE publications:

Groot, A., S. Werners, B. Regmi, H. Biemans, G. Gioli, T. Hassan, N. Mamnun, H. Shah, B. Ahmad, C. Siderius, T. Singh, S. Bhadwal and P. Wester (2017) Critical Climate-Stress Moments and their Assessment in the Hindu Kush Himalaya: Conceptualization and assessment methods. HI-AWARE Working Paper 10. HI-AWARE, Kathmandu, Nepal.

Werners, S. E., S. Bhadwal, B. Ahmad, G. Gioli, B. Regmi, A. Pandey, N. Mamnun, T. Hassan, N. Varma and B. A. Saeed (2018) Identifying and analysing adaptation turning points in the Hindu Kush Himalayan region. HI-AWARE Working Paper 18. HI-AWARE, Kathmandu, Nepal.

Werners, S. E., S. Bhadwal, A. Pandey, A. Prakash, P. Wester, N. Mamnun, T. Hassan, S. Ishaq, B. Ahmad and Z. H. Dahri (2018) Towards climate-resilient development pathways for the people in the Hindu Kush Himalayan region. HI-AWARE Working Paper 19. HI-AWARE, Kathmandu, Nepal.

Papers on adaptation pathway development in each of the HI-AWARE study basins will appear in a special issue of Environmental Science & Policy (2019).



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