

Changing Lifestyles of Mountain Communities – New Uses for Ancient Landscapes

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The patterns created by land cover and conversion of large areas of land for human uses define the spectacle of our planet from above. Changes in mountain ecosystems are perhaps not so easily detected, taking place as they do in the varied, rugged topographies of chains of peaks: peaks that are crowned with cascades of permanent snow and ice.

Climate change and human responses to over population, and decreasing fertility of agricultural land by expansion of subsistence production onto marginal lands, are, however, taking an inevitable toll on mountain ecosystems and biodiversity. This is especially true in the Hindu Kush-Himalayan region: a region that supports 1.3 billion people living in ten river basins. The water tower of the Himalayas is vulnerable not only to climatic but also to economic and sociopolitical impacts. The principal drivers behind changes on the ground are forest transition and rangeland degradation.

Land-use and land-cover changes in the Himalayas

Altitudinal gradients, latitudinal variation, and the local political economy determine land use in the Himalayas: over 80% of the population are either full- or part-time subsistence farmers who mainly grow grain. Knowledge about the interlinkages of land-use systems along elevational gradients, their relationship to social and ecological systems, and their connections to and impacts from changes taking place locally and in the environment at large, is vital to our understanding of the changes taking place. The picture is not the same across the Himalayas, there are differences between east and west. Large areas of forest have been lost in general, but

less so in Southeast than in South Asia where agricultural crops have replaced forests. The map shows the land-use situation in the Himalayan highlands, and here the picture is different (Figure 1).

Rangeland degradation in the highlands

One aspect that is often neglected is that rangeland covers more than half of the land in the Himalayas. Climate change impacts and unsustainable management practices have now driven approximately ten million pastoralists in this area into poverty. Over the past 50 years, the minimum reported winter temperatures have increased and snowfall has decreased. The warming trend might have benefited vegetation growth in arid steppe and cold desert areas, but if it continues as predicted it will certainly not benefit the most productive

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highland grasslands where productivity depends largely upon precipitation. In recent times, many nomadic herders have converted to a sedentary lifestyle. Contrary to popular belief, restricted herd mobility and increasing livestock populations are linked to overgrazing and degradation. Cattle on the move could be more beneficial to rangelands than cattle in the stall. Herders themselves suffer from a sedentary lifestyle and are prone to diseases they previously did not encounter.

Forest transition in the uplands

Forests in the mountains are a treasure trove: they provide fodder, firewood, timber, and non-timber forest resources; and all of these are essential for survival among the highest mountains on earth. After decades of forest destruction, in the 1980s countries in the Himalayas engaged in afforestation through approaches such as joint forest management (India), forest user groups for community forest management (Nepal), forest tenure reform (China), and forestry and biodiversity conservation (Bhutan). In the middle hills of the Himalayas, protected areas were either established or extended, accompanied by tree plantation; in turn, these approaches facilitated natural regeneration. Governments reinforced the rights of the people to forest tenure and this, together with market incentives, meant that farmers planted more trees and managed more forestlands than ever before. The treeline appears to have shifted northwards to higher altitudes with climate change and along with it forest plant species and many vertebrates and invertebrates.

Agricultural intensification

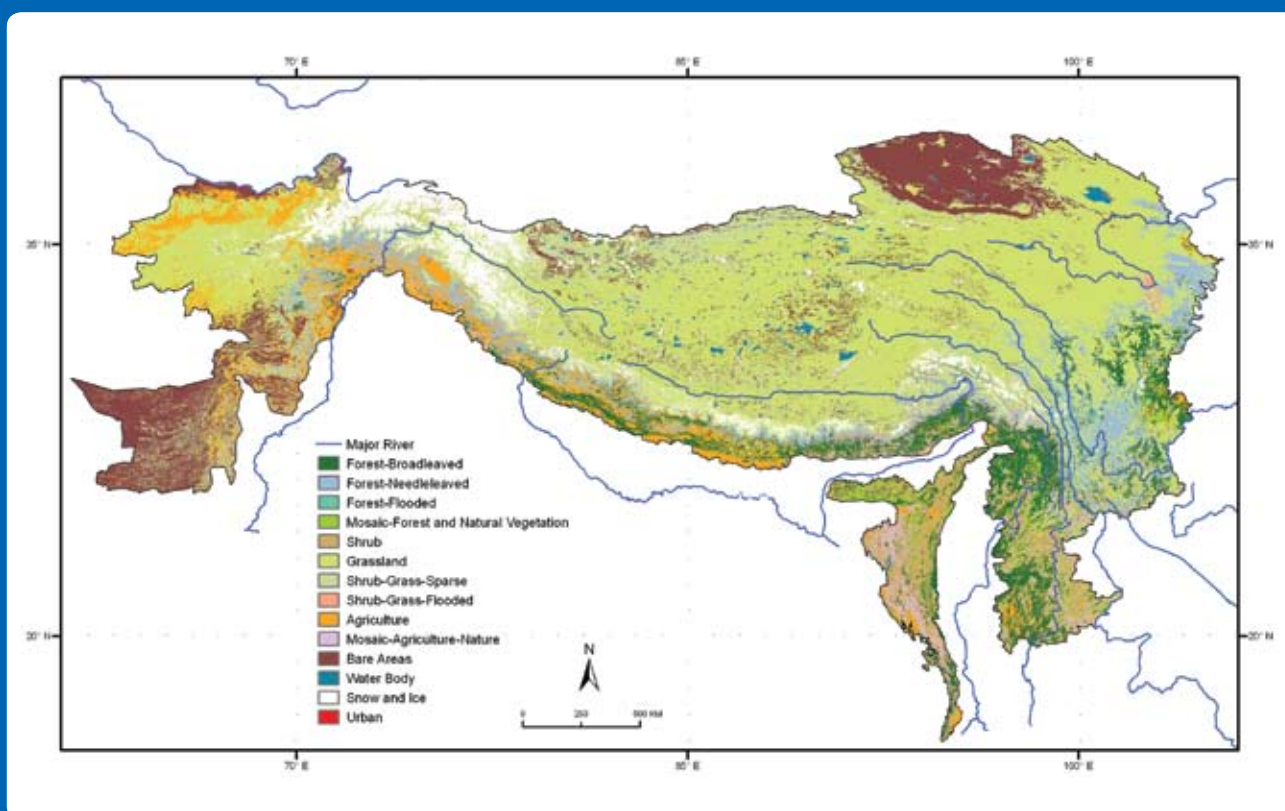
Land has become scarce as a result of overpopulation and subsistence crops have been replaced by high-value

products such as fruit, flowers, and vegetables. This trend dates back to the mid-1960s when smallholder farmers began to plant high-yielding varieties of rice and wheat. Agricultural intensification becomes untenable when appropriate changes in inputs or management don't take place concomitantly. Intensified crop production is vulnerable to markets, to changes in ecosystems, and to changes in government and development policies. Many traditional Himalayan farming systems, such as shifting cultivation, have been transformed into either monocultures of modern food or cash crops and much agrobiodiversity has been lost forever.

Deforestation and plantation in the tropics

Deforestation has occurred mostly in the tropical foothills. The most visible transformation is the creation of monoculture plantations producing rubber, tea, tropical fruits, and bananas. Poverty and the desire for profit are the two main drivers. Poverty is often associated with shifting cultivation, subsistence farming, land reclamation, and/or colonisation. Mountain farmers often have insecure land ownership and only quasi-open access to forest resources. Local user groups are not empowered. Market failures and market growth and commercialisation also contribute to poverty-driven deforestation. Large-scale

Figure 1: Land-use and land-cover map of ICIMOD defined working areas in the Himalayas





Use of modern technology in managing the landscape, Jhikhu Khola, Nepal

monoculture plantations as a pathway to modernity and poverty alleviation are subject to supply and demand mechanisms beyond local control, and when demand weakens poverty re-emerges.

Urbanisation

The built-up or paved-over areas are the urban forests of our world. In the Himalayas less than 0.1% of the land surface is urban. Nevertheless, urbanisation affects land change elsewhere through transformation of urban-rural linkages. As urban dwellers increase in number, the demand for mountain ecosystem services, such as fresh water and food, grows. The economic boom in China and India and the remittance economy in Pakistan and Nepal have accelerated urbanisation and rural-urban migration. Lifestyles and expectations change and the production-consumption relationships well understood by rural inhabitants are alien to their urban counterparts. They do not recognise the importance of Himalayan forests and grasslands in fulfilling their urban demands.

Payment for ecosystem services

Reliable flows of fresh water, productive soil, and carbon sequestration are important ecosystem services. Today, there is a growing trend to pay for ecosystem services: payment is either voluntary or mandated by policy and

is related to carbon, water, and even biodiversity. One example in the Himalayas is the 'Grain for Green' programme in China where the government paid large amounts of compensation to upland farmers to plant trees on agricultural land in upper watersheds for conservation purposes.

Agroforestry landscape

Planting trees along with agricultural crops is an excellent strategy for fulfilling increased food demands and the need for biomass resources. By doing so agricultural landscapes can provide critical ecosystem services such as water, biodiversity, and carbon sequestration. Two trends seem almost universal in the Himalayas: the number of trees in forests is declining, and the number of trees on farms is increasing.

By and large, the changes that always seem so distant from the Himalayan region and out of synchronisation with its traditional lifestyles and agricultural systems are having an impact on the landscape. Conversely, the changing landscapes of the Himalayas are having impacts not only downstream in the region, but also on a much wider area beyond. Our changing lifestyles are altering not only the patterns of land cover, but also the rich mosaic of biodiversity in the Hindu Kush-Himalayas.