



Photo: P. Spierenburg

Homestead with paddy fields in the southern part of Jigme Singye Wangchuck National Park.

Saving the forest through livestock intensification

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In many parts of the Asian Himalayas, the forests of the mid-mountain zone – ranging from 1000 to 3000 metres above sea level – have been cleared extensively for agriculture. Bhutan is in the unique position of having much of the forest in this zone still intact. The Jigme Singye Wangchuck National Park, covering an area of 1400 km², is one of the protected areas created to conserve these temperate old-growth forests and their wildlife. The Nature Conservation Division under the Department of Forests of the Bhutanese government is mandated to manage the park. Around 5000 people living in the park area practise traditional agriculture and keep livestock. When the park was established in 1993 the policy was to respect the existing land and grazing rights of these local communities. These rights relate not only to the village area, but also to extensive areas scattered throughout the main forest, which are used for grazing livestock.

Agriculture needs the forest...

The forests in the park area are part of an agricultural landscape. Many parts of the park have a long settlement history. Shifting cultivation is widespread in the southern parts of the park, and livestock grazing in the forest is common practice. The extensive forest cover assures a supply of water for irrigation of the paddy fields around the villages. The soil fertility of farmers' fields is maintained through natural processes that depend directly or indirectly on the neighbouring forest land: nutrients carried by irrigation water or surface flow, as well as manure produced by the cattle that depends on the forest's grazing resources.

Traditionally, farmers cultivate dryland crops such as millet and maize in a shifting cultivation system, often leading them to spend the entire cultivation season in temporary settlements away from the village. However, the system is in transition. Over the years, the emphasis has shifted to the permanent paddy fields located around the villages. A driving factor behind this is the expansion of irrigation facilities in the past 20 years, mostly through government schemes. Citrus, which has been promoted in the area for around 10 years, has also become an important part of the agricultural system and is now a successful cash crop for villages within a day's reach of the nearest road. The use of external inputs remains at a low level, because transport from the road to the remote villages is a major bottleneck.

Livestock is important for the farming system: cattle fertilize the fields and they are used as draught animals. They also supply milk, cheese and butter. Depending on the size of their herds, farmers use different strategies. Households with few heads of cattle usually keep the animals in the village and nearby forest areas the whole year round. Farmers with larger herds move their cattle to temporary camps deeper in the forest during the cropping season, and in winter they are brought in to the fields. The large number of cattle allows for fertilization of the fields in a short period of time. The productivity of the local cattle breed is low and farmers seek to compensate this by keeping large numbers of cattle if they can afford to.

The forest also contributes to people's livelihoods in other ways: it supplies additional income to farmers who collect and sell forest products like resin from pine trees (*Pinus* sp.), fruits of the pippla plant (*Piper longum*) and cane from the climbing palm

(*Calamus* sp.). However, the proximity of the forest to the fields also has disadvantages. Cattle that graze in the forest are vulnerable to wild predators like tigers and wild dogs. There is also a risk of crop damage by wild boars and other wildlife, and to avoid crop losses farmers spend a lot of time guarding their crops.

...but is the forest safe?

The landscape depicted so far is not a stable one, however. The resident population is growing, and so are their development aspirations. Pressure on the forest is mounting, with a slow but steadily growing demand for agricultural land, grazing areas and forest products. This raises the question whether in this agricultural landscape, the newly assigned conservation objectives of the National Park can be assured in the long run.

Grazing can potentially have a negative impact on the regeneration of old-growth forest. Surveys in various forest areas in Bhutan show that in heavily grazed forest only few unpalatable species regenerate. This leads to a situation where at first sight the old-growth forest is still intact, with a diverse, mature top canopy, while closer inspection reveals a lower and middle storey completely dominated by a few species. This implies that in the longer term, the present diverse forest will be replaced by species-poor forest. Forest grazing therefore represents a relatively invisible but potentially very serious threat to old-growth forest in the park area. An analysis of trends shows that particularly on the southeast side of the park, forest grazing is on the increase, partially as a result of investment of earnings from the citrus cash crop in cattle.

Action needed

In 1999, the park management staff initiated a joint analysis with the communities and extensionists from the district, in order to identify win-win solutions that could reduce grazing in the forest while still meeting the needs of the communities. The analysis showed that many farmers were at a crossroads. They could either choose an extensive livestock system depending on forest grazing or alternatively opt for a more intensive and market production-oriented system. A combination of extensive and intensive management would be difficult as the two strategies imply making different choices in terms of cattle breed, herd size and animal care, and also regarding the organization of labour within the household. The labour aspect was considered particularly important, as the on-going shift to more permanent cropping systems makes it difficult to keep herding the cattle in the forest away from the village. The labour force of the household is needed more and more for activities close to the homesteads.

The joint analysis by the farmers, government extension staff and the park wardens led to the conclusion that if the existing extension programme were intensified and focused, the emerging trend towards an intensive system could be strengthened, thereby reducing the pressure on the forest.

Fewer cattle, improved production

For more than 15 years, the government livestock extension agency has been introducing new animal husbandry practices in the area. The cornerstone of the programme is the improvement of local cattle through cross breeding with jersey cattle, which offer a higher production potential. Crossbreeds are well adapted to the mountain environment and can be reared at the homestead. However, they cannot subsist on grazing in rugged terrain like the local breeds, as they need better quality fodder. Also, the farmer cannot risk losing these high quality animals to wild predators. Therefore, the extension programme also

includes the introduction of stall-feeding, fodder crops and composting.

The key to increasing the impact of the extension efforts was to introduce the various components of a more intensive livestock system, giving special emphasis to the smart selection of fodder crops as this was considered to be the main bottleneck in adopting the improved cattle. Because of the long-established programme for introduction of jersey cattle for crossbreeding, farmers were well aware of the potential of these animals. At the same time they realized that in the growing economy, demand for butter and cheese would continue to increase and that more productive crossbreeds would provide additional cash income opportunities. Fodder crops were a missing part of the puzzle. The fodder crops would need to take up as little extra space as possible in the intensively cultivated zone around the village. For this reason, fodder peanut and sugar cane were selected. Fodder peanut can be grown as ground cover in the citrus orchards. It is rich in protein, which is important for milk-producing cows, and also has other advantages such as nutrient delivery to the trees through nitrogen fixation and reduction of the labour required for ground clearing. Sugar cane was selected because it is very productive and requires only small plots. It provides energy-rich fodder for the animals and leads to a visible rise in milk production. Once a good solution for the feed issue was available, the other parts of the puzzle – stall-feeding and manure production – also fell into place for the farmer. The demand for improved jersey breeds received an immediate boost.

The start of these extension activities in the year 2000 produced a remarkably quick response of reducing grazing pressure in the forest, as measured through surveys and in control vegetation plots. From a socio-economic point of view, the activities gave a boost to the development of livestock as an income-generating activity, increasing the adoption rate for improved breeds and fodder crops.

The key factor for making the process work appeared to be the fact that the evolution of the agricultural landscape had taken the farmers to a crossroads where a choice had to be made. They were receptive to new techniques that would broaden their range of available options. At the same time the establishment of the National Park created a sense of urgency to find solutions. The park management authority stepped in as a new stakeholder and was able to create the necessary momentum through a joint planning process and funding of key activities. A direction has now been chosen by which the agricultural landscape can further evolve in a way compatible with maintaining the valuable biodiversity in the area. ■

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