# Elevating river basin governance and cooperation in the HKH region

SUMMARY REPORT III
INDUS RIVER BASIN

AITHER IFSD Institute for Study & Development Worldwide eWater ICIMOD

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**About**
This report was prepared by Aither, eWater, and the Institute for Study & Development Worldwide (IFSD), for the Australian Water Partnership (AWP). It contributes to a body of work developed through a collaboration between the AWP and the International Centre for Integrated Mountain Development (ICIMOD).

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## Contents

# About this report

In 2019, the Australian Water Partnership (AWP), an entity funded by the Australian Department of Foreign Affairs and Trade (DFAT), Australian Government and managed by eWater Ltd, and the International Centre for Integrated Mountain Development (ICIMOD) signed a memorandum of understanding (MoU) aimed at strengthening bilateral water cooperation between Australia and countries of the Hindu Kush Himalaya (HKH) region (Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan). The MoU supported engagements directed at analysing challenges to, and opportunities for basin-wide management of water resources across three focus basins: the Indus, Yarlung Tsangpo-Siang-Brahmaputra-Jamuna (henceforth referred to as 'Brahmaputra'), and the Ganges. This included analyses of issues pertaining to gender equity, disability, and social inclusion (GEDSI), upstream–downstream governance arrangements, data and knowledge availability and sharing, and climate change resilience and adaptation. It resulted in high-level recommendations based on the available literature and global best practices for strengthening basin-wide cooperation. In a subsequent phase, the high-level recommendations were further tested and advanced through Knowledge Exchange and Dialogue sessions for each focus basin, hosted by AWP and ICIMOD, and including relevant stakeholders from across the basins. This report draws on the Knowledge Exchange and Dialogue session for the Indus. It documents the context and identifies challenges and opportunities for managing the water resources of the Indus River Basin as developed through the phases of this engagement to date. It is a summarised version of a more detailed report by the same authors and under the ownership of ICIMOD.

Similar reports are available for the Brahmaputra and Ganges river basins.

# High-level recommendations

1. **Make climate change the top priority**: Climate change is the biggest challenge to future water, food, and energy security in the Indus Basin. A climate-resilient basin approach would assess the likelihood of impacts from climate-induced hazards (for example, flash floods), improve early warning systems, and work with riverbank communities to improve disaster risk reduction and adaptive infrastructure.

2. **Affirm food and water security as a high priority**: The waters of the Indus are critical to the food bowl regions of the Punjab in India and Pakistan as well as the Sindh in Pakistan. Climate change and the increasing demand for water are impacting the supply of surface water for irrigation, increasing the dependence on groundwater. Conjunctive management of surface water and groundwater is increasingly critical for the Indus Basin.

3. **Develop a regional water governance framework**: There is no multilateral or regional governance framework for water in the Indus Basin. The Indus Waters Treaty 1960, signed by India and Pakistan in September 1960, is the only bilateral treaty. A regional framework would strengthen basin-scale management in the Indus and encourage the consideration of a wider range of issues in, and options for, water management.

4. **Encourage the adoption of common approaches and tools**: International experience has shown the value of consultation between technical specialists in neighbouring riparian countries on common problems by using common tools such as modelling platforms. The Indus River System Model (IRSM), applied across the whole basin, could increase shared data, strengthen flow allocation processes, enable strategic basin planning, and assist more reliable water accounting among all the four riparian states, Pakistan, India, China, and Afghanistan.

5. **Support a people-centred approach**: The HKH Call to Action push for an 'HKH Calling' programme is an opportunity for a different approach that engages local communities with bottom-up support for better water management and helps them adapt to the impacts of climate change.

6. **Create opportunities for female water professionals**: The creation of opportunities for female water professionals and practitioners within the riparian countries of the basin will help build networks, share knowledge, and influence public awareness on gender realities and barriers to inclusive and gender-equitable water management from the local to the basin scale.

7. **Document existing knowledge and success stories**: The documentation of existing knowledge and success stories of women, people with disabilities, and other marginalised groups by transboundary research groups will help in gathering data, disaggregated by gender, poverty, ethnicity, disability, and other forms of marginalisation.

CHAPTER 1

# The Indus River Basin: An overview

HIGHLIGHTS

Rising in the mountains of the HKH region, the Indus runs for approximately 3,200 km and is a major source of water for drinking, household use, irrigation, and energy production.

Climate change is the biggest challenge to future water supply in the Indus Basin.

Changes in precipitation patterns, vulnerability to catastrophic events, and increased variability in water availability will affect the basin countries – Afghanistan, China, India, and Pakistan.

The Indus River is a lifeline for the 268 million people who inhabit the river basin. Of the total basin area of 1.1 million square kilometres (km2), the largest portions are in Pakistan (52 per cent) and India (33 per cent) (Food and Agriculture Organization of the United Nations [FAO], 2011), but it also includes parts of Afghanistan and China. Rising in the mountains of the Hindu Kush Himalayan (HKH) region, the Indus runs for approximately 3,200 kilometres (km) and is a major source of water for drinking, household use, irrigation, and energy production. This water supply is under growing stress due to high population growth, rapid urbanisation and industrialisation, environmental degradation, unregulated and inefficient water use, and poverty. These factors are further aggravated by climate change, making the lower part of the basin one of the most water-stressed areas in the world. Figure 1 depicts a map of the Indus River Basin.

## General and physical characteristics

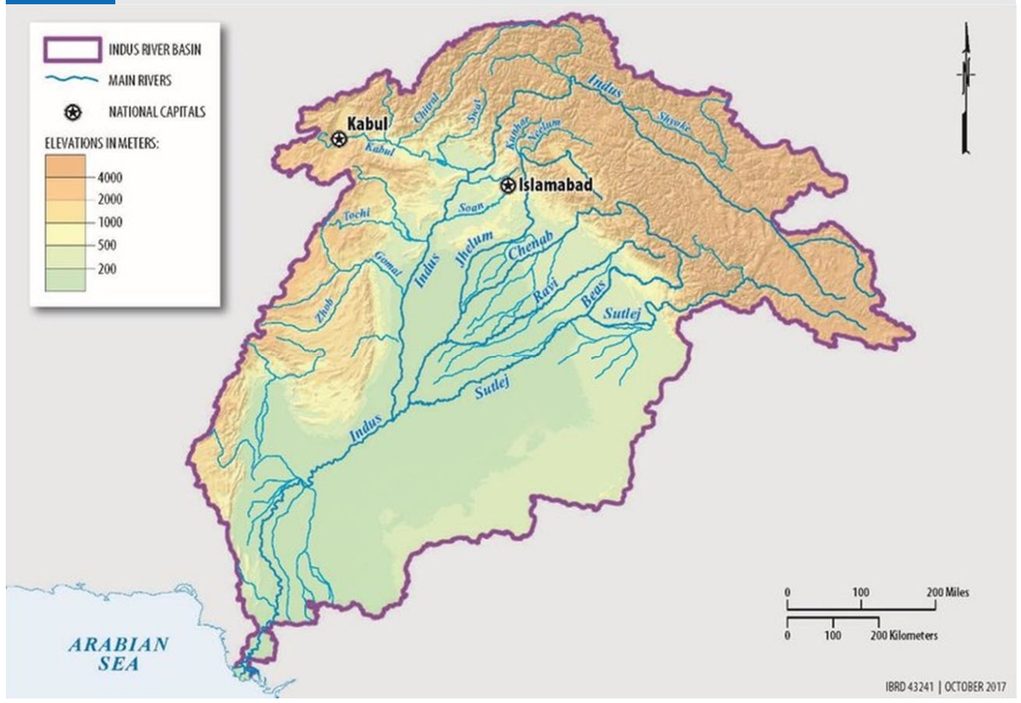
Table 1 summarises the general and physical characteristics of the Indus River Basin.

## Socio-economic trends

The socio-economic development of the countries in the Indus River Basin largely depends on the optimal use and prudent management of its precious water resources (Cherfas et al., 2018). Agriculture accounts for close to 90 per cent of water withdrawal in all countries of the HKH barring China, where 65 per cent is used for agriculture (Wester et al., 2019). In Pakistan, the Indus feeds the world's largest contiguous irrigation system, which draws on surface water and groundwater to irrigate over 18 million hectares of farmland (International Centre for Integrated Mountain Development [ICIMOD], n.d. a). Energy shortages in the region remain acute, with more than 40 million people in Pakistan alone without access to electricity, and half its population lacking access to clean cooking facilities (International Energy Agency [IEA], 2021). At present, only about 12 per cent of the Indus' hydropower potential capable of being developed, that is, of 35,700 megawatts (MW), has been harnessed.

A key socio-political trend in the HKH region is a shift towards decentralisation in environmental and natural resource policies (Agrawal, 2001; Wester et al., 2019). The shift toward decentralised management

**FIGURE 1** MAP OF THE INDUS RIVER BASIN




Source: Cherfas et al. (2018)

**TABLE 1** GENERAL AND PHYSICAL CHARACTERISTICS OF THE GANGES RIVER BASIN

| Characteristic | Description |
|---|---|
| Origin (source area) | The river rises near Lake Mapam in the southwestern region of the Tibetan Plateau at an elevation of about 5,500 metres above mean sea level (masl) |
| Length | 3,200 km |
| Total basin area | 1.1 million $km^2$ |
| Basin countries (with share of total basin area) | Afghanistan (6%), China (8%), India (33%), and Pakistan (52%) |
| Basin physiography | After winding through the rapidly eroding Himalaya, the Indus descends into the vast plains of the Punjab and Sindh regions. It flows slowly across the plains, depositing rich silt and finally emptying into the Arabian Sea through a 210 km-wide delta |
| Climate | Varied, as the river flows through geographies ranging from an altitude of 5,500 masl down to sea level and contains climatic conditions ranging from snow and ice to hot and dry, and humid at the coast |
| Share of ice and snow | 60%–80% of run-off |
| Flow | Average annual flow of 173 billion $m^3$ |
| Water uses | In Pakistan, India, and Afghanistan, 80%–90% of its water is used for agriculture |
| Population | 268 million (projected to increase to 319 million by 2025) |
| GDP generated within the basin | China: USD 12,556<br>India: USD 2,256<br>Pakistan: USD 1,505<br>Afghanistan: USD 368 |

Sources: FAO (2011); Wester et al. (2019); Cherfas et al. (2018); Zhang et al. (2013); Shrestha et al. (2015); Suhag (2016); Qureshi et al. (2015), World Bank (for GDP data)

is also apparent in the water sector. The experience and understanding of river basin management vary at local, national, and regional scales and challenges regarding the implementation of policies are exacerbated by the disconnect between various tiers of governance. State-centred governments are known to prioritise large-scale infrastructure, have vested political and financial interests, ignore local processes and hydrological interconnectedness, and neglect environmental degradation (Molle & Mamanpoush, 2012). Responding to this trend will require strengthening the exchange of knowledge across different levels of government interface and inclusive governance processes—both within and between the nation-states of the basin—to ensure fair and adaptive governance in the face of the growing risks related to climate change and natural disasters in the region (Wester et al., 2019).

## Environmental characteristics and climate change impacts

Variations in the timing and intensity of monsoon rains are having a profound impact on the health and sustainability of the Indus Basin. In mid-2022, Pakistan suffered one of the most devastating and widespread floods in its history, with more than 1,100 people killed and 33 million people directly affected (Clarke et al., 2022). Pakistan's Minister for Climate Change and Environmental Coordination, Senator Sherry Rehman, said that waters had flooded a third of the nation and a national emergency was declared (see Figure 2). The United Nations Secretary-General, António Guterres, said that this was a signal to the world to step up climate action.

Increasing agricultural and industrial pollution of surface water and groundwater, large-scale withdrawals for irrigation that reduce mainstream flows, and the blocking of sediment flows by dams upstream are degrading the riverine environment, adversely affecting freshwater fisheries, and eroding the ecological health of the river.

Groundwater is accessible and plentiful across the plains of the Indus Basin and is an important source for irrigation and of drinking water in the basin. Following the development of the extensive irrigation canal system in Pakistan, the recharge of groundwater increased significantly due to leakage from the canals. This not only increased the availability of groundwater but also heightened the menace of waterlogging and salinity (FAO, 2011). More recently, the rapid increase in pumping of groundwater in the Punjab (both in Pakistan and India) has led to greater groundwater salinity in the Lower Sindh region (Young, 2019). Groundwater and surface water are highly coupled in the Indus Basin and need to be managed in an integrated way.

Climate change is the biggest challenge to future water supply in the Indus Basin. This is due to changes in precipitation patterns, vulnerability to catastrophic events in the Upper Indus Basin, and increased variability in water availability. Even if global warming were limited to 1.5 degrees Celsius (°C), warming in the HKH region will likely be at least 0.3°C higher on average, and in the north-western Himalaya and Karakoram at least 0.7°C higher (Krishnan et al., 2019; Wester et al., 2019). Climate change alone is expected to increase water demand, especially for irrigated agriculture, by 5–15 per cent over the next three decades, depending on the level of warming (ICIMOD, n.d. a).

In India and Pakistan, water supply is already stressed, and storage capacity is low. Water demand is predicted to increase by 50 per cent by 2047, highlighting the rapidly emerging crisis. The impacts of climate change are disproportionately high on women, the poor, and other marginalised populations of the Indus Basin (Abbasi et al., 2019).

## The state of basin governance: Relevant treaties, policies, and agreements

There is no multilateral or regional governance framework for water in the Indus River Basin. The power disparities between the four basin states cause them to guard their individual sovereignty over water (Wester et al., 2019).

The Indus Waters Treaty 1960 (IWT), signed by India and Pakistan in September 1960, is the only bilateral treaty that operates in the basin. Under the IWT, Pakistan is entitled to water from the three major western rivers of the basin (the Indus, Jhelum, and Chenab, which together contribute about 80 per cent of the total annual flow of the Indus) and India is entitled to the water in the three eastern rivers (Ravi, Sutlej, and Beas, with about 2 per cent of the annual flow). The Kabul River from Afghanistan provides the remaining 18 per cent of the Indus' annual flow (Young et al., 2019) (see Figure 1).

## GEDSI and other cultural considerations

The Indus River Basin is the site of one of the world's oldest civilisations, harbouring diverse cultures and religious faiths. It is notable for its culturally diverse population and rich history. The region has been home to a variety of ethnic and religious groups over the centuries, including Hindus, Muslims, and Buddhists. However, the centuries-old traditions of patriarchy have entrenched social inequities that inform behaviour and attitudes towards women in society and become a critical contributor to gender vulnerability.

In the dominant social system prevalent in rural and urban areas of the basin, women are usually responsible for managing household water supplies, as well as undertaking household chores that require water. Despite the significant involvement of women in all water-related affairs of the household, they are excluded from community and public water management systems, which tend to be highly patriarchal and male-dominated (Earle & Bazilli, 2013). The impacts of climate change and various socio-economic drivers such as male outmigration have further reinforced gender disparities as well as increased the vulnerability of other marginalised social groups (Dilshad et al., 2019). Women do participate in water management processes at the local level; however, high-level positions, decision-making power, and the setting of political agendas continue to be dominated by men (de Moraes, 2015; de Silva et al., 2017).

Technical studies often lack a holistic understanding of the perspectives of women in their historical context, taking instead a more limited or tokenistic approach to their involvement. As a result, current irrigation management practices, including participatory processes, are less effective for women than men (Memon et al., 2019). Data disaggregated by gender, class, caste, ethnicity, disability, and other markers of marginalisation are rarely found (Resurrección et al., 2019).

Existing initiatives and platforms such as ICIMOD's Upper Indus Basin Gender Network and Knowledge Hub are well placed to support and strengthen the capacity of community groups, including networks of women, disabled people's organisations, indigenous groups, the landless, and other marginalised populations, to collectively voice their concerns in subnational, national, and basin-wide debates, dialogues, and cooperation.

CHAPTER 2

# Challenges facing basin-scale management

HIGHLIGHTS

Although not perfect, the Indus Waters Treaty 1960 has sustained communications and cooperative management between India and Pakistan for over 60 years.

There are power disparities across the four basin countries, and national governments tend to guard their individual sovereignty over water.

Greater hydro-solidarity and climate diplomacy can provide opportunities to promote mutually beneficial alliances.

## Climate change

The scale of climate change impacts in the Indus Basin is overwhelming. Commenting on the 2022 floods in Pakistan, Prime Minister Shehbaz Sharif said, "I've never seen this kind of devastation, inundation, and suffering of our people in my lifetime. Millions have been displaced; they have become climate refugees within their own country." The apocalyptic monsoons brought 1,700 millimetres (mm) of rain to some regions through July and August and caused damage estimated to be in the range of USD 30–35 billion (Ellis-Peterson & Baloch, 2022).

Climate change is a national security challenge, and also a challenge for people and the ecosystem; it undermines food security, livelihoods, and water security. Outmigration by men is seen as an important strategy to cope with the negative impacts of climate change, but this has also added to women's household and farming responsibilities (Gioli et al., 2014). Across the HKH region generally, the vulnerability of women, the poor, the indigenous, and other marginalised people is likely to increase due to climate change impacts (Goodrich et al., 2019; Resurrección et al., 2019).

## Food and water security

The Indus River Basin has extensive groundwater reserves, in the Upper Indus Plain in the Punjab region of India and Pakistan, and extending south into the Sindh region, where the water is often saline and needs to be mixed with surface water for use in agriculture (Kamal et al., 2012).

The Indus Basin groundwater aquifers in Pakistan hold in storage at least 80 times the volume of freshwater held in the country's three biggest dams. In the 1960s, large-scale extraction of groundwater began and has expanded to become an essential input in agriculture and the backbone of domestic water supply. As a result, Pakistan is on the brink of a lengthy and severe groundwater crisis (Lytton et al., 2021). Higher temperatures as a result of climate change will increase evaporation and evapotranspiration, and consequently increase the demand for groundwater for irrigation.

While agriculture is the main user of groundwater in Pakistan, industries and urban water supplies are also dependent on groundwater to a large extent (Kamal et al., 2012). The declining quantity and quality of groundwater supplies have resulted in increasing tension between urban and rural stakeholders and the tension is disproportionately high among women, the poor, and other marginalised populations (Waraich et al., 2021). The feminisation of agriculture due to males migrating to urban centres for work underlines the need for GEDSI considerations at all levels in agriculture and water management. While emerging gender studies on the region emphasise the need to empower women in decision-making, progress is slow (Resurrección et al., 2019).

Seawater intrusion in the Lower Indus, compounded by the lack of freshwater below the Kotri Barrage, is degrading water-dependent ecosystems and agricultural productivity. Seawater has penetrated 30–50 kilometres inland in some coastal areas of Sindh (Sindh Coastal Community Development Project [SCCDP], 2012), which has affected groundwater quality, agricultural productivity, and the livelihoods of some of the poorest populations (Memon & Thapa, 2011). More comprehensive environmental flow analysis is required to ensure that the trade-off involved in supplying water for irrigation and other consumptive uses is well understood, and to avoid the unrealistic expectations that modest environmental flows could restore the entire delta to ecological health (Gippel, 2015).

## Increasing competition for hydropower

The Indus River Basin is estimated to have a total hydropower potential of 55,000 MW, of which about 35,700 MW is considered technically capable of being developed. As mentioned, only about 12 per cent of this is harnessed at present.

International attention has focused on the dams that are under construction or planned in the Upper Indus in the Jammu & Kashmir region of India, as well as on their potential impacts downstream in Pakistan. However, Pakistan also has plans for a cascade of five dams (known as the North Indus River Cascade) upstream in the Gilgit–Baltistan region, with the infrastructural investments under the China–Pakistan Economic Corridor (CPEC) project. The Government of Afghanistan has plans to develop hydropower on the tributaries of the Kabul River.

To date, the focus has been on large dams but there is a growing case for alternative hydropower approaches and technologies such as a series of small dams along the length of the river or run-of-the-river hydropower stations, to reduce the environmental impact and risk of failure. Pumped storage hydropower technology is also emerging as a potential method of electricity generation with little or no environmental risk.

However, hydropower investors are increasingly becoming aware of the impacts of climate change on hydropower development. Melting snow, ice, and glaciers have increased the risk of glacial lake outburst floods and other flash floods that carry boulders, rocks, and huge quantities of sediment capable of destroying hydropower installations.

The Tarbela dam in Haripur, Pakistan is one of the largest dams in the world and was built in the upper reaches of the Indus to provide water storage for irrigation, hydropower, and flood mitigation. However, sediment inflow has reduced its storage volume by one-third and the advancing sediment is threatening power generation due to ingestion of sand into its turbines. There is growing international concern that increased flash floods due to changing rainfall patterns will increase the pace of sedimentation in the Tarbela dam, further exacerbating flooding in the Indus and reducing the supply of hydropower (Roca, 2012).

## Lack of an overall regional governance framework

The Indus Waters Treaty 1960 has successfully sustained communications and cooperative management between India and Pakistan for over 60 years, despite geopolitical tensions and three armed conflicts (Sadoff et al., 2008). However, tension between the two basin states continues, and in January 2023, Pakistan took a complaint against India to the Permanent Court of Arbitration in The Hague, Netherlands under the Indus Waters Treaty. At its first meeting, certain organisational matters and the procedure to be followed in the arbitration were considered. India declined to participate in the first meeting. In prior correspondence, India stated that the Permanent Court of Arbitration was not competent to consider the questions placed before it, and which should instead be decided through an alternative process under the Indus Waters Treaty involving a neutral expert (Permanent Court of Arbitration [PCA], 2023).

The Permanent Indus Commission (PIC), established under the treaty, formalised communications, laid down prior notification requirements for river development plans, and set out a clear conflict resolution mechanism. Through the PIC, numerous disputes have been peacefully settled over the years. More recently, however, the treaty has been criticised as being outdated, for not specifying the use of the river's resources within its possible limits, and for neglecting the effects of climate change. As stated, the power disparities between the four basin states cause them to guard their individual sovereignty over water (Wester et al., 2019). Consequently, the chance of a regional treaty or organisation emerging in the next few years is slim.

However, the impacts of climate change show that the business-as-usual approach runs a high risk of destabilisation in the region with a rippling effect that can trigger a series of intertwined crises. The 2022 Pakistan floods gave rise to health, housing, and food security crises, increased poverty, and undermined social stability. Greater hydro-solidarity and climate diplomacy provide opportunities to promote mutually beneficial alliances.

CHAPTER 3

# Opportunities for enhanced river basin cooperation

HIGHLIGHTS

Joint research, involving all four riparian countries, could lead to better understanding of the most likely long-term impacts of climate change and climate-induced hazards.

Such a 'whole-of-basin' approach could build trust between the countries and ultimately strengthen resilience.

There is an urgent need to find common ground for dialogue towards regional cooperation and adaptation support to climate change.

## Climate resilience

A climate-resilient approach to river basin management is urgently needed. Its adoption could ensure a more reliable water supply to all users, even under increasingly uncertain climatic conditions.

There is a need for long-term flexibility in adaptive water infrastructure, management solutions, governance structures, and policy instruments (Kerres et al., 2020). The need to prioritise addressing gender inequities, the needs of vulnerable communities and ecosystems, the identification of hotspots for floods, and improved early warning systems is urgent.

The COVID-19 pandemic has made it clear that a dispersed ability to act upon and resolve problems, in tandem with strong local governance, is critical to responding quickly and effectively during a crisis. Engaging the community in building resilience and improving early warning systems is a priority for coping with climate change and should include the poor, Indigenous people, those with disabilities, and other marginalised people.

ICIMOD's Upper Indus Basin Gender Network and Knowledge Hub could present a potential platform and opportunity for bringing GEDSI considerations to the forefront of basin-wide dialogues to facilitate cooperation (ICIMOD, n.d. b). Likewise, the International Water Management Institute (IWMI)'s Indus Basin Gender Profile Mapper could be a starting point for the further advancement of gender-disaggregated data and to support gender equitable research and planning (International Water Management Institute [IWMI], 2018).

## Whole-of-basin approach

A whole-of-basin approach, with joint research involving all four riparian countries, into better understanding the long-term impacts of climate change and climate-induced hazards, could build trust between them and strengthen resilience. The IWT, despite some shortcomings, has successfully sustained communications and cooperative river basin management between India and Pakistan for over 60 years (Sadoff et al., 2008). The way forward may lie not in renegotiating or expanding the treaty but rather in joint research. This has been the experience in the Mekong region, where joint studies have led to increased cooperation between the downstream Mekong River Commission and the China-led upstream Lancang–Mekong Cooperation. Pakistan's Living Indus Initiative and India's Composite Water Management Index could provide relevant starting points for joint study.

A whole-of-basin approach could be achieved through a cross-sectoral approach to management that considers the prevalent social norms and cultural practices to form non-technical knowledge-sharing platforms for women and other marginalised groups. With the innovative use of social media platforms, women could exchange information informally to discuss challenges and share local solutions and best practices. This would promote trust and enhance appreciation for the value of collaboration.

## Adopting common approaches and tools

Finding common ground for dialogue that could lead to regional cooperation and support adaptation to climate change is urgent.

Adopting common tools to assess the basin's water resources could enable technical cooperation between the riparian states and help avoid entrenched political positions. It could inform a fact-based dialogue for fair and transparent water sharing and establish a baseline water balance for the basin.

Several basin models have been developed for the Indus. The most recent of these is the Indus River System Model (IRSM), which uses the Source modelling platform (Stewart et al., 2018). The IRSM is a daily flow routing and allocation model that includes the river's gains and losses to and from groundwater. This model, developed under the Commonwealth Scientific and Industrial Research Organisation's Sustainable Development Investment Portfolio (SDIP) project (Department of Foreign Affairs and Trade [DFAT], 2019), aims to strengthen water accounting and flow allocation processes at the Indus River System Authority (IRSA), and is also suitable for strategic basin planning. There is an important opportunity to further develop the model for more reliable water accounting and more transparent and efficient data and information sharing (Stewart et al., 2018). Each of the four riparian states of the Indus Basin has used Source.

The availability and sharing of high-quality and reliable data are essential for improved water management and early warning systems, as well as to facilitate disaster management and improve regional climate resilience (Wester et al., 2019). The extent of the devastating 2022 floods in Pakistan has also highlighted the importance of internet-based data collection and sharing.

Establishing a water balance for the Indus Basin, perhaps building on the water balance for the Indus in Pakistan established by the World Bank, could be a critical first step to building trust between water agencies in the basin countries (Young et al., 2019).

The Living Indus Initiative, launched by Pakistan in partnership with the United Nations, is an umbrella initiative and a call to action to lead and consolidate initiatives to restore the ecological health of the Indus within Pakistan's boundaries (Living Indus, n.d.). It aspires "to an Indus Basin that can sustain a thriving civilization from its sources to the ocean – a basin whose natural resources and ecosystems have been repaired and restored and are resilient in the face of climate change". The initiative could provide an opportunity for regional dialogue in the Indus Basin.

## Call for increased regional cooperation in the HKH Call to Action

In October 2020, ICIMOD convened the HKH Ministerial Mountain Summit 2020, at which all HKH countries – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – signed a call to action based on the *Hindu Kush Himalaya assessment* (Wester et al., 2019). This landmark report by ICIMOD had provided a comprehensive assessment of the status of the HKH region's mountains, environments, and livelihoods, and their future.

The HKH Call to Action articulates six urgent actions, including: promote and strengthen regional cooperation at all levels; take concerted climate actions; take decisive actions to enhance ecosystem resilience and halt biodiversity loss; and promote regional data and information sharing and knowledge cooperation (ICIMOD, n.d. a). The Call to Action affirms the support of governments across the region for cooperative action on the issues identified and provides ICIMOD with an action agenda.

Key elements in the Call to Action that are relevant to the Indus Basin include the calls to:

- promote regional champions and leadership along with encouraging networks and alliances;
- build global recognition of the HKH as a hotspot of climate change and sustainable development;
- make adaptation to climate change a top priority;

- generate and share data that underpins key issues, especially climate variables, air pollution, water, energy, and food security; and
- focus on transformative adaptation, tackling poverty and inequality, inclusive development, and leaving no one behind.

As an experienced leader in the region, ICIMOD is well placed to take forward this agreed regional agenda, with a strong focus on climate resilience.

## A people-centred approach

COVID-19 exacerbated food insecurity and caused unprecedented social disruptions, especially for women, the poor, Indigenous groups, people with disabilities, and other marginalised people, and threatened to deepen inequality (ICIMOD, 2020). However, the pandemic also revealed resilience at the community level and the capacity of communities to care for each other through a period of uncertainty. Cooperation could be enhanced by drawing on lessons from the COVID-19 experience. They show that a dispersed, localised ability to act and resolve problems and strong local governance are critical to responding quickly and effectively during crisis.

The HKH Call to Action push for an 'HKH Calling' programme is an opportunity for a collective approach that engages local communities and stakeholders. As climate change impacts become more severe, it is critical to engage local communities in the Indus Basin. Community motivators equipped with knowledge and the power of technology can be engaged to empower communities with information, connect them to policy makers, and support them to nurture river basin resilience. Such processes of engagement should focus on women, the poor, Indigenous people, those with disabilities, and other marginalised peoples to address the needs and aspirations of these groups. There is now an increasing recognition of gender-disaggregated studies, including documenting the lived experience of women and men in the basin (Commonwealth Scientific and Industrial Research Organisation [CSIRO], 2022). The increasing proportion of female professionals in the water and development sector could be an opportunity for advancing GEDSI inclusive dialogues at the basin level.

Engaging civil society is another critical step in grounding the macro-level dialogue in micro-level lived experience and focusing discussions on climate resilience of the millions of people who depend on the Indus River for their livelihoods. The COVID-19 experience has made this clear. Climate change will also need local engagement to address issues and resolve problems. A programme such as 'Indus Calling' would aim to build bottom-up support for better water management and help communities adapt better to the impacts of climate change. This could be supported by enhancing existing communication programmes in the region, possibly by using mobile phone apps and other new technologies, and would be critically important to building community support, involvement, and momentum in the 'Indus Calling' initiative.

River basins in South Asia are superimposed with cultural maps. Along with inter-disciplinary discourses on water, it is important to nurture a new epistemology of water that links cultural stories with water management and ancient reverence for rivers

## Promoting regional multi-track dialogue

The Upper Indus Basin Network, a knowledge and research network of researchers working in the upper reaches of the Indus Basin, could be invited to consider initiating a dialogue with India's NITI Aayog over its Composite Water Management Index (NITI Aayog, 2019), the Pakistan Water and Power Development Authority, the Chinese Academy of Sciences or the National Natural Science Foundation of China, and Afghanistan's National Water Affairs Regulation Authority (NWARA). The dialogue process could establish a set of standards and definitions for data collection, storage, and analysis. As there is a dire shortage of data disaggregated by gender, poverty, ethnicity, disability, and other forms of marginalisation, a key consideration should be to develop such data and to develop the capacity of professionals and institutions to do the same. The lack of research capacities in exploring and documenting gender-specific knowledge, including the success stories of women and other marginalised social groups, points to the need for further work in this area (Bhattarai et al., 2021).

For a regional multi-track dialogue to be successful, it is important to ensure inclusivity and broad-based representation in order to make it participatory from its inception. The voices of civil society water experts, academia, and the research and scientific community need to be a part of the dialogue.



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Entering our 40th year, ICIMOD is perfectly positioned to support the transformative action required for the HKH to face the challenges of the escalating effects of climate change, pollution, water insecurity, increased disaster risk, biodiversity loss, and widespread socioeconomic changes. We seek to raise our ambition to support the required transformative action to step up our engagement through to 2030.

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