

River Basins Regional Programme

FOR MOUNTAINS AND PEOPLE



Improved water resource management in mountain areas is essential for the sustainable development of the Hindu Kush Himalayan (HKH) region and countries downstream. The HKH region extends 3,500 km over all or part of eight countries, from Afghanistan in the west to Myanmar in the east. It is the source of ten large Asian river systems – the Amu Darya, Indus, Ganges, Brahmaputra (Yarlungtsanpo), Irrawaddy, Salween (Nu), Mekong (Lancang), Yangtze (Jinsha), Yellow River (Huanghe), and Tarim (Dayan) – and provides water, ecosystem services, and the basis for livelihoods to a population of around 211 million people. These rivers also provide water to 1.3 billion people, a fifth of the world's population.

The river basin approach strikes a balance between the existing natural functions of the river system and societal expectations for livelihoods, industry, recreation, nature management, and agriculture. It aims to maximize the economic and social benefits derived from water resources in an equitable manner while conserving and, where necessary, restoring freshwater ecosystems. Over the past decade, ICIMOD has worked at the river basin level on flood-related topics (mitigation, preparedness, risk management, and vulnerability mapping); extended activities will encompass conservation, management, and the development of water, land, and related resources across sectors.

ICIMOD's River Basins Regional Programme focuses on multidisciplinary integrated resource management approaches that address climate change and variability, cryosphere dynamics, the hydrological regime and water availability, water-related risk management, mountain community water management, and vulnerability and adaptation. The programme emphasizes improved understanding of upstream-downstream linkages and the links between natural resources and livelihoods. The current focus is on developing programmes for the Koshi and Indus river basins, with more to be developed in the future. Key outcomes will include improved estimates of future water availability and its impacts, and adaptive water management strategies at basin and community levels.

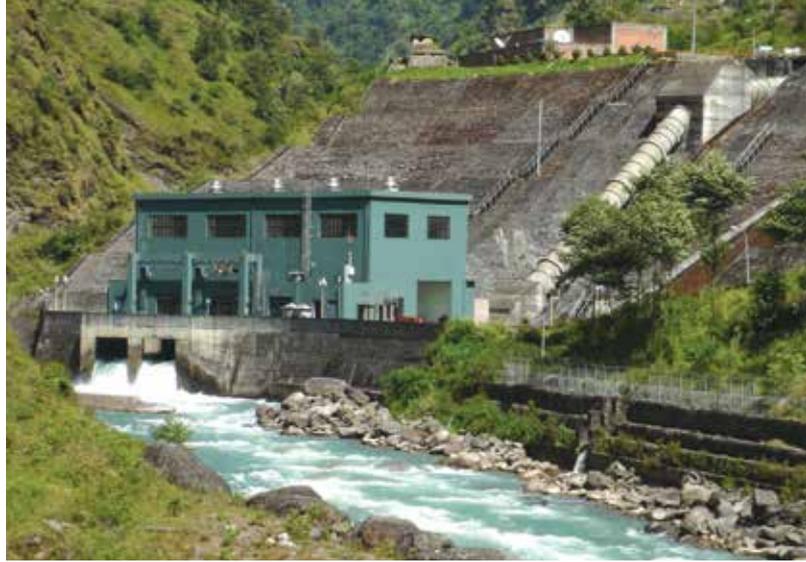
River basins of the Hindu Kush Himalayas



Initiatives

Energy Portfolio

Although the Hindu Kush Himalayas are often called the water towers of Asia, the region suffers from acute energy shortages and water scarcity. Per capita energy consumption in some countries of the region is among the lowest in the world. It is then not surprising that the quest for energy security trails not far behind the quest for water security in the HKH. The current activities in the Energy Portfolio are concerned with improving access to energy in rural areas, mainly through off-grid technological options, and sustainable hydropower development, including assessing climate change impacts and promoting local benefit sharing and power exchange and trade for environmental sustainability. These are in addition to activities to develop baseline information on energy security in the region. Given the prime importance of hydropower in the HKH region, much of the Energy Portfolio looks into issue related to hydropower, as well as other sources such as solar



and wind. The ongoing research components focus on the current state of energy security in the region, off-grid technological options and policies to support rural communities, climate change, hydrological and GLOF risks and opportunities, and sustainable hydropower development, local benefit sharing from hydropower projects with mountain communities and challenges and opportunities for cross-border power exchange and trade in the region.

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Himalayan Adaptation, Water and Resilience (HI-AWARE) Research on Glacier and Snowpack Dependent River Basins for Improving Livelihoods

HI-AWARE, part of the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA), focuses on research and pilot interventions, capacity building and policy engagement on climate resilience and adaptation in the Indus, Ganges, and Brahmaputra river basins in the HKH region. HI-AWARE seeks to contribute to enhancing climate resilience and the adaptive capacities of vulnerable populations living in these river basins using findings from research and pilots to influence policy and practice that improves their livelihoods. HI-AWARE is implementing three Work Packages – i) Knowledge

Generation, ii) Research into Use, and ii) Strengthening Expertise – in 12 study sites in the Indus, Upper Ganga, Gandaki and Teesta river basins. Knowledge Generation focuses on research on geophysical, socioeconomic, gender and governance drivers leading to climate vulnerability; and critical moments, adaptation turning points, and adaptation pathways. Research into Use focuses on uptake of generated knowledge to influence policy and practice for impact on the ground. Strengthening Expertise focuses on enhancing the capacity of young students from the region to conduct research on climate resilience and adaptation.

In addition to conducting research on water, energy, food security; human health; human habitat; and water-induced hazards (floods, heat spells, and droughts, etc.), HI-AWARE is testing promising adaptation measures in sites in Bangladesh, India, Nepal, and Pakistan, and designing adaptation pathways for out-scaling and up-scaling.

HI-AWARE is supported by the UK's Department for International Development (DFID) and Canada's International Development Research Centre (IDRC)

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Hydrological Cycle Observation System

Floods are major natural disasters that aggravate poverty in the Ganges-Brahmaputra-Meghna (GBM) and Indus river basins – home to over 600 million people and almost half of the world's poor. The establishment of a Regional Flood Information System in the Hindu Kush Himalayan Region (HKH-HYCOS) project under the global framework of World Meteorological Organisation's WHYCOS programme promotes the timely exchange of flood data and information for the reduction of flood vulnerability within and among the participating countries through established and agreed upon platforms. The initiative contributes to minimize the loss of lives and livelihoods by reducing flood vulnerability in the HKH region, with specific reference to the GBM and Indus river basins, and strengthening the framework of cooperation for sharing regional flood data and information among participating countries.

With support from the Government of Finland, the project has upgraded flood observation networks in selected river basins in the participating countries and established regional and national flood information systems to share real-time data and information and increase lead time. The project is enhancing the technical capacity of partners on flood forecasting and communication with end users and has developed a regional flood outlook model. It has also developed a full-scale, fully integrated regional project as planned and agreed on among participating countries. HYCOS is

Indus Basin Initiative

The Indus basin is shared by Afghanistan, China, India, and Pakistan. The basin ranks among the most important basins of the world in terms of human dependence. The river supports a population of about 215 million people, whose livelihoods are directly or indirectly dependent on the river. The basin is already water scarce, yet the demand for water is growing rapidly, putting further stress on the resource. Climate change is likely to exacerbate the problem. While there are more economic activities in the lower part of the basin, climate is likely the driver of change in the upper part above the timberline, affecting upstream and downstream.

Rainfall as a short-term provider of runoff and melting snow and ice as long-term inputs to run-off are theoretically well understood; however, knowledge of the seasonal patterns of rainfall, spatial dynamics of seasonal snow cover, and overall volume of the ice-reservoir in the HKH region is heterogeneous, with some



designed to provide immediate and full ownership of the project to the participating countries. It is being executed by the relevant national institutions, and ICIMOD has an implementing and coordinating role. It is being implemented in the following countries through various partners: Bangladesh (Bangladesh Water Development Board [BWDB] and Bangladesh Meteorological Department [BMD]); Bhutan (Department of Hydromet Services [DHMS]); Nepal (Department of Hydrology and Meteorology [DHM]); and Pakistan (Pakistan Meteorological Department [PMD], Water and Power Development Authority [WAPDA] and Federal Flood Commission [FFC]).

Observers: China (China Meteorological Administration [CMA] and Bureau of Hydrology); India (Central Water Commission [CWC] and India Meteorological Department [IMD])

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areas well documented and others not. The Indus Basin Initiative was initiated to support knowledge development and influence policy for better management of water resources and to facilitate adaptation measures, oftentimes through trans-boundary collaboration. The



initiative seeks to improve understanding of climate trends and variability; the impact of climate change and associated changes in the cryosphere, cryo-hydrological regime, and the impact of hydrological change on agriculture and socioeconomic conditions of vulnerable communities downstream. The initiative will support the development of better strategies for gender-sensitive policies and adaptation options and strategic thinking and interventions leading to enhanced community resilience in the Indus basin. The initiative is building a network of institutions and individuals working in the Upper Indus Basin on climate, cryosphere, water, hazards and adaptation and is supporting collaboration

Koshi Basin Programme

In the Koshi basin, China, India, and Nepal are interconnected by a common river system. As the population in the region grows and the climate changes, reliable access to water becomes increasingly important. However, water supplies are erratic and are not distributed equally: water is abundant in the monsoon season, creating hazards, but scarce in the dry season. These circumstances demand well-planned water resources management, which is also fundamental to the socioeconomic and environmental health of the basin. Water does not follow international boundaries, and solutions to emerging challenges lie in cooperative management. However, current approaches are often fragmented and uncoordinated, which leads to the inefficient management of transboundary water resources.

One of the biggest challenges in bringing countries together for transboundary management has been in demonstrating that everyone can benefit in real ways. With support from the Australian Government, ICIMOD's Koshi Basin Programme (KBP) is seeking to change this by generating regionally coordinated knowledge on the effects of climate, monsoon, glacier and snow melt, and

among them. It promotes the development and sharing of scientific knowledge on climate, cryosphere and water availability in the basin. The initiative is currently piloting innovative community-based glacier monitoring and early warning systems and studying innovative agricultural water, energy, and hazard management measures in the Upper Indus Basin that will improve livelihoods. It is also working with regional partners to build their capacity in using tools to analyse water availability scenarios in cryosphere-dominated basins.

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land use on water regimes and sedimentation; frequency, magnitude, and exposure to water-induced hazards in response to climate, land use, and other change drivers; and the dependency level of local livelihoods on ecosystem services so as to ensure water security, improved water storage and efficient water use.

The programme's outcomes are varied and promising. KBP is helping communities to access up-to-date information on floods and droughts and also building technical capacities of national agencies to address landslide issues. Decision makers are able to understand the constraints that are keeping communities from fully adopting adaptation strategies, including limited financial resources, lack of technical knowledge, and lack of awareness about adaptation options, lack of collective action, unclear property rights, and the ineffective role of state agencies. Development planners and decision makers have access to tools that can analyse future water availability and demand. Several districts in India and Nepal are making water use decisions locally, learning to conserve water and attempting to transform water management considering the river basin paradigm.

In the coming years, KBP will continue to develop tools, technologies and knowledge to support improved technical dialogue and cooperation, and ultimately better integration of transboundary approaches to water management into water and ecosystem policies, institutional capacities, and each country's overall development agenda. It will improve the wellbeing of local communities and promote the sustainable use of ecosystem goods and services.

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Peri-Urban Water Security in South Asia

Climate change and rapid urbanization are creating growing problems of water insecurity in the peri-urban areas of the cities of Khulna (Bangladesh), Kathmandu (Nepal), and Hyderabad and Gurgaon (India). Urbanization creates a demand for natural resources. Expanding cities often appropriate these resources from peri-urban areas, for instance by pumping groundwater from outside the city and selling it to city residents. These and other developments, including climate change, threaten the livelihoods of peri-urban residents and also raise concerns about social differentiation and injustice. Earlier research shows an increasing incidence of conflicts over access to water, but also evidence of new forms of cooperation devised to overcome water insecurity. However, peri-urban areas receive very little academic and policy attention.

This project aims to improve the water security of communities in peri-urban areas in Bangladesh, India, and Nepal by enhancing their resilience to the effects of urbanization and climate change and by contributing to climate-smart water resource policies that take into account peri-urban areas. In the current stage of the

project, teams in the three countries are studying the local impacts of urbanization and climate change as experienced by peri-urban communities, water and climate change policies at various levels, and water-related conflict and cooperation. Stakeholder meetings and workshops with participation from politicians and policy makers, government agencies, NGOs, local communities, and scientists have been held in all three countries to get input, discuss research priorities, and develop ideas for development and capacity building. Scoping studies have been finalized in all countries, on the basis of which choices for selection and location of further project activities in the domains of knowledge, development, and capacity building are being made. As the project develops, knowledge on conflict and cooperation in the management of peri-urban water insecurity will be used to sensitize state and non-state actors, and networks among peri-urban scholars, development practitioners, and policy makers will be strengthened.

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Water Land and Ecosystems

Farmers in the Hindu Kush Himalayas face economic and institutional water scarcity in areas where water is plentiful, but inaccessible. The inaccessibility is caused by a lack of rural electrification or irrigation infrastructure in the plains and because springs are increasingly drying up in the Himalayan mid-hills.

With support from the CGIAR Research Program on Water Land and Ecosystems (WLE), ICIMOD is leading the initiative on 'Reviving springs and providing access to solar powered irrigation pumps through community-based water use planning: Multiple approaches to solving agricultural water problems in the mid-hills and Terai in India and Nepal'. The goal of this project is to ensure affordable and sustainable access to drinking water to in the mid-hills of Nepal and Uttarakhand in India and to agricultural water in Terai Nepal.

The initiative aims to test two approaches to addressing water insecurity in mid-hills and plains of Nepal and India. The first is reviving springs in the mid-hills of Nepal and Uttarakhand through improved understanding of localized spring hydrogeology and appropriate technical interventions (e.g. springshed catchment area treatment, construction of recharge ponds) and policy interventions (e.g. linking welfare and poverty alleviation programmes

with work like pond excavation). The second approach being tested is the use of solar powered irrigation pumps (SPIPs) as a clean, climate resilient, and pro-poor solution to tackling issues related to the nexus between water, food, and energy security in the plains of Nepal. The programme will work to ensure that these tested strategies are incorporated into community-led water user master plans (WUMP). Through a consultative process, maps are created for existing water sources and detailed surveys are undertaken to assess the current conditions of springs within a given administrative boundary. After this, the community is asked to prioritize these water sources for further investment. This activity, currently being implemented in Nepal by Helvetas, will be piloted in Uttarakhand, India, for the first time through the programme.

The initiative has a strong gender focus, and aims to improve access to drinking water for women tasked with gathering water in the hills. It will do this by targeting at least 30% of the SPIPs at women and improving understanding of the policies and institutional frameworks required to support small female farmers in technology adoption.

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