

The Way Forward

Despite the challenges, there are possibilities for addressing the problems that will arise as a result of climate change and assisting communities to adapt and mitigate the impacts. It will also be important to exploit the opportunities emerging from climate change, for example growing crops at higher altitudes. The key is to consider the ground reality and develop specific strategies that acknowledge or build upon existing autonomous adaptation strategies and counter climate-related risks.

Some of the approaches that should be considered are summarised below.

Approaches in Support of Adaptation

Planning for climate uncertainty

Mountain areas are characterised by high topographic and climatic variability. The resolution of the present-day climate models is insufficient to capture this topographic variation. Equally, there are very few hydro-meteorological stations in the mountainous parts of the Himalayas, and the amount, quality, and historical availability of data records are mostly inadequate for climate trend analysis. The most consistent perception among respondents was that precipitation patterns were becoming increasingly erratic. Thus there is a high degree of uncertainty about the future direction and magnitude of change, and this needs to be taken into account when planning for adaptation. Sustainable livelihoods in the Himalayas depend on being able to live with uncertainty, above all with erratic precipitation. Over the short and medium term, so called 'no-regret' strategies are needed regardless of the direction or magnitude of change. The focus should be on 'climate resilient development', which includes three components: reducing vulnerability by minimising risk without depending on a particular climate future, increasing resilience so that the unexpected can be overcome, and enhancing adaptive capacity so that communities can take informed control over their future (Ensor 2009). Over the medium and longer term, the existing knowledge base needs to be enhanced through coordinated research in order to reduce uncertainty and enable development of adaptation measures that tackle specific climate risks that are outside historic climate variability.

Reducing poverty and social inequality

Poverty was identified by the communities as the key driver of vulnerability and low adaptive capacity to climate change. Livelihood assets are required to adapt to change, and many respondents stated that being poor limits their options to cope with or adapt to changing conditions. For example, financial capital is needed to buy a second batch of seeds or to buy food from markets when crops fail. Financial and social capital are needed for migration; it is rarely the most disadvantaged who migrate (Black et al. 2005). Lack of human capital also prevents people from taking up skilled labour in sectors that are less climate sensitive. Limited accessibility was another factor that reduced people's possibilities for escaping from poverty and limited their adaptive capacity. Vulnerability is particularly high where poverty intersects with discrimination, be it because of gender, caste, or ethnicity. This is especially true for women and lower caste people (as seen in the Nepal and Uttarakhand case studies). Thus, poverty and social inequality need to be addressed when aiming to enhance the resilience of rural communities. There should also be a special emphasis on the role of women in adaptation, as many of the coping and adaptive responses they implement add to their already heavy workloads. Interventions to reduce poverty and social inequality are very important in addressing vulnerability to climate change.

Raising awareness

Responses to climate change can be prospective or retrospective (Agrawal and Perrin 2009). Most strategies observed in the study area were retrospective rather than prospective. This may be linked to the fact that many people were



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not aware that, or unclear about the reasons why, the weather patterns were changing and thus could not anticipate climate-related risks. Many of them believed that the changes were the result of their own mistaken behaviour, or of deforestation and other evils that had enraged the Gods who were punishing them through adverse climatic conditions. As one farmer (aged 72) from Terhathum in Nepal said, “Earlier, everything was balanced. These days, the earth is upside down and the Gods are rude with us. Maybe it is because men don’t believe in God anymore and this is why they are punishing us. So we need to keep being faithful”. Since adaptive capacity is partly determined by knowledge (including indigenous knowledge) and the awareness of climate change risks, it will be crucial to raise communities’ awareness of potential climate-related risks, as well as of appropriate mechanisms to address such risks. It will also be important to raise awareness within local and government institutions.

Moving from coping to adaptation

Many of the observed community-based responses in the study areas were short-term coping strategies. Examples include shifts in the agricultural calendar in response to varying annual precipitation patterns, re-sowing after an early season failure, use of failed crops as hay, borrowing money and selling assets, and even migrating due to a complete lack of drinking water (as observed in one village in Terhathum). Many of these coping strategies deplete the household’s livelihood asset base and may actually render it more vulnerable if another shock occurs. Adaptation strategies are longer-term and sustainable. The examples observed include the introduction of new crops; maintaining multiple cropping systems; growing more than one crop per year; construction of water harvesting systems; and livelihood diversification. In order to increase the resilience of mountain communities, appropriate longer-term strategies that build on mountain communities’ traditional knowledge need to be developed, rather than focusing on short-term responses which may reinforce vulnerability in the longer term.

Supporting livelihood diversification to spread risk

Livelihood diversification is already one of the key strategies used by the studied communities to adapt to change. Communities across the study area increasingly engage in the collection of NTFPs such as yarshagumba (*Cordyceps sinensis*), a high value product in Asian medicine; in wage labour (both on and off-farm) and other non-farm employment; and in migration for work. Given the uncertainty with regard to future climate scenarios, livelihood diversification is likely to remain among the most important strategies for adapting to change. Livelihood diversification means having more than one source of income; if one source fails there is still another to rely on. This spreading of risk helps people to be more resilient to shocks. However, the study also showed that not all groups are equally successful in diversifying their livelihoods. The main reasons are lack of assets and restrictive institutions and policies. Thus conducive and inclusive policies and institutions are necessary to foster pathways to livelihood diversification and the associated improved access to employment opportunities for everybody. This could mean, for example, the promotion of high value products that can be transported across rough terrain with limited road access, or skill development in non-climate-sensitive trades targeting disadvantaged groups.

Conducive policies, institutions, and processes for enhancing the adaptive capacity of mountain communities

Given the high degree of uncertainty about how climate change will affect mountain areas and people, policy interventions should focus primarily on addressing the underlying causes of vulnerability and the limited adaptive capacity of mountain communities, including their high dependence on natural resources, persistent poverty, inaccessibility linked with limited access to markets and outreach services, and inadequate education and employment opportunities. Such policies need to be adapted to the local context and integrated into broader development policies at different scales. Strengthening local public and private institutions and raising awareness among them about climate-related risks will be key, since local institutions play a major role in supporting or hindering communities in their process of adapting to change (Agrawal and Perrin 2009). Furthermore, it will be important to bridge the gap between local institutional mechanisms and external institutions (public and private), given that the adaptation process will be influenced to a great extent by information, technology, and knowledge provided by external institutions and facilitated through local institutions.

Improved delivery mechanisms for support services

With the exception of Bhutan, communities generally lacked access to support services across the study area (extension services, access to subsidised food, energy, education and healthcare, micro-credit, crop insurance, off-farm income opportunities). Furthermore, even where services did exist, they were often not responsive to the increasingly erratic weather patterns affecting mountain communities and ecosystems. Thus, there is a need to increase coverage of and improve quality of and access to services that are responsive to climate change related risks. A special focus is needed on disadvantaged groups, such as lower caste people and women, well as those living in remote places.

Seizing emerging opportunities

Climate change can also have positive impacts on mountain people's livelihoods. For example, with rising temperatures the growing seasons are lengthening, and certain crops are maturing early, providing an additional cropping season that can help improve food security and provide higher incomes (as observed, for example, in Uttarakhand). Climatic conditions are also becoming more favourable for certain crops such as cereals, vegetables, and tropical fruit at altitudes where they previously did not thrive (as observed in Uttarakhand and Nepal). Thus, climate change should not only be associated with negative impacts; rather ways should be actively sought for capitalising on emerging opportunities.

Besides opportunities in the agricultural sector, new opportunities might also emerge for the tourism sector, which need to be seized. With increasing temperatures, cool mountain resorts in the tropics and subtropics may become attractive for people who wish to escape the heat during the hot season, thus providing important new livelihood opportunities,

as long as the revenues remain with the local people. This has already happened in Uttarakhand, where tourism is on the increase thanks to a prolonged summer 'tourist season' in the mountains, providing income opportunities of longer duration.

Labour migration is a vital livelihood strategy for rural mountain communities in the Hindu Kush-Himalayan region and was found to be increasing in most of the villages studied, mainly because of lack of opportunities for gainful employment closer by, now accentuated by climate change. Improving access to and enhancing efficiency in the use of both social and financial remittances could be a promising way of increasing the resilience of mountain communities, since access to remittances can act as a social safety net in times of shock.

Finally, rewards for ecosystem services may grow to be more important as certain resources, in particular water, become scarcer. Community-based REDD (reduced emissions from deforestation and forest degradation) projects could be another promising way of attracting funds for mountain communities.