



Sustainable Mountain Development in the Hindu Kush – Himalaya

From Rio 1992 to Rio 2012 and beyond

2012



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Sustainable Mountain Development 1992, 2012, and Beyond

Rio+20 Assessment Report for the Hindu Kush Himalayan Region

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Acronyms and Abbreviations

| | |
|-----------------|---|
| ABC | atmospheric brown cloud |
| ADB | Asian Development Bank |
| AJK | Ajad Jammu and Kashmir |
| AKRSP | Aga Khan Rural Support Programme |
| APMN | Asia Pacific Mountain Network |
| CAMPA | Compensatory Afforestation Fund Management and Planning Authority |
| CAS | Chinese Academy of Sciences |
| CBD | Convention on Biodiversity |
| CBNRM | Community Based Natural Resource Management |
| CBO | community based organization |
| CDM | Clean Development Mechanism |
| CERs | Certified Emission Reductions |
| CF | Community forest |
| CFUG | Community Forestry Users Groups |
| CICERO | Centre for International Climate and Environmental Research–Oslo |
| CO ₂ | Carbon dioxide |
| CONDESAN | Consortio para el Desarrollo Sostenible de la Ecorregión Andina |
| CPIRC | China Population Information and Research Centre |
| FAO | Food and Agriculture Organization of the United Nations |
| FATA | Federally Administered Tribal Areas |
| FCA | Forest Conservation Act |
| FRDC | Forest and Rural Development Commissioner |
| GAD | Gender and Development |
| GBC | Gilgit-Balistan and Chitral |
| GDP | Gross domestic product |
| GFG | Grain for Greens |
| GGEI | Global Green Economy Index |
| GHG | greenhouse gas |
| GII | Gender Inequality Index |
| GMP | Global Mountain Product |
| GNH | Gross National Happiness |
| GRID | Global Resource Information Database |
| HDI | Human Development Index |
| HICAP | Himalayan Climate Change Adaptation Programme |
| HKH | Hindu Kush Himalayan |
| HRDI | Herbal Research and Development Institute |
| ICIMOD | International Centre for Integrated Mountain Development |
| ICT | Information and communication technologies |
| IFAD | International Fund for Agricultural Development |
| INGO | international non-governmental organization |
| IPCC | Intergovernmental Panel for Climate Change |
| ITK | Indigenous Technical Knowledge |
| IUCN | International Union for Conservation of Nature |
| MAP | Medicinal And Aromatic Plants |
| MDG | Millennium Development Goal |
| MF | Mountain Forum |
| MHP | micro-hydro project |
| MP | Mountain Partnership |
| MPC | Mountain Partnership Consortium |
| MPI | Multidimensional Poverty Index |
| NAREGA | National Employment Guarantee Act |

| | |
|----------|---|
| NaRMGs | Natural Resource Management Groups |
| NERCORMP | North Eastern Region Community Resource Management Project for Upland Areas |
| NGO | non-governmental organization |
| NRM | natural resource management |
| NTFP | non timber forest products |
| NWFP | North Western Frontier Province |
| PES | payment for ecosystem services |
| PFI | Pakistan Forest Institute |
| PPP | Purchasing Power Parity |
| R&D | Research and Development |
| REDD | Reducing Emissions from Deforestation and Degradation |
| SAFTA | South Asian Free Trade Agreement |
| SD | Sustainable Development |
| SDC | Swiss Development Corporation |
| SEAP | South East and Asia Pacific |
| SMD | sustainable mountain development |
| SMPB | State Medicinal Plants Board |
| SUDEMAA | Sustainable Development of Mountain Areas of Asia |
| TPE | Third Pole Environment |
| TWMP | Tarbela Watershed Management Project |
| UN | United Nations |
| UNCED | United Nations Conference on Environment and Development |
| UNDESA | United Nations Department of Economic and Social Affairs |
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environment Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UNICEF | United Nations Children's Fund |
| UNPD | United Nations Population Division |
| UOCB | Uttarakhand Organic Commodity Board |
| UPFR | Uttarakhand Panchayati Forest Rules |
| UTM | Universal Transverse Mercator |
| VDB | Village Development Boards |
| VP | Van Panchayat |
| WCMC | World Conservation Monitoring Centre |
| WFP | United Nations World Food Programme |
| WID | Women in Development |
| WSSD | World Summit on Sustainable Development |

Executive Summary

The mountains of the Hindu Kush Himalayas (HKH) are abundant in natural resources. These unique landscapes provide valuable ecosystem goods and services to support livelihoods of more than 1.3 billion people – directly and indirectly. But the harsh terrain and lack of enabling institutional frameworks and policies have constrained and pose serious challenges to sustainable development of this important mountain system. The region includes four global biodiversity hotspots, 330 important bird areas, and 60 global eco-regions. The 488 protected areas in the HKH provide vital ecosystem goods and services to more than 1.5 billion people in the uplands and the lowlands. The greater Himalayas – the water tower of Asia – is the source of 10 major river systems that support water supply, food production, biodiversity, and energy generation in the region, including supporting the two fast-growing economies of India and China.

The region is home to more than 40% of the world's poor but is also one that faces 'extreme' vulnerability and risks due to climate and global changes. Progressive warming at higher altitudes has been three to five times the global average. The region has witnessed increased snow and glacial melt and the frequency of extreme events have exacerbated the livelihood risks resulting from increasing poverty, food insecurity, natural hazards and social inequities. Climate-induced changes have not only made it difficult for mountain countries to attain the Millennium Development Goals (MDGs) but also threaten to slow down or even reverse the progress made so far. The HKH countries face frequent food and energy crises and growing social and political unrest, while the climate impacts have shrunk development space while progress on past global commitments to sustainable development remains slow.

The Rio+20 conference is an opportunity for the HKH region to take stock of progress made towards meeting the Sustainable mountain development goals defined in Agenda 21/Chapter 13. This report assesses constraints and opportunities in three major areas: environmental quality, economic development, and social equity. It examines community-level progress by studying people-centric, vertically integrated, and participatory efforts made since Rio '92. It also reviews policies, legal instruments, and programmes aimed at benefitting mountain people and points out the opportunities for transforming to a green economy. Both upstream-downstream relations and benefit sharing mechanisms needed for sustaining resource flows and maintaining ecosystem goods and services for driving the green economy are examined in terms of linking incentivized producers of ecosystem services with both the local and distant markets.

The report includes learning from 10 case studies on sustainable development programmes in forestry, watershed management, agriculture, clean energy, ecotourism, biodiversity, and community development. The studies suggest that biogas and micro-hydro for clean energy, community-based approaches for managing natural resources, ecotourism for equitable income distribution, organic agriculture, and watershed management for enhancing and sustaining productivity of ecosystem goods and services, are some of the best practices that can help attain sustainable development goals.

The report also brings together the insights and expectations of hundreds of stakeholders on the green economy and institutional framework – the two themes of the Rio+20 conference. The overall message is that these concepts were defined somewhere else and passed down to stakeholders and therefore lack clarity from a mountain perspective, and need elaboration and contextualization to match mountain specificities – fragility, marginality, inaccessibility on the negative side and high adaptiveness and richness of niche ecosystem products and services on the positive side. It also echoes agreement on the need to look beyond Rio+20 and come up with actionable programmes and concrete proposals for embarking on the green growth and good environmental governance pathways focusing on participatory ecosystem management, integrated water resources, livelihood-based biodiversity conservation and poverty reduction as key themes. This would require investment by national and global agencies in creating green jobs through green projects, and policy reforms to

incentivize agriculture, natural resources and enterprise development sectors facilitated by enabling policies, knowledge sharing, regional cooperation, environmental governance, and substantial and dependable support from the global community.

To sum up, the HKH report calls for:

- adapting and developing good environmental governance systems for the HKH mountains taking into account their unique characteristics as 'water towers' and 'biodiversity hotspots' for addressing poverty reduction and enhancing human well being;
- reducing vulnerabilities and risk of HKH region and linking adaptation and resilience-building plans to sustainable development strategies by creating massive green jobs and developing green infrastructures such as managed forests and watersheds;
- empowering and assisting mountain communities to gain fair access to, and benefits from ecosystem goods and services they have been safeguarding as the primary stakeholders through mechanisms such as payment for ecosystem services;
- creating enabling institutional conditions and policy incentives to promote investment through public-private ventures with appropriate funding mechanisms and technological support for enhancing peoples' wellbeing and reducing disparities;
- strengthening national and regional institutions to facilitate upstream-downstream exchanges, trans-boundary cooperation, capacity building, and generating and disseminating knowledge, technical expertise and information for promoting SMD; and
- consolidating all new and existing funding mechanisms related to climate change, biodiversity, and MDGs for adequately funding SMD interventions in vulnerable and least developed mountain countries and regions.

PART I

Trends, Issues, Changes, and Challenges (1992–2012)

Introduction

The report aims to provide an overview and assess the issues, trends, and challenges for promoting sustainable mountain development in the HKH region. It documents the progress made since 1992 and encapsulates the lessons learned in key areas. The report covers all the three pillars of sustainable development – economic, social and environmental – and attempts to identify opportunities in the two themes of Rio+20: ‘g in the context of sustainable development and poverty reduction’ and ‘institutional framework for sustainable development’.

Assessment objectives, methods and activities

The purpose of this assessment is to take critical stock of the policies, programmes, and project related actions taken by the governments, civil society, and private sector agencies in the Hindu Kush Himalayan region to implement the commitment made at the Rio summit in 1992. In particular, the report examines the relevance, effectiveness, and impacts of these actions on sustainable mountain development on the ground. The assessment adopted a common framework in selecting case studies and their methodology across the region. It attempts to highlight the specific context of the HKH region and brings together public opinion collected through multi-stakeholder dialogues and consultations.

The report was developed through a process of virtual consultations (Table 1), commissioned case studies (Table 2) and a regional stakeholder workshop (Table 3).

Table 1: Summary of three e-conferences (Stakeholder Consultation on Rio+20) organized by ICIMOD

| e-conference event | Event duration | No. of stakeholders | Participating countries | Total contributions and key issues |
|--|-----------------|---------------------|---|---|
| HKH | 4–24 April 2011 | 296 | 20 countries in Asia Pacific, Europe, North and Latin America (majority from HKH) | Over 210 Key topics: climate change, deforestation, shifting cultivation, water and globalization |
| South and Central Asia (Youth Perspective) | 9–29 May 2011 | 550 | 38 countries Asia Pacific, Europe, North & Latin America (mostly from HKH & Central Asia) | Over 400 Key topics: Green jobs, technology transfer and alternative energy, mainstreaming youth in the Rio+20 process |

Table 2: Distribution of case studies by countries and themes

| Event | Countries covered | Total case studies/remarks | Thematic focus |
|--|------------------------------------|--|--|
| HKH (covered by commissioned case studies) | India, Bhutan, Nepal, and Pakistan | 10 (Balance between 3 pillars – economic, ecological and social/institutional of SD/SMD); policies and implementation) | Biodiversity, Community Forestry; Ecotourism; Micro-hydro; Bio-gas; Organic Agriculture; Watershed; CBNRM; REDD+ |
| HKH (key | Bangladesh, China, | Country representatives | Capacity building, Ecotourism, |

| | | | |
|----------------------|----------------------|------------------------------|--|
| informant's sharing) | Myanmar, Afghanistan | presented country priorities | bio-geographic diversity and climate impacts |
|----------------------|----------------------|------------------------------|--|

Table 3: Asia Pacific regional capacity building and knowledge sharing workshops

| Event | Participating countries | Key highlights | Major outputs |
|--|--|--|---|
| Asia-Pacific Youth Forum on Climate Actions and Mountain Issues (convened as Asia Pacific Youth meeting on Rio+20), 8–12 August 2011 | 43 Youth from 17 countries HKH Countries: Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan | <ul style="list-style-type: none"> - Capacity building sessions - Motivational sessions - Sustainability exercises - Team work for developing youth statements for Rio+20 | <ul style="list-style-type: none"> - Asia Pacific Youth Declaration on Climate Change and Sustainable Development - Asia Pacific Youth position paper on Rio+20 |
| Regional Sharing Workshop on Assessment of Challenges and Opportunities in the Asia Pacific region for Rio +20, 23–25 August 2011 | 50 participants from 7 countries: Afghanistan, Bangladesh, China (one each), India (9), Myanmar (1), Nepal (12) Pakistan (3) | <ul style="list-style-type: none"> - Presentation of and discussion of case studies - Presentation of Key Informants - Sub/regional group work to assess key issues, challenges and opportunities and develop recommendations | <ul style="list-style-type: none"> - Finalization of structure of Assessment Report - Documentation of key issues, challenges and opportunities - Development of key recommendations |

Case studies

The ten carefully selected case studies illustrate specific local, national, and regional initiatives taken to adopt more holistic, integrated, and participatory approaches that better balance the three pillars of sustainable development. The studies cover thematic areas of agriculture, forestry, watershed management, biodiversity, ecotourism, and clean energy.

The case studies encompass the three-pronged objective of assessing policy and financial commitment, progress in major gaps identified, and new and emerging challenges as a strategic entry point to the Rio+20 agenda, focusing on the two major themes of green economy and institutional framework. Additionally, the element of good environmental governance has been included to reflect on the specific needs of the region.

The studies deal with broad changes that have affected SMD since 1992. They address the questions: What have we learned that could provide us a way forward to meet emerging challenges? What are the opportunities for SMD after Rio+20 in the HKH region? How can the concerns of SMD be addressed, given the different regional and national contexts? How can the persistent poverty and vulnerability of livelihoods of mountain people be addressed more effectively? How can concerns related to equity and access to the dividends of SMD for marginalized indigenous people be addressed?

The Hindu Kush Himalayan region: Overview

The Hindu Kush Himalaya (HKH) region, also known as the greater Himalayan region or 'the roof of the world', is rich in natural resources. It has an abundance of water, biodiversity, scenic landscapes, steep heights and deep gorges, and fragile but diverse ecosystems and fertile valleys that provide ecosystem goods and services. The HKH is the source of 10 of Asia's major river systems. It includes all or part of four global biodiversity hotspots, 330 important bird areas, two mega-diversity countries (India and China), and 60 eco-regions of which 12 are among the 200 that have been identified globally. The 488 protected areas cover 39% of the HKH region. The mountains provide fresh water and ecosystem goods and services to more than 210 million mountain people and close to 1.3 billion people living in the plains downstream. These rivers are important sources of water, food, biodiversity and energy. However, recent climatic changes and atmospheric warming are threatening the mountain ecosystems, particularly fresh water, high elevation biota including forests, agro-biodiversity, and range and pasture ecosystems. The following section discusses major ecosystem goods and services of the HKH region.

The HKH region spreads over 3.44 million sq. km and has a population of around 210.5 million (ICIMOD n.d.). Details are given in Table 4.

| Table 4: HKH regional area | | |
|----------------------------|-------------------------|--------------|
| Country | HKH component (sq. km)* | % of country |
| Afghanistan | 390,475 | 60 |
| Bangladesh | 13,189 | 9 |
| Bhutan | 38,394 | 100 |
| China | 1,647,725 | 17 |
| India | 482,920 | 14 |
| Myanmar | 317,640 | 47 |
| Nepal | 147,181 | 100 |
| Pakistan | 404,195 | 51 |
| Total | 3,441,719 | |

Source: Sharma and Pratap (1994)

* The estimate is based on earlier definitions of the region, which was smaller than the area used for estimating population.

Key physical characteristics of the HKH mountains

The HKH region extends from 15.95° to 39.31° N latitudes and 60.85° to 105.04° E longitudes. It encompasses mountains of eight South and East Asian countries: Afghanistan, Pakistan, China, India, Nepal, Bhutan, Bangladesh and Myanmar, from west to east. The region has extended rugged high altitude landscapes. It has the largest area covered by glaciers and permafrost outside the Polar Regions, and is therefore often also referred to as the 'Third Pole'. The HKH region, including the Tibetan plateau, plays an important role in global atmospheric circulation that influences two major weather systems: monsoon and the Westerly (Figure 1). It is a geo-morphologically unique region with the mighty Himalayas acting as the geological buffer protecting the lush green southern slopes from the dry and arid winds of the north thus supporting a unique mosaic of biota and eco-regions.

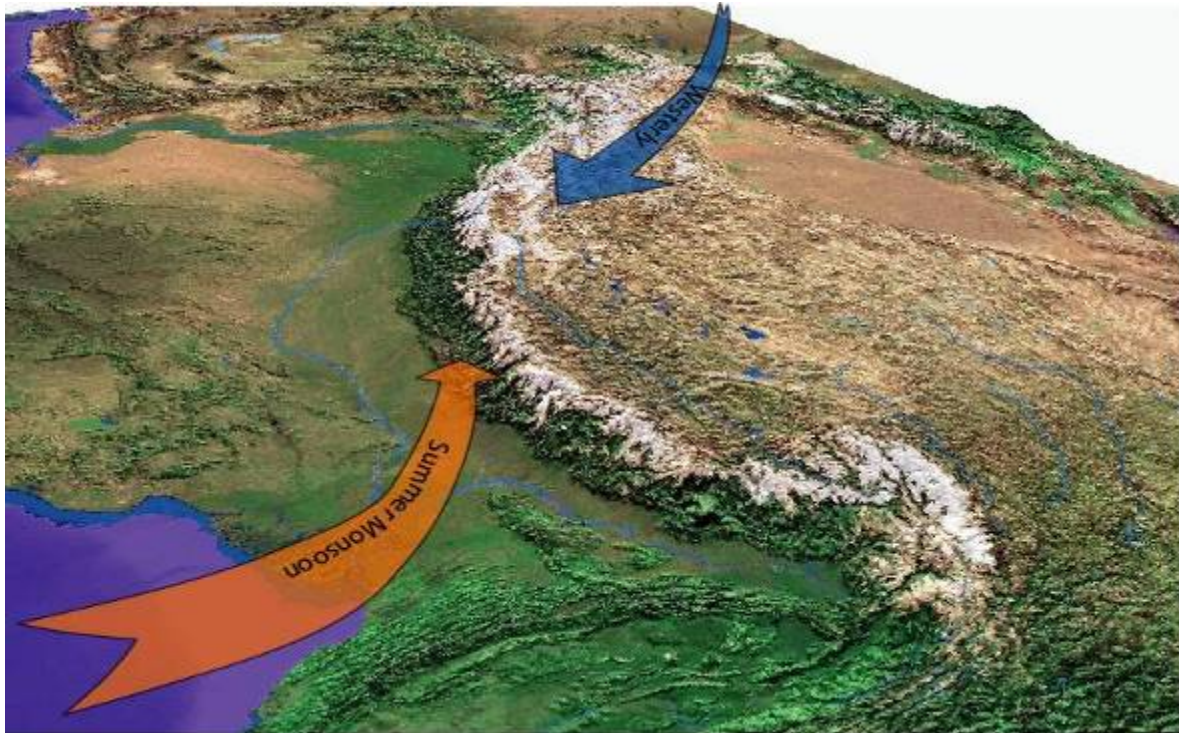


Figure 1: The HKH mountains as atmospheric and climatic modulators and 'water tower'

Major river basins of the HKH region

The total geographical area of the river basins in the HKH is 2.79 million sq. km. Including downstream areas, these basins cover 8.99 million sq. km (Figure 2 and Table 5).

From Afghanistan in the west to Myanmar in the east, the HKH region extends 3,500 kilometres (km) over all or parts of eight countries. The region has about 60,000 sq. km of glaciers (Bajracharya and Shrestha 2011). The HKH mountains are the source of 10 major rivers systems – the Amu

Darya, Indus, Ganges, Brahmaputra (Yarlungtsanpo), Irrawaddy, Salween (Nu), Mekong (Lancang), Yangtse (Jinsha), Yellow River (Huanghe), and Tarim (Dayan). These rivers provide water, ecosystem services, and the basis for livelihoods to about 210.5 million people. The populations in these river basins depend on their waters mainly for irrigation, drinking, sanitation, and industrial uses. The rivers also recharge and nurture some of the richest ecosystems and farmlands in the world. The HKH mountains have been sites of adaptation, mitigation, and resilience of the local people, who have since time immemorial maintained a rich cultural identity, food security and biogenetic diversity within the parameters of their traditions.

Table 5: Total upstream and downstream areas of the HKH river basins

| River | Total basin area | Basin area within the HKH region |
|--------------|------------------|----------------------------------|
| Amudarya | 645,895 | 166,714 |
| Indus | 1,116,347 | 555,595 |
| Ganges | 1,001,087 | 244,857 |
| Brahmaputra | 529,449 | 433,855 |
| Irrawady | 426,393 | 202,769 |
| Salween | 363,898 | 211,205 |
| Mekong | 841,337 | 138,908 |
| Yangtse | 2,066,050 | 565,162 |
| Yellow River | 1,073,443 | 250,574 |
| Tarim | 929,254 | 26,738 |
| Total | 8,993,153 | 2,796,377 |

Source: Derived by ICIMOD from Albers and UTM projections.

Services provided by the HKH mountains systems

The HKH region is extremely rich in ecosystem goods and services including water, biodiversity, medicinal and aromatic plants, wild food crops, and ecotourism resources. The natural resources provide the basis for a substantial part of the region's total gross domestic product (GDP) besides supporting the subsistence vocations of more than a billion people. The global importance of ecosystem resources in the HKH region has been recognized (Penland and Kulp 2005; Nicholls 1995; Woodroffe et al. 2006; Niu 2002; She 2004; Macintosh 2005; Sanlaville and Prieur 2005; and ICIMOD 2009). The rapid economic growth in China and India can be attributed partially to the availability of a good natural resources base, especially water and industrial raw materials in the region. Conserving and regulating water, preserving soil, supporting forest management and biodiversity conservation, providing fodder and forage resources for pastoral development, maintaining good environmental conditions for agriculture development, and producing timber and non-timber forest products, and promoting adventure and nature-based tourism are some of the most prominent ecosystems services in the HKH region. Scientists (Yao 2008; Lu et al 2004) put the annual ecosystem service value of the ecosystems of Himalayas at US\$ 150–170 billion. Climate change, especially global warming, is already having pronounced negative effects on these services. It has led to shrinking of many alpine lakes, reduction of river flow, glacial retreat, and decrease of water availability, degradation of permafrost, forests, pasture, desertification, water and soil loss and degradation of rangeland resources.

The mountains of the HKH region support a healthy and safe environment, and balanced climate. Mountains play a vital role in natural water purification and retention as groundwater, ice, and snow as well as in lakes, forested watersheds and streams. They also regulate and modulate atmospheric and climate balance beyond geographical boundaries. For example, the cryospheric environment, of 'water-ice-air-ecosystem-human' systems in the HKH region is believed to influence and respond to the global and regional environmental change processes and mechanisms including the Asian monsoon systems (TPE/CAS 2010). Mountain soils are important reservoirs for water, carbon and nutrients that enhance soil fertility. Mountain forests (28% of the world's forests) are also highly relevant as protective shields against natural hazards: they help ensure slope stability and prevent or reduce erosion, landslides, and avalanches. Further, tropical mountain forests have high genetic diversity and serve as important wildlife habitats. Together with highland wetlands, mountain forests play a significant role in biospheric carbon storage (IPCC 2007b). The HKH region has vast forests, range and shrub lands and therefore plays a major in carbon storage.

Fresh water

Water and water cycle are the most important ecosystem goods and services of the HKH mountains to civilization, including downstream populations. This is why they are also referred to as the 'water tower of Asia' (Viviroli et al. 2007). The 10 major rivers originating in the HKH region supply fresh water to about 1.5 billion people. They also supply water for irrigation. Recent estimates suggest that snow cover in the HKH region is about 760,000 sq. km on average (Gurung et al. 2011). The region also has a large number of fresh water lakes and aquifers.

Biological diversity

The HKH mountains are a treasure trove of biological and agricultural diversity including food, fibre and medicinal plants. The region is rich in medicinal and aromatic plants, different types of mushrooms, fibres such as cashmere, and mountain crops such as amaranths, buckwheat and different types of millet that are in demand in downstream and in global markets. The mountains are also sources of timber, firewood fruits, vegetables, forage plants, and non-timber forest products that support downstream economies. The vast and diverse gene pool, especially wild relatives of important crops found in the HKH region, is vital for science and humanity.

Rangelands

One of the ecosystems - range and pasture lands, (Stoddart et al. 1975), account for over 60% of the surface of the HKH. Over 100 million people have direct and indirect dependence on the rangeland resources for daily subsistence practicing different types of animal husbandry and collecting rangelands products for their livelihoods. Further, HKH rangelands are habitats for globally important fauna and flora and comprise many biodiversity hotspots and a great number of protected areas of various types and sizes, especially in Tibetan plateau are located in rangelands. Climate-induced negative changes are presenting enormous threats to rangelands ecosystems services across the HKH. In China, more than 90% of rangelands are degraded with about one quarter of them being under severe degradation or threat of desertification (Yi and Sharma 2009). This has resulted in sharp declines in fodder productivity and animal carrying capacity and has also endangered the social-economic wellbeing of pastoral communities.

Cultural services

Mountain areas support a large number of cultures. Many of these cultures have rich traditional agricultural knowledge that promotes sustainable production systems. However, these lifestyles are severely threatened by climate and other changes that are taking place. For many of these cultures, mountains play an important spiritual role: they are living forces, sources of power and symbols of the sacred. Additionally, the mountains and mountain cultures attract tourists, who in turn can contribute towards improving local livelihoods. Every year hundreds of thousands of tourists visit the unique HKH landscapes for rest, recreation, and relief from summer heat and urban pollution.

Twenty year trends in the HKH region

Socioeconomic changes

According to the MDG progress report, China has achieved the highest progress in poverty reduction by bringing the percentage of people below the poverty line from 60.2% in 1990 to 15.9% in 2005. Pakistan also brought poverty numbers down from 64.7% to 22.6%. Bangladesh and Bhutan have also made modest progress while Nepal and India are poor performers. The mountain households in Afghanistan are the poorest (79%), followed by Nepal (27%) and Pakistan (20%); their incomes are less than USD 500/year (Figure 3).

Bhutan has the highest literacy rates among women, and China the highest literacy rates for both the male and females among the HKH countries (Figure 4).

Close to 50% of mountain people are still engaged in farming and animal husbandry, with the highest numbers in China's mountainous provinces (Figure 5). Animal dung, shrubs and branches, and fuelwood are the major sources of domestic energy for more than 90% of the mountain people in China, Nepal and Bhutan (Figure 6).

Demographic changes

Rapid demographic change in developing countries began only 50 years ago. This change came to the remote mountains of the HKH region much later – a few decades before 1992. The more remote the area, the longer the time lag for major demographic shifts because the extreme weather and harsh terrain make life extremely difficult.

The demographic change has been much faster than that in developed countries, primarily due to the easier access to knowledge and technical knowhow and the spread of information and communication technologies (ICTs). However, all changes have not been positive. While the problems of malnutrition and high child mortality rates remain to be fully addressed, there has been good progress in education, public service and communications.

The population growth rates are mixed with high birth and death rates. The growth rate is higher in urban areas (Kathmandu city in Nepal has experienced one of the highest rates of 6.8% per annum) and this is associated with conflict and high remittances. Almost all mountain areas of the HKH are subsistence agricultural economies, some very primitive while others have varying degrees of modernization and influences of the market economy. Most mountain areas are predominantly rural. The total population of the HKH member countries is 1.81 billion – almost one third of the global population – with an average annual growth of 2%. Afghanistan has the highest growth rate and China the lowest. China has the best indicators of human and economic development except the Gini coefficient, where Bangladesh as well Nepal fare better (Table 6).

Table 6: Basic socio-economic and demographic data for HKH countries

| Countries | Total population 1992 (1,000s) | Total population 2009 (1,000s) | Pop. annual growth rate 2000–2009 (%) | Life expectancy at birth (years) 2009 | Human Development Index (HDI) 2010 (of 169 countries) | Gender Inequality Index (GII) 2008 (out of 138 countries) | Multi-dimensional Poverty Index (MPI) 2000–2008 (of 118 countries) | Gini coefficient of income inequality 2000–2010 | Pop. below international income poverty line (PPP US\$1, 1.25/day, 1994–2008 %) | Adult literacy rate 2005–2008 (%) |
|-------------|--------------------------------|--------------------------------|---------------------------------------|---------------------------------------|---|---|--|---|---|-----------------------------------|
| Afghanistan | 14,572 | 28,150 | 3.9 | 44 | 155 | 134 | 104 | n.a. | n.a. | n.a. |
| Bangladesh | 120,613 | 144,660 | 1.4 (2008) | 67 (2008) | 129 | 116 | 80 | 47 (2005) | 50 | 59 (2008) |
| Bhutan | 537 | 697 | 2.7 | 66 (2009) | n.a. | n.a. | n.a. | n.a. | 26 | 53 |
| China | 1,172,199 | 1,345,751 | 0.8 | 73 | 89 | 38 | n.a. | 41.5 (2007) | 16 | 94 |
| India | 898,410 | 1,198,003 | 1.7 | 64 (2009) | 119 | 122 | 71 | 36.8 | 42 | 63 |
| Myanmar | 42,085 | 50,020 | 0.9 | 62 | 132 | n.a. | n.a. | n.a. | n.a. | 92 |
| Nepal | 20,068 | 29,331 | 2.3 | 67 (2009) | 138 | 110 | 88 | 47.3 | 55 | 58 |
| Pakistan | 121,698 | 180,808 | 2.5 | 67 | 125 | 112 | 76 | 31.2 | 23 | 54 |

Sources: CIA (n.d.); UNICEF (2010); UNDP (2011)

Social and gender equity and inclusion

Two decades after Rio '92, the discourse on women's equality and empowerment in the context of development has become sharper and more focused. The focus has shifted from Women in Development (WID) and Gender and Development (GAD) to approaches that are more nuanced and critical. WID did not initially address the basic structures of inequality in relations between women and men, as it tended to focus solely on 'women's' issues. This realization led to much broader discourses and a wider working framework leading to GAD. Further shifts in gender analysis research have been concerned with transformations in gender power relations, and women as active agents of change and important knowledgeable managers of their environments. In many parts of the HKH mountains, gender is still considered to be synonymous with the category women, and is inter-connected with social, economic, and cultural roles and relations between women, and men are normally confined to largely academic discussions. There is also the tendency to shy away from critical questions regarding transformations in gender power relations.

In mountain regions, gender inequalities in access to resources and decision-making processes that affect communities, cultures and environments (U.N. General Assembly Resolution 64/205, 2010) are some key challenges that hinder active participation of women and men in sustainable development processes. Although women in the HKH have always played a critical role in local development, agriculture, and natural resources management, their workloads have intensified in recent years without corresponding increases in access to development resources, decision-making and land rights. In the hills of Nepal and Uttarakhand for instance, women have taken up pioneering roles in managing forests and taking up community leadership responsibilities. However, they continue to face differential access to resources, ownership and control over critical natural resources. Despite a number of development programmes on gender and development, including agriculture and natural resource management issues, there is limited evidence-based data on the role of differently positioned women in SMD, and the weak focus on transforming the existing, skewed gender power relations have led to limited impact. Likewise, there are also examples of major strides towards gender equality in the region (China), which began well before 1992. Similarly, major initiatives have also been taken for inclusion, particularly towards ending caste-based discrimination in India. But steps towards gender equality are still inadequate in many of the countries in the region and that needs to be continuously monitored and improved.

Further, different drivers of change have created new situations. For instance, high rates of male out-migration means that women experience intensive workloads, responsibilities and burdens, which in turn often results in low enrolment and drop out of girls from schools as well as increase in gender-based violence, and trafficking of girls and women. Increased labour burdens have not translated into increased roles in decision-making or control over resources. These trends are further exacerbated by changes in the climate and environment, and during times of climate induced disasters. It is also well known that women are further constrained by unequal power relations, gender-biased attitudes and sometimes, systematic exclusion and under-representation. It is therefore important to increase knowledge of how inequality and drivers of change such as climate change are linked and how unequal power relations are affected by social, economic, cultural and political constraints in dealing with adaptation and sustainable development measures.

Globalization and economic liberalization

Globalization and economic liberalization have been major factors in the growth of India, Pakistan, and China. The global economy has also undergone profound changes over the last 20 years. But the most spectacular change has taken place in China and India. China has become the second largest economy in the world (the Telegraph 2011) and India is expected to be the third largest by 2035 (Kaplinsky and Messner 2008). With growing economic leverage, China and India are now in a position to play major roles in the global economic, technological, and political arenas and will influence the 'rules of the game' in international trade and other aspects of the global political economy. According to Kaplinsky and Messner (2008), "The rise of China and India as global economic and political powers is one of the most important transformative processes of our time - challenging the international political economy dominated by the 'transatlantic West'. It is likely to remain significant for many years to come." Similarly, in Global Economic Prospects: Managing the Next Wave of Globalization the World Bank (2007) has predicted that 'in the next 25 years the growth in the global economy will be powered by the developing countries, whose share in global output will increase from about one-fifth of the global economy to nearly one-third.' It argues that China and some countries of South Asia, particularly India and Pakistan, will be the future drivers of the global economy. Table 7 indicates economic asymmetry of the HKH countries (Rehman and Amin 2009). Further, the emergence of Asian drivers has created both opportunities and challenges. It is therefore necessary to better understand the complexities and dynamism of the economies of the HKH countries in order to promote trans-border economic cooperation and sustainable development. Table 8 provides a snapshot of the HKH macro-economy.

| Table 7: Intraregional trade (% annual growth) in the Bangladesh, China, India, and Myanmar sub-region | | | | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Country | 1990 | 1995 | 2000 | 2005 | 2007 | 1990 | 1995 | 2000 | 2005 | 2007 |
| Bangladesh | 2.80 | 1.79 | 1.08 | 1.96 | 2.39 | 8.06 | 24.62 | 18.16 | 27.82 | 29.49 |
| China | 0.96 | 1.35 | 1.19 | 1.61 | 2.39 | 0.40 | 0.45 | 0.66 | 1.53 | 1.58 |
| India | 1.78 | 4.14 | 3.91 | 8.36 | 10.41 | 0.57 | 3.05 | 3.39 | 7.74 | 10.98 |
| Myanmar | 19.10 | 23.88 | 14.97 | 19.64 | 22.15 | 20.98 | 30.11 | 19.73 | 32.27 | 37.21 |
| Total sub-region | 1.37 | 1.91 | 1.86 | 3.04 | 4.40 | 0.96 | 1.45 | 1.89 | 3.15 | 4.07 |

Note: Export (FOB) and import (CIF)

Source: IMF (2008) as quoted by Rahman and Al Amin (2009)

| Table 8: Macroeconomic data of HKH countries, 2006 | | | | | | | |
|---|----------------------------|-------------------------------|-----------------------|--|-----------------|-----------------|--------------------------------|
| Indicators | GDP (US\$ billions) | Per capita GDP (US \$) | GDP growth (%) | Agriculture's share of GDP (in %) | Industry | Services | International trade-GDP |
| Afghanistan | 2.96 | 143.00 | 6.50 | 32.60 | 27.80 | 39.60 | NA |
| Bangladesh | 65.42 | 419.41 | 6.63 | 19.61 | 17.21 | 52.48 | 44.22 |
| Bhutan | 0.70 | 1 086.34 | 8.47 | 22.34 | 7.37 | 39.77 | 76.79 |
| China | 2 095.95 | 1 597.77 | 10.70 | 11.71 | 48.48 | 39.91 | 72.39 |

| | | | | | | | |
|-----------|--------|----------|------|-------|-------|-------|-------|
| India | 703.33 | 633.74 | 9.20 | 17.53 | 16.28 | 54.58 | 48.78 |
| Myanmar | 8.80 | 174.00 | 2.90 | 50.00 | 35.00 | 15.00 | NA |
| Nepal | 6.70 | 242.48 | 2.80 | 34.36 | 7.68 | 49.31 | 45.29 |
| Pakistan | 100.89 | 634.50 | 6.92 | 19.39 | 19.47 | 53.41 | 38.61 |
| Sri Lanka | 21.27 | 1 069.66 | 7.35 | 16.46 | 13.93 | 56.47 | 74.78 |

Source: Rahman and Al Amin (2009)

Implications of emergence of China and India as regional economic powers

Together, India and China make up almost 40% of the world's population and produce 6% of the global output. These are two very large markets. With greater integration their economic performance will have externalities – positive and negative – in the neighbourhood and in the rest of Asia and the world. China began to open up its economy in 1978, and in 30 years it enlarged its share in global export of manufactured goods. India started a process of economic liberalization about 10 years after China, and by 1991 it had achieved its best export performance in the services sector. Interestingly both of the high growth countries India and China have smaller mountain areas (14% and 17% respectively) compared to other countries in the region

The global financial crisis has accelerated the shift in economic power to emerging economies in Asia. Measured by GDP in purchasing power parity (PPP) terms, which adjusts for price level differences across countries, the largest seven emerging economies are likely to be bigger than the G7 economies by 2020, when China is likely to overtake the US. India is also likely to overtake the US by 2050.

The rise of China, followed by India, has led to a new balance of world economic power. Their growth has driven attention to other developing and transition economies, which also have a high growth potential based on cheap labour, opening up to foreign technology and capital, economic liberalization and market regulation. Since end 2008, all emerging economies have been hit by the global meltdown. However, India and China – thanks to their large domestic markets – have sustained their growth rates that are still high compared to advanced economies. In other words, the 'catch-up' process has been underway even during a crisis.

The rise of China and India as economic and political forces has created both complexities and opportunities, particularly for the smaller countries in the region. The philosophical underpinning of their respective policies is different, and divergent political and economic ambitions, increasing rivalry over market share, access to natural resources can create competitive scenario. Consequent to such posturing, conflicts over sharing natural resources (mainly water) could remain contentious and even fuel new conflicts.

China has been increasingly demonstrating its commitment to the spirit of international conventions such as the UNFCCC. However, China still classifies itself as a developing country and identifies itself both as member of the G8 and G-20 while maintaining its association with G77. The major strategic concern of all HKH countries, therefore, is how best to work together and reconcile their respective national interests while thinking for the greater good of the region, and jointly promote sustainable mountain development.

Regional economic cooperation

Although South Asian countries and China have made significant progress in integrating with the global economy, integration within the region has remained limited. South Asian countries have consistently maintained a greater level of market protection than in other regions. This has actually

negated other comparative and competitive advantages such as common geography and low production costs so vital for sustainable economic growth. Consequently, South Asia has remained the least integrated region in the world.

Factors constraining cross-border regional economic cooperation include the following.

- **Unresolved political issues:** The socio-political issues in the HKH region are complex. Even at the best of times HKH countries have found it difficult to resolve differences. Political differences due to unsettled boundary disputes and other geo-political interests have seriously affected efforts to foster regional economic cooperation in South Asia. HKH countries are caught up in mistrust and suspicions that originate in their history. As a result the countries have not been able to realize the benefits of the potential bilateral and intra-regional trade and commerce. China and India, the two largest countries in the region, had a less than co-operative relationship for a long time due primarily to border disputes that had impeded cross-border economic cooperation. The situation, however, began improving after the 2001/02 following the signing of a bilateral trade agreement.
- **Lack of communication and transportation links:** The HKH countries do not have effective, integrated transportation and communication links. The production, consumption and trade patterns of potential regional trading partners have also not been well documented and shared. Three land locked countries, Bhutan, Nepal and Afghanistan, have to depend on the goodwill and trade facilitation provided by their neighbours. Further, these countries also lack efficient trading mechanisms. For example, Nepal's trade depends fully on transit facilities provided by India. But the transit is often constrained by high handling and transportation charges and administrative delays hampering the exchanges between Nepal and its trading partners both overseas and in the region.
- **Restrictive trade policies:** Most HKH countries still have restrictive trade policies that are responsible for the exceedingly low level of intra-regional trade. However, since the onset of globalization, the regional countries have gradually liberalized their economies resulting in growth of trade volume especially between India and China. Significant trade liberalization has also occurred under the South Asian Free Trade Agreement (SAFTA) regime, which among others accords preferential duty treatment to about 5,000 products from SAARC member countries and the custom procedures are being simplified. But the region still has a long way to go in terms of developing intra-regional trade to its full potential.

Urbanization and labour migration

For a long time the mountains and hills have been a region of high migration from north to south (and sometimes the other way around), as well as from the west to the east. There has been substantial seasonal migration of labour to the plains to make up for both the unskilled labour shortages, and the need for cash incomes in the otherwise non-monetized mountainous areas. This quest for food and additional income sources has created durable exchanges across the HKH region. In addition, rulers have repeatedly induced people to migrate – often for political reasons – to under-populated areas, and to transform forests into arable land. This movement of people from the uplands to the plains have also resulted in building many economic, political and cultural relationships.

Migration and population mobility are essential elements of human and economic development. In fact migration is increasingly being used as a strategy to raise family income and also adapt to the changes taking place, including that caused by climate change. New destinations have opened up for migrants over the last two decades. These have mainly been the Gulf States, South and North East Asian countries and the West. The population movements have created new regional and transnational links. The effects of the remittances on the recipient economies have received much media attention, but have been not been assessed thoroughly. A study carried out by ICIMOD indicates that close to 15% or 30 million of the world's migrants come from countries in the Hindu Kush Himalayas. Bangladesh, India, China, and Pakistan are among the largest countries with out-bound migrants. Migration for work is a major livelihood strategy of mountain people and the HKH

countries have the highest inflow of remittances that any other region in the world (Hoermann and Kollmair 2011).

After Rio, the migration from Nepal has tripled, and that from China has doubled. The remittances reaching the region were close to US \$ 70 billion in 2007, or 21% of global flows. No other region has such a large inflow. Diaspora contribution to SMD has remained a myth because the home economies have not been able to encourage migrants to return and invest in productive areas. Skilled migrants never return to their countries of origin. This is particularly true for educated migrants who are often unable or uninterested in investing in their own country and find the host country more attractive thus resulting in net loss to the mountains. Unless migration is purposefully managed, there is no way to make the skilled human capital relevant for SMD.

Expansion of ecotourism

The HKH region has always attracted tourists. Mt. Everest – the ‘jewel of the Himalayas’ and the world’s highest mountain is one of the most sought after tourist attractions on earth. Trekking tourism to the valleys and passes in the Himalayas is a popular tourist activity which has been growing steadily.

The growing access of ICTs and air connectivity has contributed to the spread of tourism in the HKH region. They have made it easy for 15–20% of tourists and tourism businesses to locate potential ecotourism sites and make travel plans. It is estimated that 50 million people visit mountains each year (Mountain Partnership 2008). The relationship between tourism and SMD has featured prominently in Agenda 21, and in related scientific and political debates and discussions.

Tourism holds special significance for countries like Nepal with earnings comprising around 7% of GDP. In 2009 the industry generated 4.7% of the total employment. Tourism’s share in India’s GDP is 8.6% and in case of Nepal it is around 4 percent. However, the impacts of tourism on mountain ecosystems and biological resources are of concern because of the high fragility and environmental sensitivity of the HKH. Cultural identities and diversity in the mountains are also threatened by the expansion of unplanned economic activities, and the cultural and environmental consequences of mountain tourism have been largely negative. Globally, about 15–20% of tourists visit mountain destinations in the region.

In many HKH countries the tourist towns and trekking routes have suffered the impact of this resource intensive industry, with over construction of resorts and other tourist facilities. Further, the mountain landscapes have had the unintended effect of rendering people living there invisible. They have largely ended up working as menials or porters, while the overwhelming share of the tourism revenue flows to interests outside the region.

India’s ‘National Mission for Sustaining the Himalayan Ecosystem’ stresses on regulatory mechanisms for controlling tourist inflows in ecologically sensitive areas. Since April 2008, the Government of Uttarakhand has restricted the number of tourists visiting the source of the holy river Ganges to 150 per day. Similarly, the Indian state of Sikkim has been employing an environmental fee, permits for entries, and stay time restrictions in some environmentally sensitive high altitude/ areas. Sikkim had a 25% increase in tourist inflows in the past two decades and has developed a benchmark that can serve as a basis of responsible tourism in other parts of the HKH. Bhutan also has adopted high value tourism as a means to minimize negative environmental impact.

Tourism holds potential to contribute to economic development in the HKH region but its expansion cannot be at the cost of undesired consequences on environment, local cultures and livelihoods. However unlike the Alps, mountain tourism in the Himalayas is still in infancy. Although a higher annual growth rates have been forecast for South Asia (5%) as compared to (4.1%) for the rest of the world, the overall tourism potential remains underutilized. South Asia attracts less than 1% of the global tourists indicating the potentially largely untapped markets in this sector.

Growth in information and communication technologies (ICTs)

Information technologies, especially computers and mobile phones and increasing Internet connectivity in rural areas, have made significant inroads in the HKH region. Tele-density in Nepal reached 41.5% in 2011 from a low of 27% in 2010. Bhutan has 50% mobile penetration; Pakistan has had a cumulative average growth of the mobile market by 5% during last three years and mobile and Internet penetration in the mountain regions of India has been impressive (Thulasi Bai et al. 2007).

ICTs can play an important role in development by connecting people to more accurate and up-to-date information. However, there is concern that the 'digital divide' is increasing the gap between the information 'haves' and 'have-nots' especially in poor and remote mountain regions. Studies have shown that market information transmitted via mobile phones has helped farmers reduce transport costs by 33%. Farmers in remote regions, like Humla in Western Nepal, have benefitted from mobile penetration for marketing medicinal plants. However, the impact of ICTs has not been uniform across the region.

Countries of the HKH region have begun to acknowledge the digital divide in policy but the issue of access and equity has remained unaddressed largely because of the overwhelming involvement of the private sector in extending telecommunication services. Broadly speaking, computers, mobile phones and Internet access have connected remote areas to the mainstream of development. While technology can enhance the options for mountain communities to adapt and survive at cheaper costs by accessing market opportunities, its impact on enhancing resilient livelihoods has yet to be fully assessed.

Growing recognition of indigenous and traditional knowledge

The HKH region is home to hundreds of ethnic tribes, and it is their indigenous technical knowledge (ITK) that has helped them survive in the harsh mountain environments. It is only recently that HKH countries have begun tapping in the ITK to address some of the current concerns related to climate-induced changes in cropping patterns, and for adapting to extreme weather conditions. Institutionalising ITK can therefore be a critical element for inter-generational enrichment and transfer of resources.

The significance of ITK is now being incorporated in development protocols. Over 1,000 villages in Nagaland in northeast India have been organized into Village Development Boards (VDBs), with the specific purpose of taking into consideration the traditional village organization of specific cultural groups. Using this institutional mechanism, the highly distorted shifting agricultural system is now being redeveloped by strengthening the tree component that had been weakened by high deforestation. Keeping in view the traditional approaches, the state government has launched a programme called Commoditization of Public Institutions and Services. In the monsoonal region where water scarcity is acute for a major part of the year, it has been demonstrated that ITK combined with appropriate water management method is a major factor for sustainable management of natural and human-managed ecosystems not only in Northeast India, but also in other parts of the Himalayas.

Converting ITK, often seen as location-specific, into generalizations that are applicable across socio-ecological systems has been a major step undertaken to incorporate research results in public policy and development initiatives. There is growing realization in the HKH region that development approaches linking cultural diversity with biological diversity can form the basis for ensuring human security in socio-ecologically fragile mountain systems. The Apatani tribe of Arunachal Pradesh has

sound ITK of forest, land and water management, and has a highly developed system of growing rice in the valley. The Apatanies under the overall supervision of the village headman have optimized water use along with nutrient use in their rice fields.

Political and institutional changes

Democratization

A wave of democracy has been sweeping the HKH region that has been hotbed of ethnic and political conflicts for identity assertion and equitable rights. Absolute monarchy does not exist anymore in the region and dictatorship has also been mellowing down. Nepal is undergoing social and political transformation for establishing newer, smaller, federal units that could be hopefully be more effective for meeting local needs. India's Uttarakhand has become an autonomous hill state and has begun focusing on mountains both in policy and practice levels. In Pakistan, a mountain province, Gilgit Balistan has been created allowing self-governance and institutional reforms in regions that have unique landscape and bicultural distinct heritage. .

The political transformations underway have begun to push and accelerate changes in access, ownership and management of natural resources and new impetus to enable local institutions to contribute to sustainable mountain development (SMD). The emerging institutional identities need external resources for harnessing natural resources and hydroelectricity for SMD. Economic autonomy can strengthen political and cultural identities of local institutions for contributing to SMD. Decentralization combined with meaningful devolution for empowering communities is at the centre of the conflict resolution strategy across the HKH. Though it is still too early to assess the impact of smaller governance units, there are indications that they augur well for the on-going socio-political transition.

Social and political movements and good governance

Since 1992, there has been a general move towards greater devolution and decentralization of power to local governments, which has, to some extent reduced the marginality of mountain people and helped them attain their aspirations for self-governance. Some countries have considered mountain areas as 'sensitive' and have put in place strict restrictions on the movements of both outsiders and locals. As a consequence those areas were although ignored in terms of development needs but were rapidly developed in terms of roads and other infrastructures.

The entire HKH region has witnessed widespread grassroots social movements that have sometimes turned violent (such as the Maoist insurgency in Nepal) while others have been non-violent (Chipko movement in Garhwal, India). While local grievances range from complaints of marginality in national and regional governance for reasons of identity, power, religion, poverty or other socio-political causes, scholars have claimed that other factors such as environmental degradation, and lack of access to political processes are key triggers for such movements. While governments and global communities have looked at some of the mountain regions as possible sources of security problems (Afghanistan), the aspiration of mountain people are similar and much of the acrimony and grievances can be resolved when more effective and good governance of Mountains has been achieved as in the case of smaller, mountain-specific governing units such as Uttarakhand in India (Tolia 2011).

Policy and legal reforms in natural resources management

The policy environment for managing natural resources, especially forests, has been improving consistently since late 1980s although there is lack of compliance on account of a legacy of failed institutions in South Asia. Although progress in policy reform -- for example, the 1988 forest policy of India -- has been mixed regarding the institutionalization of Joint Forest Management, the potential it holds to transform forestry into green economy wealth is promising. By setting up the National Green Tribunal -- an apex legal body -- India has joined the ranks of 47-odd countries in the world that attach

significance to Right to Information and justice as enshrined in Agenda 21. India has also recently launched the Green India Mission.

Pakistan has already approved several policies including the National Environmental Policy (2005), National Forest Policy (Draft), National Energy Conservation Policy (2006), National Renewable Energy Policy (2006) and the Policy for Development of Renewable Energy for Power Generation (2006). Likewise, the National Environment Commission is the key policy institution in Bhutan. In Nepal the National Environment Policy Action Plan has been in existence since 1993. Forest policies of Nepal and Bhutan of 1993 are landmark documents that are now being considered for a global award.

India has recently passed a Land Rights Bill, which assures land rights to forest dwellers and dependent indigenous communities. It has also developed a range of policies and enacted laws covering various environmental sectors. The HKH countries are framing mountain specific regulations within the ambit of environment policy and forest laws. The Assam Hill Land and Ecological Sites (Protection and Management) Bill, 2006 is one law that aims at preventing indiscriminate cutting of hills and filling up of water bodies in urban areas – which had led to serious ecological problems in cities like Guwahati.

Uttarakhand has recently implemented a policy for harnessing renewable energy with private sector/community participation targeting power generation and management through a power council. The policy permits power generation by individuals, Gram Panchayats (village councils), registered societies, and private companies. These diverse policies reflect mountain specificity with a possibility of adoption and replication across the HKH region.

Many of such policies are also backed by fiscal incentives. Recognising forests as national wealth, the 12th Finance Commission of India recommended an incremental grant of Rs 1000 crores or USD 250 million for maintenance of forests from 2005 to 2010. This amount was distributed among the states based on their forest area. The existing system needs to be modified to adequately account for mountain states. Such initiatives have the potential of being up-scaled and emulated across the HKH region as national payment for environmental services (PES) programmes.

Policies and laws within countries in the HKH reflect environment stewardship at one level. Within the region, China and India have signed up for a number of joint initiatives because only cooperative forces can solve global environmental crises, especially taking into account the fact that these two countries contribute greatly to world air and water pollution. Both, China and India are members of the Asia – Pacific Partnership on Clean Development and Climate. This type of partnership between the region's biggest economies also augurs well for better environmental quality of the HKH mountains.

Community movement for participatory natural resources management

Lateral and vertical integration of communities in local administration is critical to attaining equity and justice leading to good governance, especially environmental governance. Inspiring initiatives of collective actions for natural resources management exist across the region but their integration into the existing institutions has been slow. However, there are some promising initiatives that could help in attaining the SMD goals.

Uplands of North-east India, comprising of the eight hilly and mountainous states, are categorised as underdeveloped regions and exemplify the classical paradox of 'poverty in the midst of plenty'. Through an IFAD supported North-eastern Community Resources Management Project (NERCOMP) project the region is now implementing technically appropriate, culturally sensitive and institutionally effective interventions through a 'genuine partnership between communities, government and civil society' forged to ensure that the actions are demand-driven, programmes are people centered, and approaches are livelihoods-focused.

Since its inception in mid 1970s, the community forestry programme has been the largest and longest participatory green initiative involving 40% of Nepal's population in managing 25% of country's forest area. Not only is the programme inclusive and equitable, it has also been able to address socio-political and environmental concerns at the national and regional levels. The emerging carbon payment through the REDD+ mechanism promises to provide incentives and co-benefits to communities thereby exposing them to a competitive world wherein protecting community rights would be crucial. First started as projects, these institutions now work with thousands of genuine local forest users getting their full participation and support and have successfully arrested deforestation and helped to improve forest cover as well as their livelihoods.

The efforts of forest dependent communities have the potential to be expanded through legal provisions as has been already demonstrated by Nepal's community forestry programme. The case studies in the report though country-specific demonstrate their strengths that lie in the diversity of approaches to suit varied socio-economic situations in the region. Nobel laureate Elinor Ostrom whose award winning research was partly based on Nepal's community forestry says, 'When collective action is high, forest users themselves monitor regularly, forest conditions get better; and when local groups have long-term rights and can harvest from a forest, they protect its conditions more'. She added, 'Having rights does not mean taking all; if they have no rights at all, why will they have interest in protecting their resources? The crucial problem is how to match forests with the interests of the people and the communities.' This has been a fundamental philosophy of Nepal's community forestry policies which is now practiced by more than one million forest land users.

Climate change as a major driver of change

The Fourth Assessment Report of the International Panel on Climate Change (IPCC 2007a) characterized the HKH as a 'data deficit' region. Only a limited number of studies provide climatic scenarios for the Himalayas. ICIMOD (2011a) has collected systematic information on the rapid loss of glaciated surface in the Himalayas. However, only limited information exist on the loss of ice mass over the years. The projected temperatures in the higher altitudes are expected to be about 3°C warmer than the baseline by the middle of the century and about 4°C warmer by the end of the century. Models project about 20% and 30% increases in annual precipitation in the eastern Himalayas by the middle and the end of the century, respectively. These projections are influenced by the emission scenarios and are biased, particularly in the case of precipitation (Shrestha and Devkota 2010). The incidence and impact of atmospheric brown cloud (ABC), aerosols including black carbon mixed with green house gases of upper, especially glaciated, slopes is becoming equally important in contributing to the melting of ice and snow. Climate change is widely expected to impact water availability, seasonality and water-related hazards.

The latest report of the United Nations Environment Programme (UNEP) on the impacts of black carbon in glacier recession says that a large number of black carbon sources in South and East Asia enhance cryosphere vulnerability in the HKH region because of large surface insulation owing to low latitude, high altitude, and low vegetation cover. The HKH is impacted even though it is not downwind of the emitting regions. A small, but growing body of peer-reviewed literature suggests that black carbon is driving significant warming and melt in the HKH region (UNEP and WMO 2011). Further, climate change would have multiple implications on this, and other aspects of livelihoods and pose new challenges to both the environment, and development in the region.

Changes in temperature and precipitation patterns

Data collected from the eastern Himalayas show that there is a definite warming trend at higher altitudes and that areas above 4,000m seem to be experiencing the greatest warming. The warming trend observed ranges from 0.01 to 0.06°C/yr (Shrestha et al. 1999) and the annual mean temperature is expected to increase by 3°C by the middle of the century (Shrestha and Devkota 2010).

A number of studies have indicated that the HKH mountains have experienced above-average warming in recent years (av. 0.06°C /year recorded in Nepal). In the eastern Himalayas progressive warming at higher altitudes has much higher rates than the global average warming (up to 0.09°C/year). Some noticeable impacts of atmospheric changes have been the increased frequency and ferocity of extreme events such as floods and droughts and the rapid recession of Himalayan glaciers. Formation of dangerous glacial lakes at high altitudes has increased risks to human lives and livelihoods downstream. Scientists are forecasting that the cascading effects of rising temperatures and loss of ice and snow will affect the amount and seasonality of future water supply including the monsoon patterns. This has significant implications on the environment and livelihoods of millions of the people living in both the upstream and downstream areas.

The degradation of permafrost and reduction of snow and ice in the Himalayas will reduce water availability affecting both natural and agricultural ecosystems that are vital for supporting the livelihoods of millions of people in the region. Of particular concern is the impact on lean season river flows on the supply of fresh water and energy to downstream populations in the Indus to Brahmaputra basins. Further, the changing socio-economic and demographic scenarios are also contributing to the increased climatic risks. The fast growing economies of the region means that the carbon emission level of the region will grow before it stabilizes. Figure 7 provides the emission share of some of the major HKH countries in relation to the global contribution.

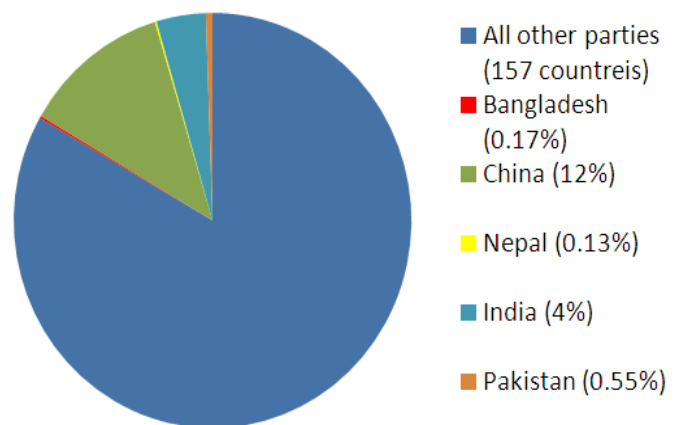


Figure 7: Emission share of major HKH countries and the rest of the world

Changes in hydrological processes

Widely observed rapid rate of glacier melting in the HKH region, is changing the river flow regime that might result in severe dry season water shortages. Changes in the hydrological cycle may significantly change precipitation patterns leading to changes in river runoff and affect the flow and nutrient cycles along the river basin ecosystems with adverse impacts on ecosystem and agricultural productivity, and the gene pool including from agro-biodiversity and wild relatives of food crops in the natural systems. In Nepal, this is already affecting the operation of many hydropower plants. In number of basins, glacial lake outburst floods (GLOFs) threaten to damage human settlements and affect life and property.

The combined impacts of disaster and damage to agriculture can have severe consequences for a wide range of environmental and economic activities, including substantial negative impacts on food security and human health (IPCC 2008). In Pakistan, for example, climate change and extreme weather are already having severe effects on the flood cycle and agriculture system threatening both food and energy security. Pakistan is highly vulnerable to climatic variability and its impact on land resources as water availability is already a serious concern in many parts of the country. Climate change has already caused decline in precipitation by 10–15% in the arid and hyper-arid regions over the last 30–40 years. Further, climatic changes increase the vulnerability to drought and flash floods. These natural calamities often pose serious threats to local food production and trigger land degradation and desertification (UNDP 2010).

Available scientific evidences indicate that global climate change will present practical challenges for local ecosystems (IPCC 2007a). These include the prospect of more severe weather, longer droughts, and higher temperatures (milder winters), heat waves, changes in local biodiversity, and reduced ground and surface water quantity and quality. These changes will impact everything from the terrestrial biodiversity to human health, built infrastructure, and socioeconomic conditions.

Changes in land use and land cover

Across the HKH region severe climatic conditions, lack of market linkages, and small fragmented farms have forced the farmers to adopt subsistence farming systems that heavily depend on forest resources. Communities cannot be expected to remain stationary once their income sources wither leading to migration within and beyond the region. The shrinking population-land ratio, reduced economic viability and decreasing interest in agriculture have amplified the impact of climate change on land use and land cover.

Between 1990 and 2005 in terms of deforestation rate, Afghanistan lost 3.1% of its forest cover per year followed by Pakistan, Nepal, and Myanmar. During this period, Nepal's forest cover came down from 33.7% to 25.4%. During the same period China increased its tree cover from 16.8% to 21.2% and India from 21.5% to 22.8% because of large-scale planting programmes.

The land use/cover change in the key basins in the HKH region is alarming. While the Indus and Ganges basins have lost 90% and 84.5% of their original forest cover, the Yangtze is down to 84.9% and the Brahmaputra basin has 73%. Climate change, agriculture intensification and rapid urbanization have contributed to this change. The traditional methods of dealing with water scarcity are vanishing and the relatively small size of landholdings in the mountains has pronounced the net impact of temperature and rainfall variability on the farm-based economy.

The consequent land use and land cover changes directly impact forest and biodiversity in mountain ecosystems (Körner 2004); contribute to local and regional climate change as well as feedback to global climate warming (Houghton et al. 1999); and by altering ecosystem services, land use change affects the ability of its diverse ecosystems to support the more than one billion people living in the 10 river basins (Xu et al 2007). Such changes also determine, in part, the vulnerability of people and places to climatic, economic or socio-political perturbations. However, there has been little research on nexus between climate and land use changes and their impacts on ecosystem productivity and functions.

Generalizations have been made from scattered studies at sites widely separated in space and time (IPCC 2007a; Nogues-Bravo et al. 2007) about the possible implications of changes in land use and land cover. The limited evidence that exists (Shrestha et al. 1999; Liu and Chen 2000; Shrestha et al. 2000; Xu et al. 2009) is already ringing alarm bells on the fate of Himalayan biodiversity and the services it has been providing. According to Scherrer and Körner (2011) the real issue of the on-going and expected climatic changes in the Himalayan landscape is not the pace and magnitude but how the changes are affecting the ecosystem dynamics and forcing species to migrate for coping. In response to fast rising temperatures and changing rainfall patterns, species are moving upslope into already occupied territory and are facing heavy competition, and many may not be able to adapt and eventually may face extinction (Eriksson et al. 2008). Highly mobile organisms, hardy species (growing on wasteland, weeds, etc.), mid-slope species will be the likely winners in the ecosystem changes resulting from climate change and likely losers are late succession plants, species with small, restricted populations and species confined to the mountains or the plains.

Additionally, improper land use and governance have combined with climate change to increase stress on mountain ecosystems in the HKH. For example, in the TAR of China, owing to decades of overstocking and poor management, rangelands are going through a process of degradation and

desertification turning the carbon-rich grass turf black, and exposing them to gales and blizzards that are becoming more extreme and devastating. Overgrazing is widespread and plant biomass is releasing carbon from peat land and underground soils due to grazing pressure. The high alpine meadows are particularly under threat as topsoil cover is being eroded by strong winds making restoration of vegetation more difficult. The rampant degradation of the rangelands is also forcing nomads to change vocations.

There is increasing evidence that in addition to human factors such as overgrazing and poor governance, natural factors such as climate change have a role in forest and rangeland degradation. In Afghanistan, annual precipitation determines the available rangeland resources, which range between 40% (in poor rainfall years) and over 85% (in good rainfall years) of the total land area. Frequent and unpredictable droughts in recent decades have further aggravated the unpredictability of the rangeland productivity and have caused high losses in Afghanistan's livestock sector. Some 70% to 80% of domestic livestock in the northern and western parts of the country perished in the prolonged drought from 1997 to 2004. Similarly, an extremely harsh winter in 2007/08 claimed the lives of over 300,000 animals and 800 people (Yi and Sharma 2009). Another severe drought in the first half of 2008 caused the drying up of pasturelands and reduced water sources in several northern provinces (including Samangan, Balkh, Jowzjan, Herat and Badghis) causing death of thousands of animals, and failure of around 80% of rain-fed agriculture. Case studies initiated by ICIMOD (unpublished) in Afghanistan, Nepal and Pakistan suggest that decreased rainfall in rangelands has often resulted in expansion of degraded area and accelerated desertification, which further weaken the basis for livestock development. The same studies also indicate that the disappearance of water resources due to prolonged drought has forced people to change their migration routes or even abandon pastoralism. The changing environment is also threatening the habitat of some economically important medicinal plants such as *Cordyceps spp.* that has been a major income source for mountain people. To summarize, the Tibetan Plateau is highly prone to heating, drying, and more extreme weather conditions, which is having pronounced impacts on rangelands besides influencing the Asian monsoon system as well.

Institutional and policy efforts in sustainable development

Efforts to improve food security in the region

The HKH region made tremendous progress in food production during 1960s, 1970s, and 1980s. With growth in food production, China, India, Pakistan, and Bangladesh, transformed themselves from countries with chronic food-deficit to near self-sufficiency in the early 1990s. Except Afghanistan and Nepal, all the HKH countries exported some food grain in the late 1990s. This growth in the agricultural sector has faced setbacks (Rasul 2010). Productivity of major food grains has slowed down or even declined for some crops (with food production failing to keep pace with population growth). As a result, South Asian countries are now finding it difficult to meet the most basic food and nutritional needs and remain vulnerable to food insecurity. In 2009, WFP reported that 43 of Nepal's 75 districts faced a food deficit, and 23 districts were chronically food insecure. There was surplus production of cereal in 1999/2000 and up to 2007/08, except 2006/07. Nepal had a surplus of 68,496 tonnes in 1999/2000 and 83,051 tonnes in 2000/01 but the deficit in 2008/09 was 132,916 tonnes (Figure 8).

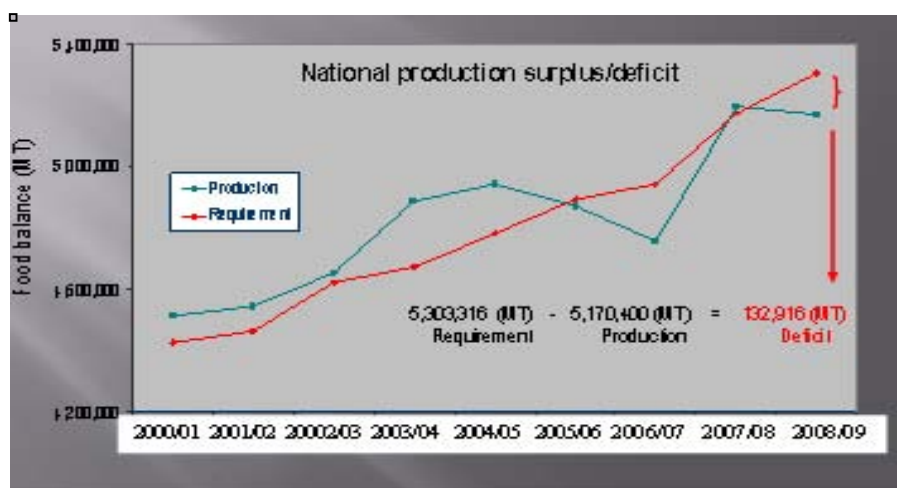


Figure 8: National production surplus/deficit, Nepal

Bangladesh is also vulnerable in terms of food security. Although the rice yield is increasing marginally and there is significant progress in overall food production, the production lags behind domestic demand. The per capita food consumption is close to the minimum nutritional requirement (2,199 calories per day in 2004). Only the top two income groups were estimated to have exceeded the nutritional target in 2006. Regular floods and cyclones also disrupt the food availability. Bangladesh currently imports three to five million tonnes of cereal per year on average, depending on weather conditions (Rasul 2010).

Bhutan is another country where food insecurity remains an issue even though its food affordability index is increasing. Only 3.4% of its land is suitable for arable agriculture, although more than 80% of the people depend on farming for livelihood. Productivity is low and variation in cereal production is very high. More than one tenth of the cereal consumed is imported or comes as food aid (Rasul 2010).

India experienced the success of the green and white revolutions, and has made significant progress in food production since the 1960s – it became self-sufficient in food grain and was exporting food in the late 1990s. However, production began declining from 2000 while the population has continued to increase. In 2000, net cereal production was 172 million tonnes and it decreased to 163 million tonnes in 2001; in 2003 it further declined to 143 million tonnes. An estimated 222 million Indians (20% of the population) in 2006 were below the minimum nutritional requirements (Rasul 2010). As the major food

grain producer and user in South Asia, India's challenge is not only to feed its growing population but also to help the neighbouring countries meet their deficits, especially during crises.

Pakistan has made tremendous progress in agriculture compared to the 1960s and the country achieved near self-sufficiency in food during the 1980s. However, production has remained erratic and has failed to keep pace with population growth (2.4%). As a result, food security has remained a persistent concern. In 2006, 10% of Pakistanis were estimated to have less food than required and the situation could deteriorate further over the next decade due to the gap between population growth and food production (Rasul 2010).

Poverty reduction measures

There are many facets of poverty in the HKH region. It is manifested by low income, poor health, low access to health facilities, malnutrition, poor education, low skills, high dependence on the natural environment, high insecurity and physical vulnerability, drudgery and limited capability and entrepreneurial capacity. These dimensions of poverty are directly or indirectly associated with mountain bio-physical and socio-economic specificities characterized by geographic isolation, socio-cultural marginalization, poor physical and economic infrastructures, poor access to market, technologies, and information; poor institutional services, and limited economic opportunities. Geographic isolation and differences in language and customs often prevent the benefits of markets, niche products, and national economic growth from reaching the mountain people.

Limited employment and economic opportunities and insecurity have triggered out-migration keeping back only women, the elderly and economically less active populations in the mountain areas and therefore these areas have lower entrepreneurial capabilities. Therefore, the nature, causes and dimensions of mountain poverty differ significantly from that in the lowlands and thus need to be understood from a mountain perspective. Yet, policy makers have not fully understood poverty in a mountain context. As result, market-driven value chain initiatives and tourism have contributed to poverty reduction only for limited populations and policy and institutional response to poverty reduction has been poor.

India's Mahatma Gandhi National Rural Employment Guarantee Scheme is perhaps the most significant poverty reduction initiative in the region ideal for mountains. It guarantees 100 days of assured employment to the rural poor in a calendar year. Though results of the cash-to-work transaction are mixed, reports indicate that the scheme has been able to reduce rural-urban migration, and promote natural resource conservation in the villages.

Efforts of development partners

Both bilateral and multi-lateral institutions have pursued SMD projects in the HKH region. These have brought active interest, resources and knowledge on SMD to the region. The World Bank has been active in funding programmes in northern Pakistan, lower hills in India and in the entire region of Nepal; the International Fund for Agricultural Development (IFAD) has a fairly large regional portfolio on uplands and the Asian Development Bank (ADB) has recently initiated agribusiness promotion to adapt to climate change in mountains; and IUCN/UNEP have started ecosystem-based adaptation in Nepal. These agencies together have raised awareness, mobilized and/or leveraged resources and knowledge on SMD to the region. ICIMOD has remained the lead agency for promoting the mountain agenda through cross-sector linkages with member governments, research institutes and civil society organizations. ICIMOD Day now is also celebrated in all member countries which are expected to give a fillip to its efforts to promote sustainable mountain development.

IFAD has specifically channelled funding to the poor in the uplands aiming at livelihood improvement through community-based resource management. The projects in Northeast India, Uttarakhand and

Nepal have benefitted the poor, women and marginalized communities in the HKH region. One of the most relevant programmes relevant to Rio+20 is Rewarding Poor People for Environmental Services (RUPES). According to IFAD (2010), poor rural people have the potential to be important players in natural resource management and carbon sequestration. An IFAD-supported programme has helped build momentum and public interest in rewards for environmental services, and has developed ways to award poor farmers who are protecting upland farming and ecosystems in China, Indonesia, Laos, Nepal, the Philippines and Viet Nam.

According to Dennis Garrity, former director general of the World Agroforestry Centre (IFAD n.d.), “Many people living in Asia’s upland communities manage landscapes that provide environmental services to outside beneficiaries. These services include clean and abundant water supplies from watersheds, biodiversity protection and stocks of carbon that alleviate global warming. Rewarding communities for providing these services reduces poverty and provides incentives to manage uplands in ways that enhance the sustainability of the lowlands, compensate for carbon emissions elsewhere and support global biodiversity conservation goals.”

Regional and global networking

Agenda 21, Chapter 13 institutionalized global attention on mountains. Although ICIMOD was established in 1983, Rio'92 contributed to its strengthening and also to the setting up of new organizations and networks.

ICIMOD set up the Asia-Pacific Mountain Network (APNM) in 1995. It was an outcome of the recommendation of the ‘SUDEEMA Call to Action 1994’ and Asia regional response to Agenda 21 Chapter 13. The initiative was supported by the Swiss Agency for Development and Cooperation (SDC). The APMN intends to be a knowledge-sharing platform connecting mountain regions and individual members through dialogue and networking. The network captures, enriches, and disseminates information from a variety of sources on mountain development issues in and for the Asia-Pacific region. It also functions as the Asia-Pacific node of the Mountain Forum (MF) – itself an outcome of the Chapter 13 – a role it has played since 1996. Within a decade, APMN was able to make notable contributions in building knowledge repositories and expertise by collaborating and networking with its large membership^[1] that includes organizations for promoting SMD. The APMN has over 250 organizational and 2,300 individual users.

APMN operates as a hybrid network within ICIMOD supporting the Mountain Partnership Consortium that includes both the Mountain Partnership and the Mountain Forum. ICIMOD has defined APMN as its ‘communication arm’ and plans to enhance its role in communication, networking and information and knowledge sharing beyond the member countries for greater Asia Pacific-wide integration.

The Mountain Forum operated as a network of regional networks (in Africa, Asia Pacific, Europe, Latin and North America) and was supported by the Mountain Forum Secretariat (or global Node) based in ICIMOD. Since 2010 it has been based at CONDESAN, an NGO working in the Andean mountains in Lima, Peru. The Mountain Partnership was set up after the WSSD in 2002 and is a voluntary alliance dedicated to improve the lives of mountain people and protecting mountain environments. The APMN at ICIMOD is a key knowledge-sharing partner in the Asia Pacific region and functions as a decentralized hub of the Mountain Partnership Secretariat.

Problems and prospects for regional collaboration

Strategic analysts have suggested that the future may remain uncertain for the South Asia region because, unlike Europe, it does not have a history of collaborative actions for developing region-wide policies. The situation has been further complicated by religious and ethnic positions that have influenced political decision-making, the absence of functioning democratic institutions, and the existence of asymmetric relations and weak implementation. The growth of extreme geo-political

positioning has, as a consequence, made it more difficult for nation-states to develop region-wide policies. Climate change and the critical need for collaboration for preserving the Water Tower of Asia offer a unique opportunity for these countries to develop an agenda for cooperation for providing ecosystem services to both mountain communities and downstream beneficiaries.

External factors such as climate change and globalization, especially migration, have raised awareness at policy level as well as opened up opportunities for collaboration. It is very likely that climate change and poverty reduction will remain the most defining challenges of the region for quite some time to come and therefore regional co-operation is more likely to succeed if efforts were made to focus co-operation more on knowledge and benefit sharing in areas of common interest such as improving co-operation in environment protection, economic development, and social and cultural exchanges. In fact this is what is currently happening and showing much greater success.

PART II

Ten Case Studies: Local Solutions for Sustainable Mountain Development in the Hindu Kush Himalayan Region

Van Panchayats or community-managed forestry, Uttarakhand, India

Key messages

- Policy reforms that strengthened property rights on tree and tree products increased community participation.
- Allocation of optimum forest area according to the size of the population made sustainable forest management possible.
- Rewarding community by Govt. of India for better conserving forests as carbon sinks has given good incentives to improve forest quality.
- Ensuring functional and democratic forestry institutions and empowering them through awareness raising and capacity building has improved forest governance.
- Technical skill development training in forest and natural resource management including carbon measurement leads to better sustainable management practices by community.
- Integration with other sector especially organic farming, non-timber forest products management, bee keeping, sericulture and ecotourism encourages tree conservation.
- Conserving water and supplying to downstream communities by charging fees has created another income source for the people.

The *Van Panchayat* (VP: Village Forest Councils) is the oldest community forestry institution in the Indian State of Uttarakhand. Their conservation efforts contribute in providing a number of ecosystem services including carbon sequestration, which has acquired a significant value in the context of climate change. There is a potential for rewarding VPs through carbon payment mechanisms in Uttarakhand, as it is happening in Nepal with ICIMOD support. In India there is a distinct possibility to do so under the Green India Mission of the National Action Plan on Climate Change that can augment the green economy.

Spatial scale/location

Uttarakhand is a newly established mountainous state formed to respond to the development aspirations of the hill and mountain people. Although about 80% of the state's population depends on agriculture only 14% of 53,000 sq. km. of its total area is under crops. This indicates the limited scope for the growth of an agrarian economy. Moreover, agriculture and allied sectors depend heavily on forest resources. Forests in the hilly parts of Uttarakhand were not codified or government-managed till 1865 and the local communities followed informal socio-cultural norms to management and harvesting. The VPs are legally recognized, under the District Schedule Act and the Indian Forest Act 1927. Their overall management, constitutions, elections, planning, and representation of marginal groups/women, various rights of members, etc. are governed by rules notified under the present Uttarakhand Panchayati Forest Rules (UPFR) 2005. The highlights of the UPFR 2005 include empowerment of women and weaker sections of society, promotion of flexible site-specific community planning, and liberal benefit sharing of usufructs under the VP rules, 2005.

There are 12,089 VPs in Uttarakhand (*Van Panchayat Atlas, Uttarakhand, 2007*) that manage over 5,449 km² of forests in 11 hill districts. This accounts for about 16% of the total forest area in the state. Nearly 50% of the VPs were formed after the creation of the state and was made possible by the policy of 'each village having its own VP'. There has also been significant new intervention, such as Community Carbon Forestry through the Kyoto: Think Global, Act Local (KTGAL) project that is managed by ICIMOD. The project addresses livelihood based management of natural resources, income generation from forest biomass residue, pine needle briquetting for clean domestic energy, and financial resources for strengthening VPs through the Compensatory Afforestation Fund Management and Planning Authority (CAMPA) for promoting green economy by strengthening institutional governance.

The major stakeholders in managing the VPs are the local community, State Forest Department, State Revenue Department, civil society and funding agencies, both government and private.

Major challenges faced:

- Inadequate forest area with regard to number of households in a village: nearly 60% of the VPs have <15 ha while 13% VPs are have <3 ha forest area under their management. Policy and technical interventions are required to determine viable/ optimum size of a VP;
- Non-holding of timely elections for democratic governance;
- Lack of adequate financial resources and appropriate incentives for effective and broad-based participation of the local community;
- Lack of sensitivity and awareness of government forestry personnel about the significance of VPs and their role in improving livelihood options; shortage of skilled and well-oriented human resources in line departments, which has resulted in bureaucratic delays and complexities to linking livelihoods with forest conservation; and
- Inadequate attention to the capacity and leadership building needs of VP members and office holders, especially as regards equipping them with technical capacity and management skills to handle the challenges, and administrative and technical issues related to managing and protecting forest resources.

Community forestry and forest governance in Nepal

Key messages

- Nepal's community forestry policy that has allowed local ownership of forest resources has radically changed the way community perceive, manage, and utilize forest resources giving more preference to protection than to unsustainable use.
- Social equity and justice in sharing benefits accruing from forestry remains a big issue but inclusive and wider participatory local policies and practices seem to be the way forward.
- Second generation issues such as how to strengthen property rights, how to build resilience and how to get more benefits from global environmental services such as Reducing Emissions from Deforestation and Degradation (REDD+) need external support and guidance.

Since mid-2000, community forestry in Nepal has been in a process of transformation, focusing on more inclusive, equitable and integrated approaches to address the changing socio-political, economic and environmental issues at the national and global levels. The present national policy debates on community forestry have been dominated by commercialization of forest products and climate change. Emerging carbon and other PES-related businesses have increased the potentials of community forestry, and possibilities of local communities to contribute to attaining the global environmental goals. These new Green mechanisms can create opportunities for mountain communities. Also commercialization of community forest products and environmental services in the national and international markets can expose local communities to larger social competition. A 'multi-layer and multi-centric' institutional arrangement may therefore emerge. In the absence of proper institutional and policy safeguards, the community-market interface may generally benefit the 'most capable' the most at a cost to the 'most incapable'.

A good forest management practice like community forestry should focus on creating a sustainable green economy to further enhance the relationship between human beings and nature. New approaches and special efforts are necessary to address the issues of integration, inclusion, empowerment and enterprise, and also to cope with the changing and challenging national and international contexts. A whole new set of institutions, skills and knowledge would be required to manage climate change adaptation and financial mechanisms, landscape-based resource conservation, forest-based green economy, etc. The government and community forestry institutions should be prepared to ensure that local communities in general and poor users in particular, are not deprived of a fair share of benefits from emerging Green businesses. The level of future environmental and livelihood impacts of community forestry will depend on the capacity and cooperation among government agencies, community forestry institutions and the private entrepreneurs in promoting Green economy and creating Green jobs for rural communities.

Community forestry in Nepal covers all districts and physiographic regions. It has helped to re-green the mountains and is one of the largest participatory Green initiatives underway since the 1970s, involving about 40% of the population in managing about 25% of Nepal's forests. In the last three decades, community forestry has evolved into an effective forestry resources management model. And encouraged by its success, Nepal has also adopted community-based approaches to managing protected areas and watersheds. The experience of community-based resource management in Nepal confirms that the 'tragedy of the commons' results not from the sharing rights, but from the absence of well-defined rights, roles, responsibilities and resources (4Rs) of different stakeholders. Furthermore, it clearly shows that poor are neither bad resource managers nor agents of

deforestation. Given proper incentives and tenure rights, they invest in, and can contribute to protecting their environments.

Since its inception in the mid-1970s, the programme has evolved continuously, and has been a good learning experience for government agencies, local communities, international development organizations, and civil society organizations. The programme has been successful in embracing the changing local needs, national development priorities and international environmental concerns. Community forestry is also contributing to social, economic and environmental agendas at the local, national and international levels. The programme took a participatory turn in early 1990s when the government enacted enabling policies, laws and regulations, and incorporates the spirit of all three objectives of the CBD in policy and practice. It is also an excellent example of local application of the global agenda on environment, sustainable development and human rights; and has been helping Nepal in fulfilling its international commitments.

Evolution toward a sustainable forest management practices

Over the years, the community forestry programme has evolved in focus from subsistence-based forestry to good green governance contributing to local democracy and sustainable rural development. Community Forestry Users Groups (CFUGs) is the largest and strongest civil society organization in Nepal and the initiative has been a one that includes marginalized communities in the rural socio-political processes. It has empowered thousands of rural women as important local development stakeholders. The CFUGs have been an important development engine at local level and in many mountain areas they have been contributing to local development by collaborating with at least 20 ministries. In many ways, the programme has been successful in tackling the three key constraints of SMD – marginality, poverty and environmental fragility. Evidences also suggest that all five important livelihood assets of mountain communities have improved after the implementation of community-based forest resources management. The programme has also been contributing directly towards the achievement of five MDGs goals: poverty reduction, environmental conservation, gender equality, primary education and partnerships for development. These outcomes are testimony that the community-based approach to resource management supports the goals of conservation of mountain ecosystems and improving the wellbeing of mountain communities.

Forest watershed-based Clean Development Mechanism, Himachal Pradesh, India

Key messages

- A legal framework ensuring the flow of carbon credits to the actual community that protects forests has provided necessary incentive to protect watersheds and forests.
- Issues related to social and gender equity and community participation have been found to be the most difficult which can be partly addressed by ensuring equitable and transparent sharing of monetary benefits within the house.
- The success of the project will also open opportunities for afforestation and reforestation in a large and degraded watershed thus benefitting larger downstream communities.

Small farmers and forest user communities in India's state of Himachal Pradesh are working to sequester over 839,582 tons of carbon dioxide equivalents over the next two decades through forestation and reforestation of 4,000 hectares of variedly degraded agriculture and forest land. Thereafter each family in 177 village *panchayats* (councils) will earn between US\$ 83 to US\$ 145 per hectare per year as payment for carbon they stock.

As a sub-component of the World Bank-supported US\$ 75 million Mid-Himalayan Watershed Development Project, the creation of carbon sinks through afforestation is likely to result in a net gain of US\$ 4.1 million for the communities over the next 20 years. The World Bank, a trustee of the Bio Carbon Fund, is brokering the transfer of funds between the host country and the client DNA (Oficina Espanola de Cambio Climatico) of Spain.

As the first project of its kind in the mountains, the project – which is larger than the 3,500 ha Clean Development Mechanism (CDM) project in China -- will not only generate environmental benefits through carbon sequestration but will also improve income-generating capacity of small farmers. Through restoration of highly vulnerable degraded forestlands in Kangra and Bilaspur districts, the project's activities are expected to generate 343 person days of employment per hectare while resulting in other environmental co-benefits such as natural water storage.

The recent agreement between the Government of Himachal Pradesh and the World Bank, effective

till December 2018, ensures that the carbon credits will go to the community, providing them the necessary incentive to protect watersheds and forests. The flow of 'green money' will start reaching communities in end 2011; 10% of the total carbon revenue will be retained by the Forest Department as overhead charges and some conditions will apply before the carbon credit starts to flow. The landowners will need to ensure that tree density is not less than 1,100 plants per hectare; that there is no felling of trees from land under the project; and that no part of the land brought under such plantations shall be diverted for non-forestry purposes. Even though issues related to social and gender equity and community participation remain to be addressed, the project does open the door for accessing 'green payment'.

Improved natural resource management for securing livelihoods in Northeast India

Key messages

- Community-led decision making, planning, implementation and monitoring increases the household income as well as improves the conservation of natural resources.
- Community empowerment is the key to bring about transparency, accountability, inclusive growth and greater ownership of development and forest conservation initiatives.
- Local sustainability is possible by practicing social inclusion, empowerment of marginalized communities, and enabling economic development through value addition to the local products and linking them to markets.

North East India is characterized by rich biodiversity and extreme poverty. Aid dependency had eroded self-reliance before the North Eastern Region Community Resource Management Project for Upland Areas (NERCORMP) – jointly funded by IFAD and the Government of India – was launched in Assam (in N C Hills and Karbi Anglong), Manipur (in Senapati and Ukhrul) and Meghalaya (in West Garo Hills and West Khasi Hills) benefitting some 87,000 households. The overall objective of NERCORMP is to improve the livelihood of vulnerable groups sustainably through improved management of the resource base in a way that contributes to protecting and restoring the environment. Its major components are capacity building of communities and participating agencies, economic livelihood activities, community-based biodiversity conservation, social sector activities and village roads and rural electrification. Encouraged by its success and as response to local demand, the project has now been extended to Arunachal and Manipur states of India.

The project promotes 'inclusive' and 'client driven' decision-making and development through deliberate formation of Natural Resource Management Groups (NaRMGs) that are tasked with decision-making, fund management, implementation, monitoring, participatory planning (Perspective and annual plans), and gender mainstreaming. Self-help groups and federations empower women through affinity groups and alliances and by involving them in savings, micro credit schemes and income generating activities. There is emphasis on reducing dependency on *jhum* by providing other livelihood options such as home gardens, extended home gardens with horticulture, and wet rice cultivation. The project also promotes off farm income generating activities such as weaving, handicrafts, groceries, and petty businesses. It also supports infrastructure development such as building of small irrigation systems for agriculture and village roads for accessing education and markets.

The communities have set up elephant and python reserves, and conserved fish breeding sites. They use the Participatory 3-Dimensional Model, pioneered in the Philippines, for community planning and decision making. The project has so far formed and used 24 different Participatory 3-D models.

The communities across the three states of India's North East are diverse. There is general acceptance of NaRMGs and its harmonization with traditional institutions. However, more work is needed to ensure harmonization at higher levels. Linkages are also being formed with the private sector and the government while promoting a mix of community and individual approaches to development. In North-eastern India, 80–90% of land belongs to the community or village chiefs. As NaRMGs represent the community, there is no problem in implementing the project because the self-help groups engage entire households, especially women, in meaningful activities.

Watershed management in Pakistan: adaptation and sustainable development

Key messages

- Communities that have for years conserving watershed of the Tarbela dam and producing national public goods have no incentive to sustain these efforts.
- Climate Change has added another factor that is affecting their traditional source of livelihoods and threatened sustainable management of watersheds.
- Carbon Forestry offers a good opportunity to Tarbela community provided a programme such as REDD+ is launched that can mitigate carbon, adapt to climate change and also reduce poverty by ensuring payments in lieu of conservation.

The Tarbela Watershed Management Project (TWMP) was initially started to control siltation in the Tarbela dam with community involvement. It has gradually evolved into a community-based natural resources management and sustainable development project. The project began in the 1970s and its evolutionary process was parallel with global developments like the Stockholm Conference (1972), the Rio Summit (1992), and the present discourse on the green economy. Alongside field activities related to integrated watershed development and creation of alternative livelihood opportunities, the watershed field stations also addressed the second component of Chapter 13 of Agenda 21 i.e. knowledge generation about the ecology and sustainable development of mountain ecosystems. Watershed management as a discipline has also been incorporated in the curriculum of the Pakistan Forest Institute (PFI).

Key informant interviews and literature reviews reveal that the local processes of the TWMP project have addressed the global concerns but evolved without juxtaposing the Agenda 21 or other global process documents in perspective. The global processes have been the major factors influencing the preparation of the TWMP project documents through other ongoing processes in Pakistan.

The achievements of the TWMP are significant. An area of more than half a million acres has been brought under tree cover and soil conservation, and check damming has had a positive impact on silt load in the dam. Meeting the main objective of the TWMP – the reduction of silt load through participatory watershed management – is the project's main success story. However, progress could have been much more holistic and sustainable had the concerns of biodiversity conservation also been incorporated in the project's design. Biodiversity concerns that remained largely un-addressed are the creation of buffer zones or biological corridors for wildlife in the mountains catchments. After completion of 30 years of watershed management under different phases the project now stands at a

crossroads. There is a huge pressure and high community expectation for securing livelihood benefits commensurate with the sacrifices they have made for protecting watersheds.

green economy is being viewed as the viable path for low-carbon economic development for the watershed. REDD+ is recognized as one of the best option for promoting community forestry that can give multiple benefits. The TWMP has been analysed for its relevance to the current discourse of Rio+20, in particular its niche in the green economy. The findings of this study show that TWMP has all the required institutional and social setups to start it as a REDD + project. However, capacity building of communities and TWMP staff, and legal and technical arrangements are also required.

Conservation and development of medicinal and aromatic plants in Uttarakhand, India

Key messages

- Medicinal and aromatic plants (MAPs) conservation and development efforts in Uttarakhand state of India provides a learning example of sustainable development for the entire HKH region.
- MAPs are the most important bio-diversity resources for socio-economically marginalized communities in the Himalayan region sustainable conservation of which requires public-private-civil society partnership.
- The Uttarakhand case demonstrates that MAPs sector development has impacted on all the three pillars of sustainable development – ecological, economic and social.
- Multi-sectoral and multi-disciplinary approaches are necessary for further success because cultivation, conservation, processing, marketing and equitable benefit sharing requires enabling policies, institutional framework and above all knowledge management.

Medicinal and aromatic plants (MAPs) form an important component of biodiversity and these are closely linked with local health care systems, rural livelihoods, and herbal industries. The Himalayan region is extremely rich both in the diversity of MAPs and indigenous/traditional knowledge on the use of herbal medicines. A majority of the communities are socio-economically marginalized and depend heavily on MAPs for their primary health care needs. However, more than 90% of the MAPs used in herbal industries today are extracted from the wild resulting in a rapid decline of high value species. In accordance with the Agenda 21 commitment, and subsequent action plans under the CBD all member countries and the Himalayan states need to develop long and short-term strategies for conservation, sustainable and scientific harvesting, utilization, cultivation and marketing of MAPs with the involvement of all stakeholders.

India's Uttarakhand state is also known as an 'herbal state' for its tremendous wealth of MAPs. The state has about 5,000 species of vascular plants, of which about one third are known to have some medicinal properties. Of these, nearly 150 species are sold to the herbal industries and are mostly sourced from the wild.

After the formation of the new state in 2000, there was a paradigm shift in biodiversity conservation and management, and its efforts aimed primarily at enhancing the impact on local livelihoods. Since much of the land is hilly and unproductive for regular agriculture, the government realized that forests have potential to sustain local livelihoods if managed through meaningful community participation. An important administrative reform was introduced and a new position of the Forest and Rural Development Commissioner (FRDC) was created. The role of the FRDC is to link forests, biodiversity, and agriculture to rural development. This has resulted in a number of new policies, strategies and actions that included the reforms in the MAPs sector.

The state has also made major changes to reorganize its research and development programmes in the MAP sector to include medicinal plant business, policy instruments and long-term strategies for the sustainable development of the herbal sector. A State Medicinal Plants Board (SMPB) headed by the Chief Minister issued necessary policy directives and technical guidelines. The state has also established an Herbal Research and Development Institute (HRDI) for developing and disseminating knowledge. A large number of government and non-government organizations, including traditional practitioners and scholars, have contributed to the development of state's herbal sector.

Uttarakhand also has the advantage of access to a number of national research and development institutions based in Dehra Dun. A rapid MAP inventory and mapping project has been initiated for generating baseline data for preparing Conservation, Development and Harvest (CDH) plans that are to become a part of the Forestry Working Plans. Most significantly, the forestry administration has mainstreamed conservation and development of MAPs in divisional management plans and annual plans of operation. The Forest Department has also made provision for improved access of local communities to NTFPs.

Transboundary ecotourism in the eastern Himalayas in Sikkim (India) and Bhutan

Key messages

- Ecotourism has potential to generate multiple co-benefits ranging from conservation of biodiversity to cultural heritage but in the HKH region, it provides most equitable benefits by involving poor people.
- Promoting nature tourism in a regional framework can have a maximum benefits to the communities as it helps bring more responsible tourism and promotes diverse livelihoods that leads to both conservation and development.

Ecotourism, which aims to protect the natural environment and cultural diversity by attracting nature enthusiasts and generate revenue for local people without harming nature, has emerged as a successful mechanism for contributing to all three pillars of SMD in the Eastern Himalaya. People involved in mountain tourism have witnessed an increase in tourist arrivals, longer length of stay, increasing visitor expenditure and retention. India and Bhutan have been promoting tourism as one of the most promising means for attaining sustainable development. Their cooperative policies are having major impacts on development. In the Eastern Himalaya region, visitors experience a safe environment and unique hospitality, with good local awareness about the opportunities that ecotourism presents. Visitors have also appreciated the quality and maintenance of the unique bio-cultural landscape. The region's highly distinctive natural beauty and Buddhist culture are being conserved for retaining the unique identity and also for benefitting from tourism.

Both Bhutan and India have their own tourism policies and action plans. The formulation of policies that address the needs of the place and people in adjoining transboundary regions can assist in promoting tourism across borders and to foster pro-poor tourism enterprises. Regional tourism has not flourished in the HKH region as yet but the model in the Eastern Himalaya has scope for up scaling. The case study provides an overview of regional tourism status in Sikkim in India, and Bhutan, and suggests strengthening regional cooperation in tourism. The paper aims to explore the tourism potential in the region by promoting ecotourism as an example of transboundary cooperation between India and Bhutan.

ICIMOD has been facilitating regional cooperation through its transboundary conservation initiatives. ICIMOD's Regional Cooperation Framework, developed through consultative processes harmonizes national policies and legislation for effective management of the Kanchenjunga landscape and it has been a key instrument for achieving environmental and economic sustainability among the countries that share this territory. Ecotourism forms part of this initiative.

Organic agriculture in Uttarakhand – a green solution for mountain agriculture

Key messages

- Organic agriculture that localizes food systems has the potential to mitigate nearly 30% of the global greenhouse gases.
- Development agencies can play a key role by fostering cross-region sharing and institutional strengthening since organic technologies such as bio-pesticides and organic fertilizers are largely sourced from traditional knowledge.
- Besides technical capacity building, acquisition and transfer of technology and skills in marketing, certification, and innovative financing need external support.
- A Participatory Guarantee System of group certification schemes can reduce costs as well as harmonize product standards and fetch better price due to quality improvement.

Organic farming is the manifestation of the traditional environmental stewardship of the people that provides a meaningful outcome in the form of economic growth. Agriculture is the mainstay of economy in mountain regions and therefore sustainable development is directly linked to agricultural development.

The green revolution technologies did not really reach the mountain regions primarily because the farmers could not afford the expensive chemical fertilizers and irrigation. Other inputs – intensive extension services and machineries – were also not available in the hills. Therefore, the indigenous technologies and inputs-based diversified agriculture suited the mountain regions, which Uttarakhand is using for promoting organic agriculture or 'green agriculture'. Mountains and hills have a long tradition of collecting of forest waste and using it in barn management, and that gets recycled as an important source of carbon (humus) for the soil. This tradition also sequestered carbon under the ground as soil organic carbon, which is another benefit of Green agriculture. The success of organic agriculture in Uttarakhand can thus be attributed to its rich agro-biodiversity and forestry resources (above 60% of the land). Other reasons are the very high literacy among farmers, the large number of educated rural youth not wanting to pursue traditional agriculture and state's good network of roads, railways, and air links connecting it to large markets in Delhi and even Europe.

Creation and strengthening of farmers' associations has served as a tool to ensure participation and equity for small farmers, and also a mechanism to take care of supply chain issues such as marketing, certification, and integration of internal quality management system to help ensure traceability and organic compliance. The Uttarakhand Organic Commodity Board (UOCB) was set up in 2003. The state approached Sri Ratan Tata Trust (SRTT) for support and an initiative. The Himmothan Pariyojna was given the responsibility to run the programme. The State and the SRTT contributed equally to finance the initiative with support of the UOCB, which is viewed as a model institution in a new sector. As a support mechanism, the state government has tasked the state seed certification agency to undertake organic certification and has also named the State Organic Certification Agency (USOCA), as another major support measure.

Organic agriculture that includes forestry, range and pasture development fits into the sustainable development agenda of mountains like 'fish in water'. Recent global reports indicate how organic agriculture can contribute to climate change adaptation and provide resilience to farmers in vulnerable regions. Organic agriculture that localizes food systems has the potential to mitigate nearly 30% of the global greenhouse gas (GHG) emissions and save one sixth of global energy use (Mae Wan Ho and

Lim Li Ching 2009). Sarah Borron (FAO 2006) has argued that environment disturbances affect farmers from marginalized regions and organic agriculture techniques can increase resilience in soil and water, biodiversity, landscapes as well as community knowledge systems. These are essential for building resilience for the climate change impacts in the HKH region.

The Organic Production Initiative now needs to be brought into a long-term policy framework of mountainous countries and regions. Institutions supporting the programmes need to be strengthened with realistic budgets. Private sector participation needs to be encouraged and consumer forums need to be built to bring about sustainable and fair trade mechanisms. Regional government need to also take a position on potentially harmful factors such as genetically modified organisms, intensive agriculture policy, and contract farming.

Nepal's biogas programme, the green economy, and sustainable mountain development

Key messages

- Nepal's biogas programme has made significant contribution in the improvement of the local, national and the global environment; this has been recognized by recent award of the Carbon Emission Reduction (CER) to this project by the CDM Board.
- It supports forest conservation by replacing the traditional fuelwood used for cooking.
- Lack of clear and enabling policies is still hindering the provision of adequate incentives to promote institutional or community biogas plants which have larger potential.
- Lack of research and development support is necessary to scale up and scale out biogas energy in the mountainous regions.

Biogas, as source of clean energy for rural Nepali households, is environmentally friendly, economically feasible, and socially accepted. The technology has been in use in Nepal since 1977. The Biodiversity Support Programme (BSP) has been successful as a rural development programme that has fostered a partnership among government agencies, donors, the private sector, NGOs, and community based organizations (CBOs). Initial investment subsidies and low interest loans with long repayment periods were some of the key elements for the success and expansion of the programme.

The biogas programme has multiple benefits. A major household level benefit is the reduction in the time and energy spent by women and children in collecting firewood. Reduction in air pollution, including CO₂ and black carbon emissions, is a major environmental benefit. Biogas plants with attached toilets have also promoted better sanitation. The biogas programme also promotes local employment because it requires skilled workers for construction, maintenance, marketing, and financing of biogas plants. Further, the residual biological slurry can be used as organic fertilizer. The biogas programme supports the government's goals of promoting sustainable energy, improving access to energy for the rural poor, and reducing poverty. The biogas programme also provides economic benefits through energy and fertilizer substitution, and increased yields from animal husbandry and agriculture.

Nepal has appropriate infrastructure at the macro level: it had 243,065 plants installed across the country in July 2011. Effective enforcement of quality control has ensured that around 93% of the plants are operational. This statistic is very high compared to neighbouring countries. Initially greater emphasis was given to extension and promotion while research and development (R&D) was given low priority. However, in recent years a number of organizations have initiated programmes to carry out applied research on various issues not only limiting to domestic biogas plants but also on the benefit to rural farmers.

Micro-hydro energy development in Northern Pakistan

Key messages

- Micro-hydro plants are an ideal energy source for remote and fragile mountain environments as it better responds to local economic, physical and social needs and specificity.
- Decentralized approaches of generating and distributing clean energy using local water, solar and other sources may be the best option for isolated mountain areas.
- Strong commitment and support by the government through in terms of enabling policies and economic incentives is needed for their sustenance.
- A practical recommendation will be for the public sector to build and maintain 'mini grids' and allow local investors and community organizations to generate clean hydroelectricity to feed such grids.

This case study documents a good practice in decentralized development of renewable energy and climate change mitigation in one of the most fragile ecological settings of the world now faced with unsettling climate change impacts. With coordinated support from government, NGOs and R&D organizations and funding/ lending agencies, communities in the remote mountains are not only meeting their energy needs from close to 300 self-managed micro-hydro projects (MHPs), but are also helping in offsetting carbon emissions, and in generating and trading certified emission reductions (CERs) under a UNFCCC recognized CDM project.

The MEPs are changing rural livelihoods in the remote, fragile and socioeconomically marginalized mountain valleys of Gilgit-Balistan and Chitral (GBC) in northern Pakistan. The entire area is prone to natural disasters and, in recent years, climate change impacts have become visible in terms of extreme swings in the weather patterns. Pakistan in general and the remote off-grid valleys of GBC in particular face acute energy shortages. The insufficient energy, despite high potential for clean hydropower, forces people to cut alpine trees and other vegetation to meet their basic needs. The use of diesel and other fossil fuels has also increased.

The Aga Khan Rural Support Programme (AKRSP) introduced MHPs as a community-led development initiative in the region in 1990. The management of MHPs has been built on the traditional practices of common property management. By 2005, the communities had built 240 MHPs, with a combined installed capacity in excess of 10 MW. When Pakistan ratified the Kyoto Agreement in 2005, a CDM project was conceived, which after a rigorous and long process was registered with the UNFCCC in October 2009. The bundled CDM Project envisages constructing 103 new MHPs with a total capacity not exceeding 15 MW, at a cost of US\$ 18 million over a seven-year period. The participating communities have provided 20% cash as equity contributions towards the total investment; 50% of the cost is contributed by the Pakistan Poverty Alleviation Fund (PPAF) in small grants, and carbon income and loan financing make up for the remaining 30%.

The financing mechanism and business model also provide a scalable partnership approach. Public funds are leveraged to raise community equity from capital and carbon markets. The ownership of smaller units is community-based, and units of 0.5 MW and higher, are designed to operate as formal power utilities with three goals: economic gain, social services and environmental protection.

Local success stories

India's 'Apple State'

Himachal Pradesh lies in India's northwest in the Himalayas. Its five million people live on marginal sloping lands practicing both traditional and commercial agriculture, which better described by the terms used to refer to the state – 'Fruit State' or 'Apple State'. Roughly 31 per cent or 614,000 ha of arable land are under horticulture. The annual production is about 312,000 tonnes. Apples are the main cash crop, accounting for 42 per cent of the area under horticulture, and about 90 per cent of fruit production. About 97,438 ha are under apple cultivation, involving about 150,000 growers, who together produce about 510,161 tonnes each year (Department of Horticulture, Himachal Pradesh 1998). Apples contribute about US \$1.7 billion to the state's economy each year -- roughly US\$150–170 million directly, and about US\$1.5 billion indirectly, through jobs the industry has created.

Bees as rented pollinators

Himachal's Kullu Valley and surrounding areas are seats for beekeeping. The two species, *A. cerana* (indigenous) and *A. mellifera* (exotic) of bees support the state's economy both as honey bee producers pollinators. Beekeepers rent colonies to the apple orchards, and growers benefit from enhanced production - a win-win deal for both the growers and the beekeepers. The fee amount for renting bee colonies - both *Apis cerana* and *A. mellifera* - range between US\$ 13-17 per colony for the total flowering period of apple crop. Beekeepers collect the rent money at the time of renting the colonies or after rendering pollination services. *Apis mellifera* keepers practice migratory beekeeping on commercial scales with 100 to 1500 bee colonies, while the *Apis cerana* keepers are stationary and have 10-30 bee colonies. Beekeepers having more colonies (500 to 1500) rent out about 50 per cent of the colonies, and the rest are retained for honey production. The demand for bee colonies for apple pollination has been increasing every year. This large-scale use of honeybees for apple pollination has led to the development of a new vocation in this small state of India. A number of pollination entrepreneurs and associated enterprises have developed in and around the state to provide pollination services. This is a both a green and smart agricultural practice, which has not only increased fruit production but also helped small and landless farmers improve their incomes (Pratap 2012).

Integrated tourism and park management: Shangri-la, China

Tourism planning and development work in Shangri-La, Yunnan, China is an example of nature conservation and culture preservation that have to go hand in hand with special protection of sensitive habitats of unique flora and fauna (e.g. golden monkey). Special attention has to be given to protect local cultural heritage and values while developing infrastructure even regulating tourism, if required, and managing the sensitive sites with involvement of local communities, religious leaders and their knowledge.

Education and awareness raising of stakeholders especially visitors, tour operators and local youth can help implement and sustain good tourism practices. Involving local community in all stages, from the planning to revenue sharing, is essential to support local livelihoods by creating additional

financial support for local people. Equally important is tourism related local product development, based on local biodiversity including medicinal plants and different kinds of mushrooms and other natural products. This combined with right marketing and promotion strategies can lead to creating unique brands for the local tourism infrastructure.

Integrating tourism into park development and management planning creates a synergistic and complementary conservation and local development model that can contribute towards SMD. Shangri-La Eco-tourism and World Heritage Site is an example of this where environmental impacts have been minimised while providing a fulfilling and high-quality tourism experience. It has also ensured participation and benefits for local communities by creating various revenue-generating mechanisms. The site has integrated tourism activities in zoning, land use planning and regulating tourism through licensing of tour operators, guides, accommodations and also has education and awareness raising programmes for visitors.

PART III

Challenges and Opportunities for Sustainable Mountain Development

Lessons from the case studies

The HKH region faces multiple issues, both existing and new challenges. While the persistent challenges of poverty, rapid urbanization, population growth and environmental degradation are having greater impact new challenges are resulting from climate change, youth migration and growing social conflicts that have aggravated the old challenges. Climate change induced threats and higher rate of global warming in the mountains are causing disproportionate impacts on the HKH mountains and hills. Economic and food crises, social and political unrest, shrinking development space, and slow progress on past commitments are the key challenges. Globalization and ecosystem degradation are also seriously affecting agriculture and ecosystem production and productivity thus increasing food insecurity and social and gender inequity.

HKH mountains support many different ecosystems and provide key goods and services that provide livelihoods to millions of people and are also the basis for human activities beyond their natural boundaries. Most of the goods and services provided by these mountains have their origin in the upper slopes that are sparsely populated. The consumers of these goods and services are mostly in the lowlands, especially water and energy. Highland and lowland systems are thus highly interdependent. Himalayan mountain communities with their rich traditional ecosystem knowledge and highly adaptive capacity contribute significantly to the quality and the sustainability of these goods and services. However, they are rarely and/or are poorly compensated for the services they provide to downstream communities.

The case studies provide a snapshot of micro level changes but also provide lessons for macro level adjustments. They indicate that while India and China have grown economically, the rate of change in the HKH region, which is largely rural, has remained modest. Ethnic conflicts, cross-border tensions, demographic transition including outmigration and increased and unplanned urbanization have had adverse influences on local economies and the environment. In contrast, growing tourism, increased remittances and improved market linkages for natural and organic products have helped some mountain and hilly regions to register modest growth although growth has not been uniform.

Key messages from the studies are summarized in Table 9.

| Table 9: Summary of the case studies in the HKH region | |
|--|---|
| Case study theme | Key messages |
| Medicinal Plants/NTFPS | Identification and reform of policy barriers can improve access to medicinal plants by local people and significantly increase the benefits. Uttarakhand case is an example for other states and nations to follow. |
| Community-based NRM | Empowering communities to participate in planning, designing, implementing and monitoring of NRM at local level can help them take better decisions as well as gain ownership of local resource governance and management process. |
| Community forestry and forest governance in Nepal | Good model of forest resource governance enabling farmers to improve livelihoods and participate in and benefit from emerging opportunities such as REDD+. Community-managed forests are generating triple dividend: improved environment in terms of watershed management and biodiversity conservation, enhanced local income and poverty reduction and carbon mitigation. |
| Ecotourism | Important source of income to local community with relatively more distributive effect for bringing income equity. Conservation through sustainable livelihood is shown to be possible. |
| Van Panchayats (Community forestry) | A good forest governance model. Generate multiple products such as clean energy, compost, fodder banks; carbon co-benefits (REDD) and leads to biodiversity conservation |
| Forestry CDM | The case study demonstrates that although difficult, Forestry based clean development mechanism (CDM) is possible. CO ₂ sequestration through improved forest and watershed management helps to develop new forestry institutions locally and benefit sharing issues are solved through consultations, innovations and dialogue. |
| Organic agriculture | Uttarakhand state has demonstrated that organic agriculture can improve farmers' income, environment and health. Improved agro-ecosystem resilience, soil organic carbon deposits; reduced costs are the clear environmental benefits. Initial financial and technical support is a must to enable farmers to transit from chemical to organic farming. |
| Bio-gas promotion | A successful national program which has been on demand in different parts of Asia and Africa. It has promoted peoples' participation with significant social and economic benefits in clean energy production and getting global recognition for environmental benefits. |
| Micro-hydro projects (MHP) | Pakistan's MHPs have successfully shown that low-cost, clean and sustainable source of energy for remote mountain communities (off-grid locations) offsetting carbon emissions and generating and trading CERs under a CDM programme. |
| Watershed management | Community-based watershed conservation in catchment areas of the Tarbela multipurpose dam has produced multiple environmental benefits but due to policy vacuum social benefits are lacking. Poor sectoral coordination and thematic integration of social and environmental pillars with economic pillar is identified. Future potentials of participatory watershed management are high through REDD+ and other |

Major learning from the case studies

Green projects are suitable for subsistence economies

Most mountain areas of the HKH region are under subsistence agriculture. Some are primitive while others have varying degrees modernization and inroads of the market economy such as Kullu Valley in Himachal Pradesh, India; Kathmandu in Nepal; and Kunming in Yunnan, China. Nepal and Bhutan, typical mountainous countries, are predominantly rural. Development has come to these areas through emphasis on specific niche products such as apples, vegetables, medicinal plants, wild mushrooms, and cash crops as well as services; and it has come in different scales due to remoteness. Most mountain town development models have been transported from the plains without much regard to mountain specificity and therefore the environmental consequences have been rather devastating, especially in the fragile valleys such as Kathmandu.

Traditional cultivation systems have potential for organic production

Mountain areas of the North Eastern States of India and the Chittagong Hill Tracts of Bangladesh have been practicing traditional agriculture – shifting cultivation – for centuries and have been often blamed for deforestation and environmental degradation. Scientists have been documenting evidences that now suggest that shifting cultivation with adequate fallow cycle and good management can guarantee sustainability. The case study has indicated that, sedentary agriculture alone will not provide food and ecological security besides being bio-culturally inappropriate. A more sustainable solution is a community-based natural resource management strategy supported by enabling policies and strengthened institutions under which land and tree tenure is assured, access to technical and extension service is improved and communities are allowed to choose the crops, and trees, including agro-forestry practices. These approaches have demonstrated that not only is food security improved qualitatively but the area under low-intensity shifting cultivation or for that matter nomadic and ranging lifestyle, results in preservation of ecosystems as is evident in Nagaland, India; parts of Tibet, China; and Bhutan.

Decentralization and devolution can lead to good governance

After 1992 there has been a general shift towards greater devolution of powers to local governments. Most mountain regions were considered sensitive border areas and were kept under regulatory watch of central governments or as parts of centre-dominated governance units that either ignored the development needs of mountain people or awarded them with development projects the benefits of which were captured by non-mountain intermediaries, civil servants and or local elite. Such projects disregarded local needs, ecology, and local culture. In recent years, a change in mindsets has been accompanied by the acceptance by governments of the need to accommodate local developmental aspirations, without suspecting rebellious tendencies, which still exist in some mountain areas. These social movements and conflicts are about identity politics, caste and class grievances, and protests against general irresponsiveness to local and cultural aspirations. Mountain communities that have been given economic freedom and political autonomy to choose the development path have addressed to SMD goals better as shown by case studies of Van Panchayats in Uttarakhand in India and micro-hydro projects in Gilgit Balistan province in Pakistan.

Need for a balance among the three pillars of sustainable development

The nature and extent of the problems, issues, and possible solutions in SMD have changed and/or multiplied in some cases since 1992. The challenges and threats demand a new strategy and orientation on the part of scientists, researchers and policy makers for finding a balance among the three SMD pillars. While in the 1970s, the region was concerned about rural development, in the 1980s the shift was to deforestation and soil erosion and general environmental degradation – all

linked to the vicious cycle of population growth, environment degradation, and poverty. The issue of development and environment is not new but was considered to be caused by internal forces.

In the first decade of the 21st century, and with climate change, the fragile Himalayan ecosystem has come under new threats, primarily from external drivers of change. Therefore, balanced development in the HKH mountains faces a set of challenges resulting from its specific geological, socio-cultural and geo-political situation. In the 1990s, globalization and economic liberalization swept the region and India and China are emerging as economic and political powers. The mountain countries in the HKH region have implemented social, developmental and environmental policies to attain SMD but in a haphazard and unbalanced manner as is evidenced by the following analysis of the three pillars of sustainable development.

Social Pillar

The challenges of reducing poverty identified 25 years ago are still real and imposing. Only the context, in terms of the emerging trends and challenges and our understanding of the problems, has changed. During the last 20 years mountain poverty has come down but not in terms of absolute numbers and perhaps the amounts of natural resources used. Social conflicts have been growing in countries such as Afghanistan and Nepal mainly due to poor governance and inequitable distribution of resources, especially in productive resource sectors such as agriculture, forest and range lands. As roads link the remote regions to national and international markets, even subsistence farming is undergoing through fundamental changes, and in many areas it is fast losing relevance to the household economy. The small farmer in the HKH faces multiple challenges both from within and outside. There has been slow but steady increase in access to resources including credit, and growth in literacy, and new opportunities have come up outside the region for selling labour, resulting to a huge outflow of hill migrants. But the benefits from these have not been uniform in the rural society with poor and illiterate losing out. For example, Nepal's economy has been surviving largely on remittances. However, remittances are not helping the rural economy due to lack of investment opportunities, the required entrepreneurship among the youth, and insecurity. With a spurt in remittances, economies have also exposed themselves to externally influenced vulnerabilities. For lack of proper investment policies, outside external interests are benefiting from many opportunities in the mountains – tourism, biodiversity, and hydropower. The challenge is to create an enabling and favourable investment climate for mountain communities to benefit and prosper from these new opportunities.

Although SMD is being morphed into the concept of green economy, poverty alleviation remains the top challenge for the economies in the HKH. The implications of a transition to green economy to achieve SMD and its outcomes are still unclear. Should mountain regions have specific indicators for measuring the green growth – such as, say a Mountain Product Index (GMI) – to draw attention to costs and benefits by measuring the use of the ecosystems goods and services sourced from the mountains? Addressing this and other similar questions is crucial for articulating and eventually attaining SMD in the HKH region.

Environmental pillar

Global warming and climate change have added a new dimension to our understanding of environmental challenges. This has brought to the fore the need to reform or reformulate policies and processes for redefining the sustainable development path. It is already clear that climate change impacts are much more pronounced in the mountains than in the plains. Two decades after Rio, while the global community is back to reinforcing sustainable development through a transition to low carbon or green economy in which climate change adaptation and poverty eradication are in the centre, the HKH region is struggling to end mountain poverty and still hosts more than 400 million of the world's poor.

Rapidly increasing climatic events and surface warming demand a major shift in the way the critical ecosystem services including rangelands, biodiversity and forestry are managed. While the poverty

reduction requires continued economic growth, the type of future natural resources management regime needs to incorporate measures to build resilience and measures to adapt to the impacts of climate change. The Himalayan countries face daunting tasks of building more resilient agriculture and natural resources sectors to protect food, energy, water and ecological security. There is also a need for greater understanding, and response, to the threat of climate-induced migration. More than 60% of the economically active population in the HKH region depends on agriculture. A pro-growth, pro-poor, and pro-mountain development agenda that supports agricultural sustainability, including targeted, adaptive management programmes for ecosystem services, can help improve to resilience. The agriculture and forestry sector can also in mitigating GHG emissions in the region provided there are appropriate incentives and innovative institutions, capacity building support, technology, and management systems; and by sequestering carbon in forests, soils and rangelands. Incorporation of agricultural adaptation and mitigation in the ongoing climate change negotiations can open up opportunities for financing of sustainable growth in the mountains under climate change constraints. Mitigation strategies that support adaptation and development investments with climate change co-benefits should be favoured for enhancing ecosystem services in the mountains.

Economic pillar

The HKH region faces challenges that are specific to its sub-regions and are also rooted in its socio-cultural and economic distinctiveness. Barring Bhutan – the country that pioneered Gross National Happiness (GNH) as an indicator of development that is based on conservation of the environment, economic development and social and cultural identity – the other countries are focused on achieving higher economic growth rates measured by GDP. The latter approach faces questions mainly on equity and sustainability. Infrastructure development and ecosystem destruction has kept pace in the mountains, creating economic impacts at the cost of forest degradation, and increased hazards in the form of landslides, floods and displacement of people.

Every country in the region has been liberalizing its economy and trade under different multilateral and bilateral regimes. Trade between South Asia and China has also expanded significantly. The expansion of regional trade among the HKH countries can yield tremendous economic gains in production specialization, efficiency and improved quality of exports, which can benefit all the countries. However, to realize the potential of economic development, the HKH countries need to reform policies and institutional setups to enable and strengthen the regional and bilateral economic co-operation since many economic issues transcend geopolitical boundaries and require a coordinated approach from all the countries of the region. With increasing mobility and access to knowledge and information, enhanced regional economic cooperation and exchange among the HKH countries can only address the challenges of poverty and environment degradation. The meaningful strengthening of economic pillars can benefit all the countries.

What has worked and what has not

Many SMD initiatives in the HKH region have led to synergistic impacts and also contributed to learning. But the developments have often come at a cost – of losing focus on social equity, economic self-reliance and environmental sustainability, the three pillars of sustainable development.

Accessibility, both physical and electronic, has increased across the region. Extensive road and communication networks have played significant roles in improving access to services and markets. Computers, mobile phones and the Internet have connected remote areas to the mainstream of development. However, the issues of access, equity, and cultural identity have remained unaddressed. Road building has rarely confirmed to the region's ecological fragility and vulnerability although the concept of 'green roads' was successfully demonstrated in Nepal many decades ago. The gap is non-existence of policies and regulations, and where they do exist, the little attention there is on implementation. How availability of technologies have enhanced options for mountain

communities to adapt and survive at cheaper costs by reaching out to market opportunities remains to be assessed.

In recent years, many examples of grassroots, medium-scale, and state-level initiatives have emerged and these have potential for building on the existing momentum to reverse the negative trends of environmental degradation. This has been demonstrated by various case studies:

- Community-led initiatives in the ecologically fragile and economically-vulnerable mountain valleys of Gilgit-Balistan and Chitral have demonstrated the virtue of micro-hydro projects, both as means to weather unreliable power supply and to leverage carbon credits for expanding the reach of such projects. Micro-hydro units generating a total of 10 MW already exist and there are plans to add 103 more units over the next seven years.
- In terms of number of plants and per capita biogas generation, Nepal has demonstrated the efficacy of an eco-friendly technology. With more than 90% of over 240,000 domestic biogas plants operating effectively, there has been a 30% reduction in firewood use. Since biogas has been covered under the Emission Reduction Purchase Agreement, CDM has opened a new opportunity for further promoting the technology.

The impact of community-led decentralized energy generation notwithstanding, many parts of the HKH region has powerhouses generating hydroelectricity for use in the plains. Within the framework of SMD, there is need for a policy push in favour of private sector participation for low-carbon energy development options in the mountains with adequate safeguards for inclusive development and local benefits. Lateral and vertical integration of communities in local administration is critical for attaining equity and justice. There are inspiring initiatives across the region but their integration in existing institutions has lagged. Some of the promising initiatives include the following.

- In the uplands of northeast India, comprising eight of the least developed states in India, the IFAD-supported NERCOM project is focusing on interventions that are technically appropriate, culturally sensitive, and institutionally effective. A 'genuine partnership between communities, government and others has been forged to ensure that the interventions are demand driven and client oriented.
- Van Panchayats are managing 16% of the total area of Uttarakhand, India in 11 hill districts and are examples of decentralized planning and management of forest resources in terms of access and benefit sharing. Ecosystem services emanating from the forests are valued at USD 50 billion per year. The Government of India has allocated USD 272 million to forest rich states for better managing their forests for 2005–2010. This fund has been increased by 10% and is to be used over the next five years.
- Since its inception in the mid-1970s, Nepal's community forestry programme has been the largest and longest participatory green initiative wherein 40% of the population has been involved in managing 25% of the country's forest area. The programme is inclusive and equitable and has also been able to address socio-political and environmental concerns at the national and regional levels. Emerging carbon and PES in the form of REDD+ are exposing local communities to a competitive world wherein protecting community rights would be crucial. The potential for receiving co-benefits along with strengthened forest rights could result in three benefits – mitigation by sequestering carbon, adaptation by conserving biodiversity and watersheds, and reducing poverty by improving livelihoods.

Though created experimentally, such institutions have worked through real local participation from planning to benefit sharing and have the potential to be expanded. But these approaches are not appropriate everywhere. Their strength is the diversity of approaches suited to varied socio-economic situations and therefore the potential for generating knowledge and disseminating it in other mountain regions. Such bottom-up institutions can also strengthen the three pillars of SMD and ought to be preserved through legal provisions.

Many areas in the HKH region have been late to open up to outside forces and processes. But markets have penetrated faster and deeper into the mountains where there is little government presence. The following initiatives provide lessons on how to address the ensuing challenges of protecting and enhancing local livelihoods.

- With over one million small tea farmer households as members, the West Garo Hills Tea Farmers Federation has been able to arrest price crashes and ensure better returns for growers. The next step is to solicit support to set up a tea-processing factory, and open up the option of the growers in adding value to their produce, and marketing the finished product. The federation has set an example and demonstrated that alliances of small producers with a supportive administration can help them to take charge of their livelihood options and move towards economic development. Markets are not intrinsically bad and the existence of powerful and committed intermediary institutions with knowledge, legitimacy and joint venture links can increase the bargaining power of local producers and such efforts can result in win-win outcomes.
- In Uttarakhand, India the setting up of the Organic Board has reduced the transaction costs of having a reliable institution for certifying organic products. The right institution-at-the-right-place can enhance the carrying capacity, resilience, sustainability and social equity goals of SMD. When backed with proper legal support, these institutions can grow nationally as is the case of community forest management led by FECOFUN in Nepal, and Van Panchayats and organic farmers in India.

Markets for mountain good and services are important for the green economy or low carbon growth path. After the failure of the Kyoto Protocol and other multilateral agreements to allocate global warming penalties to historical polluters, there is now a shift towards decoupling economic growth from greenhouse gas pollution. India and China are already making great strides towards a low carbon economy. The scale of impact in reducing global warming in mountain areas of the HKH region might be modest, but the efforts serve as important learning experiences for leveraging new marketable opportunities.

One opportunity that can be stressed is the greater need for regional and national institutions to help local mountain communities to tap national and global resources for accessing markets, availing public services, and gaining legitimacy and power to influence through instruments such as Free Prior Informed Consent (FPIC). Such institutions can promote SMD more effectively.

Emerging trends and opportunities for SMD

Climate change has brought about complex problems but for mountain countries it has also opened up a number of opportunities. For example, increasing warming in the highlands also mean that a number of new crops can be cultivated and also new pasture and forest species can appear at higher slopes. It has also created space for new scientific explorations alongside the livelihood pursuits of mountain people.

There is need for a rethinking of the entire mountain development approaches. Building ecological infrastructures not only to produce goods for subsistence but also to generate services that can benefit downstream communities (e.g., water storage) is one approach. However, since the environment is an overriding concern, the approach has to be on building resilience of successful ongoing programmes (e.g. community forestry, biogas energy and organic farming), addressing poverty and inequity, and improving property rights and governance. Other emerging opportunities for SMD include expansion of green practices, such as ecotourism, high-value mountain products, and mountain forestry for carbon sequestration and biodiversity conservation with in-built mechanisms for addressing equity and environmental sustainability concerns.

Building on the success stories and learning from the failures

The links between mountain resources and sustainable livelihoods in the HKH region are intricate and tightly knit – almost 1.3 billion people rely on the limited mountain resources, especially water. In Bhutan, for instance, an estimated 78% of the population depend extensively on mountain resources to sustain livelihoods. The situation is somewhat similar in Afghanistan, Nepal, and Myanmar. Tighter demographic controls, quest for long-term conservation and policies for harnessing hydropower resources are helping Bhutan to attain higher GNH.

In the HKH region, countries are united by geography and thereby face common problems, issues and challenges. But the political landscape is different and climate change, political instability and transboundary contentions threaten the region's ability to thrive and prosper. The region has not been a success story from the SMD perspective largely because of the inability of the countries to implement the sustainable development agenda they signed at Rio'92. The failure is partly also because of multiple problems and crises such as climate change, energy crises, food insecurity, increased disasters, increasing population and growing conflicts the region has been facing. These have made mountain communities more vulnerable and perhaps less resilient, and the region more fragile (ICIMOD 2011b). However, the opportunities to manage water, biodiversity including agro-biodiversity, tourism and agriculture are immense. For this the region would need effective regional co-operation and collaboration for developing common and enabling policies and institutional framework, financial support mechanisms, multi-stakeholder partnerships and above all, systems to facilitate learning from each other.

Scope for green economy for sustainable development and poverty reduction

Markets for mountain goods and services have been growing. Global trade in herbal medicines, including pharmaceutical and nutraceuticals alone is estimated at USD 120 billion/year where China's share is between USD 5–10 billion and that of India about USD one billion/year. The share of mountain herbs and natural products in this trade can be enhanced many fold. After the failure of the Kyoto Protocol (KP) in mitigating global warming, especially in addressing their impacts on mountains, and with no legal agreement on the replacement of the KP when it expires at the end of 2012 in sight, there is now a shift towards decoupling economic growth from GHG related issues. There is global agreement that all countries have common but differentiated responsibilities to pursue low carbon economic growth paths. The impact of global warming on the HKH mountains being one of the highest, it will be justified to make a call for specific global policies and financial support to mountain

regions for transiting to green economy or a low carbon growth path as well as reducing poverty. This transition would involve huge domestic resource allocations, estimated at USD 1.4 trillion a year in the developing countries. The HKH countries are not in a position to mobilize such resources.

Without enabling policies it is likely that the green economy could bypass the mountains as evidenced in Uttarakhand state in India. Tolia (2011) found that the plains-based economy benefitted from the fruits of green revolution in agriculture that pushed GDP growth by around 8–9% a year while the hill economy remained at 2–3%. The over-riding theme is that while progress and change in the HKH region might be unprecedented by historical comparison, the changes in the mountains have been eclipsed by the larger non-mountain economies. As result the mountains have remained invisible on national and global agendas.

Climate change and poverty eradication are at the centre of SMD debate. In the Rio+20 discourse, while the global focus is on the green economy but the number one priority in developing mountain countries remains poverty reduction – including in the mountainous regions of India and China. What relation will the Asian transition to green economy have on SMD? Is there need for developing a mountain specific indicator like the Mountain Product Index (MPI) to draw attention to the increased economic costs and benefits of development in the mountains, instead of relying only on GDP?

Some specific issues and questions relating to the green economy debate in the context of SMD are: a) How to collect documentary evidence of national and regional/global influence or contribution of the ecological footprints of mountains? b) What specific roles can mountains play in transforming the 'brown' economy of countries to green economy since current perceptions and opinions of national policy makers is that it may be marginal and negligible. For example, policy space allotted to mountains is very small in national reports for Agenda 21, chapter 13. It is therefore a challenge to use the green economy platform for leveraging more attention to mountains in national policies.

The effects of climate change on mountain ecosystem services and that of globalization are eroding local culture and values, traditional management systems and knowhow, and rules of natural resources governance. Therefore, land use and ultimately local environment management need special analysis and focus. There is also a danger that climate change compensation funding instruments may simply be a change of the label of development aid to make it part of the climate change action and/or green economy related support with attached conditionality.

Access to funds for developing countries remains slow and this requires specialized institutions, human resources, relevant policy and legal regimes. Acquiring development aid is generally a difficult and tedious process. Demand for SMD must therefore be first created within the national system articulating local payoff mechanisms as part of joining the regional and global green economy support system. Decoupling the economy and GHG emissions is fine but there should be a separate window for funding for sustainable mountain development.

Further, the green economy focus on production should include the negative implications of unbridled consumerism. One pertinent question to ask will be: Can the green economy actually deliver in terms of changing ground realities for indigenous, local and poor people, particularly in terms of rewards (through PES, REDD, REDD+) for good environment stewardship and helping in carbon sequestration through good forest management and use of indigenous knowledge for ecologically and socioeconomically sound farming?

Striking a balance between social, economical and environment pillars on one hand, and dovetailing them within the prevailing institutional and governance framework giving a due emphasis on equity and inclusion will be a challenge to achieve success in transiting to green economy. Therefore, countries and mountain areas need to be biannually ranked on their progress in SMD to draw attention to the low success on the three pillars of sustainable development. This could be best done in the report of the UN Secretary General to the UN General Assembly. Further, suitable international policies for mountains to redress the grievances and provide rewards to mountain people through

suitable regional and global instruments and mechanisms not only for the loss and damage caused to mountain ecosystem goods and services due to external drivers but also to provide incentives, for sustainably maintaining ecosystem services as global public goods need to be explored.

It has been scientifically established that the HKH region influences global climatic systems through jet flows, heat exchanges and the distribution of climatic change. This could be affected by the adverse impacts of climate change on fresh water resources, biodiversity, food security and disasters. The mountainous regions therefore need to be compensated for the damage and loss through suitable climate and non-climate finance mechanisms.

The HKH region is particularly vulnerable to extinction of globally important biodiversity, threatening the future medicine, food and other non-timber forest products – all of which are essential for a green economy. In particular, many of the biodiversity resources are affected by the impacts of climate change such as habitat degradation and replacement by invasive species.

Green economy: Key issues for the HKH mountains

A recently released preview of the 2011 Global Green Economy Index (GGEI), a robust analytical tool ranking expert perceptions of national green reputations against a new custom index of 37 datasets measuring performance, indicated that China, the second largest GHG emitter, is also ranks second in green performance (Dual Citizen 2011).

To address the lack of a unified view among the HKH countries on what represents and drives a green economy, and to provide clarity on what it means for mountain regions, in September 2011 ICIMOD, jointly with UNEP, organized the International Conference on Green Economy and Sustainable Mountain Development, which came up with a declaration defining the framework for green economy in the mountains (ICIMOD 2011c). Yet there is a need to further identify opportunities from developing and least developed country contexts for promoting green economy. It is likely that green economy could be a good vehicle to reach SMD. There is therefore a need to come up with specific and strategic approaches to implement green and low-carbon economy concepts in the mountains. There is also a need for new global policies and finances to support poverty reduction and sustainable development through green economy and good governance solutions. The key outcomes that can be desired for mountains in green economy is an ecosystem services-based economy that is both pro-poor and pro-growth and addresses the issues of ecological fragility, social inequity (creating employment for the poor and reducing inequality and marginality) and economic underdevelopment (by reducing poverty and reducing costs of living) through interventions owned and managed by mountain communities and supported by national and regional agencies.

Green economy: opportunities

The green economy has ample opportunities in the mountain eco-systems but there also are risks. Green and low carbon solutions in mountain regions need to create jobs, help produce surplus green products for national and international markets, promote access to markets and prioritize poverty reduction. Further, the green economy transition in developing and least-developed countries should not constrain the policy space of countries to pursue their own development paths. There is also need for a separate programme of work for mountains in the UNCSD process to develop green growth pathways that recognize, value, and realize the ecosystem goods and services produced by the mountains.

Green economy: challenges

Mountain countries will face numerous challenges in adapting and adopting green economy policies. Different countries are interpreting green economy differently and are embarking on different approaches to promote Green growth concepts and practices for sustainable development. Some authors are equating green economy and sustainable development, which is not correct. Green economy can be a means to achieve SMD in the mountains but it cannot substitute the broader

concept of SD. The common challenges mountain countries are confronting or will face in future are: How to document good green economy relevant cases on which the future pathway can be charted? And, how effective are the approaches, and what lessons can be learnt from the experiences?

Institutional framework for sustainable development

The Rio+20 Secretariat has included institutional framework on the agenda because of concerns about the lack of global progress on agreed sustainable development goals. The general objective of this theme is to achieve the overall integration of environment and development issues at national, sub-regional, regional and international levels, including in the UN system. The key issues identified by the secretariat – lack of implementation of commitments; absence of national setup and lack of mainstreaming; lack of capacity building; lack of coordination and integration among and between sectors; and lack of accountability – are also relevant and true for the HKH region.

Therefore, the institutional framework for sustainable development in the context of the HKH region should aim to identify the actors at local, national and regional levels and set out the functions of institutions for achieving better coherence and coordination among agencies implementing sustainable development activities, especially in the mountains. Although the UNDESA is focusing more on reforming the UN systems based on the 'one UN' concept, for the HKH countries, the need is to reform the traditional and overly bureaucratic national and regional institutions into modern service delivery organizations bringing in more transparency, accountability, good governance and knowledge management. Replacing and reforming out-dated policies and reconciling the contradictions among overlapping rules and regulations and effective implementation of the existing policies are equally important. In general, there is lack of coherence, coordination and effective monitoring of progress at all levels. Therefore, any new institutional framework must avoid overlaps and duplication, and seek to attain synergies in programming efforts of international and national organizations through enhanced participation of all stakeholders.

The following are the key challenges for institutional strengthening for SMD.

Research-based knowledge and information

Developing proper institutional framework will also have to consider the role of research organizations both at national and regional levels for filling the knowledge gap. SMD issues in the HKH are of a transboundary nature e.g., water, biodiversity, markets, and quality standardization for green products. Before transforming into a green economy, these countries must set green accounting policies and green technology research and adaptation institutions to assist the shift from GDP to more gross natural products-based indicators. Consumerism today is a driver of change, changing values and attitudes of the people, but in the green economy context consumers also need to be ready to be willing to pay for Green products that will require raising awareness, in which data and information will play an important role.

Technology and technical capacity building

Green economy will require 'green technologies' that will need a suitable framework and mechanism for enabling adaptation, retrofitting, and transfer to developing mountain countries. Therefore, strengthening of existing multi-lateral, regional research and knowledge management institutions focusing on mountain friendly technologies and practices given the specificity of mountain systems, should be a pre-requisite in the new institutional framework.

Promotion and transition towards a green economy need capacity development in education, research, advocacy and policy reforms. Similarly, enabling policies and institutions are needed to provide incentives to producers of mountain-based ecosystem goods and services. Regional as well as upstream-downstream approaches are needed for promoting Green markets and for addressing the challenges of poverty, biodiversity loss, trade barriers and climate change. In summary, there is a need to develop a green economy roadmap for the mountains in the HKH region based on

comparative advantages of eco-systems niches and/or those areas where nations have and are building competitive advantages through training, skills development, and provision of appropriate technologies such as mobile communication devices, information sharing and financial support. Capacity building of policy makers remains the utmost priority because good policies are needed to drive the new development process.

Opportunities for gender equity and inclusion

Development that reduces poverty and enables all groups of people in contributing to creating opportunities, in sharing benefits, and participating in decision-making will go a long way in ensuring that SMD makes a real difference to both women and men equally. Gender inclusive development means that issues affecting the relationship between and among women and men and their ability to participate in the green economy and environmental resource governance in the HKH region are taken seriously. In a rapidly changing climate, environment and socio-cultural context, women need to assume active leadership and decision-making positions. The challenge is how sustainable development measures and policies take into account the prominent role of women and gendered knowledge in shaping an equitable and inclusive green economy and natural resource management, and how access to and provision of development resources (water, information, education, health, income, agricultural inputs, etc.) is assured. Taking into account the role of women in the mountains, especially in agriculture and natural resources management, institutions need to be supported in strengthening their resilience to climate change impacts mainly in the context of valuing indigenous knowledge, the sustenance of low-carbon development pathways and SMD. Research also needs to focus on the collection and analysis of gender-disaggregated data, indicators and differentiated experiences of women and men as they adapt to multiple drivers of change.

The initial findings of ICIMOD's Himalayan Climate Change Adaptation Programme (HICAP) work indicate that women in general are more vulnerable than men to climate change as they face more social, cultural, economic and political barriers that limit their ability to cope with the changes, and access resources that are critical for livelihoods and survival. At the same time, they are also at the frontline of climate change (Nellemann et al. 2011). Their increased responsibilities, indigenous knowledge and stewardship in managing natural resources, households, communities, environments and income generating activities in the context of the migration of males, and the rapid economic changes, positions them well for contributing to effective strategies for adaptation to climate and global changes.

Conclusions

Our extensive analysis of the literature, case studies and e-discussion outputs indicates that mountain people have not been the real drivers of change in the HKH mountains. The key players or drivers have been the people in power – political leaders, bureaucrats, non-governmental actors and international development players, including donors. The public sector institutions are generally centralized and function in archaic ways but still remain as the predominant drivers of change. Historically speaking, as argued by an e-conference contributor, the HKH mountains have been the refuge for people who escaped the violence of wars and social conflicts in the plains. The prevailing peace and tranquillity allowed them to develop unique socio-cultural ‘bonding’ with the mountains. However, due to neglect, marginality and poverty, these mountain communities have generally been the losers in the seemingly good processes of decentralization, devolution and governance.

In general, changes introduced by successive regimes have been at the cost of peace and harmony of co-existence in the HKH mountains. Peace has meant more than just the absence of war. New kinds of conflicts over sharing and appropriating natural resources such as water, forest, pasture, and biodiversity have been simmering and some have gone beyond the management capacity of traditional social institutions. The undesirable changes of the past can be reversed only by engaging and connecting with diverse mountain dwellers in multi-stakeholder discussion and dialogues by creating a new institutional mechanism for nurturing the green economy that suits the mountain people, and by investing in developing technology conducive to the fragile Himalayan geomorphology.

Translating good intentions into sustainable or smart actions would require re-thinking of new institutional frameworks and developing good governance practices while promoting a low-carbon growth path in the HKH mountains. There is a downstream demographic push to extract more resources and pressure the ecological balance in some parts of the HKH region. A multi-pronged strategy including education, awareness raising, levelling the playing field, developing enabling policies, and creating institutional spaces can help in creatively managing the growing demand on mountain resources and services. Learning from local cultures, rebuilding on local knowledge, and strengthening good practices could be crucial drivers of change. Participatory conflict resolution techniques as practiced in the Philippines may also be useful in the HKH communities.

The trans-boundary nature of natural resources, especially water, and cross-border relations in managing the mountain resources has yet to get the attention the issues deserve. Should not the countries of the region develop joint policies, programmes, regulations and institutions for sustainable development of the HKH region? They should – perhaps – given that they share many common problems and potential solutions. Only cross-border linkages can help in resolving the complexities of equitable sharing of natural resources across diverse social systems. Clearly, there is a case for negotiating out-of-the-box solutions, which should be possible through collaboration and co-operation among the key players involved in sustainable management of the HKH mountains.

It is understood that a diverse group of people are aiming to influence the Rio+20 agenda and are interpreting and positioning the green economy agenda using their own understanding and contexts. The view of the HKH region is that the green economy should not be an alternate to sustainable development that was agreed 20 years ago. Instead it should be a practical and flexible mechanism to reinvigorate SD and SMD. The crucial question for the mountain regions is: what is the form of green economy that can serve as a good instrument for addressing the problems? There is a danger that the green economy, like sustainable development, could be limited to convenient interpretation to suit different contexts and a measurable goal that should be avoided.

It is being argued that the ‘top down’ agenda of the green economy seeks to break the current inertia in the global climate change debate. The views of the HKH region, however, are that the gain for the environmental pillar need not be a loss for the economic pillar if the green economy can be made to

deliver Green products and Green jobs. Therefore, a balanced approach is needed while promoting green economy in the mountains. Issues of scale, the right of indigenous peoples to resources, and the poverty reduction related outcomes of the green economy are important considerations. The green economy concept has already been criticized as being heavy on technology, financial and human resources. Therefore its implications on feasibility, sustainability and gender dimensions must be critically examined. Also important is addressing governance issues, especially social and gender equity and participation of stakeholders in designing, implementing and sharing the benefits.

Despite political and economic uncertainty, the HKH region has been a veritable laboratory of innovative approaches towards SMD. It is another matter that these approaches have not been integrated or scaled up. As a consequence, social and gender equity and equality, has largely remained unachieved, and poverty has continued to persist. The challenge is to build upon existing initiatives from an equitable poverty alleviation perspective.

Good work on watershed management must be sustained, value-added and up-scaled. Climate change adaptation can piggyback watershed projects in conflict-ridden regions like Afghanistan, Nepal and North-east India where conserving soil and water for addressing food security is critical. Watershed management can also help to reduce siltation in large dams as is the Tarbela in Pakistan. Watershed management can also help address equity concerns.

Sustainable mountain development calls for integration of thinking and action around diverse approaches. A multidisciplinary approach, interdisciplinary thinking and trans-disciplinary actions are the ways to go for attaining SMD in the mountains. This would require efforts for empowering communities, educating and engaging youth and re-crafting and strengthening supportive institutions.

It is clear that the proposed or evolving development and institutional frameworks for low-carbon or Green growth agenda should clearly and properly reflect the needs and aspirations of the mountain people. The drivers for the transformation to green economy and new institutional governance should be the people of mountain regions and not external players who may fund or invest in mountain products and benefit from the initiatives in an inequitable manner. Change agents and community leaders need to be the real drivers of change who can lead the initiatives in which outsiders can participate.

Key messages

Sustainable mountain development has not been a success story in the HKH region. The main reasons for this are the emergence of new and multiple challenges and crises such as climate change, energy crises, food insecurity, market meltdown, increased disasters and growing conflicts. Together, the global, regional and local drivers of change have made the mountain communities more vulnerable and exposed them to new risks. The resulting downstream impact could be more severe owing to increasing occurrences of extreme events such as floods and droughts. However, there are also some opportunities for mountain communities. Still lacking is awareness, knowledge, change of mind-sets and above all, good policies and institutional frameworks.

The Mountain Agenda cannot be revived for the sake of the mountains alone. It would need to be justified from the upstream-downstream perspectives, particularly the importance of the mountain ecosystem goods and services. Equitable and enabling trade regimes, cross border co-operation, knowledge management, common markets – combined with benefit sharing mechanisms -- and promoting public-private-civil society partnerships could be the new rallying points for developing a comprehensive green economy agenda for the mountains. A shift from the watersheds to integrated river basin approaches with cross-sectoral integration is vital for addressing the impending challenges including those resulting from climate change and food security. Mountains specific institutions also need to be strengthened through capacity enhancement and expansion of knowledge because 20th century institutions cannot resolve 21st century problems.

The case studies and e-discussions have captured the essential contours of the emerging issues and the impending challenges in mountain development. In the lead up to the Rio+20 summit the task will be to get stronger, incremental and meaningful political and financial commitments from member countries to ensure that mountain-friendly green economy programmes and instruments get the attention that is needed for converting the opportunities into incentives for vulnerable mountain communities. Least developed and developing mountain countries and regions will also need easy development finance, technology adaptation and transfer mechanisms, and concessional market access for green products.

The importance of ecosystem goods and services of the HKH mountains has increased with clear recognition that they have equal or higher role for downstream countries and the rest of the world. The global view has also shifted towards developing better understanding of the specificity of mountain systems. The appreciation of HKH mountains as the drivers of change is perfectly timed for renewed attention to the issues and challenges for developing a global Mountain Agenda that is forward-looking for both the mountain dwellers and those who live downstream in the region and beyond.

Mountain countries must invest in green projects and carry out necessary policy reforms to provide incentives to sectors such as agriculture, natural resources and enterprise development for promoting Green technologies and practices in the mountains.

Regional cooperation is necessary for promoting the green economy and good environmental governance since accessing markets, financing and technologies will be critical for the concept to take root.

A nationally contextualized and driven green economy can provide opportunities to promote human wellbeing and intergenerational equity and the mountains regions can contribute significantly to make it happen.

Rio+20 should be an opportunity for reinforcing the spirit of Agenda 21 and, more importantly, a step forward for bringing the economic and social pillars of SMD at par with the environmental pillar in terms of importance for harmonizing the global processes in favour of mountains and other vulnerable countries. The mountains matter to everyone and therefore demand the global attention they deserve.

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In 1992, at the United Nations Conference on Environment and Development – commonly referred to as ‘Rio 1992’ or ‘the Rio Earth Summit’ – mountains received unexpected high political attention. They were granted a chapter in the ‘Agenda 21’ as fragile ecosystems that matter for humankind.

Since then, efforts by different actors have been undertaken to promote Sustainable Mountain Development. Some of them relate to the above event, others just emerged on their own. However, in view of the UN Conference Rio+20 – United Nations Conference on Sustainable Development in 2012 it seemed relevant to assess and understand what has been achieved by whom and how. It appears equally important to learn what has worked and what has not worked, and why, in order to draw lessons for more effective interventions in future. The anticipation of possible future challenges or opportunities may further help to be better prepared for their management. This will certainly encompass the adaptation to and mitigation of global change as the mainstream concern of the last decade as well as the new, albeit disputed paradigm of a Green Economy. As in the past, major unexpected and unpredictable political, social, economic or technological innovations may overshadow such mainstreams.

The Swiss Agency for Development and Cooperation, committed to sustainable mountain development since many decades, has commissioned a number of regional reports to assess achievements and progress in major mountain regions such as in particular Central Asia, Hindu Kush-Himalaya and the South East Pacific, South and Meso America or the Middle East and North Africa. The Swiss Federal Office for Spatial Development has commissioned - in the context of the Swiss Presidency of the Alpine Convention 2011/12 – a report on the European Alps. In addition, UNEP has facilitated the production of the report on Africa’s mountains and mountains in Central, Eastern and South Eastern Europe; and the Aspen International Mountain Foundation together with the Telluride Institute has prepared a report on the mountains of North America.

The insights gained through these reports, which were presented at the Lucerne World Mountain Conference in 2011, and in which key local, regional and global actors have been actively involved provided the inputs for a mountain section in the outcome document of Rio+20. They are also meant to feed into future global and regional processes, institutional mechanisms, and initiatives that emerge as a result of Rio+20 in support of Sustainable Mountain Development.

