

If our intent is to partner our efforts with that of the local communities, we need to learn to use simpler language. It might be too late to stop the calamity of global warming, but it is not too late to learn to talk about it so that the message is clear to everyone.

to prevent, mitigate, and respond effectively to environmental and other changes in ways that are socially and environmentally acceptable and economically and technically feasible. While preparing for short-term impacts requires strengthening socioeconomic and political capacities to deal with such events and adapt to the biophysical fallout, in the long run, careful adaptation of farming systems, economic activities, such as repackaging tourism products, and resources such as hydropower are necessary.

Proactive adaptation through vulnerability mapping. Anticipating disaster and responding proactively is needed to reduce mountain people's vulnerability; rather than simply reacting after a disaster. This requires mapping vulnerability and threshold limits of the environment. While adaptation happens at local levels, vulnerability should be addressed at a higher level through zoning and setting minimum safety standards, supported by incentives and disincentives.

Addressing water-induced disasters. The effects of glacier retreat in the Himalayan region are likely to be detrimental to hydropower. Damage to this sector may have catastrophic downstream impacts. As water stress is predicted to be the most pressing environmental problem, with far-reaching consequences for human survival and wellbeing, proper adaptive measures, warning systems, and rescue operations must be developed. High dams may be more attractive than diversionary dams and may be necessary to recharge ground water. The idea of mountains as water towers may need to be reevaluated. The development of alternative water supply sources, transboundary water demand management, water storage, and diversification of energy supply through the development of renewable energy are some possible adaptation options.

Increased access to and appropriate management of common property. Common lands should be managed as common property resources to complement private resources and sustain the livelihoods of the poor. Managed to supply daily household needs and raw materials for labour intensive local economies, these resources would benefit poor households and be less attractive for the rich.

Integrating vulnerability reduction into overall development policy. Adaptation strategies need to be integrated as crosscutting poverty reduction interventions. Linking climate change adaptation to project development as an add-on does not provide sufficient leverage to simultaneously address poverty alleviation and adaptation to climate change. A community-based adaptation approach, which recognises indigenous knowledge alongside scientific knowledge, should be promoted to build resilience. Government agencies can help communities by creating enabling support mechanisms (financial, awareness-raising, capacity building) at various levels.

Other adaptation policy options that emerged out of the discussions include exploring the feasibility of introducing climate insurance for crops; empowering local communities by building their resilience-enhancing capabilities through policy and institutional support mechanisms (delivery of resources, skills, technologies, secure tenancy, research and development, innovation, governance); changing laws on plant breeding and varieties to encourage local varieties; proper dissemination and management of existing knowledge; keeping predator species for biodiversity conservation; improving vector-control, energy, and environmental policies; and integrating the environment and health sectors.

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E-discussion Mountain Forum – Asia Pacific Mountain Network

Celebrating 25 years of ICIMOD for mountains and people

30 April – 14 May 2008



Building resilience of mountain communities to climate change

Be it melting glaciers, rising sea levels, more virulent storms and floods, less snow, or more droughts, climate change is taking place around the globe, posing a great threat to nature and humanity in the 21st century.

Adapting to the unpredictable effects associated with climate change is crucial to being able to deal with the unavoidable impacts, especially among vulnerable mountain communities which will be hit hardest. How can we help communities become more resilient to the consequences of climate change and contribute to building resilience for the next generations? It is the poor and most vulnerable who will suffer climate change's worst impacts. Building their resilience is the more sustainable response. Building resilience is about increasing the ability of social, economic, and ecological systems to withstand shocks and surprises and to revitalise if damaged. On a positive note, the process of adapting may create coping strategies not just to climate change but also to sustainable development. Adaptation reinforces and builds resilience, which is the key to both long and short-term survival. While ecosystem management approaches are being promoted as a means of increasing ecological resilience, social resilience is about building the ability of communities or groups of people to adapt in the face of external social, political, and environmental stresses and disturbances. It is generally believed that an adaptive ecosystem management approach, combining adaptive management of both social and ecological systems, can improve the resilience of people and the environment and reduce vulnerability. Innovation, knowledge transfer and capacity building, and investments are required to enhance the resilience of mountain communities in the Himalayas and to implement effective adaptation. Little is known about climate change impacts and adaptation experiences in mountain regions, however.

While many questions relating to climate change remain unanswered, perhaps because of the limited scientific knowledge base, interesting issues have emerged out of the e-discussions. This publication attempts to synthesise and group emerging issues and core messages that have come out of the discussions according to the three themes, although grouping the issues is not an easy task given their crosscutting nature.

Asia-Pacific Mountain Network (APMN) is a knowledge sharing platform connecting mountain regions and members through dialogue and networking. The network, which is hosted by the Integrated Knowledge Management group of the International Centre for Integrated Mountain Development (ICIMOD), captures, enriches, and disseminates information on mountain development issues in and for the Asia-Pacific region. APMN acts as the Asia-Pacific node of Mountain Forum, a role it has played since 1996. The network is generously supported by a small grant from the Swiss Agency for Development and Cooperation (SDC).

An e-discussion on building resilience of mountain communities to climate change was held from 30 April to 14 May 2008 to mark World Environmental Day 2008. The discussion was also one of a series of events being organised to celebrate ICIMOD's Silver Jubilee year, 2008. The e-discussion was organised to generate knowledge on the state of resilience of mountain communities and the ecosystems upon which they rely to the impacts of climate change. The discussions focused on three thematic areas: 1) concept and methods of assessing impacts, vulnerability, and adaptation; 2) climate change adaptation experiences; and 3) limitations and barriers and desired policy responses.

I. Concepts and methods of assessing impacts, vulnerability, and adaptation

While there are lessons to learn from crisis-driven responses, there are risks when moving too quickly without enough of the right kinds of information and without meaningfully engaging the communities we would like to help.

Caution should guide any decision-making related to climate change.

Discussions on this theme attempted to address broad questions related to methodologies for assessing impacts, vulnerability, and adaptation. Some of the key questions included the following. How can climate change impacts be detected, anticipated, or estimated? Are existing frameworks for decision making relating to climate change conceptually sound and operationally practical? Do they capture and understand the factors underlying vulnerability and resilience? There have been efforts to identify and characterise climate change vulnerabilities and adaptation strategies to understand the state of resilience in mountain areas. The environmental, social, economic, cultural, institutional, and political forces that create or contribute to vulnerability need to be better understood in order to develop effective adaptation strategies. We need to understand how to assess climate change impacts, adaptation, adaptive capacity, and resilience, and how policy can provide support to poor and vulnerable mountain communities. There is no appropriate holistic framework for addressing these issues at present.

While there is much anecdotal evidence of climate change, no comprehensive studies have yet been conducted on vulnerability and adaptation in the Asia-Pacific region. Studies on (a) perceptions and current knowledge, and (b) adaptive strategies at the household and community levels, as well as lessons learned, can provide the basis for concepts and methods of assessing climate change impacts, vulnerability, and adaptation. Exactly how vulnerable mountain communities in the Himalayan region are, is not well understood. The few examples of successful adaptation approaches and practices in the region are at best fragmented and need to be assembled into a coherent, understandable whole.

The discussions underscored the importance of ecological resilience and how it links closely with social resilience. As the degree of ecosystem resilience depends on the resilience of key species, the need to conserve species biodiversity is vital to any resilience-building effort. Climate change has triggered ecological processes including the loss of rare and vulnerable species and the expansion of invasive ones, affecting higher altitudes and the social and economic structure of mountain communities. There is evidence of a close relationship between apex predators (e.g., the snow leopard) and biodiversity, which may increase ecosystem resilience. However, as food security matters most, the challenge is to convince communities and other stakeholders that biodiversity and wildlife are equally important to their livelihoods and serve as a buffer to disturbances that will be felt as a result of climate change.

There was consensus on the need for conceptually sound and operationally practical methodologies for assessing impacts, vulnerability, and progress towards building both social and ecological resilience. Methods of assessing vulnerability, impacts, and progress of efforts should be based on participatory documentation of realities on the ground, complemented by scientific monitoring. This will enhance our understanding of how climate change affects mountain people and their environment, will help reduce their vulnerability, and will increase social and ecological resilience. We must examine scientific capabilities and methodologies critically, and identify prone sites and the threshold limits of nature through detailed vulnerability mapping. These should provide the base for devising adaptation strategies for mountain areas. Congruent approaches and information sharing are necessary for effective response. Support institutions and the coping practices of indigenous communities also need to be recognised and better understood in devising interventions.

II. Climate change adaptation experiences

Discussions on this theme aimed to generate knowledge on adaptation to climate change in mountain regions including successful and less successful practices, reactive and proactive approaches and strategies, and lessons learned. The following are the issues and recommended options emerging from the discussions.

Build upon existing resilience-enhancing practices and institutions. Mountains have always been unpredictable, risky environments. Throughout history, mountain people have developed unique strategies to cope with the uncertainties and variability of climate and nature. Examples

of coping practices include nomadic pastoralism, and multi-cropping and mixed farming systems, among others. However, recent changes in climate are different to those that mountain people have known and been prepared to cope with in the past. Furthermore, traditional adaptation measures have been weakened by development interventions, market processes, and demographic changes. Development interventions for mountain communities do not have the elements to address place-based climatic problems of recent vintage. Traditional adaptation practices, and support technologies and policy programmes need to be upgraded or augmented by new science, technology, institutions, and management tools through a proper understanding of social, political, economic, and environmental forces. Before imposing new ideas on mountain communities, it is essential to consider how best to assist mountain people to recognise and reinvigorate their own resilience-enhancing practices and institutions.

Better understand mountain communities' perceptions on climate change. Mountain communities are experiencing unusual climatic phenomena such as abrupt and untimely rainfall, longer and warmer winters, and less (or more) snowfall, among others. They associate climate change impacts with the invasion of exotic species in highland areas, decreased crop productivity, increased pest attacks, more incidence of soil erosion, landslides, and others, and modification in wildlife behaviour. If local people's perceptions of and observations about climate change are real – and this should be validated or verified by scientific studies – we will need to formulate adaptation strategies in consultation with local people to prepare them for the impacts of climate change.

The impacts of global warming and climate change on the Himalayan region are serious. They range from increased rate of glacial retreat, to desertification and unprecedented changes in rangeland ecology, which has made mountain people's lives more difficult. These conditions have been further aggravated by poverty and environmental problems; the mountain poor and women are the most vulnerable and often the hardest hit. Climate change impacts are multi-faceted, affecting all sectors: agriculture, food security, water resources, energy infrastructure, ecosystem services, and human health, among others. For the vast majority of mountain people, climate change means increased risks of losing their homes and livelihoods, greater chances of disease, child malnutrition, less security, and sometimes even death. Hydropower, which depends on snow-fed rivers, is likely to be affected by the melting of glaciers. Climate change is also reducing the flow of many spring-fed rivers in the mid-hills – the main source of water for millions of people. We need to improve our understanding of the hydrological cycle of smaller spring-fed rivers to develop appropriate adaptation strategies. While there are many good soil and water conservation practices (for example, sanctuaries above springs natural resource management, diversified livelihoods options), these practices are often not upscaled to address the problem through proactive adaptation planning.

Issues of urbanisation, migration, and the building of structures/and settlements in vulnerable areas along rivers, coastal flood zones, and susceptible geographical locations are putting people and property at greater risk. The Himalayan region has witnessed several catastrophic disasters in recent years. This clearly indicates a need to carefully design 'mountain cities' that can adapt to climate change.

III. Limits and barriers to adaptation and desired policy responses

Discussions on this theme attempted to identify the limits and barriers (physical, ecological, technological, information-linked, and financial) to adaptation in both natural and human systems, and the desired policy responses. Uncertainty in climate change projections is a significant impediment to developing a long-term adaptation policy. Governments have a role to play in preparing communities to adapt to climate change through policy guidelines and economic and institutional support. Adaptation policy options and the necessary conditions for these options to be implemented and scaled up must be identified with the communities in a participatory manner. From the discussions, the major barriers and recommended policy actions are as follows.

Removing barriers to information. Long-term climate data on the Himalayan region are lacking and most meteorological stations are located in the lowlands. Proxy sources like tree rings, ice cores, and pollen grains can be used to study long-term climate trends and can help in formulating appropriate adaptation and mitigation strategies. There is a need to assess climate change risks and vulnerabilities for mountain communities as well as the livelihood options open to mountain people. In order to build mountain people's resilience we must: 1) build information on what is happening on the ground and the local communities' responses, and 2) develop interventions

Climate change, which the scientific community now accepts as certain and having far-reaching consequences, will exacerbate our vulnerability to new forms of disaster at national, regional, and global levels.