Community resilience in Nepal

Bimal Regmi and co-authors describe how local knowledge, practices and innovations in Nepal can raise community resilience to climate change

Poor, marginalized people in rural areas of Nepal, who depend solely on natural resources and climate-sensitive sectors such as agriculture, forestry and fisheries for their livelihoods, are particularly vulnerable to climate change impacts. Most farmers depend on monsoon rain for crop cultivation, so changing rainfall patterns could have devastating results. Similarly, extreme rainfall causes landslides and soil erosion and can destroy property or even take lives.

For generations, smallholder farmers in Nepal have used local knowledge and traditional methods and innovations to adapt to climate variability. These local-level adaptation strategies are now being used to help them cope with adverse climate change impacts. Anecdotal information and evidence of this from communities requires further investigation, however. This article describes the results of research looking at whether or not existing local knowledge and livelihood assets enable villages to cope with climate change. It also explains how local knowledge and innovations are important when designing research and development interventions targeting vulnerable communities.

MAIN POINTS

- **The authors explain** how smallholder farmers in Nepal have used traditional methods and local knowledge to adapt to climate variability for generations.
- **They describe how** these strategies are now helping farmers cope with adverse climate change impacts.
- **They caution that** some people are more vulnerable than others and that livelihood assets need assessing to understand how such assets contribute to vulnerability.

Research was conducted in the Solukhumbu, Kaski, Tanahun, Kailali, Bardiya, Gulmi, Jhapa, Ilam, Dolpa, Mustang and Bardiya Districts of Nepal. Focus group discussions were carried out with communities to identify key issues, climate change impacts and community-based adaptation mechanisms. Interviews with key informants and informal discussions with respected village figures were held to document local knowledge, innovations and practices promoting community-based adaptation to climate change.

Smallholder farmer adaptation strategies

Few communities in Nepal have benefited from early warning systems, seasonal forecasts or any activities directly related to climate change. They have, however, been using their own traditional community-based adaptation methods for generations. Some of these are described below.

Water storage systems to cope with water scarcity: Communities in Kalabang in the Kaski District built water conservation ponds during the monsoon, and the farmers of Arba use water harvesting tanks to trap rainwater to use in the dry season. Waste water collection and drip irrigation systems were also used for vegetable farming.

Potato cultivation on soil heaps to reduce soil moisture loss: Farmers from Kalabang have experienced reduced winter rainfall for the last six to seven years. To conserve soil moisture, they have started to cultivate potatoes on mounds of soil. They say this helps to retain soil moisture. Other famers in the area are now replicating this practice.

Coping with water stress using drip irrigation: The farmers of Chaur have adopted a drip irrigation system to cope with water shortages during the pre-monsoon season. This consists of a water tank and a network of pipes with drippers at predetermined intervals that deliver water in a controlled way to the roots of crops such as cucumber and cauliflower. Farmers report that drip irrigation uses less water than bucket irrigation without reducing yields. The people of Chaur also believe that drip irrigation helps their crops mature early.

Management practices: Mulching helps increase soil moisture for those farming vegetables, and bio-fertilizers and bio-pesticides help improve soil fertility. Fodder trees planted on grasslands help tackle the invasion of new grass species, and growing potatoes in rows requires less water so helps people cope with drought. Farmers now sprinkle warm water in their nurseries to maintain heat during the cold season, and some spray ash around the periphery of their nurseries to control ant attacks. Using alternative energy sources, such as biogas, has reduced firewood consumption.

Young girl in rural Nepal Photo: © Greg Younger

Some farmers have built retention walls along terrace borders and others have checked soil loss and erosion by planting vegetation barriers, such as broom grass, mulberry and napier grass, on sloping land, roads and in gullies. Drainage canals on rain-fed 'bari' land have checked soil loss following intense rainfall, and trail improvement has also helped conserve soils.

In Kalabang, millet and maize used to be sown immediately after maize tilling in early June. Due to lower June rainfall, however, farmers postponed sowing millet until August so that the millet could get sufficient water for higher yields. Similarly, farmers in Amalchaur have started to sow wheat in December instead of November due to reduced winter rainfall. In December, wheat can get moisture from condensation and dew.

Watering to promote coffee flowering: Coffee flowers from February to April, and during this time it requires a little rain. The coffee flowering season has been delayed in Chaur in the Kaski District due to low or delayed rains, and this has affected coffee productivity. Krishna Neupane, a local resident, tackled this problem by sprinkling water on his coffee plants in the dry season to promote coffee flowering.

Hanging nurseries: Farmers reported that pest numbers were increasing in line with temperature increases. Traditional ways of raising seedlings in nurseries could not tackle losses from pest attack, so farmers

from Serabeshi have started to raise seedlings in hanging nurseries. Farmers say this has helped to control pests and also to save seedlings from frost, weeds, fungus and red ants.

Changing crops: In Kalabang, irrigated 'khet' land was converted to rain-fed 'bari' land due to drought. Millet and mustard replaced rice, and mustard also replaced wheat as it requires less water. Farmers now grow drought-resistant crops in semi-irrigated 'tari' land. They prefer early maturing vegetables and drought-resistant rice varieties such as Mansara and Anga. Farmers also sow high quality rice like Jetho Budho, a local landrace, which they sell at the market to buy cheaper rice varieties like Mansuli.

Farmers in the Mustang and Dolpa Districts are growing new vegetables in their homesteads due to changes in temperature. Similarly, farmers in the flood-prone areas of Bardiya and Kailali Districts are growing watermelon, sesame, black gram, peanuts and sweet potato.

Selecting the right crops and varieties: Farmers in the drought-prone areas of Gulmi District grow drought-resistant crops to make best use of the dry land. Farmers grow elephant foot yam, taro, cassava, winter bean, air potato, cush-cush yam, brinjal and swiss gourd. Similarly, in the marginal areas of Gulmi District, farmers are growing cassava, winter bean, elephant foot yam, taro, sugarcane, tumeric, ivy gourd and legumes. In water-logged areas in Jhapa District, farmers are cultivating mint, jansen, sweet flag and green vegetables. Farmers are also using new hybrid varieties with short durations and drought tolerance.

Vegetable farming: Communities in Balapur village, Bardiya District, have begun to cultivate vegetables on riverbanks. Previously, riverbanks were used to cultivate other crops, but due to erosion and changing river routes, the land has become too sandy. Communities have learned to cultivate vegetables such as tomatoes, bitter gourd, watermelon, sweet potato, sponge gourd, bottle gourd and pumpkin on this land. Similarly, sandy and riverbank land belonging to the community forest user group was used for communal farming. The group distributed this land equally amongst 116 households who now cultivate rice, wheat, chickpea and lentils. The group collects 15 to 20 kilograms from each household's harvest and funds from the sale of this produce are deposited in the group's bank account and used for social purposes. The communities are clearly managing the land in an equitable and sustainable manner.

Vegetable cultivation in sandy soils has proved very promising in Kailali District and other eastern regions of Nepal. People now grow seasonal vegetables during the winter season to earn income from otherwise fallow sandy land. In Balapur village, a farmer can earn around 20,000 to 30,000 Rupees a season this way. Farmers also grow vegetables commercially in the winter season due to high market prices. This practice could be replicated in other villages where farmland is sandy, and applied on barren public and government riverbank land.

Farming in Nepal Photo: © global.finland

Improved storage systems: Farmers have been making pits to store potatoes in because the pits help maintain cooler temperatures allowing the potatoes to last longer.

Farmers in the Kaski District protect their seeds from frost and cold temperatures by covering them with plastic and hanging them in safe places. Farmers in the Kailali District use earthen vessels to store their rice, maize and other cereal seeds. These vessels are kept on raised beds to protect them from flooding. Farmers are also raising the level of their houses and cattle sheds to keep them safe during the monsoon floods.

Collaborative responses: The non-government organization Local Initiatives for Biodiversity, Research and Development (LI-BIRD) and its partner organizations working in the study areas have been instrumental in introducing biodiversity-based livelihood strategies through various projects and programmes targeting poor and socially excluded communities. This has helped raise community awareness about the importance of conservation and build community capacity to use natural resources for livelihood benefits. Income generating activities have targeted poor and landless communities. LI-BIRD and its partners have introduced innovative activities to develop and promote plant varieties and technologies that can cope with extreme climatic events like droughts and floods. Similarly, focus on strengthening and empowering community-based institutions is making communities stronger and increasing their resilience to climate change impacts.

Conclusions and ways forward

From a poverty reduction perspective, adaptation is already necessary as people's lives and livelihoods face an increasing burden of shocks and stresses. Communities have been using traditional knowledge, practices and technologies to cope with adverse climatic stresses. Adaptation and coping mechanisms include conservation and sustainable use of important plant species, use of different soil and water conservation methods such as drip irrigation and technologies to retain soil moisture, changing cropping patterns and crop composition, improved marketing and strengthening community-based institutions including community-based insurance systems. Such mechanisms have been promoted by civil society and non-government organizations working in the study area.

The study also demonstrated that some individuals and communities are more vulnerable than others. Reliance on climate-sensitive crops, poor access to alternative livelihoods, remoteness from markets, inferior social services and weak social networks are important factors contributing to vulnerability. It is, therefore, necessary to assess the various livelihood assets of rural communities, taking socioeconomic factors and local practices into consideration, to understand how they contribute to community vulnerability. ■

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ACKNOWLEDGEMENTS

● The authors would like to acknowledge LI-BIRD, the International Institute for Environment and Development, Promoting Local Innovation in ecologically-orientated agriculture and natural resource management (PROLINNOVA), and the Development Fund, Norway, for providing the opportunity to be involved in this research and publish this article.