

Scientific Framework for ICIMOD's Regional Programme on Adaptation to Change

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About ICIMOD

The International Centre for Integrated Mountain Development, ICIMOD, is a regional knowledge development and learning centre serving the eight regional member countries of the Hindu Kush Himalayas – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – and based in Kathmandu, Nepal. Globalization and climate change have an increasing influence on the stability of fragile mountain ecosystems and the livelihoods of mountain people. ICIMOD aims to assist mountain people to understand these changes, adapt to them, and make the most of new opportunities, while addressing upstream-downstream issues. We support regional transboundary programmes through partnership with regional partner institutions, facilitate the exchange of experience, and serve as a regional knowledge hub. We strengthen networking among regional and global centres of excellence. Overall, we are working to develop an economically and environmentally sound mountain ecosystem to improve the living standards of mountain populations and to sustain vital ecosystem services for the billions of people living downstream – now, and for the future.



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Foreword

For hundreds of years, communities across the Hindu Kush Himalayas have demonstrated a high level of resilience and an innate ability to cope with change under difficult socio-ecological conditions. However, rapid environmental, social, and economic changes are now challenging their capacity to adapt to changing conditions. Communities in the Hindu Kush Himalayas are highly vulnerable to the impacts of climate change, which are further compounded by multiple other change processes in relation to demographics, land use, access to markets, and socio-political institutions. Specific approaches based on in-depth knowledge of local conditions and opportunities are needed to support effective short- and long-term adaptation measures in the region.

The International Centre for Integrated Mountain Development (ICIMOD) is committed to improving the lives and livelihoods of people living in the Hindu Kush Himalayas. This includes supporting the adaptation of vulnerable mountain households, communities, and ecosystems to enhance their resilience to change, focusing specifically on the challenges confronting mountain women and disadvantaged groups.

Through its Regional Programme on Adaptation to Change, ICIMOD aims to improve the resilience and livelihoods of mountain women, men, and children in the region by supporting adaptation to socioeconomic and environmental change, including climate change. This scientific framework was developed to provide strategic direction to enhance the programme's impacts on the ground and at the policy level in the countries of the Hindu Kush Himalayas. ICIMOD, in collaboration with the Center for International Climate and Environmental Research-Oslo (CICERO) and GRID-Arendal, initiated the development of this scientific framework for the Regional Programme on Adaptation to Change under the Himalayan Climate Change Adaptation Programme (HICAP). The programme's framework, which draws lessons from its forerunners, provides guidance on how to address challenges, where to make contributions, and how to direct efforts towards the 'burning questions' facing the region. It also addresses mountain-specific adaptation needs and provides a shared vocabulary and framework for designing activities and guiding them towards the programme's goals.

Focusing on the nexus between science, policy, and practice and the need to link adaptation to vulnerability and resilience, this framework outlines the need for a holistic perspective to understand climate change impacts in the context of other large-scale, non-climatic changes. Through this, it helps to position the Regional Programme on Adaptation to Change within a wider understanding of the drivers of social-ecological change and of the vulnerabilities and specificities of the Hindu Kush Himalayan region in order to support planned adaptation at the local, community, and national levels.



David Molden
Director General
ICIMOD



Acronyms

HKH	Hindu Kush Himalayas/Himalayan
HICAP	Himalayan Climate Change Adaptation Programme
ICIMOD	International Centre for Integrated Mountain Development
IPCC	Intergovernmental Panel on Climate Change
NAP	National Adaptation Plan
UNFCCC	United Nations Framework Convention on Climate Change

Acknowledgements

The Regional Programme on Adaptation to Change had a number of forerunners in ICIMOD, which impacted on its development. Significant among these are the Swedish International Development Cooperation Agency (SIDA)-funded 'Too much and too Little Water' project, the International Fund for Agricultural Development (IFAD)-funded 'Securing Livelihoods in the Uplands and Mountains of the Hindu Kush Himalayas' (Phases I and II), the Asian Development Bank (ADB)-funded 'Himali', the MacArthur Foundation-funded 'Assessment of Climate Change Vulnerability of Mountain Ecosystems in the Eastern Himalayas, as well as impact of climate change on biodiversity and related ecosystem', and the Ministry of Foreign Affairs, Norway-funded 'Himalayan Climate Change Impact and Adaptation Assessment' (HICIA), the predecessor of HICAP. The Programme objectives were developed drawing on the lessons from these forerunners.



1. Introduction

The International Centre for Integrated Mountain Development's (ICIMOD) Regional Programme on Adaptation to Change serves as an umbrella for three key 'Initiatives for Impact' designed to ensure the implementation of the programme's goals and objectives in line with ICIMOD's Strategic Plan. These initiatives are the 'Himalayan Climate Change Adaptation Programme' (HICAP); 'Livelihoods and Ecosystem Services in the Himalayas: Enhancing Adaptive Capacity and Resilience of the Poor to Climate and Socioeconomic Changes' (AdaptHimal); and 'Rural Livelihoods and Climate Change Adaptation in the Himalayas' (Himalica). To support coherence, enhance impacts, and promote synergies within this inherently complex programme, a scientific framework has been developed to define the scientific concepts and principles underpinning the programme to provide a context for prioritizing activities, coproducing knowledge, and delivering consistent scientific results. This framework guides and informs the production, use, and interpretation of the mountain-specific scientific information that forms the basis of ICIMOD's Regional Programme on Adaptation to Change.

This document elaborates the scientific framework of the Adaptation to Change Programme in an attempt to improve the connections between science, policy, practice, and stakeholders and to tackle challenges at the intersection of local, national, regional, and global change processes in the context of the Hindu Kush Himalayas (HKH). A specific goal of the framework is to provide decision makers in ICIMOD's regional member countries – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – with evidence-based knowledge, strategies, and tools to improve the conditions of mountain communities.

The scientific framework consists of three main components – science, policy, and practice. – and is guided by six cornerstones: historical and contextual complexities, consequences, conditions and vision for change, interpretation and subjective sense-making, responsibilities, and governance and decision making. These cornerstones, along with the science-policy-practice nexus and the theoretical focus on linking adaptation to vulnerability and resilience, position the efforts of the Adaptation to Change Programme and its 'Initiatives for Impact' within a wider understanding of the drivers of social-ecological change and of the vulnerabilities and specificities of the HKH region. The framework provides guidance on to how to address challenges, where to make contributions, and how to direct efforts towards the 'burning questions' facing the region, which are drawn from ICIMOD's strategic documents.



2. The Role of Scientific Framing in ICIMOD's Adaptation to Change Programme

Rationale

Communities in the Hindu Kush Himalayas are highly vulnerable to climate change. At the same time, they are subject to multiple other change processes in relation to demographics, land use, market opportunities, and socio-political institutions. Biophysical conditions, isolation, and socioeconomic marginalization pose constraints on the adaptive capacities of HKH communities and limit their ability to plan for the future. At the same time, mountain people are resilient and have over the years demonstrated an ability to cope with change under difficult socio-ecological conditions. Adapting to change in the HKH requires specific approaches based on in-depth knowledge of local conditions and opportunities. To address the special needs of the HKH region, ICIMOD initiated the Regional Programme on 'Adaptation to Change'.

Goal and Objectives

The main goal of the programme is to improve the resilience and livelihoods of mountain women, men, and children in the HKH region by supporting adaptation to socioeconomic and environmental change, including climate change. The overall objective is to support the adaptation of vulnerable mountain households, communities, and ecosystems and enhance their resilience to change, focusing specifically on the challenges confronting mountain women and disadvantaged groups. The specific objectives are to:

- produce, transfer, and communicate new evidence-based knowledge, as well as strategies and mechanisms for action, to diverse stakeholders
- identify economic, institutional, and governance-related mechanisms for ensuring and strengthening mountain people's adaptive capacity, with particular attention to women, gender, and power dynamics
- appreciate social-ecological linkages and the resilience of both as coupled systems with attention to livelihood diversification, institutional capacities for adaptation, and national and regional knowledge-sharing platforms.

Initiatives for Impact

The Regional Programme on Adaptation to Change Programme encompasses three 'initiatives for impact', all of which adopt a holistic perspective to understand climate change impacts in the context of other large-scale, non-climatic changes (socioeconomic, ecological, institutional) and as part of multidimensional vulnerability.

- **Himalayan Climate Change Adaptation Programme (HICAP):** This initiative is designed to produce solid interdisciplinary scientific knowledge across social, environmental, and climatic themes; create meaningful knowledge with and for communities; identify adaptation policy and planning strategies; and inform member countries of policy directions on climate change adaptation.

- **Enhancing Adaptive Capacity and Resilience of the Poor to Climate and Socioeconomic Changes (AdaptHimal):** This initiative aims to improve livelihoods and enhance community resilience, first, by developing a system to identify pockets of poverty and vulnerability and the location-specific drivers of change; second, by designing appropriate innovative livelihood and adaptation options through pilot interventions that improve livelihoods, thereby addressing vulnerability in the project areas; and third, by building the capacities of community members and institutions for adapting to change and facilitating policy engagement for the refinement and formulation of pro-poor policies that address the needs of poor and vulnerable mountain communities.
- **Rural Livelihoods and Climate Change Adaptation in the Himalayas (Himalica):** This initiative aims to support the development of rural mountain livelihoods in the context of socioeconomic and climatic change, as well as the conservation of HKH ecosystem assets and services, through active regional cooperation. To achieve its goals, the initiative enhances the capacity of regional partners to formulate policy on adaptation; raises awareness and disseminates knowledge on the effects of climate change and adaptation responses in the region; strengthens collaborative action research to generate evidence-based knowledge on adaptation; conducts collaborative pilot activities for adaptation and livelihood interventions; and builds institutional capacities on climate change adaptation, particularly of educational and training institutions.

These initiatives are collectively committed to building on existing capabilities, strengthening multiple forms of knowledge (quantitative and qualitative scientific findings, indigenous and traditional knowledge, and practical know-how), supporting bottom-up and gender-sensitive perspectives, improving science-policy-practice-stakeholder interfaces, and tackling challenges at the intersection of local, national, regional, and global change processes in the context of the HKH. An additional concern that underpins all of these initiatives is the need to provide decision makers in ICIMOD's regional member countries at all levels with evidence-based knowledge, strategies, and tools that will improve the conditions of mountain communities.



3. Addressing Mountain-Specific Adaptation Needs: Enhancing Adaptive Capacities

Lessons from the Past

Lessons from ICIMOD's past projects that have assessed the impacts of climate variability, socioeconomic change, and the ability of communities to adapt to change clearly indicate a need to design interventions that increase the resilience of production systems, enhance and diversify income and livelihood opportunities, and strengthen local governance mechanisms. These insights are central to strengthening the adaptive capacities of mountain communities and, thereby, reducing their vulnerability. In particular, findings from past initiatives indicate a need to design interventions – technical and institutional – specifically to improve natural resource management practices and strengthen resilience within production systems. Moreover, there is a need to ensure access to inputs, in particular with regard to food security during lean periods, by strengthening (or initiating where necessary) institutional mechanisms that address such needs.

The findings from past projects also suggest the importance of enhancing incomes by diversifying income opportunities and encouraging risk management mechanisms. They also highlight the need for effective support services, particularly in regard to technical outreach and extension services, input sourcing, and markets, in order to strengthen short-term and long-term adaptive capacities and resilience. Most importantly, learning from past projects suggests a critical need to facilitate the flow of information and exchange of knowledge for informed decision making, particularly at the local governance level, for the formulation of effective strategies and action that can reduce vulnerability and enhance the long-term resilience of rural communities. While the results of ICIMOD's past projects and assessments provide the necessary direction for designing strategies to enhance short-term and long-term adaptive capacity, these have to be contextualized with the rapid changes taking place in the HKH.

Mountains as a Frame of Reference

Vulnerability in the mountains has multiple dimensions, many of which arise out of the biophysical fragility of the terrain. The vulnerability of mountain communities is, in part, caused by their insularity, a condition resulting from the constraints imposed by inaccessibility. Although inaccessibility is most obviously manifested in terms of physical connectivity to the outside world, in practice this translates into extremely limited access to inputs, extension and support services, markets, and information. More importantly, inaccessibility limits the ability of mountain communities to effectively make their voices heard in decision-making forums, thus marginalizing them in the larger development context and reducing the chances of any affirmative action by relevant government mechanisms. Although opportunities do arise out of the high natural and cultural diversity in mountains, which add important niche value to many mountain resources, the inaccessibility and marginality of mountain communities often make it challenging for mountain people to capitalize on such opportunities.

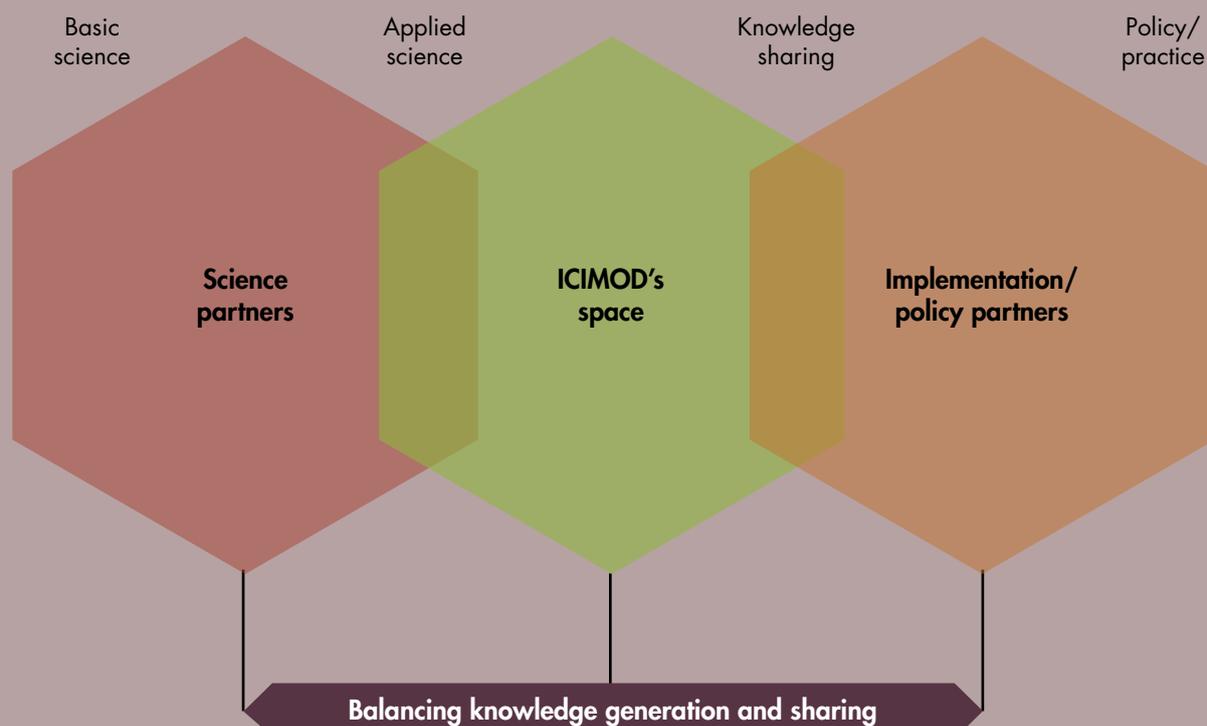
The design of any framework for enhancing the adaptive strategies of mountain communities to cope with climate or socioeconomic change processes will, therefore, have to factor in specificities of the mountain context. However, there is a critical dearth of in-depth information, knowledge and understanding on the different dimensions of mountain poverty and vulnerability. This is further exacerbated by the lack of information and knowledge on the severity and

multiple effects of climate change and on its impacts on mountain communities in the HKH. This lack of knowledge, and the resulting limitations on our understanding of mountain poverty and vulnerability, constrains the development of effective policy action. It is in this context that a scientific framework becomes a critical prerequisite for generating evidence-based knowledge to improve our understanding of the contours of change and the extent of poverty and vulnerability in the mountains, as well as the opportunities and challenges that are specific to this context.

The scientific framework described in the subsequent sections defines the parameters for knowledge generation and, thereby, the scientific foundation on which all generated knowledge can be analysed, interpreted, and packaged to provide evidence for informing policy action. The framework fits into ICIMOD’s Strategic Plan as illustrated in Figure 1.

The scientific framework of ICIMOD’s Adaptation to Change Programme clarifies the main concepts on which the various initiatives are built. It sets the foundation for connections and cross-learning among the different components of the programme; delineates the boundaries of the programme; and provides guidelines for orienting the process of choosing, designing, and carrying out specific activities in order to meet goals and achieve outcomes. The framework serves as a guide for how to address challenges, where to make contributions, and how to identify the ‘burning questions’ that drive our efforts. It also proposes a shared vocabulary and delineates a conceptual framework that guides our approach to the dynamics of adaptation from local to global scales; to institutional and governance-related challenges; and to enhancing adaptive capacities leading to socio-ecological resilience through salient, legitimate, and credible research results for mountain communities in the HKH region and for ICIMOD’s regional member countries. The framework provides a foreground for the positioning of regional solutions within a larger international debate. It provides necessary guidance for setting priorities in research, practice, and policy.

Figure 1: ICIMOD’s role in linking knowledge generation with policy implementation





Burning Questions

The 'burning questions' address core concerns in relation to vulnerabilities and potential adaptations to change. They remind us of the fundamentals that go beyond science and policy and challenge us to move beyond 'taken-for-granted' inquiries. These questions are as follows:

- Which changes have the largest impact on the lives of mountain communities and which questions are we seeking to understand?
- What factors contribute to adaptive capacity in the context of the HKH?
- Which resources are important to local livelihoods in the HKH region and how do climatic and other global and regional drivers and processes affect these resources?
- How will changes affect upstream-downstream relationships?
- What additional stress does climate change place on individuals, households, communities, policy makers, and ecosystems?
- What are mountain people's current adaptive capacities, how do these capacities help them strive toward the lives they want to live?
- What flexibility do people and livelihood systems have and what constrains their flexibility to adapt?
- What institutional capacities and which structural factors beyond people's immediate control enable or hinder their capacities to adapt or even exacerbate their vulnerabilities?
- How certain can we be about the future impacts of climate change and other overlapping changes (e.g., deforestation, migration, global markets) on people's lives, as well as the impacts of local adaptation efforts and policies, and what are the limits to science and feasible solutions?
- How much change do people desire, how much can they handle, and when is change disruptive?
- What are the likely barriers to, and limits of, adaptation, and whom do they affect?
- What policy, institutional, and technological options are available to facilitate adaptation?
- What are the central policy frameworks influencing people's adaptive capacities and government actions in relation to adaptation?
- How can we measure and evaluate adaptation interventions, particularly in relation to routine development interventions?

A Shared Vocabulary

The Adaptation to Change Programme and its initiatives use the following terms and their definitions to guide programme activities and monitor success. The definitions are largely derived from existing science and from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report and, thus, are not formally cited here. Each is intended to be used as guidance, not to be translated, reinterpreted, and used in diverse contexts or for different audiences.

- **Adaptive capacity:** The combination of strengths, attributes, and resources available to an individual, community, society, or organization that can be used to prepare for, and undertake actions to, reduce adverse impacts, mitigate harm, or exploit beneficial opportunities. Also defined as the ability of systems, institutions, and individuals to adjust to potential damage, to take advantage of opportunities, or to respond to consequences.
- **Adaptation to climate change:** In human systems, the process of adjusting to actual or expected climate conditions and their effects, in order to mitigate harm or exploit beneficial opportunities; in natural systems, the process of adjusting to actual climate change and its effects. Human intervention may facilitate adjustment to expected climate change.
- **Capabilities:** A person's opportunity and ability to generate valuable outcomes.
- **Gendered impacts and opportunities:** Differences in experienced impacts and possible responses due to the distinct social and cultural roles imposed on men and women, always in combination with other dimensions of privilege and marginalization (age, class, caste, race, ethnicity, [dis]ability).
- **Flexibility:** The potential for change and opportunities for adaptation under conditions of uncertainty.
- **Resilience:** The ability of a social, ecological, or socio-ecological system and its components to anticipate, reduce, accommodate, or recover from the effects of a disturbance in a timely and efficient manner, including the human ability to learn from mistakes and be forward-looking in thought and action, as well as the ability of ecosystems to preserve and restore their functions. It is useful to distinguish between 'engineering' or restorative resilience and 'ecological' or transformative resilience (bounce back and bounce forward).
- **Uncertainty:** A state of incomplete knowledge that can result from a lack of information or from disagreement about what is known or knowable. Uncertainty may have varied sources, from imprecision in the data to ambiguously defined concepts or terminology, or uncertain projections of human behaviour. Uncertainty may also be inherent in the biophysical properties of a system, such as the climatic system. Uncertainty can, therefore, be represented by quantitative measures (e.g., a probability density function) or by qualitative statements (e.g., reflecting the judgment of a team of experts).
- **Vulnerability:** The propensity (natural tendency) or predisposition (structurally-driven tendency or likelihood) to be harmed.



4. Framework for Designing Activities and Guidance Towards Programme Goals

The programme's shared vocabulary indicates an alignment between the programme initiatives and the concepts employed by major international initiatives and recent IPCC reports. The burning questions guide and focus the activities of the initiatives on the issues that are of most relevance. The conceptual framework links science, practice, and policy and guides ongoing work towards the shared outcome: enhanced adaptive capacity and resilience in the face of multiple drivers of change.

The framework is composed of three main elements with the following objectives:

- To situate ICIMOD's Adaptation to Change Programme at the forefront of a new era of global change programmes
- To offer a specific theoretical perspective linking adaptation, resilience, and vulnerability while situating the programme within existing constraints and opportunities in the HKH region
- To articulate a process-oriented linkage between science, policy, and practice to guide research and implementation

The Six Cornerstones: Coproducing Salient, Credible, and Legitimate Research

To guide the objectives of local community impact and policy relevance in order to support the adaptation of vulnerable mountain households, communities, and ecosystems and enhance their resilience to change, the Adaptation to Change Programme adopts six distinct cornerstones for global change research elaborated by the International Social Science Council. This work is embedded in the International Council for Science latest framework, 'Future Earth'.

The cornerstones are:

- historical and contextual complexities;
- consequences;
- conditions and visions for change;
- interpretation and subjective meaning-making;
- responsibilities; and
- governance and decision making.

The six cornerstones define a fundamental set of lenses through which to understand the processes of climate change and global environmental change as social processes embedded in specific social systems – past and present. They provide tools for critically questioning and rethinking the shape and course of these processes and systems in the future. The aim is to promote integrated research across the sciences and to ensure a research design that considers impact and decision-making needs from the outset, which is necessary to give the impact of ICIMOD's initiatives saliency, legitimacy, and credibility. The cornerstones and respective details for use in Table 1 were developed to frame research and guide processes of knowledge production, regardless of the questions to be addressed or research sites used.

Table 1: Six cornerstones of the Adaptation to Change conceptual framework

Cornerstone	Details for use
Historical and contextual complexities	<ul style="list-style-type: none"> • Distinguishing multiple stressors, drivers, and interdependencies • Dealing with differences across geographical, cultural, personal, and professional contexts and identities • Learning from history
Consequences	<ul style="list-style-type: none"> • Living with global change • Taking stock of threats and impacts across different groups and regions • Identifying social boundaries and tipping points • Measuring success • Improving the outcomes of specific actions and instruments
Conditions and visions for change	<ul style="list-style-type: none"> • Understanding how we can change behaviour and social practice • Speeding and scaling up processes of change • Building consensus on the directions for change
Interpretation and subjective sense-making	<ul style="list-style-type: none"> • Understanding the nature and role of subjectivities, values, beliefs, interests, hopes, and needs • Creating different visions of the kinds of societies we should be striving to build
Responsibilities	<ul style="list-style-type: none"> • Focusing on the most vulnerable • 'Foregrounding' normative issues • Promoting wellbeing • Fostering global and inter-generational justice • Safeguarding ethical approaches
Governance and decision making	<ul style="list-style-type: none"> • Coming to grips with policy processes and political will • Identifying drivers and barriers for decision making • Mapping institutional capacities • Making knowledge work • Building relevant institutions and structures at different levels • Ensuring dialogue and collaboration • Fostering participatory decision making • Promoting participatory policy engagements and formulation

These cornerstones provide guidance for research choices and the implementation of activities under the Adaptation to Change Programme. They serve as tools for setting boundaries for this framework and ensuring that the questions asked are relevant to the HKH context – but they are not to be mistaken for predefined priorities.



Adaptation as a Factor in Vulnerability and Resilience

At the core of this scientific framework is the understanding that change is inevitable, that the Hindu Kush Himalayan region is dynamic, and that a variety of entry points are required to assess the dimensions of change and envision possible pathways that can benefit vulnerable mountain communities. The framework acknowledges a sense of urgency in the face of multiple socio-ecological boundaries and changes across various spatial and temporal scales, as well as the need to understand the cultural, gendered, and value-related specificities of multiple stakeholders, their relation to one another, and their relation to nature.

The central issues for the HKH region are perhaps best captured by the range of concerns addressed jointly by the three initiatives. They have components on climate scenarios and hydrological models, a focus on ecosystems and food security, and a central component on adaptation to change. They also pay specific attention to women and gender. The dissemination and communication of cross-component work, together with ambitious designs, enable HICAP, AdaptHimal, and Himalica to develop and expand ICIMOD's work on adaptation in the region.

This multiplicity of change also contains many possibilities. The framework recognizes the opportunities for change inherent in mountain communities and their ecosystems and the opportunities that policy makers and other stakeholders have before them to enact positive change, as well as the opportunities posed by the increasing focus on adaptation by national and international bodies such as National Adaptation Plans (NAPs) and other United Nations Framework Convention on Climate Change (UNFCCC) policies and finance protocols. Moreover, the framework recognizes a multiplicity of activities for adaptation to change in the region and the wealth of knowledge locally, nationally, and internationally. The framework takes as its point of departure the need to come to grips with change and uncertainty, rather than downplaying or fighting this reality. It supports embracing and working with change and uncertainty and focuses on how local communities and other stakeholders interpret change and uncertainty, while providing guidance for decision making.

Change processes are dynamic, and it is important to situate resilience and adaptation responses within these change processes. Adaptation, resilience, and vulnerability are best seen as processes, not the result of a one-time intervention or focal event. Resilience is at the core of ICIMOD's strategic long-term planning, but in the Adaptation to Change Programme it is situated as a factor of adaptation and vulnerability. The framework defines 'resilience' as the ability of a social, ecological, or socio-ecological system and its components to anticipate, reduce, accommodate, or recover from the effects of a disturbance in a timely and efficient manner. Local adaptation distinguishes between 'engineering' or restorative resilience and 'ecological' or transformative resilience (bounce back and bounce forward). To better understand and improve resilience requires paying attention to the changes that occur on larger scales, through careful and continuous learning and flexibility; attention to culture, gender, and women's roles; and awareness of limits and the multiple effects of global processes on local systems and their capacities for change. It also requires a central focus on institutions and the national and international frameworks that guide decision making.

There is an undeniable gap between the knowledge provided by models and downscaled scenarios and the immediate need for local adaptation and decisions in the short term. The knowledge gap also refers to the availability of information, often dependent on social processes, as well as on the availability of well-prepared institutional mechanisms for proper absorption of that information into decision making. This is why a focus on local knowledge processes and decision-making practices can help supplement the deficit of knowledge on adaptation and bridge scientific worlds across disciplines.

Uncertainties and knowledge gaps, as well as the conception of adaptation, vulnerability, and resilience, call for sustainability, equity, flexibility, and the capability to respond – and also for legitimate, feasible, and efficient responses. Many uncertainties cannot be reduced, not everybody or everything can always be resilient, and invulnerability is an unrealistic goal. Feasible and equitable transitions to sustainability for the HKH region need to aim for an optimal balance between vulnerability, resilience, and adaptive capacity, both for people and ecosystems, as well as the interactions between them.

This moves us toward critical thinking with respect to one of the fundamental issues in this programme: a proper understanding of what constitutes adaptive capacity and adaptation. Toward this, we propose to make a direct link between adaptation and resilience to vulnerability. Vulnerability and resilience are not opposites, but complementary, and are both important factors in adaptation. Resilience and vulnerability coexist, not only in individuals, but also in communities, sectors, institutions, and regions. The purpose of the initiatives under the programme is to provide an idea of which strategies and mechanisms could potentially constitute well-grounded adaptive measures and increase resilience – which is not the same as pretending that we can achieve invulnerability – as well as to better understand uncertainties.

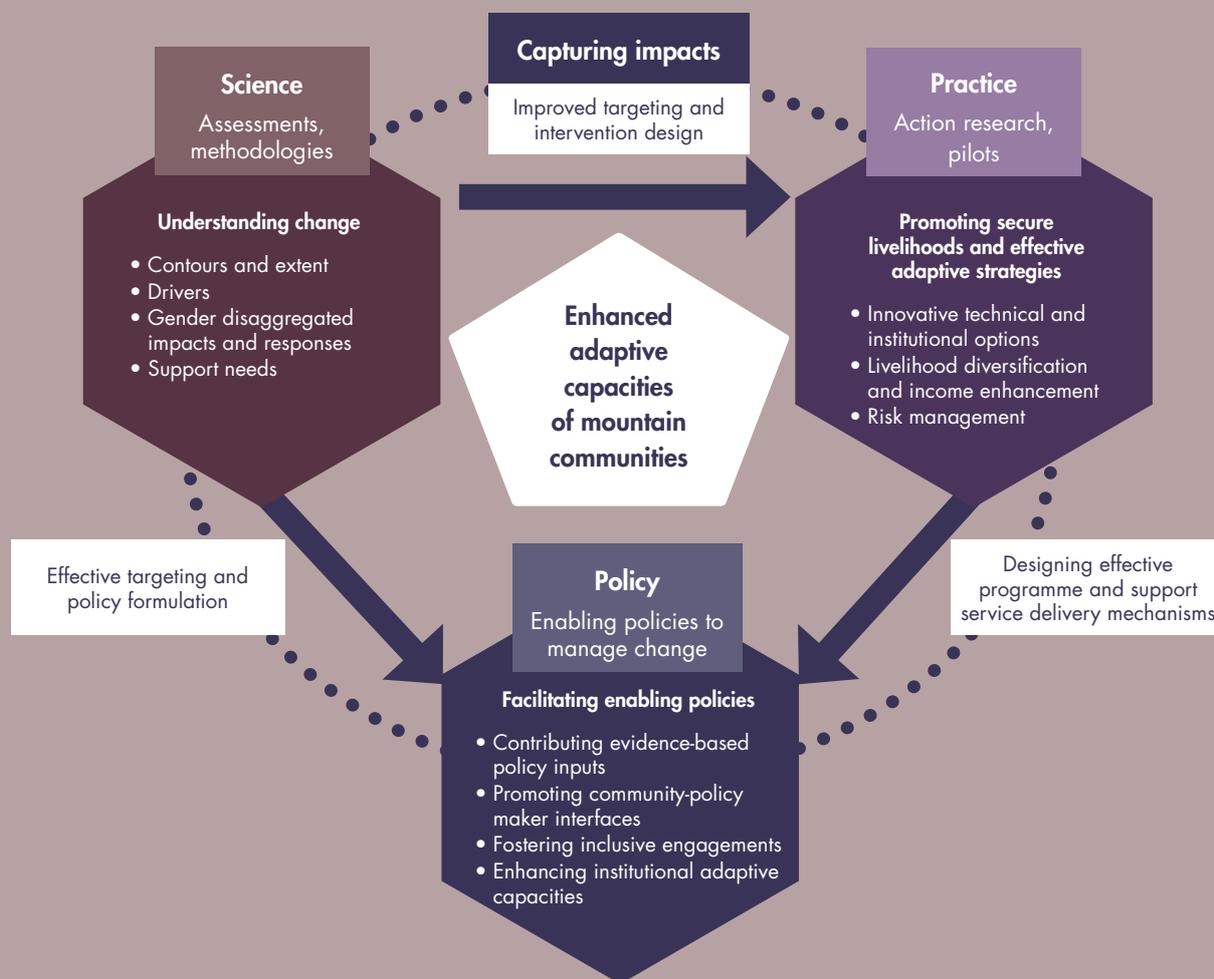
Deciding on what adaptation action is taken implies deliberate reflection on how much harm, loss, and vulnerability is acceptable (because it is unavoidable) and how much is intolerable. It also implies defining the feasibility of, and opportunity space for, actions and decisions about resource allocation.

Addressing adaptive capacity in relation to resilience and vulnerability centres our attention on institutions, or their absence, as central mediators for change to happen and for protection from risks for communities and individuals. This process is dynamic and constantly in flux, and, inevitably, power-laden. For the purposes of project activity design it is important to ask ourselves: For whom and for what do we seek resilience or adaptation options?

Three Components: Science-Policy-Practice

The conceptual linkages between adaptation, resilience, and vulnerability are situated on the central axes articulated in the Adaptation to Change Programme: knowledge building, practice, and policy, and emphasizing multi-directionality across the three components of the Adaptation to Change Programme (Figure 2). These components recognize that there are multiple sources and types of knowledge, some of them strictly local and

Figure 2: Change matrix for the Adaptation to Change Programme



rooted in the particularities of mountain people and their contexts. Other sources of knowledge are global (such as climate scenarios or international scientific trends). ‘Knowledge’ in this framework also refers to practical knowledge, arising from experience, tradition, and non-scientific ways of knowing. The challenge is to bind them all together through research design and activities, while also attending to their usability by communities as well as by other decision makers.

Component A: Science addresses the understanding of vulnerabilities and opportunities for change through the analysis of previous and ongoing work in the region and the production of new knowledge from multiple viewpoints and different scientific and non-scientific perspectives. The framework enables a variety of analyses, from assessments of existing knowledge to production of new knowledge. Understanding vulnerabilities and opportunities can be done through climate and hydrological modelling, downscaled climate projections, and the assessment of ecosystem services or food insecurity, as well as by means of household surveys, micro and macroeconomic analyses, ethnographic place-based research, and action research, including the analysis of local governance, institutional capacities, and content, and the frame analysis of adaptation plans. There are direct links between this knowledge-producing component and practice, but also possible direct links with policy transfer and analysis.



Programme research design and deliverables should be both salient and credible to a wide range of audiences, effective at meeting user requirements, and aimed at informing robust policy formulation and sustainable implementation. This entails embracing multiple ways of doing research and multiple methodological and epistemological traditions. It also means making sure that results are used. The framework pays central attention to how research findings are framed, how narratives are constructed, and how these can best be packaged to increase reception by, and usability for, different decision makers with diverse needs in different cultural, political, and socioeconomic contexts.

Component B: Policy focuses on science-policy-stakeholder interfaces. It corresponds with the policy axis in the current formulation of ICIMOD’s Regional Programme on Adaptation to Change. This component guides all scholars and partners in the teams working for initiatives for impact under the Adaptation to Change Programme to ensure that their views are easily understood by those outside their expert communities and to ensure that the results of their work are translated and usable by multiple stakeholders. The codesigning of activities with stakeholders is central to success. An understanding of policy processes and existing institutional mechanisms, as well as the content of relevant documents, is also central. Finally, this component requires the development of appropriate monitoring and evaluation tools.

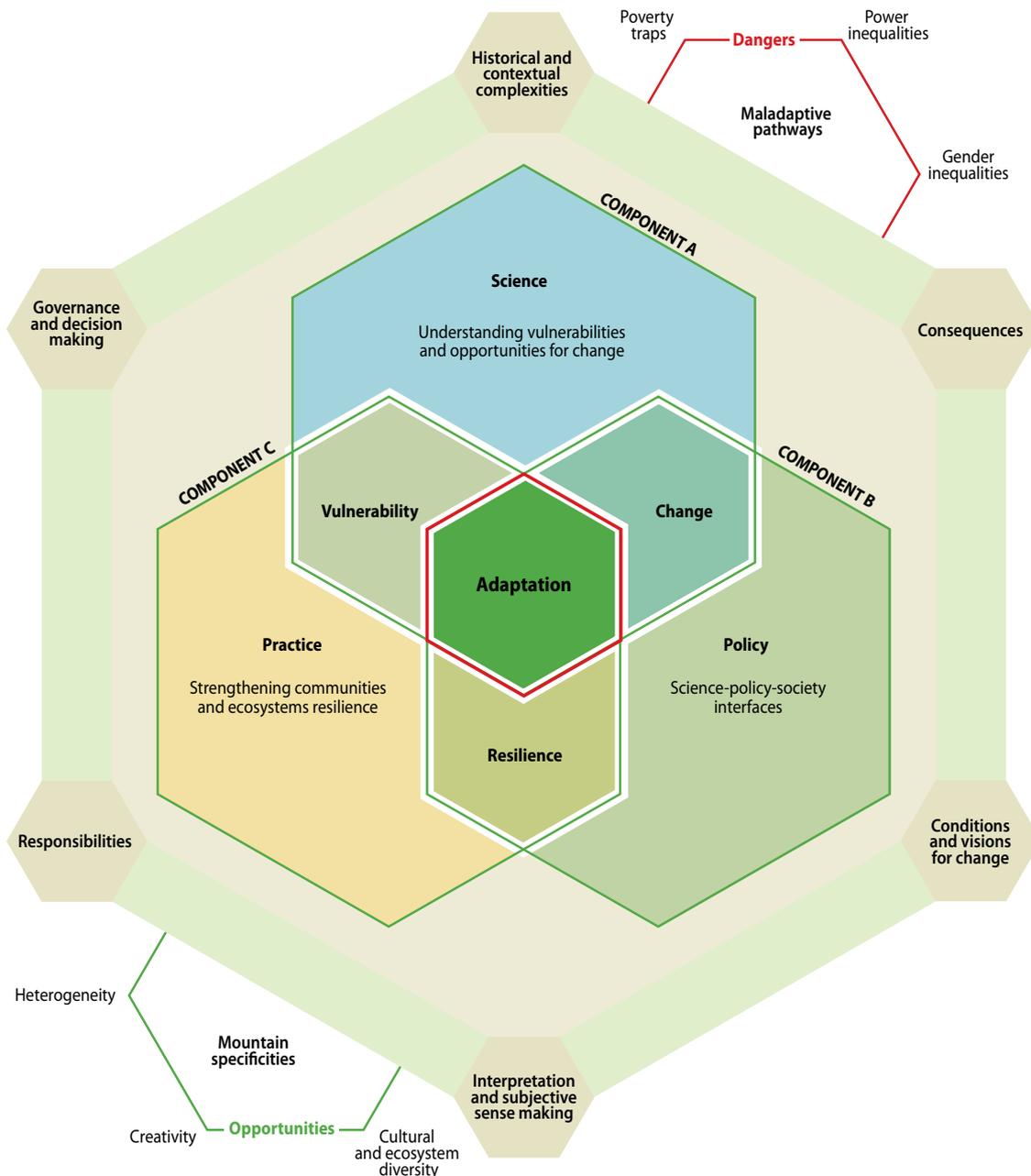
Component C: Practice relates to impact and, when taken as central, leads us to think through a cyclical conception of research activities, capacity building, and decision making leading towards strengthened community and ecosystem resilience. After the assessment and understanding of vulnerabilities and opportunities (Component A), this cyclical model envisions a direct link with practice through direct engagement to enhance adaptive capacities. It supports learning and the monitoring of activities in collaboration with communities and other stakeholders to improve understanding of change processes and capacities to respond and prepare for them. Another aspect of this component engages in strengthening socio-ecological resilience by identifying and creating possibilities for improved capacity to cope with change and uncertainty.

Scientific Framework

The six cornerstones, along with the science-policy-practice axis and together with the specific theoretical choice of linking adaptation to vulnerability and resilience, situates the efforts of the Adaptation to Change Programme and its initiatives for impact in a wider understanding of the drivers of social-ecological change and the vulnerabilities and specificities of the HKH region. This three-level and interconnected conceptual framework, as outlined in this section, is illustrated in Figure 3.

The six points of the hexagon represent the cornerstones, which provide signposts to the framework – the boundaries of the programme – and shed light on the context of the other two elements of the diagram. At the intermediate level, the science-policy-practice interface calls for specific efforts to design and produce results that serve the purpose of achieving concrete impacts in multiple communities. On the central axis of the hexagon we find the key framing of the programme, which conveys the relationship between adaptation, resilience, and vulnerability situated within the other elements.

Figure 3: Scientific framework for adaptation to change in the HKH



Finally, outside the hexagon are the dangers and opportunities specific to mountain communities. Power, gender inequalities, and poverty traps may lead to maladaptive pathways, while mountain specificities, such as cultural and ecosystem diversity, creativity, and heterogeneity, can be harnessed as opportunities for resilience. These outer concepts convey the need to pay attention to the most vulnerable populations and their specific comparative advantages in the activities of the programme and its initiatives for impact.

This scientific framework guides us by:

- Providing a basic theoretical framework through which adaptation is understood as a factor of resilience and vulnerability
- Identifying a multiplicity of stressors and mountain-specific diversity and opportunities
- Identifying the components of, and threats to, adaptive capacity
- Requiring the co-exploration and coproduction of knowledge
- Envisaging integrated research and perspectives across all sciences and recognizing the need to present results in ways that are easily understood by multiple communities (local as well as scientific and policy-making)
- Focusing on local knowledge and understanding of decision-making processes and their players
- Localizing global modelling data as meaningful input for adaptation options
- Presenting scientific results with variables that have relevance for communities and policy making
- Focusing on participatory community-oriented research that identifies elements of adaptive capacity in mountain communities and in relation to central themes such as food security, ecosystem services, and gender
- Focusing on stakeholder analysis, problem structuring, analysis of constraints, and incentives
- Using macroeconomic modelling as a tool to link multiple data from all components and to guide adaptation options
- Using vulnerability assessment and vulnerability index
- Focusing on the analysis of HKH institutions with relevance for adaptation
- Providing a framework for the assessment of institutional capacities that facilitate or hinder adaptive capacities and resilience
- Focusing on bringing scientific findings into policy development processes, opportunities, and limitations at different levels of decision making
- Focusing on the analysis of relevant documents for adaptation in target countries and regions
- Providing a framework for monitoring and evaluation, and learning



5. Conclusion

The framework for the Regional Programme on Adaptation to Change is intended to guide programme teams to reveal the historical and contextual complexities that shape structural inequalities, vulnerabilities, and poverty as well as possibilities, while envisioning alternate futures and understanding policy process and decision-making strategies. It provides a framework for investigating the components that form adaptive capacity, as well as those that threaten it. The framework will guide teams in the initiatives for impact to better understand the multi-scale consequences of climatic and global change, to acknowledge both scientific and subjective knowledge creation, and to address the ability of people and systems to respond to problems, including attention to cross-linkages in decision making and the bridging of diverse scientific universes. It focuses the attention of research and activity design on audiences and impact and on the coproduction of actions and solutions.

The framework also directs attention to pinpointing institutional blockages and policy openings to facilitate planning at local, district, national, and regional levels; to develop monitoring, evaluation, and learning systems; and to operationalize disaster preparedness plans, National Adaptations Plans, and policies for adapting to change. This more holistic understanding highlights the multiple ways these plans and policies are interconnected and required to work together, with the ultimate goal of answering the burning questions relevant to the Hindu Kush Himalayas.



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