

SELF-SUFFICIENT SLOPES

Food security in the highlands

Niche high-value agriculture increases food supply, but have contributed to destroying traditional, indigenous farming systems in the mountains.

By Shantanu Nagpal

When governments talk about security, they usually mean defence against an external enemy. But in the food defi-

cit areas of the Himalaya, security has other meanings. Food security is the ability of an household to get access to enough food, either by producing



Chronic and widespread malnutrition in the Himalaya.

UNICEF/Sean Sprague

it or by earning enough to buy it.

In the Himalaya and Hindu Kush mountains there is now a shift away from aid for subsidising subsistence agriculture to aid for exploiting special assets like hydropower, tourism, vegetables that these hills offer. Thus, instead of concentrating on staple foods, farmers are encouraged to grow high-value crops which contribute to their incomes and their food purchasing power.

The shift was inevitable. Decreasing returns from existing agriculture meant that farmers could survive for only eight to nine months a year on traditional food crops (maize, rice, millet, wheat) and had to search for non-farm income for the rest of the months. With over-extraction, overgrazing, and intensive cropping came dramatic declines in soil fertility and signs of unsustainability. Spurred by success stories in Himachal Pradesh and hill areas of Uttar Pradesh in India, governments and NGOs focussed their efforts on high-value agriculture. It made sense; it was accepted economic theory – maximise incomes from existing resources.

Yet all indicators now show that niche harvesting can be equally debilitating for the land. It can also lead to a situation where land is unable to regenerate and thus becomes unsuitable for agriculture. Niche harvesting has raised hopes and increased incomes for a few. What it has also done, however, is decrease collective responsibility, destroy traditional methods, increase risk and vulnerability, and accelerate the breakdown of social sanc-

tions on the resource base that communities have maintained over the years.

The fault lies with governments and NGOs who have been obsessed with supply without concentrating on demand or the special features of mountain regions. Traditional systems have been allowed to break down. "All policies are made in the plains, for the plains, by politicians from the plains. Mountains are seen as liabilities that need nagging attention," says N S Jodha of the International Centre for Integrated Mountain Development (ICIMOD) in Kathmandu. "It is no surprise that these policies are made assuming that what works well in the plains, should work in the higher mountains." That, in essence, is the problem of people living in the Himalaya and Hindu Kush regions.

For policy makers, mountains are a "valuable resource base" for meeting the needs of the plains. They generate electricity, tourism, and food that can be sold in the plains, but are sparsely populated, low vote bank areas. For politicians, the marginal communities need far too much energy and attention to be worth the effort. For the same investment, far more votes can be generated in the plains. If these weren't *people* we were talking about, we could have couched this problem in the classic "market failure" model of economics. Perversely, that would have been the real definition of mountain people: market failures that need special attention in a democratic market.

According to Jodha, mountain ar-

Farming in Ladakh

Cold deserts epitomize the problems of mountain regions. They are remote, fragile and harsh. Farming communities use traditional wisdom to grow crops and regenerate their resource base in these areas.

Ladakhi farmers have developed their own astrological system for solar observation which they use to make agro-metereological forecasts, like snowfall, winds, storms, solar radiation and even pests.

Annual crop rotation makes optimum use of local agro-climatic conditions. In Pattan Valley farmers grow two crops despite the fact that snow covers the fields from November till March or April. This crop rotation is achieved by spreading soil over the snow in the fields. This catalyses snow melt and land preparation can start as early as March. Barley can be harvested in July followed by buckwheat in September. Kuth is sown prior to snowfall since a long period of stratification is essential for this seed. Kuth is harvested after mid August. Crop rotation practices are based on factors that help maintain soil fertility. Fields are divided into thirds and crops are rotated on that basis or on a yearly basis. The emphasis is on fertility, conservation of manure and decrease in any crop residues that are disease carrying.

Local germplasms of major crops in these areas are acclimatised to the harsh climate and the conservation of this germplasm receives high priority. The common practice is to collect seed from select stands that show vigour, high productivity and resistance to disease. After every three or four years, the seed source is changed without diluting the seed selection criteria. It extends a natural check against inbreeding and low productivity.

Monastic traditions are used to improve soil fertility. Soil that has been sanctified by the Lamas is used for barley cultivation. This is a simple and logical way of improving the porosity of soil that has been hardened by continuous barley cultivation. In this religious ceremony, fresh, sanctified soil is spread by the farmers before he grows the next barley crop. To ensure uniform distribution, 20-25 kg of manure is unloaded after every seven steps of a woman.

Farming communities have developed different kinds of co-operative organisations to carry out routine farming operations. These organisations also help during calamities. In most villages, a village mate is annually selected from certain families and his special job is to make all kinds of community related announcements such as repairing of kuhls and water tanks, as well as any special events/ceremonies. The farmers pay his salary.

areas are special because they are fragile; the region is susceptible to irreversible damages and it is difficult to recoup losses. In such areas productivity is low and the cost of maintenance high. Mountainous areas are also mostly inaccessible. These factors limit the production and exchange options available to the mountain people. Thus any application of traditional food or

famine theories are difficult.

Despite their biophysical drawbacks, the mountains are home to a large number of people. Living in small, scattered settlements, the people have adapted their needs to the environment. They adopted traditional mechanisms that helped preserve and regenerate resources (*See Box 1*). In Bhutan, demand was controlled

through traditions like sending the eldest son to become a monk. In other areas demand was controlled through migration.

Overgrazing was controlled through strict time-sharing mechanisms which limited the time available to each farmer to graze his cattle in the commons. Disputes were resolved within the community. Village elders settled differences. Now similar disputes are resolved by civil servants who set the rules based on what they have learnt in the plains. All petty trade activities were on a small scale and were inter-linked. This meant that no one had an incentive to intensify resource use because the returns were limited.

Most importantly, consumption and production choices were far greater. There were more varieties of crops grown and consumed and this meant that the soil had a chance to regain its fertility. During the time the

soil was rested, farmers survived on roots and shrubs which, although less nutritious, met their food needs. This changed when the government introduced its "Grow More Food" campaigns and set up a Public Distribution System (PDS). Consumption and production became limited to the three or four varieties of grain that could be bought or sold through the PDS. Government help came only if the farmer grew these high yielding varieties, which required intensive agriculture. Mixed cropping decreased, fertility came down, and farmers were made dependent on fertilisers which only the government or the market provided. The farmer also consumed only what was grown, changing his diet pattern completely.

The initial problem of food shortage was a direct result of concentration on grain production. Between 1950 and 1990 there was a doubling of the population in the mountains. An

The cost of increasing yields

Emphasis on increasing yields and incomes has decreased famines and improved household food availability, but this food security has come at a significant cost to fragile mountain areas. Food varieties that contributed to the diversity of the region have completely disappeared.

State incentives encouraged the farmer only to grow one or two crops (rice or wheat) completely neglecting other crops he formerly grew and consumed. The farmer now grows only what he can sell or what he gets external support to grow. Consequently, households that used to consume over 20 varieties of food items now consume five. The food items that disappeared were the ones that were environmentally friendly, resilient, grown to increase soil fertility, or grown at a time when the soil was being "rested". Now the same few crops are grown without resting periods or inter-cropping, resulting in rapidly declining soil fertility.

Rice and wheat displaced roots, leafy food items and millets. The new generation hardly knows any other food. The problem is difficult to solve because dietary habits have changed – it's noodles now, and it will take a long time, if ever, to show the new generation the advantages of growing diverse food items.



Harvesting rice in the Nepal midhills.

ICIMOD

area that had already reached its peak production capacity now had to sustain twice as many people. Per capita availability of resources declined despite the extension of cropping activities in marginal lands. There were no dramatic increases in productivity and thus food availability also declined.

One factor that contributed to making the food problem worse was the breakdown of traditional systems of maintaining, enhancing, sharing and conserving resources. ICIMOD studies indicate that the number and combination of crops, extent of crop rotation, inter-cropping, and other forms of diversification have declined over time. This has been a direct result of the change in attitudes of the popula-

tion, their reluctance to adhere to social sanctions that prevented over extraction, and their inability to conduct group action.

The reason these attitudes changed is because the state intervened and introduced its own version of how things ought to be run (*See Box 2*). Further, linkages with the external market meant that profitability became such an overwhelming concern that farmers turned a blind eye to the fact that their resources were being depleted at an unprecedented rate.

By subsidising fertilisers, pesticides, large-scale irrigation projects and high yielding seeds, governments made indigenous systems seem obsolete. Farmers saw the potential ben-

efits in over-extraction; they sold more – even though most of what they sold to the government was undervalued – and earned more as a result.

This strategy had two results: firstly, farmers were now linked to

markets that weren't their own. They were producing what the plains wanted, and getting paid prices decided by the plains. This alienated the farmers from their resources. Secondly, this strategy made the farmers more

Niche agriculture

'Due to their specific biophysical attributes mountain regions have some comparative advantages over the plains. Mountains act as a source of important high value-added products like medicinal plants, fruits, flowers, vegetables, or are a source for hydro-electric power. To increase food security, these niches have to be harnessed in a way that they benefit the local population. Accessibility and availability of exchange options are critical for successful harnessing of a niche.

For instance, mountain areas grow off-season vegetables (vegetables that cannot be grown in the plains during the summer) and these are sold in neighbouring towns. There are quite a few success stories of mountain areas that have profitted from growing off-season vegetables. The common theme that links these success stories is accessibility of these areas to their final markets. It is this linkage that has made the Jhiku Khola area so profitable. An hour by road to Kathmandu, farmers can make day trips to sell their vegetables in the city. In many parts of Kathmandu one can see hundreds of farmers on the roadsides selling vegetables from small bundles. They do brisk business in the evenings as they must finish their stocks before they return home.

Another possible reason why these farmers might like to do their own marketing is because of the unfavourable terms of trade they get from middlemen. This is a problem faced by many areas not well connected to the market. They have to depend on the vegetable trader who usually gives them rates sometimes as low as 20 percent of the final selling price. Neither the government nor the farmers have been able to improve the terms of trade between the hills and the plains.

An interesting story illustrates this point. A group of monks from the district of Leh heard about the hugely profitable vegetable market in Delhi. They decided to risk all their savings on a make-or-break vegetable marketing trip to the Indian capital. They hired a truck, packed it with all their fresh vegetables and set out. Delhi turned out to be much further than they had imagined. By the time they reached the city, most of the vegetables had perished. They did not know where to sell the produce or how to contact a middleman. They didn't even have a place to stay and eventually found refuge in a monastery. Two days later all they had left with them were turnips. And turnips don't sell in Delhi. Eventually they had to beg for money and returned in the same truck with nothing to show for their investment of Rs 20,000 (USD 475).

Niche harnessing can benefit mountain regions because it can increase income and thus improve access to food. However, without infrastructural support, niche harnessing is not only ineffective, it can be harmful because it requires higher investment and greater inputs. It also makes the farmer dependent on external market forces and contributes to a breakdown of traditional methods used to secure food and conserve resources.

dependent on external inputs, and thus limited their production and consumption options. Input-output ratios worsened with increased fertiliser use, exacerbating the extent of over-extraction. There was no incentive from the government side to encourage farmers to plough back what they earned from the land.

This market-oriented approach also created pockets of wealth. Areas that were well-endowed and accessible benefitted while others remained in relative isolation. As a farmer in the Jhiku Khola watershed in the middle mountains of Nepal explained: "We have benefitted because we are linked so well to Kathmandu. But in the higher areas around our watershed, farmers have given up farming and

find working for us more remunerative. But we can employ them only for a few months, after which they must go back to their farms. Their own fields are tilled by their women, and they try and grow what little they can. It is usually not enough because with the money they earn here, they have to buy food. And food is now more expensive than ever."

The Jhiku Khola watershed is spotted with barren pastures, denuded land and exhausted soil. It also faces a severe water problem. The cause of this is the breakdown of social sanctions on common property resources. Overgrazing, deforestation, poor choice of trees for the forest and the extension of intensive agriculture on marginal land have contributed to this situation.



Farmer takes cattle down for winter, Humla, northwest Nepal.

Bikas Rauniyar

There are now efforts to create user groups (community groups, much like those that existed in the past) which will use the resources as common property and will thus restrict overgrazing by feeding livestock inside their shed rather than letting them graze freely. This limits grazing and keeps top-soil intact. ICIMOD officials responsible for some of this rehabilitation work claim that their efforts will take time to yield results. And the success of their efforts will almost solely rest on their ability to create user groups that are genuinely concerned and aware of the problems they face.

No choice

“Life is easier for the rich farmers because they can afford to pay for expensive fodder, but the poorer ones have had to sell their livestock because there are no pastures left. These are the people for whom food remains a perennial problem. This is due to a strat-

egy that overemphasises food and entitlements to food, without giving enough attention to where the food will come from in the long term,” said one official. “In Jhikhu Khola farmers have had to cultivate on steep slopes where they know degradation will be the fastest. They had no choice. The other slopes are now either taken or infertile.”

To ensure food security, cash crop farming – which utilises the niche (*See Box 3*) of mountain areas – has emerged as a viable option and one that is being promoted across the region. The logic of this option is: farmers have been unable to secure for their households enough food simply by growing grain, which, in any case, is not suited for the mountains. Thus, instead of foodgrain, farmers should be encouraged to grow high-value cash crops which will increase incomes and enable them to buy enough food.

There have been many success stories: the most famous one is that of apple farmers in Himachal Pradesh. This has served as a template for many agricultural transformations in the HKH region.

Garampani is a small town in the Nainital district. It is situated in the lower Himalaya and is close to the hill stations of Haldwani, Nainital, and Almora. In the last 10-15 years, there have been dramatic increases in the adoption of market-based high-value vegetable cropping in this area. The results have been very positive. Income and employment have increased by 170 percent on an average. Although farmers have adopted cash crops, be-



Selling fuelwood in Almora, India.

Bikas Rauniyar

cause of land quality, labour shortage and fear of food scarcity, they have not completely abandoned conventional crops.

Cash crops still account for only 63 percent of the total area under cultivation. The local market for vegetables developed spontaneously and without external influences. Vegetable farming has decreased the migration of youth to cities. High labour requirements and increased incomes have made the gender distribution of workloads more equitable. Women, traditionally restricted to sowing and reaping, now do the marketing and selling.

The negative consequences of cash crop farming have been primarily related to environmental degradation and the decline in availability of fod-

der, an important by-product of conventional crops. As a result, dependency on forest fodder has increased sharply leading to overgrazing. The number of cattle has declined and so has the availability of organic manure and milk. This has raised some important questions about the sustainability of high-value cash crop farming.

The single largest problem has been the shortage of water. This indicator of unsustainability has also been widely reported in the Jhiku Khola watershed. Drying up of water resources has meant that risks associated with cash crop farming have increased significantly, while returns have not been able to keep pace. Farmers of the Jhiku Khola watershed learnt their lesson, albeit rather late. With the help of NGOs, farmers built a tank in 1998 to



Apple orchard in Himachal Pradesh (Inset: Grading fruit)

ICIMOD

collect rainwater. But that winter the rains never came.

The decline in traditional water harvesting techniques has worsened the problem. Traditional practices, based on a high degree of cooperation and responsibility, were effective and equitable. For instance, *kulos* (water channels) that diverted water right from the glacial head to a village, at times travelling over 10 kilometers, were jointly owned by the original builders and their descendents. They distributed water freely, and in time of shortages, according to the effort put in by various farmers who maintained the kulo. This ensured commitment because each farmer had a stake in the efficient running of irrigation supply.

Traditional wisdom

Traditional wisdom about species of trees that help in water and soil conservation is fast disappearing. In his doctoral thesis, Balaram Thapa notes that Nepali farmers have thorough knowledge of trees that are good for water harvesting and the ones that are bad. Farmers classify trees according to the density of leaves, tree height, inclination, root size and shade effects. They prefer trees with small leaves that decompose easily, and trees that have inclined leaves to reduce *tapkan* (water falling off a leaf) which reduces erosion. But the government paid no heed to this knowledge and promoted trees that are detrimental to water conservation and erosion, opting for species purely for their high survival and growth rates. Ignoring traditional wis-

dom has resulted in dry and eroded catchments. 'Resilient' but useless trees (farmers call these trees *rukho*) are peppered all over the landscape.

R.K. Shrestha of the *Love Green Foundation*, a Nepali NGO that promotes planting of trees for forest, fodder and fruits, says that along with water, it is the high use of insecticide and pesticide that have harmed crops. Diseases have increased dramatically and yields have dropped significantly. Pesticide use has killed bees that improve pollination. The quality of vegetables being taken to the nearby markets is suspect because it contains dangerous amounts of chemicals. No one cares, as long as cash crops make cash. An area of 0.5 hectares, subjected to high-value agriculture, can yield as much as 600,000 Nepali rupees (USD 9,520) in three to four months.

But earnings are seldom ploughed back. Farmers in Jhiku Khola have earned a lot of money, yet most of it has been used to buy land in the neighbouring cities or has been invested in gold. There are no signs that any money is being reinvested in the land.

An official at ICIMOD admitted that free distribution of seeds and subsidies on fertilisers and pesticides is not ideal because it does not give farmers a fair idea of the cost of inputs going into their land. Realistic input prices for seed, fertiliser, pesticide, electricity etc. will compel farmers to space planting cycles and look for alternative measures to increase soil fertility and reduce crop diseases. With the income the farmer earns, he can afford to give the soil some rest.

This increase in income has changed lifestyles and decreased migration. But for the women of Jhiku Khola, the drudgery is still the same. They still do most of the work on the farm while the men concentrate on the marketing. Diets have changed dramatically and the focus is on proteins, meats, packaged food and alcohol. Most farms boast a few motorcycles and conspicuous consumption is up. Children go to boarding schools and the parents hope they will find better jobs in the cities. One farmer said: "Farming is getting tougher. With our land in the city, and our son employed, we are hoping that we, too, can enjoy better facilities."

Woes

Focus on value-added niche crops has not helped food security for the poorer villages that are either not connected to main cities through a highway or have poor biophysical features. These areas have to depend on non-farm incomes, which means migration to the cities or to areas where cash crop farmers need cheap labour. To add to their woes, poorer farmers of the same watershed now have no grazing commons and limited access to water.

A solution to this problem needs

aware and cooperative politicians. Districts should be divided according to watersheds which share common biophysical features. Authority should be decentralised and farmers must have their say in how much money is being spent where and on what in each watershed. This transparency will improve cooperation and remove farmers' fears that benefits are unequally divided. Most importantly, any successful strategy will need politicians who see benefits accruing to mountain areas as a priority.

The strategy of increasing food production, and thus improving food security in the Himalaya, has overlooked the impact on the environment. The strategy has not attempted to learn from traditional wisdom and has contributed to the breakdown of all forms of cooperation that would have ensured sustainability. Governments have – either through indifference or through ill-informed policy – made matters worse.

A new form of food insecurity now threatens the lives of farmers of this region – the threat of depletion of key resources like water, fodder, and soil. Increased incomes might have brought prosperity, but the steam is running out of this strategy.

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