ICIMOD

FOR MOUNTAINS AND PEOPLE

Rural Livelihoods and Adaptation to Climate Change in the Himalayas

INFORMATION SHEET #5/10

Key concepts for climate change adaptation

Adaptation is the adjustment of a system to moderate the impacts of climate change, either to take advantage of new opportunities or to adjust to the consequences (Adger et al. 2003).

Vulnerability is the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change such as climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and the variation to which a system is exposed, its sensitivity, and its adaptive capacity (IPCC 2007).

Vulnerability = f (Exposure + Sensitivity – Adaptive Capacity)

Adaptive Capacity is the ability of a system to adjust to climate change, to moderate potential damage, to take advantage of opportunities, and to cope with the consequences (IPCC 2007).

Resilience is the capacity of a system to absorb disturbance and reorganise while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks (www.resalliance.org).

Many rural people across the world still follow traditional lifestyles and are highly dependent on natural resources for their livelihoods. These people will be directly affected by the impacts of climate change on natural resources and the expected increase in natural disasters. This is particularly true for the people living in the Hindu Kush-Himalayan region, already poor and marginalised from the mainstream, and cultivating marginal lands in a fragile region. The adverse effects of climate change are already noticeable in the Hindu Kush-Himalayas and are impacting the resources, especially water, on which mountain communities depend. There is an urgent need to help communities adapt to the prevailing and expected changes in order to secure their livelihoods. To do this effectively, it is necessary to develop a better understanding of the likely changes and how they will affect livelihoods, as well as a knowledge of the adaptation approaches developed over the years for survival in this challenging region, and the mechanisms people are already using to cope with climate variability and change. It will then be possible to develop and support adaptation approaches that build on existing strengths and knowledge to increase the resilience of mountain communities.

Case study: Community-based vulnerability and capacity assessment in the Himalayas

A study by ICIMOD in collaboration with the International Fund for Agriculture Development (IFAD) showed that mountain communities are already noticing the effects of climate change in the Himalayan region. The community-based vulnerability and capacity assessment was carried out in villages in Bhutan, northwest India, North East India, and Nepal.

Women in a village in Almora district prepare a seasonal crop calendar

The results from northwest India are typical. People in the districts of Tehri Garhwal, Bageshwar, and Almora in Uttarakhand still follow a predominantly traditional lifestyle and guard a vast body of local knowledge. They live predominantly from agriculture (rainfed and irrigated), pastoralism, and seasonal processing of forest products, with additional income from tourism and remittances. Besides climate change, the communities are exposed to multiple stressors including a trend towards increasing feminsation of agriculture as a result of migration of men for work. The people in Uttarakhand perceive various climate related changes, summarised in the table below, which have a direct impact on their livelihoods – and have developed a range of mechanisms to cope.

"Due to changes in the climate sometimes it is difficult to distinguish between the various seasons. Even in the month of October it is as warm as in June," Bhagwan Nath, Naikena village Almora

"Over the past few years the climate has changed drastically. There is very little snowfall and the weather has become quite warm and it seems that this is impacting the flowering pattern of apple and Malta orange trees here," villager from Motiya Pathar, Uttarakhand

"Earlier, traditional methods of pest control like spraying of salt or ash were effective in controlling the pests, but now due to increase in pest infestation these methods have become ineffective," Ram Singh Gud Gadoli

Summary of perceived changes, impacts on livelihoods, coping mechanisms and future risks

Communities' perception of change	Experienced impacts on livelihood systems	Coping and adaptation	Potential future risks
Decrease in rainfall and unpredictable onset of monsoon	Overall decline in agricultural productivity	Replacement of rice with finger millet; purchasing rice; barter; improvising with new (cash) crops; delayed sowing	Growing food and livelihood insecurity
Longer dry spells; in some places drought like conditions	Drying up of springs; less flow in springs and streams	Irrigation systems opened on a rotational basis; traditional water sharing system in Almora	Scarcity of water for drinking and agriculture; increase in health problems; increased workload for women and children; children staying away from school
		Delayed sowing time in irrigated fields at the far end of channels	Crop failure
Higher temperatures linked with decreased water availability	Lack of fodder; in some places lack of water for animals	Sell off dairy animals; shift to smaller livestock, particularly goats (maladaptation?); barter fodder for manure	Risk of malnutrition; increased drudgery
	Land becoming less productive	Less land area under cultivation; buying food	Dependence on cash income; food insecurity
Warmer winters and significantly less snowfall	Increased incidence of pests and diseases, e.g. white grub 'karmula' attacking roots	Installation of karmula traps; increased use of insecticides and pesticides; use of ash and salt	Increased food and livelihood insecurity
	Double flowering of Malta orange and apple trees	No coping strategy	Degradation of orchards; income insecurity

Mountain people and climate change – challenges and opportunities

There are many drivers of change – social, political, economic, and environmental – affecting mountain people and their livelihoods. Global climate change is an additional factor that will affect mountain people directly and also exacerbate the impacts of other drivers of change.

Mountain people are particularly vulnerable to climate and other drivers of change because the mountain system is already a marginal environment, as a result of its fragility, poor accessibility, and marginalisation from the mainstream. At the same time, mountain people's livelihoods depend to a great extent on natural resources, which are vulnerable to change, and people already tend to be poorer than in the plains and thus less able to cope with challenges.

Equally, many mountain communities still guard a vast body of local knowledge that supports survival and promotes sustainable production systems at high altitude. The traditional land management practices represent adaptation mechanisms developed by mountain communities over the course of time in order to survive under challenging and variable climatic conditions. Thus, they already have skills and experience in adaptation, although at a less rapid rate and without the impacts of so many different drivers of change.

Mountain people are also the stewards of important mountain ecosystem services such as water, agricultural production (including high value mountain niche products), medicinal plants, watershed management and hazard prevention, carbon sequestration, and the preservation of cultural landscapes for recreation, which primarily benefit lowland populations. With climate change these services will become more important and provide new opportunities for mountain people as the demand from the lowlands increases. For example, there is an increasing demand for mountains as a space for recreation as a result of their pristine landscapes and comparatively cooler climate, and for freshwater, which is becoming an increasingly scarce resource.

The impacts of climate change in the Himalayas

The Hindu Kush-Himalayan region is expected to warm more than the surrounding lowland areas. This means that targeted adaptation strategies will be needed, especially for poorer and more marginal groups dependent on natural-resources, who will bear more than their fair share of the adverse impacts of climate change. In order to support and design appropriate adaptation strategies, it is necessary to be able to predict likely future trends, and to know more about existing coping strategies. We need to have a much better understanding of current climate change impacts and mountain communities' traditional repertoire of strategies to respond to climate variability, in order to identify key determinants for future adaptation (Adger et al 2003).

Projections of future climate change for the Hindu Kush-Himalayan Region

- Temperatures are likely to warm more than the global mean in South Asia and especially on the Tibetan Plateau and in central Asia, with the highest warming at the highest altitudes
- Overall increased monsoonal precipitation (with persistent uncertainty about monsoon processes)
- Overall, summer precipitation likely to increase, winter precipitation likely to decrease
- General increase in the intensity of heavy rainfall events
- Fewer very cold days
- In mountain areas, precipitation will be increasingly in the form of rain instead of snow, with a predicted rise in the snow line by 150 metres per degree Celsius temperature increase

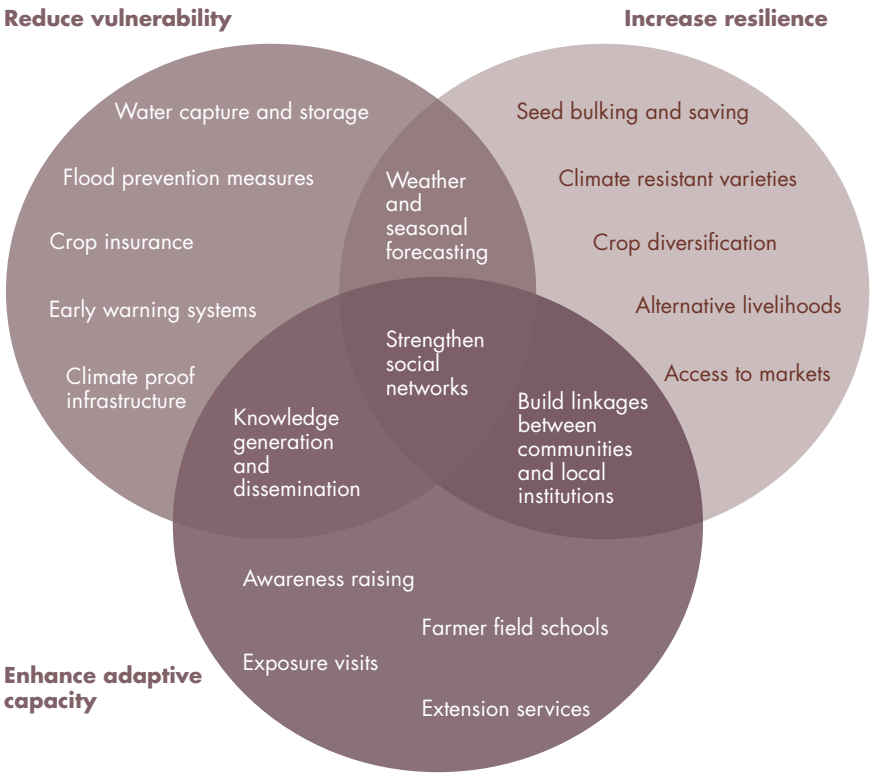
(Source: IPCC 2007)

Adaptation scenarios

Over the short and medium-term, due to persistent climate uncertainty, adaptation measures in mountain areas will be limited to climate resilient development. This means so called 'no-regret' strategies are needed regardless of the direction or magnitude of change. Climate resilient development includes three components: reducing vulnerability by minimising risk without depending on a particular climate future, strengthening resilience so that the unexpected can be overcome, and enhancing adaptive capacity so that communities can take informed control over their future (Ensor 2009).

In the medium to long term, it will be crucial to increase our knowledge in order to reduce uncertainty and enable adaptation measures to be developed that tackle specific climate risks that are outside historic climate variability.

Short to medium-term adaptation: Climate resilient development



Medium to long-term adaptation: Build knowledge base

- Generate knowledge on impacts, driving forces of vulnerability and adaptation mechanisms, and disseminate among stakeholders at different levels
- Test adaptation options (e.g. drought resistant crops, improved irrigation systems)
- Elaborate an enabling policy framework which allows communities to cope and adapt
- Set up hydro-meteorological monitoring stations
- Conduct impact and sensitivity studies (e.g., crop models or sensitivity of water resources)

References

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