

A roadmap for regional cooperation on adaptation in the Hindu Kush Himalaya: addressing transboundary and cascading climate risks

This roadmap aims to chart a course towards stronger regional cooperation on adaptation in the Hindu Kush Himalaya (HKH), with a focus on building resilience to the transboundary and cascading climate risks the region faces.

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The actions proposed in this roadmap were generated by stakeholders from across the region who participated in a 2023 Science-Policy Dialogue in Kathmandu, Nepal. The dialogue explored stronger regional collaboration on adaptation, the main areas of work such institutional cooperation could advance, and the tangible outcomes it could and should deliver. Actions were grouped into three pillars: (1) research, information sharing and knowledge-based dialogue; (2) policy and governance instruments; and (3) implementation, capacity strengthening and finance. The actions were subsequently refined by the roadmap's authors.

This brief first outlines the context and case for building resilience to transboundary and cascading climate risks in the HKH. It then presents opportunities that could be harnessed and proposes 15 actions. The actions are not exhaustive. They do not represent the views of all stakeholders. The roadmap should be considered an indicative guide that can be strengthened and improved over time.





The context

Through globalization, our economies and societies, and the ecosystem services that sustain them, have become increasingly intertwined (Talebian et al., 2023). The implications of this are stark in the context of climate change. As global temperatures rise, and the severity and frequency of extreme events increase, countries are vulnerable to the risks from within their own borders and those catalysed by cascading and spill-over effects from the impacts of climate change farther afield – sometimes from places on the other side of the world (Niggli et al., 2022). How will these risks spread? Who will be affected? The answers depend to a large degree on dynamic networks of people, finance, resources, and trade.

The HKH region spans eight countries – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan – and is home to twelve major rivers, seven of which are transboundary (Molden et al., 2017). Its ecosystems provide direct services – such as freshwater resources – to 240 million people living within the region and support a further 1.65 billion people downstream (ICIMOD, 2023). This makes the mountains of the HKH a globally important asset. Yet the region is also a global hazard hotspot (Rusk et al., 2022) and experiencing warming at a rate far higher than the global average (Dhimal et al., 2021). Glaciers are rapidly shrinking. The rate of loss sped up, with glaciers losing 65% of their volume over the last decade¹, and forecasts indicating that they will likely lose a further 30-50% of their volume by 2100 under 1.5-2°C of warming (ICIMOD, 2023).

¹ 2010-2019, compared with the previous decade.

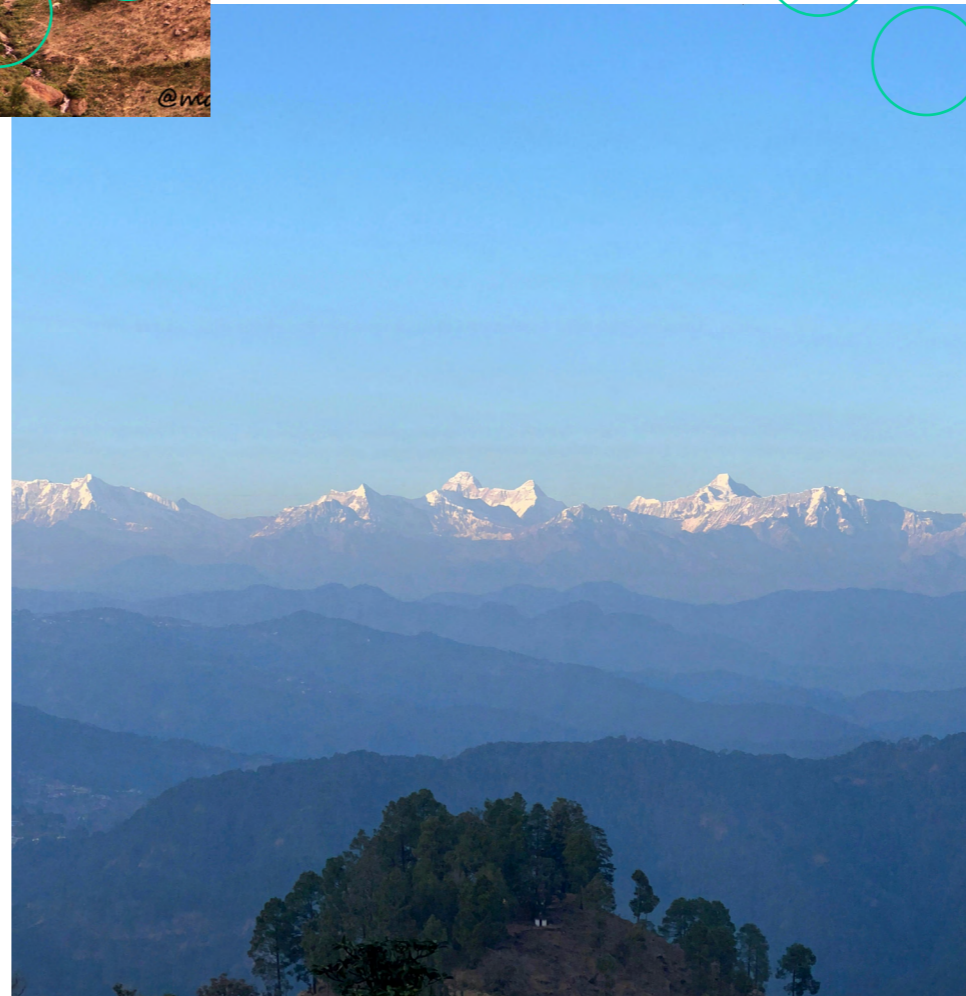
The region is also financially and socially integrated with the rest of the world. This means that the economic aspirations of its governments and the welfare and security of its people depend on the successful management of climate change impacts in any number of countries, across all regions of the world. These growing interdependencies mean the HKH faces significant risks from climate change both direct and indirect in nature. We outline further details about these indirect or “transboundary” climate risks in the next section.

To address these risks and respond to the “distress call” being issued by mountains (United Nations, 2023), decisive international action is required. This action, according to the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC), must go beyond the pace, depth, and scope of current adaptation efforts, and be supported through regional cooperation and transboundary governance in cases where risks cascade and transcend jurisdictions (Adler et al., 2022).

The HKH stands poised to demonstrate global leadership in this transformation of adaptation. The wealth of scientific and indigenous knowledge on climate change² and history of autonomous adaptation responses across the region (Xu et al., 2019) can readily inform and inspire action on a larger scale. Existing practices and collaborative initiatives provide avenues to further strengthen relationships between countries on adaptation and build a unified voice on managing climate risk (Talebian et al., 2023). Given this interdependence, strengthening resilience to transboundary climate risks across the HKH is not only in the interest of governments in the region but also of governments worldwide. Demonstrating that regional adaptation among the countries of the HKH supports and strengthens global resilience to climate change could command significant attention on the world stage.

² The first comprehensive assessment of the Hindu Kush Himalaya region was published in 2019 (Wester et al., 2019), providing an open-access source of research on the social, environmental and economic pillars of sustainable mountain development. It compiled knowledge from more than 300 researchers, experts and policymakers.

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Transboundary climate risks and their manifestation in the HKH

Transboundary climate risks are generated when the impacts of climate change or mitigation and adaptation actions cross administrative boundaries or national borders and result in adverse effects in a jurisdiction beyond their inception (Hedlund et al., 2018; Carter et al., 2021; Harris et al., 2022). Such risks are already manifesting across the HKH via intra-regional risks (risks that both originate and manifest within the HKH), endogenous risks (risks that originate in the HKH but manifest for people beyond the region) and exogenous risks (risks that originate from beyond the HKH but manifest within the region) (Talebian et al., 2023). Such risks could increase in severity in the future as the climate warms and the effects propagate through different spheres of activity.

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Energy security:

Climate change can impact the production, supply and distribution of energy and the infrastructure on which all these depend. Disruptions can create cascading impacts that propagate through export-import relationships (Niggli et al., 2022). India has power-exchange agreements with Nepal, for example, to utilise the country's surplus hydroelectricity (Hussain et al., 2019). This includes a 2024 agreement to import an additional 10,000 megawatts over the next 10 years (Reuters, 2024). Yet the future production of hydroelectricity could be threatened by climate shocks, such as glacial lake outburst floods and extreme rainfall (ICIMOD, 2023). Moreover, the availability of water in the region is expected to peak mid-century – in tandem with accelerated glacial melt – and subsequently decline (ibid). If such impacts occur, they could affect hydropower supply in countries such as Nepal and cascade through related trade agreements, potentially jeopardizing energy investments and energy security in importing countries such as India.

Trade, finance and infrastructure:

Climate change can impact the export and import of food and other commodities (including those essential for manufacturing industries), the resilience of international financial investments and remittances, and the infrastructure underpinning these economic sectors. Across South Asia, climate change is predicted to cause significant declines in cereal crop yields: rice yields could decline by as much as 40% in India and 32% in Nepal at current rates of warming, for example (Rasul, 2021). With South Asia the second-largest producer of wheat and rice worldwide, this could have significant repercussions for food security both within and beyond the region.

Cascading climate risks can also disrupt financial flows such as remittances. In 2023, the top five low-middle income country recipients of remittance inflows included India (USD 120 billion), China (USD 50 billion), and Pakistan (USD 27 billion); and Nepal was among the top six recipients as a percentage of GDP (26.8%) (KNOMAD, n.d.). Climate shocks that affect the livelihoods of those sending remittances, or the economic performance of source countries more broadly, could therefore have implications for the financial stability of the HKH region.

Human health and wellbeing:

The cascading effects of climate change in one country can generate and amplify risks to the physical and mental wellbeing of people in another. Climate-sensitive infectious diseases are a growing global concern. In the HKH and other high-altitude regions, climate change and extreme weather events are altering the ecosystems in which disease vectors live and persist, increasing exposure to diseases such as dengue fever and chikungunya fever (Phuyal et al., 2020). Climate impacts can also disrupt critical health infrastructure and pharmaceutical supply chains that are vital for the supply of essential medicines. Nearly 90% of global pharmaceutical manufacturing sites are exposed to flood risks, and a further 25% are exposed to risks relating to water stress (Dobson, 2021). Transboundary climate impacts can also raise the risk of food- and water-based diseases, insecurities and malnutrition, as well as threats to life directly, from floods and landslides for example. Regionally integrated systems and strengthened knowledge exchange could be used to more effectively monitor and manage the impacts of climate change on human health and wellbeing at transboundary scales (Dhimal et al., 2021).



Biodiversity and ecosystem services:

Cascading climate impacts can generate risks to ecosystems and biodiversity and the services they provide through increasing numbers of invasive species, geographic redistributions of flora and fauna, and diseases in plants and animals. Wildlife corridors, tourism infrastructure, water basins, and protected areas can all be transboundary in nature, providing a vehicle through which climate risks can transcend political and sectoral boundaries (Xu et al., 2019). The HKH is home to a mosaic of cross-border habitats. For example, forests supply fodder, fuel and medicine; and wetlands support culture and tourism (Xu et al., 2019). An estimated 60–85% of rural communities across the region are said to be directly or indirectly dependent on this diversity in ecosystems and the species that inhabit them (ibid). In Bhutan, a preliminary assessment estimated the value of ecosystem services to equate to USD 15.5 billion per year, with 53% of the total benefits flowing to people outside of the country (Kubiszewski et al., 2013). This highlights the importance of developing regional cooperation and adaptation strategies that explicitly recognize the role that ecosystems play not only in enhancing national resilience but also in creating co-benefits and stronger regional resilience. These create a “collective advantage”.

Opportunities to harness

The need to address and adapt to transboundary climate risks is gaining prominence in the global policy landscape. Negotiating groups and Parties to the United Nations Framework Convention on Climate Change (UNFCCC), including countries of the HKH, are increasingly referencing transboundary, cascading and compound climate risks and the importance of strengthening regional and global cooperation on adaptation in negotiations and submissions relating to the Global Stocktake, the Global Goal on Adaptation, and the formulation and implementation of National Adaptation Plans. The 2023 UN Climate Change Conference was the first to adopt decisions that explicitly referenced transboundary climate risks, with Parties recognizing that “climate change impacts are often transboundary in nature and may involve complex, cascading risks that can benefit from collective consideration and knowledge-sharing, climate-informed transboundary management and cooperation on global adaptation solutions” (Decision 2/CMA.5 para 18). Such growing momentum presents an opportunity to drive the management of transboundary and cascading climate risks worldwide and nurture a more enabling policy environment.

Accounting for the transboundary nature of climate risk in the adaptation priorities, plans and programmes that countries of the HKH draft and implement would build a more accurate picture of the risks their communities face. At the same time, it would present an opportunity to demonstrate how their actions to adapt to transboundary climate risks contribute to strengthening regional and global resilience. Moreover, initiating collective and coordinated action on adaptation to transboundary climate risks presents the countries of the HKH with opportunities to address intractable challenges associated with adaptation and, in turn, generate far-reaching benefits.

Effective regional and international collaboration on adaptation can strengthen knowledge sharing, information exchange and technology transfer, for example. Pooling resources and expertise can alleviate pressure on limited national resources and capacities, reduce country-level adaptation costs, accelerate the implementation of cost-effective adaptation solutions, and help bridge silos across planning departments and sectors (Talebian et al., 2023; Thankappan, 2024). Transboundary initiatives could help tackle data

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fragmentation, which has been identified as a challenge in the HKH (GEO mountains, 2023); indeed, data fragmentation, language barriers, disparate regulations, and geopolitical tensions can present barriers to building comprehensive and integrated multi-hazard risk analyses. Such analyses are considered essential for understanding the triggers, drivers and dynamics of cascading climate risks (Rusk et al., 2022; Sharma et al., 2023; Dubey et al., 2024; Thankappan, 2024). Collaborative, cross-country efforts could also increase the credibility of voluntary climate pledges and targets and enhance climate diplomacy.

Enhanced cooperation can also help reduce inequities within and between countries by more fairly distributing costs and resources and by reducing the risk of maladaptive outcomes – adverse impacts from adaptation actions that cascade to other countries and regions (Lager et al., 2021). Transboundary adaptation projects further respond to calls from the adaptation community to raise levels of ambition and scale up investment in adaptation action. Securing funds to address transboundary climate risks has been a challenge to date, with most multilateral adaptation finance supporting national-level projects (Browne et al., 2022). But increasing climate finance flows to address transboundary climate risks has the potential to generate more transformational adaptation outcomes and harness economic efficiencies by strengthening resilience in multiple locations through a single investment. This is a significant incentive for donors (Harris et al., 2024).

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Regional cooperation in the HKH

Despite the strong rationale for investing capacity and resources in adaptation to transboundary climate risks, and the potential for co-benefits to arise from such efforts, few examples of cross-border adaptation projects exist in the HKH (Mishra et al., 2019). The South Asian Association for Regional Cooperation (SAARC) adopted its Action Plan on Climate Change in 2008 to strengthen regional cooperation on topics including the management of climate change impacts and risks (Tiwari and Joshi, 2015). Meanwhile, transboundary landscape approaches have been applied across the HKH to support water management – the Koshi Basin Programme involving China, India and Nepal, for example (Molden et al., 2017) – and conservation and biodiversity goals more broadly. The Kangchenjunga landscape comprises 19 protected areas, 9 of which are transboundary, for instance (Gurung et al., 2019). However, there have been calls to further institutionalize regional cooperation to tackle shared environmental and climate change challenges through a common and cross-border approach (ICIMOD, 2022).

At the 2020 Ministerial Mountain Summit, representatives from all eight governments of the HKH signed a declaration and agreed to “constitute a Task Force with high-level representation from the eight HKH countries to assess the feasibility of establishing a regional institutional mechanism” (ICIMOD, 2021). As part of this process, the Task Force was encouraged to assess similar regional collaborative platforms and

instruments from across the globe to make an informed set of recommendations for the HKH for the next Ministerial Summit. The Alps, Carpathians and Andes, for example, are mountain ranges that – like the HKH – span multiple countries and have different governance systems in place to foster dialogue, share resources and knowledge, and promote the sustainable use and protection of mountain ecosystems (Price Rios et al., 2024).

In 2023, the Adaptation Without Borders partnership convened a group of 45 regional stakeholders in a science-policy dialogue on regional cooperation on adaptation to cascading climate risks in the HKH. The dialogue aimed to identify what a regional institutional mechanism could feasibly and usefully do to strengthen cooperation on adaptation to cascading climate risks, the main areas of work it could advance, and the tangible outcomes it could and should deliver. **A key recommendation from the dialogue was to establish a cross-cutting working group on adaptation in mountain areas to drive regional resilience to cascading climate risks.** This working group would work with other thematic working groups established under the regional institutional mechanism – on the cryosphere and air pollution, for example – to ensure an integrated and coherent approach. Participants also proposed a roadmap of actions to be considered and coordinated by such a working group. Building on up-to-date analysis (Talebian et al., 2023), we group these actions into three types: 1) research, information sharing, knowledge-based dialogue; 2) policy and governance instruments; and 3) implementation, capacity strengthening and finance.



Research, information sharing, and knowledge-based dialogue

Adequately addressing transboundary climate risks requires research and data collection, the sharing of information and insights, and dialogues between sectors and across scales. The guiding principles of the Sendai Framework for Disaster Risk Reduction 2015–2030 emphasize that effective disaster risk reduction considers multiple hazards and depends on “the open exchange and dissemination of disaggregated data, including by sex, age and disability, as well as on easily accessible, up-to-date, comprehensible, science-based, non-sensitive risk information, complemented by traditional knowledge” (United Nations, 2015: 13). Article 7 of the Paris Agreement complements this approach, suggesting that “Parties should strengthen their cooperation on enhancing action on adaptation, taking into account the Cancun Adaptation Framework, including with regard to: (a) Sharing information, good practices, experiences and lessons learned, including, as appropriate, as these relate to science, planning, policies, and implementation in relation to adaptation actions” (United Nations, 2016).

In the context of the HKH, this approach is vital for tackling the challenges posed by transboundary climate risks, for which knowledge is still nascent. Research provides the scientific foundation necessary to understand climate impacts, identify and assess transboundary climate risks (to, from and within the HKH), and explore the feasibility and efficacy of potential solutions. Information sharing helps ensure that knowledge is disseminated across jurisdictions, enabling countries to better understand the risks they face, learn from each other’s experiences, and coordinate their responses effectively. Knowledge-based dialogue

can foster cooperation between sectors – particularly vital in the context of cascading climate risks that have implications for a range of policy domains (from trade to foreign policy). By prioritizing knowledge building and exchange, countries in the HKH can better understand the complex dynamics of transboundary climate risks, more accurately communicate their needs for support, and develop more effective adaptation strategies.

Such an approach aligns with the findings of a 2023 workshop, “Interdisciplinary Monitoring, Data and Capacity Sharing across the Hindu Kush Himalaya”. Participants proposed the development of a common platform or portal to facilitate data sharing and the integration of national monitoring systems; regular workshops to provide updates from mountain monitoring across the region; guidelines for the standardization of data and metadata; transboundary repositories to facilitate consistent storage and access to data; and intergovernmental mechanisms and legislation to enhance data exchange and regional collaboration (GEO mountains, 2023). These actions strongly align with the measures proposed in this roadmap. Regional organizations – such as the International Centre for Integrated Mountain Development (ICIMOD) with the support of the Asian Disaster Preparedness Center (ADPC), for example – may be best placed to coordinate and facilitate knowledge and information exchange. At the same time, effective coordination and exchange require inputs from all scales – from the local to the global – and from both public and private sectors.





This roadmap calls for five actions and measures to support and enhance research, information sharing, and knowledge-based dialogues on transboundary climate risks in the HKH:

1

Establish a Hindu Kush Body of Experts on Climate Change (HKCC) and equip them with a mandate to strengthen the evidence base on transboundary climate risks that the region faces.

This body should draw on the efforts and expertise of ICIMOD’s Hindu Kush Himalayan Monitoring and Assessment Programme (HIMAP) and connect with and strengthen the Himalayan Consortium of Universities to encourage inclusive collaboration and build on existing knowledge. It should also oversee the integration of scientific and Indigenous knowledge from the region (Witharana, 2023). This should convene regular knowledge-exchange dialogues that provide opportunities for stakeholders from multiple sectors and constituencies to come together to discuss the state of knowledge on transboundary climate risks in the HKH, the results of relevant risk assessments, opportunities for policy uptake of research findings, and lessons and best practices from programming and implementation. The body of experts should also be responsible for coordinating, facilitating or delegating the following measures and actions.

2

Commission collaborative and multidisciplinary research on transboundary climate risks in four sequential areas:

1. A regional transboundary climate risk assessment – The assessment should develop indicators to examine the economic, social and ecological dimensions of cascading climate risks (potentially in coordination with those developed under the UNFCCC UAE–Belém work programme, if relevant (UNFCCC, 2024)).
2. A series of deep-dive case studies – These should aim to understand how different groups are vulnerable to different types of transboundary climate risks across the region and the implications of transboundary climate risks for household incomes and livelihoods (Birkman et al., 2022). They should examine the risks posed for demographic and marginalized populations (e.g., by sex, age, income levels, and disabilities), for different sectors (e.g., agriculture and health), for various outcomes (e.g., food security and wellbeing).

3. A political-economy analysis – This analysis should seek to understand the barriers and opportunities and co-benefits and trade-offs that policymakers face in addressing cascading climate risks across the HKH at local, national and regional scales.

4. A cost-benefit analysis of investing in adaptation to address cascading climate risks – This should explore the implications of such risks for the national economies of the region and the potential for such risks to boost or undermine national socioeconomic development plans.

All four of these research agendas outlined should seek to incorporate narratives that convey two time horizons: the short-term implications of cascading climate risks, and longer-term visions and actions. Both are important to raise in regional climate weeks and ministerial forums.

To deepen inclusivity and co-ownership of the findings, governments across the HKH should lend their support to these cross-border research projects and invest in attribution science across the region more broadly.

3

Examine the feasibility of establishing a regional information service, led by a multi-stakeholder network of climate scientists and service providers, to incentivize investment in data collection and exchange on transboundary climate risks in real-time.

Data on the differential risks posed by cascading climate impacts on marginalized groups are urgently required. To accurately inform decisions and investments at all scales, mechanism must be established to ensure that these data both come from and reach “the last mile” (Klenk et al., 2017). Data collection, dissemination and monitoring will require designated human and financial resources. A promising avenue would be to capitalize and build on existing data-collection platforms, such as the UNFCCC Clearing House on Risk Transfer, and the World Meteorological Organization (WMO) Climate System Monitoring. Another would be to establish transboundary socio-environmental monitoring networks and regional initiatives to offer lessons and best practices that the HKH could draw upon (Cartaya, 2024). In the Andes, for example, the Rosa network integrates existing long-term monitoring efforts in that mountain region into a network of observatories and learning sites. Thus, the network helps generate and share information in a coordinated and efficient manner, identify information gaps, make integrated readings of social and ecological changes in the region, and link this knowledge to land management and decision-making.

4

Integrate transboundary climate risks into national risk assessments.

Climate risk and vulnerability assessments tend to adopt a strictly national perspective. Often, they only assess the impacts of climate change that a particular jurisdiction is projected to experience directly (Fekete, 2010). These assessments need to broaden their scope to include transboundary climate risks – both those risks that originate outside of their jurisdiction but manifest within, and those risks that originate within their jurisdiction but are felt beyond. The process of identifying and assessing these types of risks should be shared among countries within the HKH to foster cooperation and facilitate learning from best practices. These assessments should take into account climate hazards that could exacerbate transboundary climate risks. They should also examine the socioeconomic drivers of transboundary climate risks, and the risks faced different societal groups, and the risks that may be of regional or common concern.

5

Commission assessments of best practices and responses in building resilience to cascading climate risks and share results in a common repository.

Beyond research and data collection on the risks themselves, responses and solutions should be identified and shared between sectors and scales. Current adaptation projects (whether led by governments or non-state actors across the region) should be mapped. Projects that are already addressing transboundary issues should be highlighted, and any gaps should be identified. The outcomes, challenges and good practices of such initiatives could be assessed and a current baseline established to guide future resilience-building efforts. Such efforts should contribute to greater harmonization of needs and responses by development partners across the region (Lu, 2011).





Policy and governance instruments

The 2023 UN Climate Change Conference took a decisive step towards creating a more effective enabling environment for the management of transboundary and cascading climate risks globally. But such recognition now needs to be reflected in stronger risk-management practices of governments the world over – including those in the HKH. This means integrating transboundary climate risks in national adaptation plans and strategies, but also considering their implications for policies across any number of government ministries, agencies and departments – from finance and foreign policy to trade and security (Anisimov and Magnan, 2023). How to feasibly achieve policy coherence and integration in the management of transboundary climate risks is one crucial issue for governments to explore. A related matter is whether current structures, processes and mandates are sufficient and effective to address such emerging risks – or whether institutional reforms are required (Townend et al., 2023).

National climate risk assessments and adaptation plans must go further than assessing transboundary climate risks; they must identify response options and indicate who will assume the task of reducing or managing the risk (Harris et al., 2022). Regional organizations, such as ICIMOD, can play a crucial role in assessing the coherence of policies between countries to ensure that adaptation measures that one country adopts do not inadvertently exacerbate the vulnerability of another (Lager et al., 2021). They also perform a critical function in strengthening the

international cooperation that will be vital to managing transboundary climate risks; at the 2023 UN Climate Change Conference, Parties recognized “the importance of international collaboration, including transboundary cooperation, for contributing to progress towards the goals of the Paris Agreement” (Decision 1/CMA.5 para 156). Such regional organizations could even host transboundary adaptation programs for identified intra-regional risks. But to successfully perform this role, countries need to be willing to communicate the transboundary climate risks they face and their planned adaptation actions – strengthening transparency and trust but also enabling complementarities to be harnessed between each country’s strategies and plans (Benzie and Harris, 2021). The HKH Ministerial Mountain Summit could be a key forum for this dialogue and exchange.

Governments will need to “go local” to ensure that policy measures to address transboundary climate risks account for the variable impacts and degree of severity that will likely be faced by some groups (the poorest and most marginalized, for example). At the same time, the highest-level political cadre must also act. In the case of transboundary risks, it is in the national interest to cooperate with others and harness the “collective advantage”. Adaptation must receive the political attention and prioritization it deserves, on a par with mitigation; it will require the full diplomatic prowess of nations to protect their policy ambitions from such risks and safeguard their investments.





This roadmap calls for four actions and measures to support and enhance the governance of transboundary climate risks in the HKH:

1

Establish a regional adaptation framework.

A regional organization such as ICIMOD should assess demand from Regional Member Countries (RMCs) to establish a regional adaptation framework, drawing inspiration from the recent adaptation plans and strategies of regional associations and continental unions (such as the African Union and European Union). Such a framework could highlight synergies between national adaptation plans, revealing common risks and shared needs and priorities that could benefit from collective action, thereby amplifying rather than duplicating national efforts. It could also reveal gaps in the management of transboundary climate risks that may warrant a regional adaptation approach, drawing on state-of-the-art evidence (action 2 under research, information sharing, and knowledge-based dialogue). The framework could further identify existing policy mechanisms and initiatives (national, bilateral and regional) that may serve as appropriate entry points for the design or implementation of effective responses³. This would strengthen the integration of transboundary and cascading climate risks in relevant policies and agreements. Conversely, it could highlight risks for which no obvious risk owners or potential remedial policies are in place – communicating such gaps to governments and regional organizations (action 1 under implementation, capacity strengthening, and finance). The framework could also support working groups to promote and monitor sectoral resilience-building initiatives.

2

Convene a regional climate summit.

A regional organization such as ICIMOD should host a flagship summit and associated high-level dialogues that bring together policymakers with non-state actors (researchers, practitioners, funders and community-based organizations) to drive adaptation to cascading climate risks. The summit should aim to strengthen political will, deepen the evidence base, and mobilize financial resources for transboundary adaptation initiatives. The summit should seek to underscore the risks that Indigenous Peoples and marginalized groups face from transboundary climate impacts and propose concrete actions that strengthen their resilience. Efforts should be made to encourage and enable governments respond to their needs and recognize their rights in their national climate strategies and plans.

³ Existing regional entities and networks may be effective in helping reduce and manage transboundary climate risks. Such entities and networks include, for example, SAARC groups on agriculture, disasters, early warning systems, and water treaties; and collaborations between WMO and national meteorological and hydrological services. The potential for such conduits to address transboundary climate risks must be identified and assessed to understand the extent to which any measures and options could be implemented through them.



3

Coordinate inter-ministerial and inter-departmental exchanges.

Governments in the HKH should establish inter-ministerial and inter-departmental exchanges or working groups to raise awareness of transboundary climate risks and help ensure the integration and coherence of responses to such risks. There is a huge gap in considering the implications of cascading climate risks in sectoral policies other than adaptation. Such exchanges or working groups should be tasked with examining and auditing policies to assess needs and opportunities for the integration of transboundary climate risks, and to appraise how the desired outcomes of policies may be impacted by transboundary climate risks, and/or may inadvertently undermine resilience to such risks. These working groups should also support efforts to demarcate roles for managing such risks within governments and develop coordination mechanisms where needed. Finally, they should help ensure that policies and plans better account for transboundary climate risks when they undergo periodic reviews and updates – offering an opportunity to flag any issues for discussion under the regional adaptation framework. Such an approach would reduce duplication of effort and ensure follow-up actions on lessons learned and recommendations made.

4

Instigate or support a group of mountain negotiators under the UNFCCC.⁴

This group could promote mountain and transboundary agendas in the negotiations through both joint submissions to the UNFCCC and the development of common messages. The group could also argue for structures and processes that would build a stronger enabling environment for the management of transboundary climate risks, such as institutional mechanisms that facilitate the sharing of national adaptation plans between countries to identify shared risks and planned responses to them. An initial step could involve a learning exchange with the Alliance of Small Island States (AOSIS), perhaps convened by a regional organization such as ICIMOD.

⁴ The Kyrgyz Republic proposed the establishment of a mountain partnership negotiating group at COP28.



Implementation, capacity strengthening, and finance

The IPCC (2023) has recognized that “weather and climate extremes are causing economic and societal impacts across national boundaries through supply-chains, markets, and natural resource flows, with increasing transboundary risks projected across the water, energy and food sectors”. However, governments and organizations aiming to implement adaptation to such cascading risks face three significant and related hurdles: lack of evidence, lack of capacity and lack of finance.

The systematic assessments and quantifications of risk that usually underpin adaptation plans and programs are only just beginning to emerge in the case of transboundary climate risks. This leaves the adaptation community faltering, reluctant to justify the investment needed for adaptation without a comprehensive understanding of the risk (especially in the face of competing needs and insufficient support for risks that are already well known and understood). Partly as a result, most government departments overseeing the development of adaptation plans and programs lack the capacities required to assess their country’s exposure and vulnerability to transboundary climate impacts. Capabilities are lacking to an even greater degree to design appropriate and effective responses to such impacts.

The inadequacy of climate finance to address transboundary climate risks has also been raised throughout this roadmap. Of the

small number of funded projects that are classified as regional or transboundary, most tackle shared or common risks rather than risks that flow between remote countries or regions. The short-term, project-based and country-specific nature of current multilateral funding models restricts opportunities for shared ownership of adaptation programs and the international cooperation Parties call for in UNFCCC decisions (Browne, et al., 2022). Even if these challenges were addressed, the hurdles in developing bankable proposals and accessing climate finance for transboundary projects would likely mirror those plaguing local and national adaptation projects.

Regional organizations and bodies such as ICIMOD, the SAARC Disaster Management Centre, and the South Asia Co-operative Environment Programme (SACEP) are well positioned to design and implement regional adaptation programs to address transboundary climate risks. They can play an important role in collaborating with multilateral and bilateral climate finance providers and advocating for greater support to both national and regional programs. They can also play an important role in building the capacity of governments and organizations to apply for and access climate finance, and to argue for greater allocations of national budgets to adaptation. But they would require enhanced support from the international community to overcome challenges and harness their potential.





This roadmap calls for six actions and measures to facilitate implementation, strengthen capacities, and mobilize climate finance in relation to adaptation to transboundary climate risks:

1

Develop a regional adaptation implementation framework to guide the operationalization of programs to address transboundary climate risks.

The implementation framework should complement the regional adaptation framework (action 1 under policy and governance instruments) by translating identified priorities for regional action into programming activities that build resilience to such risks in practice. The framework could initially encompass principles, recommendations and guidelines on the design and implementation of adaptation programs that build resilience to transboundary climate risks, drawing from best practices (action 5 under research, information sharing, and knowledge-based dialogue) and promoting just and equitable approaches (Malloy and Ashcraft, 2020). The framework could subsequently evolve to become a regional coordination mechanism spanning multiple action areas and adaptation projects led by a collective of national and local organizations, and to host regional programs to address risks for which no obvious owners or potential remedial policies are in place at the local or national scale.

2

Scope the needs, costs and benefits of an HKH Community-Based Early Warning System (HKH – CBEWS) to strengthen access to information about transboundary climate risks.

The system, if established, should support the most vulnerable people to help them respond effectively to natural hazards that could catalyse intra-regional risks through transboundary biophysical systems. It should build on local communities' knowledge, experience, needs and demands; rely on local infrastructure and technology (to disseminate warnings); and strengthen localized access to clear, timely and actionable information (Baudoin, et al. 2014). It should be integrated with existing early warning systems (such as the HKH Regional Flood Information System and the South Asian Flash Flood Guidance System). It should aim to cover multiple hazards and, crucially, to support communities to identify and respond to the range of hazards that could be generated as impacts flow across borders (Tsering, et al. 2021). Governments and regional organizations should also support and leverage existing training programs to enhance the understanding of local volunteers, community leaders and youth groups regarding the risks their communities face. They should help support them to interpret early warning signals, and act as intermediaries, ensuring that critical information reaches every household.

3

Develop a comprehensive and long-term, regional capacity-strengthening program on the management of transboundary climate risks.

This program could cover a range of needs, including but not limited to the following: providing technical support for national adaptation planners on transboundary climate risks; offering peer-to-peer exchanges on best practices in addressing these risks; providing training modules in accessing adaptation finance and sources of support for adaptation projects aimed at transboundary climate risks; convening policymakers in and across sectors to support the integration of transboundary climate risks into their plans and policies; establishing institutional exchange networks for practitioners with the aim of incentivising cooperation on addressing transboundary climate risks; and creating programs that engage with youth, vulnerable groups, and marginalized communities to strengthen their adaptive capacity and incorporate their views and practices in adaptation efforts. The program should be co-designed through a multi-stakeholder process and implemented through existing institutes and initiatives where possible.

4

Establish a regional climate adaptation fund dedicated to managing transboundary climate risks.

A regional organization such as ICIMOD should assess demand from Regional Member Countries to establish a regional adaptation fund that could raise and pool funds from diverse sources (including public- and private-sector sources of climate finance mobilized by governments, bilateral climate finance providers, philanthropic foundations, corporations, financial institutions, and individual investors) (Bose, 2020). It could also support efforts to mobilize funds from innovative models and financing mechanisms, such as climate-resilient bonds and catastrophic risk-insurance schemes.

This would mirror developments elsewhere: the Association of Southeast Asian Nations (ASEAN) State of Climate Change Report 2021, for example, places the "assessment of transboundary climate risks and actions" as one of the prioritized actions for enhancing adaptation by 2030. It argues that the "establishment of an ASEAN regional adaptation fund could make adaptation a regional agenda, help build solidarity, help address transboundary climate risks that individual country adaptation planning may not be able to address and make easily available new resources that countries need". The regional adaptation fund could develop guidelines for national contributions and incentivize allocations through cost-benefit analyses of regional resilience building. It should provide financial reporting guidelines to regional adaptation programs, balancing accessibility and usability with high standards of transparency and accountability.

5

Enhance the enabling environment for multilateral climate finance to better address transboundary climate risks in the HKH.

Regional bodies such as ICIMOD should support governments and organizations to develop bankable proposals for adaptation projects that address transboundary climate risks. To better enable such proposals to go forward, regional bodies should help map the climate finance landscape and the applicable mechanisms, processes and instruments.

National governments and regional organizations should also call for the Green Climate Fund and Global Environment Facility to include programming for adaptation to transboundary climate risks in their portfolios (via their UNFCCC negotiating teams). Negotiators could also recognize transboundary initiatives that the Adaptation Fund supports and call for their expansion, potentially via a specific window for pilot projects that build resilience to teleconnected risks propagating between non-neighbouring countries. More broadly, governments could encourage multilateral funders to develop more regional funding pools, expand the allocation of funds to longer-term regional adaptation programs, clarify and simplify their guidelines and funding models and procedures, and enhance flexibility of climate attribution to increase the accessibility of their funds (Browne, et al. 2022).

6

Host investment dialogues to fund adaptation projects and programs in key sectors affected by transboundary climate risks.

A regional organization such as ICIMOD should host investment dialogues that engage national and regional businesses and representatives from trade industry groups to facilitate increased private-sector finance for (and engagement in) adaptation efforts to address transboundary climate risks in the HKH.

The investment dialogues should provide an avenue for private-sector representatives and businesses to outline key risks their sectors face, and to improve understanding about opportunities, barriers, needs and enablers for enhancing adaptation efforts to these risks. At the same time, contributions from experts in these dialogues should encourage businesses to integrate transboundary climate risks and the implications of such risks into their investments to support climate action and a transition towards sustainability.

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