

# Opportunities for Income through Biodiversity Conservation

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Endowed with a rich variety of gene pools, species, and ecosystems of global importance, the Himalayan region is among the world's ten 'mega-centres of biodiversity' and forms one of 34 global 'biodiversity hotspots'. But the region's high population is impinging on the natural resources base, leading to its degradation.

The Himalayan region presents a paradox. While it is one of the richest regions in the world in terms of biodiversity resources, it is also home to some of the

world's poorest peoples. The livelihoods of these people depend heavily on the natural resources, and changes affecting natural resources can affect them severely, and contribute to the widening of income inequities between the wealthy and the poor. These changes include ambiguous tenure and property rights regimes, including loss of access to and control over common property resources; demo-

graphic changes including both refugee migration across borders and internally displaced persons; and the illegal trade in biodiversity products.

Integrated use of biodiversity by mountain households provides food, water, fibre, medicines, energy, housing, and cash-generating products upon which the survival of mountain peoples depend. The values of biodiversity can be both 'use' and 'non-use'. In the past, conservation focused mainly on non-use and existence values. However in recent years, biodiversity has more often been seen as a source of sustainable income that has the potential to reduce poverty. Besides the current values of utility, function, and recreation, future values of biodiversity such as ecological services are now considered equally important. Biodiversity provides ecological services in many forms: soil, water, and nutrient conservation in watershed protection; abatement and filtration of water and air pollutants; flood control; positive impacts on climate change; carbon sequestration; and so on. Therefore, in linking biodiversity conservation with income generation both direct use values (products for income generation) and indirect use values (services from conservation) need to be considered.

Biodiversity conservation is of more interest to people when it has a utility value and communities are able to benefit from it. This utility value could be subsistence, for example, forest products form the food security strategy for many indigenous peoples in the region; or income generation opportunities for poor rural households. Several examples of income generation using biodiversity products by communities which have worked as an incentive for conservation, are evident in



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Collecting the high value caterpillar plant yarcha gunbu (*Cordyceps sinensis*), in Yunnan, China

the region. However, these examples resemble 'islands' of success and have yet to be scaled up. In the following sections, we give examples of areas where we have found linking conservation with income generation to be successful. They are: (1) nature valuation for accrued benefits, (2) ecotourism and biodiversity conservation, (3) niche products from shifting cultivation, and (4) forest-based non-timber products.

### Nature valuation for accrued benefits

Environmental services provided by nature are recognised and appreciated globally. In general there is a growing concern for establishing mechanisms of payment to local communities or governments in appreciation of environmental services. There is a need to develop valuation methodologies, especially for natural systems, that would bring increasing benefits to service providers. Payment of environmental services is expected to enhance conservation of natural systems, which is the dream of many communities and governments in the Himalayan region. Although assigning monetary or numeric value to natural ecosystems is difficult, such valuation draws attention to their importance and helps prioritise conservation needs. A modest effort to assign values to natural systems in the Kangchenjunga National Park and the Khecheopalri Sacred Lake in Sikkim of India has shown both the national park and the lake to provide high recreational and sacredness values. This can be attributed to the conservation of the sites for both biodiversity and pilgrimage. The application of contingent valuation method was found promising in the case of national park valuation; this method did not however count the non-monetary contributions, which were the contributions of the communities. Contingent valuation is seen as a useful tool for decision-makers in developing countries making decisions on investment and policy that consider biodiversity hotspots and protected areas. More valuation studies and payment arrangements need to be worked out for the benefits to accrue to the local communities in the region.



### Ecotourism and biodiversity conservation

Ecotourism places importance on the natural resources themselves, attaching to them aesthetic and conserva-



Mountain medicinal roots and crops

tion values rather than recognising only their consumptive worth. The growth of ecotourism has occurred simultaneously with an increased recognition of the need to implement biodiversity conservation. Some successful examples of ecotourism-related enterprises linked to nature and biodiversity conservation in the Himalayas include: (1) expansion of the Chitwan National Park through community forestry and ecotourism development in Nepal, (2) biodiversity and ecotourism initiatives in Sikkim, India, (3) conservation of the snow leopard through community-based tourism in Ladakh, India, and (4) mountain tourism for local community development in the Annapurna region of Nepal. In all of these initiatives, activities built upon the skills, interests, and knowledge of communities, the private sector, and government are working towards: (a) increasing community and private sector involvement in conservation, (b) increasing economic returns from ecotourism services and enterprises, and (c) contributing to policies that combine ecotourism with conservation goals.

### Niche products from shifting cultivation

A wide variety of practices fall under the rubric of shifting cultivation. Most are marked by a short 'cultivation phase' of one to two years, followed by a relatively longer 'forestry phase' usually referred to as the 'fallow'. Shifting cultivation is an agricultural system mired in misunderstanding. It has been generally subjected to policies that are based on questionable perceptions of the ecological and livelihood realities of both the practice and the farmers involved. ICIMOD's case study results have shown, however, that biodiversity conservation is favoured in the forest and farm management practiced in shifting cultivation. The range of products and species that shifting cultivators depend on for their livelihoods is much higher than for other farmers. This interest is not limited to the species alone, but to a wide array of landscape elements from which these products are obtained. Agrobiodiversity is a vital subset of biodiversity, both for conservation and food security of indigenous peoples. Shifting cultivators maintain high levels of agrobiodiversity in their various farming practices. The farmers have complex practices of intercropping and sequential cropping on their jhum fields and

home gardens. Their seed conservation practices contribute to the *in situ* conservation of both agrobiodiversity and gene pools. In terms of genetic diversity, land races rather than hybrids, as well as wild and endemic varieties of important food crops are potential niche products from shifting cultivation areas. An excellent example of a niche product catching the attention of the market is 'kholari' bean from the shifting cultivation area of Nagaland in India. Genetic diversity is maintained among communities through intricate seed exchange and conservation measures. Shifting cultivation provides a good example of on-site agrobiodiversity conservation by communities, which also has the potential to enhance livelihoods in mountain areas.

### **Forest-based non-timber products**

This overview would not be complete without mentioning forest-based non-timber products, which have shown great potential for enterprise development. A key research issue is that often the forward linkages dealing with the business model have not been considered in the past. Problems with backward linkages such as unsustainable harvesting and lack of management of these resources in both government and community-managed forests and pastures are common. Only a few species are being cultivated on a small scale in private areas. Successful examples of biodiversity enterprise developed by communities

while conserving the resources are oak-silk in Garhwal, India; jatamansi (*Nardostachys jatamansi*) in Humla, Nepal; the high value caterpillar plant 'yarcha gunbu' (*Cordyceps sinensis*) and Matsutake mushroom (*Tricholoma matsutake*) in Bhutan; and traditional local paper made from lokta (*Daphne spp*) and rope from argeli (*Edgeworthia gardeneri*) in Nepal and India. Sustainable harvesting of oak leaf for silk enhanced the regeneration of oak forests in Garhwal. In the case of Nepal, an enterprise growing jatamansi in Humla organised through user groups enhanced the restoration and conservation of forests and increased incomes in the area that, in turn, generated an interest in conservation. Policy intervention for pilot testing by opening up collection of Cordyceps in some areas of Bhutan provided economic benefits legally to the local communities, generating interest amongst them for sustainable harvesting and conservation of its habitat. There are sporadic examples of cultivation of medicinal plants by individuals and communities in their private and community lands. *Swertia chirata* in Eastern Nepal is one example where communities have developed indigenous technologies for regeneration and harvesting. These examples clearly show the success of enterprise development supported by established market linkages, local institutional mechanisms, and public policy.