

Biodiversity: Conservation Challenges in Nepal

Biodiversität: Herausforderungen des Naturschutzes in Nepal

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Die Einrichtung eines beeindruckenden Netzes von Schutzzone garantiert die nachhaltige Bewahrung der Biodiversität in Nepal. 1973 wurde der erste Nationalpark (Royal Chitwan National Park) gegründet. Mittlerweile beträgt die Schutzzone über 18 % der Gesamtfläche des Landes. Es wird ein holistischer Ansatz im Management praktiziert, um die Nachhaltigkeit der geschützten Zonen unter Einbezug und Teilnahme der lokalen Bevölkerung zu gewährleisten. In Puffer-Zonen werden 30-50 % der Park-Einkommen bzw. Rückflüsse für Entwicklungsprogramme aufgewendet. Das Schutzzone-System bewahrt nicht nur die biologische und kulturelle Diversität, sondern wurde auch als Hauptreiseziel für den Natur-Tourismus ausgebaut. Über 40 % der Touristen besuchen die Naturschutzgebiete und stellen somit das Haupteinkommen dieser Gebiete sicher.

Nepal's Protected Area System begun in 1973 with the establishment of the Country's first national park 'Royal Chitwan National Park'. Since then, sixteen protected areas of different categories have been created covering all the representative examples of ecological system found in Nepal. The protected areas coverage is over 18.2 % of the total area of the country. During three decades time, the emphasis of protected area management has shifted from a traditional to a participatory one. Similarly, a holistic approach in the management has been adopted for long term sustainability of the protected areas with the involvement of local people in conservation.



Indian rhinoceros (Rhinoceros unicornus) in subtropical Royal Chitwan National Park declared in 1973 in central Nepal — Panzernashorn im 1973 gegründeten, subtropischen Royal Chitwan National Park in der Terai-Ebene, Zentral-Nepal¹

¹ Photo: Kees Bakker, <<http://members.lycos.nl/KeesBakker/indrhino.htm>>

With the advent of the National Parks and Wildlife Conservation Act 1973, legal base has been provided to wildlife conservation in Nepal. The fourth amendment of National Parks and Wildlife Conservation Act has provision of buffer zone and sharing of 30-50 % of park- or reserve revenue for community development programs in buffer zone areas. The buffer zone for six national parks has been declared and for others are in process to declare in near future. Buffer zone is a people centered program where the balance between the people's need and sustainable conservation of biodiversity is sought.

The protected area system not only conserves the biological and cultural diversity but also has been developed as a major destination of nature tourism. The number of visitors to the park has increased tremendously and become a main source of income of the protected areas. The community based tourism has been promoted in mountain national parks and in buffer zones in Terai.

His Majesty's Government of Nepal believes in participatory management of protected areas for its sustainability and winning the support of all stakeholders in conservation of Nepal's biodiversity.

Introduction

Nepal, a small Himalayan kingdom (area: 147,181 km², 26°20'N – 30°27'N and 80°4'E – 88°12'3) with its diverse topography (elevation: 75 – 8,848 m) and climatic zones (subtropical – arctic), harbors biological riches of both the Palearctic and Indo-Malayan biogeographic realms, including endemic Himalayan floral and faunal elements. The country has about 51 percent of land surface under some sort of vegetation cover (forested area 29 percent; shrub lands and degraded forest 10 percent; and grasslands, 12 %). Seventy-five vegetation types have been identified. Estimates on the number of plant and animal species vary, but there are over 6,500 species of flowering plants; over 1,500 fungi species; and over 465 species of lichen. About 370 species of flowering plants are considered endemic to Nepal and about 700 species are known to possess medicinal properties. Faunal diversity in these habitats is equally impressive, as they contain about 181 mammal species, 858 bird species, 130 reptile species, 50 amphibians, 185 species of fresh water fish, 656 species of butterflies, and approximately over 5,000 species of insects. Of these, 26 mammals, nine birds, and three reptiles are either endangered, vulnerable, or threatened.

Importance of Biodiversity

People in the mountains and other rural areas are quite dependent on the natural resources to meet their daily needs. The productive and consumptive values of several flora and fauna are very high. In addition, wild biological resources contribute to the production of domesticated resources, serving as the source population for regular supply. Wild genetic resources are used to improve established domesticates e.g., in high mountain areas semi wild yak are regularly used to breed with domestic cows for the hybrid chaunri, which is a good milk producer. Rangeland and wild forage species are the main sources of livestock production, an important economic activity for mountain farmers. Several species of clear-water fish,

mushrooms, medicinal herbs, fruits, vegetables, and plant products are marketed or consumed, Plants, such as bamboo, from the forest are used extensively as building materials and for handicrafts, carrying cases, musical instruments, and so on. Orchid stems are used to make unique and beautiful ornaments.

Among the 700 species of naturally growing medicinal plants in Nepal, about one hundred species are exploited for commercial purposes. However, due to the lack necessary in-country processing facilities, over 90 % of the herbs are transported across the border to India. The trade in crude medicinal herbs has been an important source of livelihood and cash income to the rural people for generations. The cash income from medicinal herbs is estimated at about 10 million US\$ a year. Some of the species collected for medicinal purposes are *Swertia chiraita*, *Aconitum* sp., *Nardostachys jatamansi*, *Ranwolfia serpentina*, *Picrorhiza scrophulariiflora*, *Saussurea lappa*, *Mucuna nigricans*, *Acacia catechu*, *Oroxylon indicum*, *Withania somnifera*, *Terminalia bellerica*, *T. chebula*, *Atropa belladonna*, *Pterocarpus marsupium* etc.

The non-consumptive importance of biodiversity in mountain areas, although indirect, is the hydrological benefits to watershed areas, maintenance of the ecosystem, and income generation through tourism. Increase in tourism based on biological resources has resulted improvements in the rural economy.

Factors causing Loss of Biodiversity

Loss and fragmentation of suitable natural habitats is the main threat to biodiversity conservation in Nepal. It is occurring at all levels including terrestrial and aquatic habitats. Species that survive such threats are likely to lose genetic variations as the number of individuals in a population is reduced and populations are increasingly isolated from one another. There is a potential for recovery of communities as long as all of the original species survive. While the creation of protected areas assures protection of certain species, such protected areas, however, are usually surrounded by damaged habitats, making them habitat islands.

Habitat outside protected areas is under continuous pressure from human activities, and they are being degraded and converted in to agriculture lands. The success of malaria eradication program in the Terai in the late 1950s resulted in mass migration of people from the hills to the plains in search of productive agricultural land. This brought about a devastating effect on the biological diversity of the Terai and many of the unique ecosystems, along with the species residing with them, were lost. There is no record of how many species were lost and what quantities during this span of time.

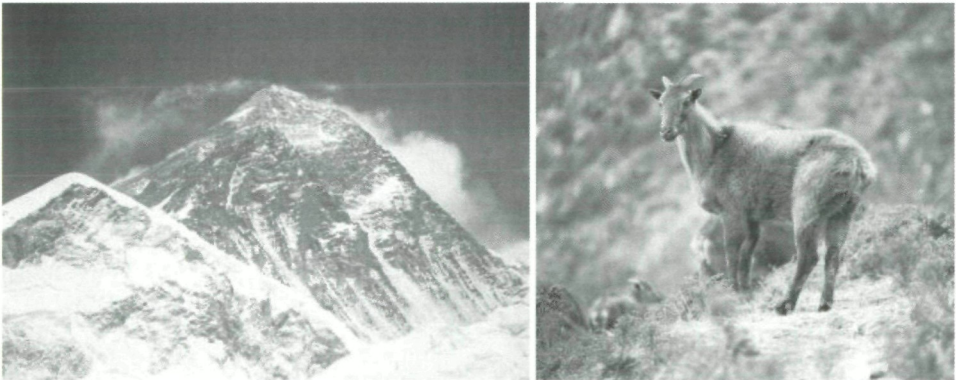
Various development activities, such as roads and canals passing through park and reserves, have also created an edge. The portion of the east west highway passing through the Bardia National Park has resulted in many accidents and added to the edge in the interior of the park. Habitat fragmentation has restricted the migration and mobility of many species and has increased the incidence of wildlife damage to human life and property. Such people-wildlife conflicts have frequently given a negative impression of wildlife conservation. For example there are frequent cases of elephant damage in east Nepal during their migration from India to Nepal. The damage incidents are reported from the migratory route which has been converted into agricultural fields and new human settlements.

Poaching is another threat to biodiversity conservation in Nepal. Poaching of rare species such as the tiger, rhino, bear (*Selenarctos thibatenus*), musk deer, snow leopard, gharial, and others, is because of the value of their bones, skin, and other derivatives. Control of poaching outside protected areas is difficult. Similarly, some medicinal plants and orchids are threatened by over harvesting.

Conservation of Biodiversity

It has been estimated that if Nepal were to lose its remaining humid tropical forests, 10 species of highly valuable timber, six species of fiber, six species of edible fruit trees, four species of traditional medicinal herbs, and some 50 species of little known trees and shrubs would be lost for ever. In addition, several wildlife habitats of 200 species of birds, 40 species of mammals, and 20 species reptiles and amphibians would be severely affected.

In response to this, a plan was introduced in the early 1970s to conserve biodiversity by establishing protected areas in ecologically important areas. Such a strategy has provided effective protection and long-term conservation of threatened species *in situ*. Over the last two decades, an extensive network of national parks and protected areas has been developed, covering more than 26,983 sq.km, equivalent to almost 18.33 percent of Nepal's total land area. The protected area network includes nine national parks, three wildlife reserves, three conservation areas and one hunting reserve and six buffer zone areas.



In Sagarmatha National Park up to the peak of Mt. Everest the population of the Himalayan tahr (Hemitragus jemlahicus) increased — Im Sagarmatha National Park, der den Gipfel des Mt. Everest einschließt, wächst die Population Himalayischer Tahre.²

The Royal Chitwan National Park and Sagarmatha National park have been included in the United Nations World Heritage List, because of their outstanding natural value, and Koshi Tappu Wildlife Reserve has been included in the Ramsar Convention List, acknowledging its international importance under the Convention on Wetlands of International importance, especially for migratory waterfowl.

² Photos: Ted & Laura Lee, <<http://www.smv.org/images/NepalPix/AllPix.html>>

The protected area system not only protected the biological diversity but also conserve the cultural and religious heritage inside protected areas. Some of the important religious sites are Tengboche Gomba in Sagarmatha, Shey Gomba in Dolpo, Triveni in Khaptad and Balmiki Ashram in Chitwan.

Some Conservation Success in Nepal

After the establishment of the protected area network, population of many protected mammals in the existing reserves have greatly increased. Among these populations are tigers and rhinoceros, in Chitwan; black buck (*Antelope cervicapra*), in Khairaphanta, Bardia; Ungulates in general in Chitwan, Bardia and Suklaphanta; Wild Water Buffalo (*Bubalus bubalis*) in Koshi Tappu Wildlife Reserve; and tahr (*Hemitragus jemlahicus*) and musk deer (*Moschus chrysogaster*) in Sagarmatha and Langtang. The re-introduction of the rhinoceros in Bardia appears to be quite effective. The situation of many birds is less certain, but there is evidence that gharial released into the rivers around Chitwan are staying and beginning to breed.

Legislative Framework, National Strategy and Action Plans

Nepal has several government decrees on wildlife conservation. The wildlife conservation Act of 2015 B.S. (1958) was the first to identify the need for special protection of biodiversity in the country. As a result, a rhino sanctuary was established and is now a part of the Royal Chitwan National Park. The National Park and Wildlife Conservation Act 2029 B.S. (1973) is considered to be a leading legal document for biodiversity conservation and provided a regulatory mechanism for conservation of protected areas and wild species which has developed into four amendments. This act also empowers His Majesty's Government to propose and establish six different kinds of protected areas: national park, wildlife reserve, strict nature reserves, hunting reserve, conservation areas, and buffer zones. The Buffer Zone Act, the fourth amendment, is an area in which people's participation is pivotal to the protection of biodiversity in a given protected area.

Several Acts on conservation such as aquatic Animals Protection Act 2017 (1961) and its amendment in 2002, The King Mahendra Trust of Nature Conservation Act 2039 (1982), Forest Act 2049 (1992) and its amendment in 2002 and Soil Conservation Act 2039 (1982) are in force.

The National Park and Wildlife Conservation Act 1973 has been amended several times as deemed to address the changing situation and problem faced by the management and meet the challenges more effectively and sustainable. The regulations have been drafted to suit the local situations. The Himalayan National parks Regulation respects the traditional practices of local people on use of resources but prohibits the use of firewood by visitors to lessen the growing pressure of high altitude forest where growth is very slow.

Similarly, the Act has introduced new Regulations: Buffer Zone Management Regulation 2052 (1996) and Conservation Area Regulation 2053 (1977) with the provision of community forest, religious forest, private forest and institutionalization of community based organizations. Annapurna and Manasalu Conservation Areas are managed through national NGO 'King Mahendra Trust for Nature Con-

ervation' and Kachenjunga Conservation by the Department of National parks and Wildlife Conservation with the assistance of World Wildlife Fund Nepal Program and local people as a key stakeholder. The enactment of the 'Buffer Zone Management Guideline' extenuates the integration of conservation with community development activities in buffer zone.

Management Priorities and Practices

In the beginning, management focuses primarily were on protection of endangered species and their habitat, research on endangered species development of basic infrastructure of protected areas and organization of conservation awareness program. Various provisions have been made by law to accommodate the local needs since religious beliefs and practices have deeper impact upon their lifestyle and environment. Some of the cultural practices for example, Buddhism have been instrumental in protecting wildlife and local knowledge in enhancing the scientific management of the resources. The Himalayan National Park Regulation allows local people to collect fuel wood, fodder litter for their domestic use and encourage for rotational grazing of livestock in highland pastures. In Terai, indigenous residents like Majhi, and Musar, who are traditionally dependent on fish are granted permission to collect for their subsistence living.

Unlike in mountains, local residents living around the parks and reserves in Terai are admitted to harvest grass from the protected areas for about 10 days every year to meet their household requirement of thatch grass and reeds. Over one hundred thousand people are benefited from grass collection every year. This practice has been very successful to show the benefits of conserving resources and winning the goodwill of people in biodiversity conservation. Different conservation awareness programs are organized at local and national level for generating environmental awareness. Coordination and interaction meetings with local community are held from time to time to discuss the matter of mutual interest concerning protected areas.

The number of park visitors has increased tremendously and protected areas have been developed as one of the popular tourist destinations for wildlife viewing, trekking and sight seeing. More than 40 % of the total arrivals of tourists in Nepal visit protected areas for recreational purposes. Similarly, the number of domestic visitors is growing annually. The tourism has become not only a major source of income of protected areas but also has contributed substantially to uplift the socio-economic condition of local community through employment generation and providing business.

The management emphasizes have gradually been moved toward people participatory management for long term sustainability of protected areas and alleviating resource use pressure on core area. It is intended to meet the needs of local people from buffer zone itself through development of community forestry and reducing dependency on forest resources through providing various income generation activities, skill development training and developing alternatives to reduce the fuel and fodder needed for local communities. The community based tourism that is eco-friendly has been promoted for managing increasing number of visitors to the protected areas.

Community in Protected Area Management

In last 30 years biodiversity conservation in Nepal, the emphasis of protected area management has moved from a traditional wildlife management to a participatory one. Similarly, a holistic approach in the management has been adopted for long term sustainability of the protected areas with the involvement of local people in conservation. The fourth amendment of the National Parks and Wildlife Conservation Act 1973 has been landmark in conservation history of Nepal. The amendment act has provision of buffer zone and sharing of 30-50 % of park or reserve revenue for community development programs in buffer zone. The buffer zone is a people centered program where the balance between the people's need and sustainable conservation of biodiversity is sought.



Rhododendron arboreum, the national flower of Nepal, one out of 6,500 species of Nepal's flora — *Rhododendron arboreum*, Baum-Rhododendron, Nationalpflanze Nepals, eine von 6.500 Pflanzenarten Nepals.³

Prior to this arrangement, several efforts have been made to embrace people participation in protected area management through forming wildlife conservation committees and organizing several coordination meetings with the local communities. Such meetings have been conducive to management and to make changes in overall policy. The protected areas are also providing supports for social and community development activities. Annapurna Conservation Area, Manasalu Con-

³ Photo: K. McInturff, <<http://www.uib.no/people/nboov/>>

servation Area (managed by King Mahendra Trust for Nature Conservation), Makalu Barun National Park and Buffer Zone Area (managed by His Majesty's Government of Nepal), and Kanchenjunga Conservation Area (managed by His Majesty's Government with assistance from World Wildlife Fund Nepal Program) are the excellent examples of participatory management of protected areas in Nepal. The conservation and community development programs are identified by the people themselves and are implemented with their full participation and ownership. Such program has developed mutual understanding and trust between protected area and people. The local people have been involved in combating poaching and sometime their support has led to the apprehension of poachers and confiscation of poached animals. The symbiotic relationship between protected areas and local people and its importance has been realized by both the stakeholders.

Prospects and Challenges

The development of buffer zone in the vicinity of parks and reserves and sharing of its revenue have certainly broadened up the scope of protected area management. Involving local community in resource management is a challenging job that demands painstaking efforts and time in mobilizing community. It's being a new concept, it is difficult to implement where literacy rate is low and people are poor and have high expectations. It has been strenuous work to organize community and get work done with limited number of staff and present level of local community's capacity. There is a need to provide capacity enhancement training to the communities for efficient delivery, sustainability of the programs.

Furthermore, high dependency and ever rising demands and scare forest resources outside protected areas due to unprecedented growth in human as well as livestock populations have created resource use conflicts. The protected areas continue to face growing demands of firewood, fodder and livestock grazing. Illegal and unsustainable harvest of non-timber forest products especially at higher altitude has become a threat to conservation of biodiversity. Other sources of conflicts are the livestock depredation and crop damage that is a serious threat to subsistence farmers. Often, loss of human life and loss of endangered species become a management dilemma.

Although, it is intended to have buffer zone for all parks and reserves, there is a serve constraint of additional regular staff. The number of staff has not been added up proportionately to the area extended to implement the program effectively. Likewise, annual income varies from one to another protected area and many of them lack sufficient income to support the implementation of buffer zone programs. There is a need to search for alternative source of support for these protected areas where funds are inadequate.

The protected areas are becoming one of the chief sources of attraction for both national and international visitors. The number of visitors to the several protected areas have increased tremendously and become a main source of income exceeding over 80 % of the protected areas' revenue. The visitor number is still growing and over 40 % of the total tourists coming to Nepal visit protected areas. The tourist facilities and services have not yet developed to its standard for meeting the needs of the growing number of tourists. The increasing volume in tourism business has

exerted more pressure on the forest and created new problems of garbage disposal. The government has recently banned the importation of beer bottles in Sagarmatha National Park as a part of mitigation measures. There is a need to regulate tourism and control haphazard development of tourist amenities in protected areas. The community-based tourism has been promoted in mountain national parks and in buffer zones of park and reserves in Terai.

Conclusion

The protected area system not only conserves the biological and cultural diversity but also has been developed as a major destination for nature tourism. Since the success of biodiversity conservation relies on enduring support of local people and meeting their legitimate and growing needs of resources on sustainable way, area adjacent to the protected areas should be designated buffer zones so as to manage the resources in sustained manner. A participatory effort and mutual understanding of all concerns, from local to global level, is required for managing these areas more effectively. Further, management skills need to be enhanced through proper training to both communities and park staff. Conservation education programs, alternative energy particularly in mountain parks and institutionalizing community based organizations will remain key to the success of biodiversity conservation in Nepal. The community development programs that have direct linkage to conservation and reduce the dependency on forest resources should be encouraged.



*Local people will support biodiversity conservation, when they gain an income — Die lokale Bevölkerung unterstützt die Erhaltung der Biodiversität, wenn sich damit etwas verdienen lässt.*⁴

Besides consolidation of resources and updating the existing management plans will be required to address the current problems and challenges faced by protected area management. His Majesty's Government of Nepal believes in participatory

⁴ Photo: Scott Yost, <<http://www.vic.com/nepal/images/elephants.html>>

management of protected areas for its sustainability and winning the support of all stakeholders in conservation of Nepal's unique biodiversity. The interdependency between protected areas, local people and tourism should be understood and maintained the critical balance between resource conservation and its utilization for the longevity of our life support system.

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