

# Livestock Grazing in India's National Parks

Kailash Sankhala

**ABSTRACT.** A major management problem in India's national parks is livestock grazing. In the early years, grazing was tacitly permitted, but as it became clear that livestock were having a detrimental impact on the natural habitats, the national park authorities began to take steps to exclude domestic animals from at least some of the country's protected areas. Project Tiger was an essential step, providing both a focus and support from the highest level. Case studies from Kanha and Bandhavgarh National Parks are provided.

## CHAPTER III

### PEOPLE AND PROTECTED AREAS: CASE STUDIES

#### I. INTRODUCTION

The initial problem of livestock grazing in India's national parks was established in 1872 when the first national park was established. At that time local wishes were overruled by the interests of the nation. The story of the conflict in India is different. It did not begin with the declaration of national parks and associated park management had accepted cattle grazing, forestry operations and gathering of minor forest products as permissible operations and that there was no cause for conflict. But in 1971, it was discovered that the parks and sanctuaries were deteriorating and many species were becoming rare. To set right the mistakes of this style of management a comprehensive new law was proposed. It was also decided to re-examine park management on the concept of total environmental conservation. With the passing of the new Act in 1972 and the launching of Project Tiger, conflicts started surfacing because the people were not accustomed to restrictions on their use of the parks, concluding that they had an inalienable right to graze their cattle in the parks.

#### 2. INDIA'S NATIONAL PARKS

The history of the national park movement in India began in 1935, when the first national park was established in the foothills of the Himalayas and named Valley National Park (now Corbett National Park). Proposals for forming a national park were simple. Neither a public hearing nor any debate was necessary. One simple order of the Governor of the United Provinces, in 1935, was sufficient.

The Forest Department considered an original forest as part of regular commercial operations, and showed up

concern for the protection of several forests inside the park. Excessive cattle grazing and the reduction of fodder trees on an extensive scale was part of the grazing licence. Construction of a large irrigation-cum-power dam, which further reduced the habitat diversity of the park, was approved unopposed. About 1971, one of the park's 323 sq km less than 2 sq km was established as a museum sanctuary where tree felling was also allowed.

By 1970, the situation of Kanha, Bandhavgarh and other national parks of India was similar. The law had been made only in paper. Even their declaration as national parks was not enough. Their status was not being maintained, which was a major concern. The provision was double-edged — it could also be redesigned by a simple administrative order. Except for commercial hunting, no options being made in exceptional circumstances for exceptional purposes, there were no restrictions placed on other land uses, forest operations or the department's commercial operations. The glances with "National Park" or "Game Sanctuary" in the late fifties, however, started attracting the attention of a new industry — tourism — with the significant ecological impact of Indian inside the parks.

It is difficult to comprehend the great expenditure of foreign conservationists, ecologists and wildlife supporters on the law. The proposal it was that the licensees in these parks had the right to hunt and grazing of cattle as essential prerequisites for management of a national park. This was primarily to avoid confrontation with the people and the politicians. Nearly forty years after the establishment of the first national park, the national park movement, if there was any, was a hopeless cause.

#### 3. THE WILDLIFE PROTECTION ACT, 1972

By 1971, it was apparent that wildlife was being depleted and animal populations were regressing a long distance. Some species, such as the tiger, were vanishing. Disturbed by the situation, Prime Minister Indira Gandhi called a special meeting. We had a long and frank

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**ABSTRACT.** *A major management problem in India's national parks is livestock grazing. In the early years, grazing was tacitly permitted, but as it became clear that livestock were having a detrimental impact on the natural habitats, the national park authorities began to take steps to exclude domestic animals from at least some of the country's protected areas. Project Tiger was an essential step, providing both a focus and support from the highest level. Case studies from Ranthambhore and Desert National Park are provided.*

## 1. INTRODUCTION

The initial problems between people and parks date back to 1872 when the first national park, Yellowstone, was established. At that time local wishes were over-ruled by the interests of the nation. The story of the conflict in India is different. It did not begin with the declaration of national parks and sanctuaries; park management had accepted cattle grazing, forestry operations and collection of minor forest produce as permissible operations and thus there was no cause for conflict. But in 1971, it was discovered that the parks and sanctuaries were deteriorating and many species were becoming rare. To set right the mistake of this style of management a comprehensive new law was proposed. It was also decided to base national park management on the concept of total environmental conservation. With the passing of the new Act in 1972, and the launching of Project Tiger, conflicts started surfacing because the people were not accustomed to restrictions on their use of the parks, considering that they had an inviolate right to graze their cattle in the parks.

## 2. INDIA'S NATIONAL PARKS

The history of the national park movement in India began in 1935, when, the first national park was established in the foothills of the Himalaya and named Hailey National Park (now Corbett National Park). Procedures for forming a national park were simple. Neither a public hearing nor any debate was necessary. One simple order of the Governor of the United Provinces, in 1935, was sufficient.

The Forest Department continued to exploit forests as part of regular commercial operations, and showed no

concern for the presence of several livestock inside the park. Excessive cattle grazing and the reckless lopping of fodder trees on an extensive scale was part of the grazing licence. Construction of a large irrigation-cum-power dam, which further reduced the habitat diversity of the park, was approved unopposed. Until 1971, out of the park's 323 sq km less than 3 sq km were earmarked as *sanctum sanctorum* where tree felling was not allowed.

The story of Tarora, Shivpuri, Kanha and Bandhagarh — the other premier parks of India — is similar. The first two were parks only on paper. Since their declaration as national parks was not of any significance, their status was ignored. Conditions in wildlife sanctuaries, which were 130 in number by 1970, was much worse. Though it was easy to designate any area as a sanctuary by a simple administrative order, the provision was double-edged — it could also be redesignated by a simple administrative order. Except for commercial hunting (exceptions being made in exceptional circumstances for exceptional people) there were no restrictions placed on either local residents, forest contractors or the department's commercial operations. The glamorous title "National Park" or "Game Sanctuary" in the late fifties, however, started attracting the attention of a new industry — tourism — with the additional disturbing impact of lodges inside the parks.

It is difficult to comprehend this gross misunderstanding of foresters, conservationists, ecologists and wildlife experts of the era. The pity of it was that the foresters at times justified both felling of trees and grazing of cattle as essential prescriptions for management of a national park. This was primarily to avoid confrontation with the people and the politicians. Nearly forty years after the establishment of the first national park, the national park movement, if there was any, was a hopeless compromise.

## 3. THE WILDLIFE PROTECTION ACT, 1972

By 1971, it was apparent that wildlife areas were dwindling and animal populations were registering a sharp decline. Some species, such as the tiger, were vanishing. Distressed by the situation, Prime Minister Srimati Indira Gandhi called a specialist meeting. We had a free and frank

stock-taking of the condition of wildlife in the country. The Inspector-General of Forests gave the official version that all was as it should be according to the Forest Law. The Prime Minister, however, accepted our suggestion that formulating new legislation to protect the country's vanishing wildlife and the wild lands was needed. It was a coincidence that exactly one hundred years after the declaration of the formation of Yellowstone National Park, the Indian Parliament passed the Wildlife Protection Act in 1972. The national parks and sanctuaries which had been established under various state laws were regularised as national parks and sanctuaries under this act.

By now the human population had exploded. Vested interests and profits regarding the natural resources — forests, mining and grazing lands — had increased. Development activities for transforming India into a prosperous industrial country which was agriculturally self-sufficient were also in motion. Unfortunately these very activities, in some cases, were the cause of deforestation. The people too had become more conscious of their rights and privileges. It was too late to start a dialogue. Preventing the felling of forests and removal of dead wood, and eliminating cattle camps and grazing from the national parks meant direct and violent confrontation with the people. The choice was either to have or not have national parks.

#### 4. PROJECT TIGER

At this stage, the author was asked to prepare a plan for the preservation of the Indian tiger. There was now an opportunity to begin afresh. Fortunately, Srimati Gandhi's support was complete and her directions were clear that commercial forestry and cattle grazing must be stopped in our national parks and sanctuaries, especially in the tiger reserves.

Once more a beginning was made at Corbett National Park when, in April 1973, it was redesignated as a Tiger Reserve. Since no compromises were to be made in executing Project Tiger, confrontation with vested interests was inevitable. Setting right the management mistakes committed for nearly half a century was a challenge. By now, public opinion, international support and the nation's will were all in favour of establishing the nature reserves free from human disturbances. Corbett Park was "freed" from all forest fellings, cattle grazing and other forms of exploitation. Kanha (Madhya Pradesh) was slightly ahead of others in stopping grazing, but hunting of wild dogs and jackals and the baiting of tigers for tiger shows continued there. Others that followed this lead were Bandhipur (Karnataka), Manas (Assam), Sundarbans (West Bengal), Ranthambhore (Rajasthan), Melghat (Maharashtra) and Palamau (Bihar). The last two proved to be difficult and the only area to be freed from felling of forests and cattle grazing encompassed about 200 sq km — totally inadequate for any meaningful conservation project. Simlipal (Orissa) proved to be a hopeless unit. Nothing

much could be achieved there since it was dotted with tribal settlements which depended upon agriculture and cattle grazing. The influential forest corporation proved to have too strong a lobby. The Field Director himself got involved in an unplanned research affair with a "glamorous" Elsa-like tigress, and had no time for the Project.

Inspired by what was being done in the Tiger Reserves, other national parks and sanctuaries also made attempts to free themselves from exploitation. Some success was achieved, notwithstanding tough opposition and confrontation. Examples of these conflicts are given here to illustrate and highlight the problems in retrospect and to understand them in perspective for future programmes.

#### 5. ELIMINATION OF GRAZING IN RANTHAMBHORE NATIONAL PARK

Ranthambhore Tiger Reserve extends over 400 sq km of dry, deciduous, hilly terrain. It has high grazing potential and has always attracted cattle. Over 12 villages with more than 20,000 cattle were inside the park and grazing took place without any limitation. It was a grazing ground for over 40,000 livestock from the adjoining plains especially during the monsoon. In addition, during the agricultural off-season about 30,000 bullocks belonging to relatives of the villagers were accommodated in the reserve, involving secret marriage agreements made by the villagers. This grazing was excessive by any standard. The populations of sambar, chital, and nilgai were suffering due to this competition and they were harassed by the graziers and their cattle.

There was no use explaining to villagers the philosophy of nature conservation. After days of meetings the headman would conclude by saying that the scheme was good but should be implemented away from his village, preferably in some other district. A decision was made in 1971 to stop the entry of outside cattle. It was a tough decision since militant graziers were soon up in arms. Their force had to be met with force. This resulted in many clashes. Despite this, success was achieved: outside cattle grazing was stopped.

The second action was that of relocating the 12 villages situated inside the reserve. Long meetings with the people were required to gain their confidence. Hospitals, schools, better houses, cattle yards, village wells and temples plus adequate compensation and agricultural land were promised. New roads to market their produce were assured. A breakthrough was possible by making the Sarpanch a member of the family of the Field Director, by means of a simple religious ceremony of tying a sacred thread. Anantpur village was shifted physically and wholesale to a new site. The people were settled and all that was promised was given to the individuals and to the village community. It is now a prosperous village with the new name Kailashpuri.

The fair deal and the sincerity of the Project staff along with the welfare activities started in the village

prompted other villagers to follow suit and they too moved out to a new site, Gopalpura. The core area of the reserve was thus totally vacated by people, a historic act in the conservation history of the world.

This action, however, did not end hostilities. The lush green grass of Ranthambhore National Park proved to be too tempting for villagers. They invariably grazed their cattle inside whenever there was an opportunity. Detections resulted in confrontations. These were not economically backward people. Any number of meetings to convince them did not work. They preferred their own style, irrespective of what it might mean to others and to the country.

“Operation Shift” was easier in the case of Kanha National Park, primarily because the inhabitants were tribal Baigas who are not graziers and do not own large herds of cattle. In addition, they lived in forest labour villages, and had no title to the land. It mattered little for them to leave, especially if they were given better land and fair compensation for their houses. They built their new houses with their own labour but were paid by the Project. Their fields were levelled at Government cost and building material was supplied free. The only regret they had was that of leaving a game-rich reserve. Baigas are brutal in killing animals and known for eating animals killed by tigers and wild dogs.

## 6. ESTABLISHING DESERT NATIONAL PARK

The experience of establishing Desert National Park was equally interesting. One would imagine that in a vast treeless and uninhabited area it should be easy to demarcate and gazette a national park. That is not so. The seemingly sterile land of the Indian Thar Desert is highly productive, rich in grasses, grass-eating animals, seed-eating birds and their predators – eagles, hawks and falcons. Chinkara is the dominant antelope, occurring all over the desert even where surface water is unknown for months. Lizards, sand fish, sand toads, and predators such as the mongoose and desert fox are common. The bird population is rich in variety. Common sandgrouse flock in hundreds and thousands on waterholes each morning. Travelling over 50 to 60 km., clouds of imperial sandgrouse arrive in winter. A few hundred lesser bustards flock in pairs. Eagles and falcons also arrive at the same time. It is the last stronghold of the Great Indian bustard, a rare bird seen in flocks like the peafowl. Such is the richness of life in Thar Desert.

Out of over 160,000 sq km it was difficult to locate and demarcate even less than 1 per cent of the area which was free from human activity. There are three types of people who have interest in the desert tract: cattle owners, small farmers and nomadic hunters. Large herds of sheep, goats, cows and camels are owned by people and they graze them there wherever water is available, after which they migrate. The paucity of water acts as a limiting factor and a control over excessive grazing. This has been in effect for

over a thousand years, and they have flourished in this way. The relics of the ruins of their forts, “havelies” and houses tell the tale of their prosperity. They did not consume more than their share and lived in tune with the ecosystem. Cutting of trees was unknown to them. On one occasion certain people, “Vishnois”, laid down their lives before allowing the Maharaja’s men to cut trees. Today, the community is rich.

The hunters are nomads. They have always hunted within the limits of their daily needs and moved from area to area to reduce their hunting pressure. All was well until development programmes came to the desert. Now the younger generation is being brought into the “mainstream” of fashion. Women now want lipstick and men wear Terylene bush-shirts. Both have to be imported from outside. This means exchange, so something has to be sold out of the ecosystem. The easiest thing to acquire is the fur of desert animals and thousands of animals were slaughtered for export markets. One dealer smuggled 75,000 skins of jungle cats, desert foxes, and jackals in one consignment.

To save the rich wildlife and beautiful landscape of the desert, Desert National Park was suggested. The work of establishing the park has been in process for the last five years but without much success. Even in the tract of land we call a desert, the interest of man is deep-rooted. These people are not prepared to spare even one per cent of the desert area from grazing, and the state government is hesitant to define a clear policy.

## 7. EXPERIENCE IN OTHER PARKS

The case of the bird sanctuary in Nal-Sarovar, Gujarat is also distressing. In a shallow lake of 100 sq km, the finest in the country, where over a hundred thousand flamingoes arrive, as well as migratory waterfowl, there are islands inhabited by cattle graziers. Their daily movements keep the entire sanctuary in a state of tension.

The confrontation of the Maldharis and the Asiatic lion is another well-known case. The Gir forests hold a small population of lions in a small area and they are always in danger of extinction. Construction of a stone wall to cordon off the Gir National Park has been a historic effort but the Maldhari, the local grazier community, continue to use poison bait when their buffalo are killed. Should this see-saw situation continue? For how long? To this author’s way of thinking, relocating the Maldharis is the only answer.

Another example of a small wetland is Bharatpur, known for its resident and migratory birds. Over 10,000 birds nest and over a quarter million birds migrate in different seasons, especially in winter. Even rare birds such as Siberian cranes arrive to winter there. The area is a bare 30 sq km in a vast agricultural system. Over-grazing by 4,000-5,000 buffaloes, most of them unproductive, was destroying vegetation, toppling and trampling floating

ground nests and churning mud ponds and killing fish, destroying one of the finest national parks in the country. An attempt was made to stop their entry by law enforcement; a clash resulted in bloodshed. The people were not poor — some were in Government service and keeping dairy cattle meant extra income to them. Therefore, if we think that projects to improve the economic conditions of the people living in the adjoining areas of the parks will help in reducing pressure on the park, we are mistaken. Moreover, if such work is entrusted to the authorities of the national parks and reserves, the main responsibility and management of the park might be neglected. A conservationist's job is the welfare of the land, the habitat, its flora and fauna and not the social welfare of the people. He should, at the most, actively work towards good public relations with the people and conduct nature education camps to instruct the future generation. Examples of such work are the nature camps of the Gujarat State.

## 8. GRAZING IN PARKS: OTHER CONSEQUENCES

It is thus observed that cattle grazing is the major problem that Indian wildlife and the national parks and sanctuaries face today. Out of the 53 national parks and 247 sanctuaries mentioned in the directory, published by the Ministry of Environment (1985), almost all suffer from the problems of forest fellings and cattle grazing. The felling of trees for commercial purposes is easy to stop once the State Government makes a decision, but the prevention of cattle grazing is difficult. This is more acute in the Himalaya and the arid lands, both in the hot desert of Gujarat and Rajasthan and in the cold desert of Ladakh, Jammu, and Kashmir. Grazing is the one single factor that has delayed the final notification of more than half of the national parks of India.

There are no national parks in the states of Andhra Pradesh, Bihar, Meghalaya, Mizoram and Nagaland. States such as Arunachal, Assam, Himachal, Jammu and Kashmir, Maharashtra, Orissa and West Bengal could also afford to place more areas under conservation management. Remarkable progress appears to have been made from 1980-1984 by increasing the number of national parks from 19 to 53. However, the question is how many have been finally notified and freed from grazing? According to information

received just two in Rajasthan, two in Madhya Pradesh, two in U.P., one each in Gujarat, Assam, Karnataka and Jammu and Kashmir are "real" national parks; the others are only in the process of becoming national parks. Unfortunately, in the sanctuaries, grazing and forestry operations have been accepted as a practice of management. With the increasing pressure of cattle and timber exploitation, the habitat of the sanctuaries will deteriorate and these conservation areas may remain only in name.

## 9. A NOTE ON TOURISM

The question then remains whether the 90,000 sq km of land can be freed from commercial exploitation and cattle grazing. If it can be done, should they remain inviolate? This is neither possible nor desirable. The first principle — "for the enjoyment of the people" — of the Yellowstone National Park should help and guide us. The strategy should be to invite a wider section of people to visit the parks — in modern terms, tourists. Since more and more people are showing concern for nature conservation, it is time to mobilise them. Tourism is only beginning in our sub-continent and therefore the advantage is that it can be regulated to become the least consumptive. Our parks are small compared to those of many other countries. Their capability to absorb human impact is much less. We need not follow the West to make our national parks into weekend campsites. The practice of limiting the number of vehicles and putting a ceiling on the number of visitors at a time will have to be fixed and rigidly controlled. The luxuries of five star accommodation and swift modes of travel need to be restricted. They encourage only the wealthy visitor who may not be especially interested in nature. If facilities are more modestly priced, this would attract also those who are keen nature lovers. This will help selective tourism to evolve.

This change in the use of the parks by encouraging a different type of people — travellers — is a lesser evil and will expedite the process of making the parks free from cattle grazing by producing a more extensive public opinion lobby. The national parks surely have a future in this sub-continent, but they need to be protected and preserved as forts and fortresses of our natural history.

# Protected Areas and Local Populations in Kirthar National Park, Pakistan

W. A. Kermani and Khan M. Khan

**ABSTRACT.** *Kirthar National Park, one of Pakistan's most important protected areas, is an excellent example of how species can rebound from extreme over-exploitation to reach levels which are once again productive. The Kirthar region has been occupied by people for thousands of years, but only with the introduction of firearms did the wildlife begin to decline. In order to reverse this decline, the co-operation of local officials was sought through appealing to their self-interest. Interest from the highest officials in the central government has resulted in a new development plan for the park.*

## 1. INTRODUCTION

The Kirthar National Park (308,733 ha.) is in south-west Pakistan, comprising the southeast extension of the Kirthar Mountain range west of the Indus river. There are 93 villages within the Park area with a human population of 10,500. The domestic stock population is 11,228 cattle, 27,988 sheep, 44,441 goats and 3,046 camels. Karachi is 58 km by road from the park, while Hyderabad is 72 km away. The Park has just two stretches of metalled roads, namely 80 km from Karachi and 56 km from Hyderabad. Travel elsewhere within the Park requires 4-wheel-drive motor vehicles.

The vast majority of land area belongs to the Government, with 637.95 sq km being under cultivation. Some 440 sq km has the status of protected forest under the Forest Act whereby acts, such as felling of trees, are prohibited. The Park area is also a wildlife sanctuary under the Wildlife Protection Ordinance 1972 which prohibits killing, trapping and hunting of wildlife. Adjacent to the Park about 8 km to the east, is the Surjan, Sumbak, Eri and Hothiano Mountains Game Reserve where controlled hunting is permissible.

The Park consists of hill ranges separated by fairly wide undulating valleys. The highest altitude within the Park occurs at Karchat Mountain at 1,004 m above sea level and the lowest altitude at the Hub Dam at 70 m above sea level. There are no perennial rivers in the Park. However, drainage of rain water is provided by Baran Nadi via the Indus and Hab rivers into the sea.

There are four distinct climatic seasons: winter, December to March; hot, April to June; rainy, July to September; and autumn, October to November. The average annual rainfall is 15 cm. Mean annual temperature is 39 degrees C in summer and 5 degrees C in winter. The principal geological formations within the area are calcareous limestone. Sandy limestone, shale, sandy shale and grey sandstone occur throughout the range. Some stages of these formations are rich in fossils. The soils contain fragments of rocky material which is generally limestone. Surface soils contain 90 per cent sand and 10 per cent clay.

Underground water, which has been tapped in many places, is brackish under the limestone formations and fresh under sandstone formations.

There is geological and archaeological evidence that suggests this region carried tropical forest vegetation until about 500 B.C. The geophysical changes have, however, turned this zone into an arid region and dominant vegetation in the Park is composed of open communities of deciduous, xerophytic trees and shrubs. In the rainy season there is profuse regeneration of ephemeral vegetation and summer annual grasses. The characteristic vegetation communities depending on soil types are *Acacia nilotica*, *Indigofera oblongiflora*, *Ziziphus nummularia*; *Capparis aphylla*, *Prosopis spicigera*, *Commiphora mukul*; or *Euphorbia caudicifolia*, *Grewia tenax*, *Acacia senegal*.

The Park has 26 species of mammals, 58 species of birds, and 23 species of reptiles. The most interesting among the mammals are ibex, wild sheep or urial, gazelle, leopard, jungle cat, desert cat, wolf, desert fox, striped hyaena and the Cairo spiny mouse.

Among the birds the most interesting are the grey partridges, seesee partridge, three species of sandgrouse, Bonelli's hawk eagle and Egyptian vulture. And the most spectacular of all is the annual winter visitor, the houbara bustard which is heavily persecuted elsewhere in the country but is protected in this Park.

Kirthar National Park is also rich in archaeological and geological sites. The famed Rannikot Fort, at the northeastern tip of the Park, represents a remarkable example of the defense system of the late Muslim rulers of

Sind. The ancient carved stone tombs at Taungus are comparable in the mode of their construction and ornamentation to those at Makli hills in southern Sind. Pre-historic remains of habitation near Koh-Tarash cover a spectrum of our national history ranging from pre-Islamic to even the pre-historic period (3500 B.C.). The geological history of this area dates back at least 45 million years (Eocene Epoch).

## 2. HISTORY OF THE PARK

The distinction of being the first National Park in Pakistan to be recognised by IUCN in 1975, gives a benchmark of the first significant step taken in the country for scientific management in the field of wildlife conservation. This region is of particular interest because while it never suffered from over-population (though it has supported a permanent human population for at least 100 years), the area had always remained an attraction to hunters. Those who used bows and arrows left little mark but the gun-bearing civilised men exercised a tremendous influence over the area because as rulers they took pride in the number of animals bagged and the sizes of trophies. It is a story of an incessant pressure of hunting in the pre-independence days when an Englishman had the prized horn of a Sind Ibex setting the record of 133 cm. In the post-independence era, the people acquired more guns and it became another refrain of the familiar story of too many guns chasing too few animals inherited by an independent country. The local population, poor as they were, considered the hunters as welcome visitors who supplemented their income.

So after Guy Mountfort submitted his report to the Government of Pakistan, the dwindling status of wildlife in Pakistan was brought in focus and his book "The Vanishing Jungle" gave a shocking sense of awareness to the people. It was then thought how pressing and urgent was the need for wildlife conservation. The Kirthar area, containing interesting wildlife species and relatively sparsely populated by human beings, was considered the first priority and the pioneering work of conservation was started.

The first important step was to take the people in confidence, enlist their support, win their sympathies and arouse an interest and pride in their valuable heritage. Without the goodwill and active collaboration of the local population nothing could be achieved or accomplished. Initially the Chiefs of the dominant local tribes were approached, a programme of conservation was laid out before them, the benefits that were likely to accrue to their people were set forth and the importance that they would assume under the development project was highlighted. The name and fame the leaders would earn within the country and abroad proved to offer a great deal of attraction. The Chief was converted to the side of conservation, and with his commitment, support, and blessing mass contact was launched. The people awoke to the consciousness that there was indeed such a thing as conservation which, when correctly practised, will bring in its wake considerable

opportunities of employment, jobs and economic benefits which hunters could not provide. That their area would one day become a popular holiday resort for visitors from home and abroad held out a promise of their own increasing importance.

The successful enlistment of the wholehearted support of the people and their leaders was reassuring for the representative Government, as the leader of the area was also a member of the National Parliament.

The next significant cornerstone laid was the legal umbrella spread over the wildlife; the Wildlife Protection Ordinance 1972 promulgated in Southern Pakistan became a model for the rest of the country to follow and the other three Provinces subsequently enforced their own wildlife laws.

Then came the essential phase of preparing a scientific management plan for the National Park. It was here that IUCN extended active help and support by assigning the work to their Staff Ecologist, Colin W. Holloway, who spent a considerable time in the country and together with Khan M. Khan prepared a comprehensive management plan.

According to the concepts set forth in the Management Plan, the development projects were formulated and funding provisions were made. The phased programmes of development are progressing apace.

In an area where Ibex had almost been hunted out (leaving only about 1200) and the Urial number had been reduced to a very low level, the Kirthar National Park now has over 4,000 Ibexes and about 1,000 Urials.

At the other side of the spectrum is the boom that the National Park has brought about. There are 108 employees drawn from the villages within the national park who are now serving with the Government. The complex built for the visitors and tourists has helped the people to market their dairy products, poultry, eggs and meat as well as the handicrafts they prepare. The visits from VIPs boost the morale of the people and fill them with pride. The law that permits no further extension of cultivation of land than the already existing rights, prevents encroachment from outsiders, which is a welcome change for the inhabitants.

There is also a provision for sportsmen in the nearby game reserve, where cropping of wildlife is allowed under specific regulations. The hunters try their luck in a lottery and those who succeed in the draw pay a fee of Rs. 10,000 (foreign nationals) or Rs. 5,000 (locals) for hunting one Ibex. In the 1985 season ten hunters came from foreign countries to hunt ten head and another ten were allowed to be hunted by nationals.

The President of Pakistan, during his visit to Kirthar National Park on April 20, 1983, was pleased to see the results of wildlife conservation in the park area. While recognising that effective steps have been taken for the preservation of wildlife in the park area, he emphasised

the need to develop this beautiful spot as a major tourist attraction and was pleased to issue a Presidential Directive for the development of this Park.

The plan prepared in pursuance of the President's Directive includes the development of archaeological/geological sites and monuments, improvement of infrastructure, furnishing of the existing tourist cottages and dormitories, improvement of jeep trails and foot trails

leading to the look-out points, improvement of existing water points and sinking of new wells, and electrification of Khar and Karchat Visitor Centres. The development plan as envisaged will cost Rs. 24,500,000.

Such then is briefly the success story of a national park in a country which is a latecomer, only recently joining the family of conservationists in the developing world.

**ABSTRACT.** The paper briefly describes the local context of the Annapurna area. Its geology, natural resources, and human history. The Nepal Plan for the preservation of the Annapurna area is presented. The main proposal for the park is to be managed under the King Mahendra Trust for Nature Conservation. The proposed management forms of the park are discussed together with some of the issues to be analyzed in the final management plan for the park. The concept for the Nepal Plan is to have the Annapurna National Park demonstrate how a nationally established, but privately managed park can serve as a catalyst for socio-economic development and increased environmental awareness in nearby communities and the nation as a whole.

## 1. INTRODUCTION

### *The Annapurna area*

The Annapurna area is well-known internationally and in Nepal for its beautiful mountains and unique ecology. The area is bounded to the north by the dry alpine deserts of Dolpo and Mustang; to the west by the Dhaulagiri Himal, to the east by the Mahabharati Valley and to the south by valleys and foothills surrounding Pokhara. The southern slopes of this area receive some of the heaviest rainfall in Nepal (over 5,000 mm per year) which has created an ecology different from other regions of the Himalaya. This area supports mountain birch, oak, rhododendron forest, bamboo jungle, *Saxifraga* spp., diverse orchid flora, and a rich variety of birds and mammals including Himalayan Monal pheasant, Danfe — the national bird of Nepal, Himalayan tahr, breeding deer, serow, ghoral, Himalayan bear, musk deer, blue sheep, red panda and snow leopard. In direct contrast to the southern slopes the northern slopes of the Annapurna area are mostly dry grassland steppes due to the rain shadow created by these majestic peaks. Here blue sheep and snow leopard can be found and possibly the rare Great Tibetan sheep.

The geology of the region exemplifies the uniqueness of the Annapurna Himal. Twenty-five million years ago

India and Asia were separated by the Tethyan Sea. The sea was transformed into land by the collision of these two land masses to plates, resulting in the formation of the Himalaya. One of the rivers that drained into the present Tethyan Sea, the Kali Gharial, was able to cross the mountain as low as they were, creating the world's longest gorge, with a 2,000 vertical metres below the peaks of Annapurna and Dhaulagiri. The Kali Gharial, however, penetrates the mountains through which it flows. Today signs of this ancient sea are seen in the small beach stones collected by people of the region which are found some miles away from over 100 million years ago.

## 2. THE NEPAL PLAN

"The Nepal Plan" is put forward not as a final statement but as a means to encourage the establishment of this important park and to focus attention on the existing management ideas of the King Mahendra Trust — a practical model for Third World park development. It summarizes a series of concepts and approaches developed to help to provide protection for the rich of biotic and cultural systems of this area. The plan was inspired by the Tourism Master Plan of 1972, the work and writings of Karna Shaha, the King Mahendra Trust for Nature Conservation, the Department of National Parks and Wildlife Conservation, the Department of Forests and other agencies of 1980, along with other individuals such as John Brown of FAO and Lt. Col. Jimmy Roberts and Herbert Haines. The Annapurna National Park would be a national park, incorporating recreation and tourism along with forestry, agricultural and the needs of local people who will be participants in managing the park and the resources it protects. The park complex will also incorporate a wildlife refuge.

Creation and management of national parks has traditionally been the province of government agencies. However, the role of private organizations represents a positive and growing segment in the world's protected areas. Governmented by legislation, private organizations have the advantage of being able to introduce still new approaches

# Annapurna National Park: The Nepal Plan for Joining Human Values and Conservation of a Mountain Ecosystem

Bruce W. Bunting and R. Michael Wright

**ABSTRACT.** *The paper briefly describes the local context of the Annapurna area: its geology, natural resources, and human ecology. The Nepal Plan for conservation of the Annapurna area is presented. The unique proposal for the park to be managed under the King Mahendra Trust for Nature Conservation is introduced. The proposed management zones of the park are discussed together with some of the issues to be analysed in the future management plan for the park. The concept for the Nepal Plan is to have the Annapurna National Park demonstrate how a nationally established, but privately managed park can serve as a catalyst for socio-economic development and increased environmental awareness in nearby communities and the nation as a whole.*

## 1. INTRODUCTION

### *The Annapurna area*

The Annapurna area is well-known internationally and in Nepal for its beautiful mountains and unique ecology. The area is bounded to the north by the dry alpine deserts of Dolpo and Mustang, to the west by the Dhaulagiri Himal, to the east by the Marsyandi Valley and to the south by valleys and foothills surrounding Pokhara. The southern slopes of this area receive some of the heaviest rainfall in Nepal (over 5,000 mm per year) which has created an ecology different from other regions of the Himalaya. This area supports mountain laurels, lush rhododendron forest, bamboo jungle, *Bambusa* spp.), diverse orchid flora, and a rich variety of birds and mammals including Himalayan Monal pheasant, Danfe — the national bird of Nepal, Himalayan tahr, barking deer, serow, ghoral, Himalayan bear, musk deer, blue sheep, red panda and snow leopard. In direct contrast to the southern slopes the northern slopes of the Annapurna area are mostly dry grassland steppe due to the rain shadow created by these majestic peaks. Here blue sheep and snow leopard can be found and possibly the rare Great Tibetan sheep.

The geology of the region exemplifies the uniqueness of the Annapurna Himal. Twenty-five million years ago

India and Asia were separated by the Tethys Sea. The sea was transformed into land by the collision of these two land masses or plates, resulting in the formation of the Himalaya. One of the rivers that drained into the ancient Tethys Sea, the Kali Gandaki, was able to erode the mountains as fast as they arose, creating the world's deepest gorge, well over 6,000 vertical metres below the peaks of Annapurna and Dhaulagiri. The Kali Gandaki, therefore, predates the mountains through which it flows. Today signs of this ancient sea are seen in the small black stones collected by people of the region which are fossil ammonites dating from over 100 million years ago.

## 2. THE NEPAL PLAN

"The Nepal Plan" is put forward not as a final statement but as a means to encourage the establishment of this important park and to focus discussion on the creative management ideas of the King Mahendra Trust — a potential model for Third World park development. It summarises a series of concepts and approaches developed in Nepal to provide protection for the mix of human and natural systems of this area. The plan was inspired by the Tourism Master Plan of 1972, the work and writings of Karna Sakya, the King Mahendra Trust for Nature Conservation, the Department of National Parks and Wildlife Conservation, the Department of Forests and other agencies of HMG along with other individuals such as John Blower of FAO and Lt. Col. Jimmy Roberts and Hemanta Mishra. The Annapurna National Park would be a multi-use park, incorporating recreation and tourism along with forestry, agricultural and the needs of local people who will be participants in managing the park and the resources it protects. The park complex will also incorporate a wildlife refuge.

Creation and management of national parks has traditionally been the province of government agencies. However, the role of private organisations represents a parallel and growing segment in the world's protected areas. Unencumbered by legislation, private institutions have the advantage of being able to innovate with new approaches

to management and local participation (Cross, 1983). For example, a private agency has the ability to apply funds generated by a reserve into development of the area to establish self-sufficiency. In contrast, a government agency must deposit funds in the central treasury discouraging entrepreneurial local management. On the other hand, private agencies cannot match the security of government creation and are potentially subject to government's power of eminent domain. For this reason, IUCN insists that to qualify for the UN List of National Parks and Equivalent Reserves the "highest competent authority in the country" must be involved in establishing the park designation (IUCN, 1978).

The Nepal Plan seeks to join the benefits of both institutions. (The legal structure of private management referred to in this paper must still be subjected to legal analysis and comment). As with other parks in the Kingdom, (See Fig. 1) Annapurna National Park would meet the international park standards, for the government would sanction trust management and ensure its security. It is proposed that actual management of the complex be the responsibility of the King Mahendra Trust for Nature Conservation which was legally established in 1982 under KMTNC Act 2039. Despite increasing interest in private approaches to conservation, no such organisation has undertaken responsibility for an area of such global importance as Annapurna. Although recently created, the King Mahendra Trust seems well qualified for the task.

### 3. ZONING AND MANAGEMENT ISSUES

How can the King Mahendra Trust protect the area's natural and cultural resources, allow continued local use of the natural resources, incorporate recreational use of the same resources and protect these resources for Nepal's future generations? This is the essence of the challenge which the Nepal Plan seeks to meet. Once a commitment has been made toward the establishment of the Annapurna National Park three major tasks must be addressed: research and production of a management plan; physical construction of park facilities; and training of personnel.

As Thorsell (this volume), has pointed out, one of the most essential steps in park establishment is preparation of a management plan. In a number of Latin American and Caribbean countries, rather than beginning with a full-fledged management plan, a more preliminary "Operational Plan" or interim guidelines serve as a practical guide during the first few years. Given the unique integration of uses and the private initiative of the Trust, such a preliminary planning approach has much to recommend it.

An excellent point of departure for management planning are the objectives identified by Kama Sakya in his proposal of December 1982 on "Annapurna National Recreational Area or Rashtriya Prakritik Manoranjan Sthall" (Sakya, 1982) which are:

- a) To ensure the *sustainable utilisation of species and ecosystems* such as forests, wildlife and fish, and to yield the greatest sustainable benefit to the present generation, while maintaining its potential to meet the needs and aspirations of the future generations.
- b) To exploit the *optimal tourism potential* and improve recreational facilities in order to open a new chapter of resort tourism, which enriches our foreign exchange receipts, strengthens the balance of payments and increases government revenue.
- c) To preserve the *ethnological and cultural heritage of the region*, so that it would remain as a reminder to future generations of the historical achievements of their forefathers, which they left in trust for them.
- d) To *help the local economy and to develop tourism ancillary* industries such as farms, orchards, poultry and handicrafts.

Noting that rainfall in this area is perhaps the highest in the whole Kingdom, Karna Sakya identifies the additional objective of prevention of deforestation to avoid downstream flooding and erosion.

Management objectives should also be established for the "zone of influence" — areas and communities which exert direct impact on the park and vice versa. As a private agency it may actually be easier for the Trust to be involved in human development and public participation in the surrounding region than other agencies of HMG.

In developing the plan for the park it is important to start small, with financial resources and personnel capable of being maintained from resources generated within the park. A key to local acceptance is selection and training of locals to manage the area (while retaining awareness of the pressure which can be exerted upon local guards for special favours to friends and relatives). The Trust, based in Kathmandu, must recognise the desirability of implementing action as close to the resource as possible. Like the Department of National Parks and Wildlife Conservation, the Trust must balance the value of local decision making, and responsiveness to local priorities against its own need for central control and national perspective — this will be especially difficult with the Trust's first major project.

### 4. ZONING ANNA PURNA

Based on preliminary resource analysis, in the Nepal Plan the national park complex is divided into six management zones (See Figure 2.)

*The Protection Zone* is centred on the Annapurna massif but extends at least to the peak of Dhaulagiri including the Kali Gandaki River (a major migratory route for birds moving between Tibet and India) to the west and

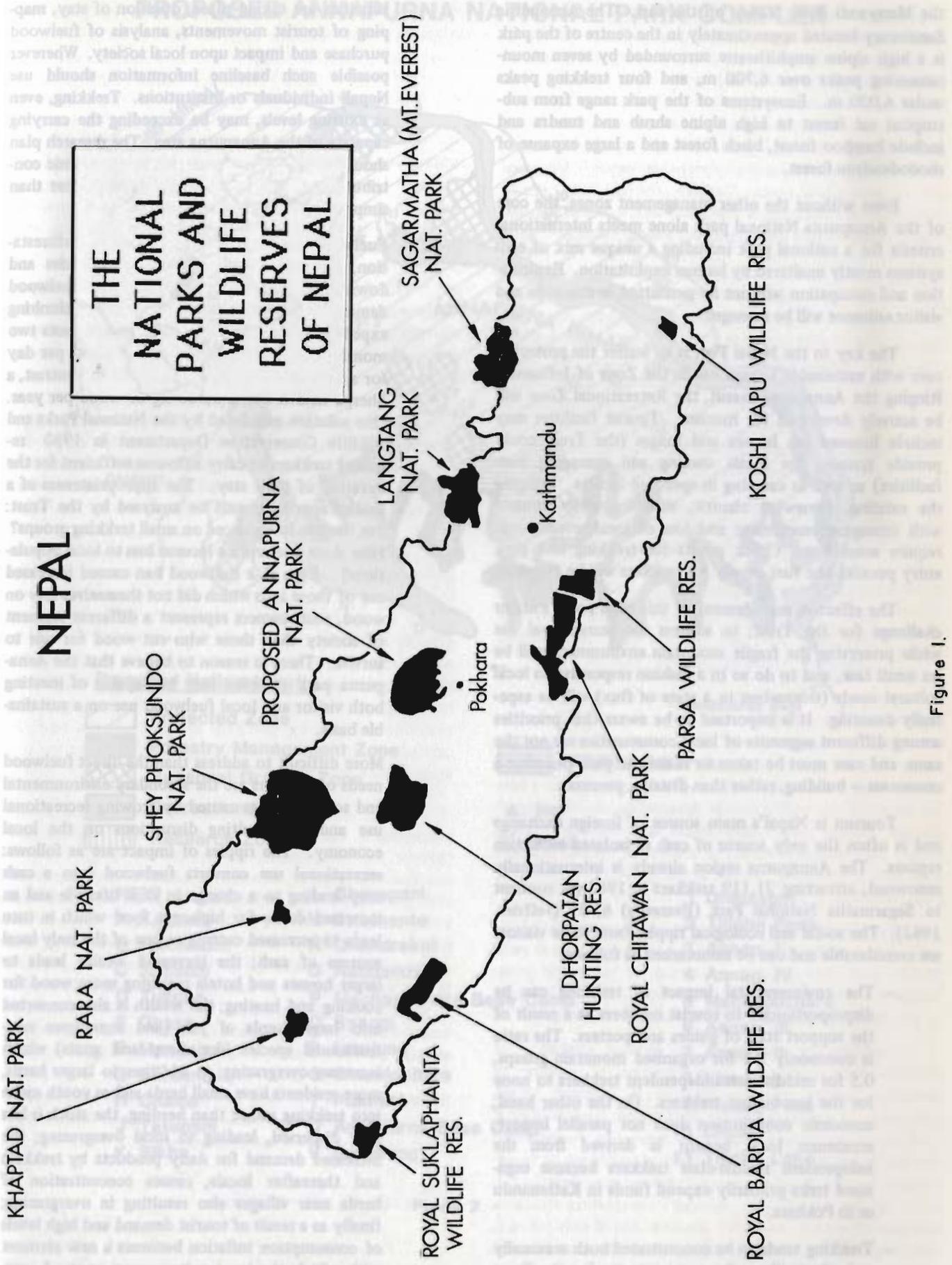


Figure 1.

the Marsyandi River Valley on the east. The Annapurna Sanctuary located approximately in the centre of the park is a high alpine amphitheatre surrounded by seven mountaineering peaks over 6,700 m, and four trekking peaks under 6,000 m. Ecosystems of the park range from subtropical sal forest to high alpine shrub and tundra and include bamboo forest, birch forest and a large expanse of rhododendron forest.

Even without the other management zones, the core of the Annapurna National park alone meets international criteria for a national park including a unique mix of ecosystems mostly unaltered by human exploitation. Exploitation and occupation will not be permitted in this zone and visitor entrance will be managed.

The key to the Nepal Plan is to buffer the protected core with sustainable human use in the Zone of Influence. Ringing the Annapurna massif, the Recreational Zone will be actively developed for tourism. Tourist facilities may include licensed tea houses and lodges (the Trust could provide training for locals owning and managing such facilities) as well as camping in specified locales. Bringing the existing, somewhat chaotic, situation under control with minimum resentment and loss of local revenue will require sensitivity. Check points for trekking and park entry permits and fuel supply for trekkers will be essential.

The effective management of this zone poses a major challenge for the Trust; to address the recreational use while preserving the fragile mountain environment will be no small task, and to do so in a fashion responsive to local cultural needs (themselves in a state of flux) will be especially daunting. It is important to be aware that priorities among different segments of local communities are not the same and care must be taken to make the park planning a consensus – building, rather than divisive, process.

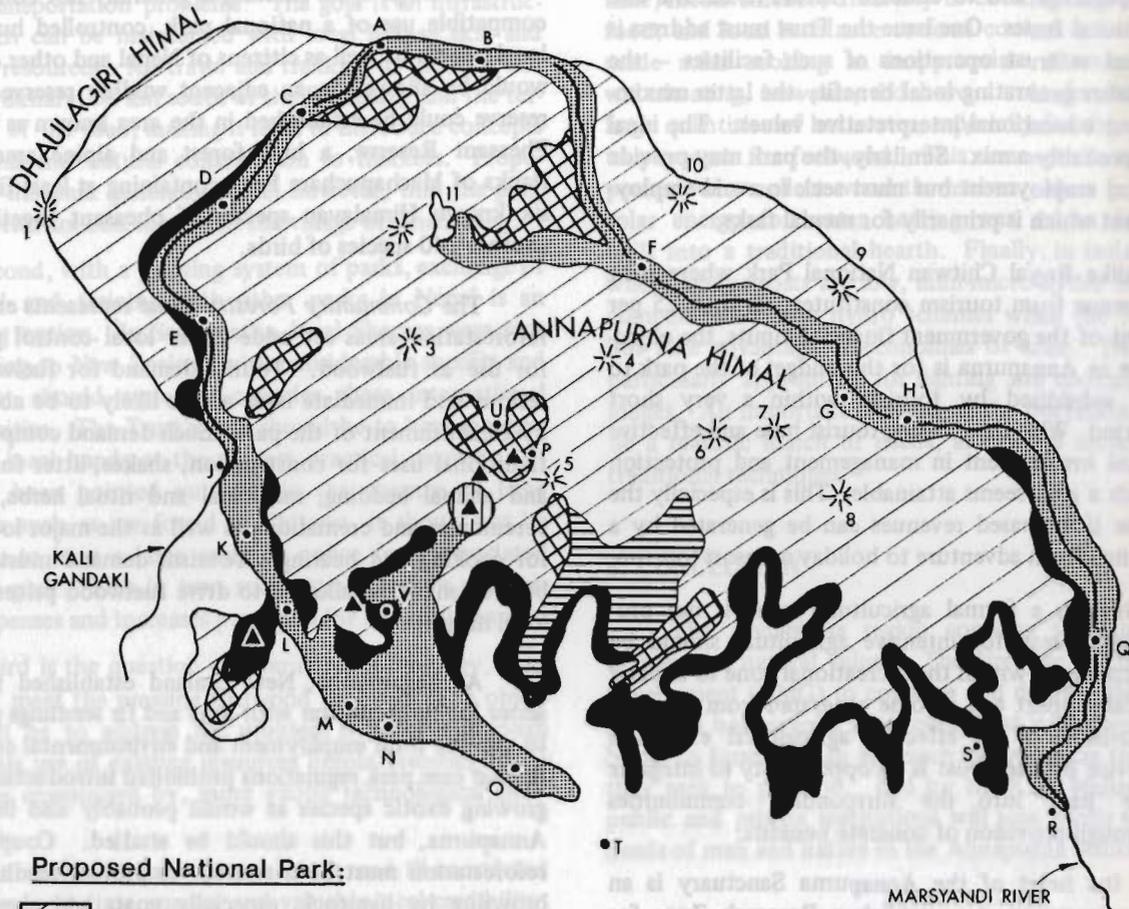
Tourism is Nepal's main source of foreign exchange and is often the only source of cash in isolated mountain regions. The Annapurna region already is internationally renowned, attracting 21,119 trekkers in 1983 (in contrast to Sagarmatha National Park (Everest's) 6,732 (Jeffries, 1982). The social and ecological ripples from these visitors are considerable and can be summarised as follows:

- The environmental impact of trekking can be disproportionate to tourist numbers as a result of the support staff of guides and porters. The ratio is commonly 2-1 for organised mountain groups, 0.5 for middle-class independent trekkers to none for the low-budget trekkers. On the other hand, economic contribution does not parallel impact; maximum local benefit is derived from the independent middle-class trekkers because organised treks primarily expend funds in Kathmandu or in Pokhara.
- Trekking tends to be concentrated both seasonally and physically. An early priority for the Trust must be research on existing trekking – what

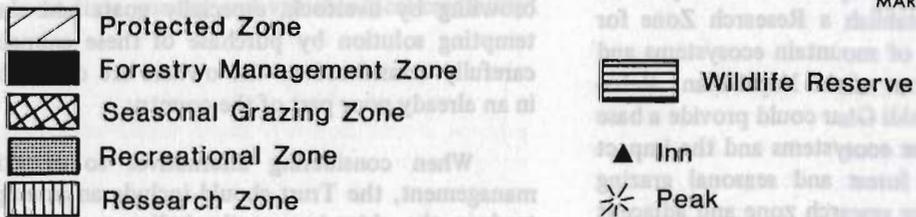
activities are taking place, duration of stay, mapping of tourist movements, analysis of fuelwood purchase and impact upon local society. Wherever possible such baseline information should use Nepali individuals or institutions. Trekking, even at existing levels, may be exceeding the carrying capacity of the Annapurna area. The research plan should seek means to increase the economic contribution of visitors at current levels rather than simply increasing their numbers.

- Fuelwood consumption can result in deforestation, soil destabilisation, erosion, landslides and downstream flooding. Tourist-generated fuelwood demand is growing rapidly. A typical climbing expedition in Sagarmatha, for example, lasts two months and requires four loads of wood per day for a total of 8,000 kg of firewood. In contrast, a Sherpa hearth burns 5,000 kg of wood per year. One solution mandated by the National Parks and Wildlife Conservation Department in 1980 required trekkers to carry kerosene sufficient for the duration of their stay. The appropriateness of a similar approach must be analysed by the Trust: can the ban be enforced on small trekking groups? How does one replace income loss to local populations? Even if a fuelwood ban caused increased use of those inns which did not themselves rely on wood, such owners represent a different segment of society than those who cut wood for sale to survive. There is reason to believe that the Annapurna park complex may be capable of meeting both visitor and local fuelwood use on a sustainable basis.
- More difficult to address than the direct fuelwood needs of trekkers are the secondary environmental and social impacts caused by growing recreational use and the resulting disruptions on the local economy. The ripples of impact are as follows: recreational use converts fuelwood into a cash crop leading to a change in local lifestyle and an increased desire for high-cost food which in turn leads to increased cutting as one of the only local sources of cash; the increased wealth leads to larger houses and hotels requiring more wood for cooking and heating; the wealth is also converted into larger herds of yak (and sometimes non-traditional species like sheep and goats) which increases overgrazing; in addition to larger herds, more residents have small herds and as youth move into trekking rather than herding, the stock is less well dispersed, leading to local overgrazing; the increased demand for dairy products by trekkers and thereafter locals, causes concentration of herds near villages also resulting in overgrazing; finally as a result of tourist demand and high levels of consumption inflation becomes a new element with which the local culture must contend with almost no appropriate tools.

# PROPOSED ANNAPURNA NATIONAL PARK COMPLEX



## Proposed National Park:



<b>KEY:</b>	L Ghorapani	1 Dhaulagiri
A Kagbeni	M Birethante	2 Tilicho Peak
B Muktinath	N Chandrakot	3 Annap. I
C Jomsom	O Naudanda	4 Annap. IV
D Tukche	P Machapuchare Base Camp	5 Machapuchare
E Ghasa	Q Syangi	6 Annap. III
F Manang	R Lamjung	7 Annap. II
G Bardang	S Ghandokhara	8 Lamjung
H Chame	T Pokhara	9 Pisang Peak
J Tatopani	U Annapurna Base Camp	10 Chulu
K Sikha	V Gandrung	11 Tilicho Lake

Figure 2.

- Development of park infrastructure such as trekking lodges provides an opportunity to demonstrate alternative sources of energy to the local population and to educate visitors to natural and cultural issues. One issue the Trust must address is local vs trust operations of such facilities – the former generating local benefit, the latter maximizing educational/interpretative values. The ideal is probably a mix. Similarly, the park may provide local employment but must seek to avoid employment which is primarily for menial tasks.
- Unlike Royal Chitwan National Park where park revenue from tourism constitutes less than 25 per cent of the government financial inputs, the objective in Annapurna is for the budget of the park to be subsidised by tourism within a very short period. With the existing tourist base and effective local involvement in management and protection such a goal seems attainable. This is especially the case if increased revenues can be generated by a switch from adventure to holiday or resort tourism.
- Although a formal agricultural zone is not proposed, areas for intensive agriculture should be encouraged within the recreational zone to expand local support and income generated from tourism. Provision of an effective agricultural extension service by the Trust is an opportunity to integrate the park into the surrounding communities through provision of concrete benefits.

Near the heart of the Annapurna Sanctuary is an important opportunity to establish a Research Zone for scientists focussing on study of mountain ecosystems and to monitor the dynamic systems of the Nepal Plan. Rehabilitation of the facility at Kuldi Ghar could provide a base for study of the park's diverse ecosystems and the impact on the nearby community forest and seasonal grazing zones. In a very real sense the research zone and adjacent areas add a biosphere reserve in the heart of the national park complex.

The Nepal Plan recognises the existence within the park of several Seasonal Grazing Zones. In a region of such limited land resources and where yak or yak/cattle cross-breeds are important symbols of wealth, the challenge is to ensure that grazing use is sustainable, not eliminated.

Traditionally the timing of seasonal migration of livestock from higher to lower elevation in response to available pasture was co-ordinated by elected village guardians. If a grazing management system is established it must be aware of such traditional regulating mechanisms. On the other hand, if the traditional approach is incorporated by the Trust to control management decisions it must be able to adapt to changes in ownership structure and mix of species caused by the new tourist-induced cash economy mentioned previously. Given the fundamental role of grazing in the local society, meaningful participation in designing a compatible grazing system could be the

single most important objective of the Trust if its new park paradigm is to succeed.

Although sport hunting is generally not considered a compatible use of a national park, controlled hunting by local people as well as citizens of Nepal and other countries would be allowed in an adjacent wildlife reserve. Such a reserve could be established in the area known as the Pipar Pheasant Reserve, a high forest and alpine area on the flanks of Machapuchare Peak containing at least five of the six known Himalayan species of pheasant together with another 140 species of birds.

The *Community Forestry Zone* represents existing or reforestation areas set aside under local control primarily for use as fuelwood. Tourist demand for fuelwood is a serious and immediate issue and is likely to be accelerated by establishment of the park. Such demand competes with traditional uses for construction, shakes, litter for latrines and animal bedding, medicinal and ritual herbs, fuel for ceremonies and cremations as well as the major local needs for cooking and heating. Tourism demand must be met, but it cannot be allowed to drive fuelwood prices beyond local means.

At Sagarmatha, New Zealand established two nurseries for reforestation with pine and fir seedlings primarily to provide local employment and environmental education. In that case park regulations prohibited introduction of fast growing exotic species as would probably also be true at Annapurna, but this should be studied. Coupled with reforestation must be a strategy to protect seedlings from browsing by livestock, especially goats and sheep. The tempting solution by purchase of these animals must be carefully considered as the owners are often the poorest in an already poor part of the country.

When considering alternatives to effective forest management, the Trust should include an attempt to reintroduce the *shing-i-nawa*, the indigenous village firewood resource management committees which were discontinued after the forests were nationalised in 1957. However, such a reintroduction will not itself be easy; the Trust, based in Kathmandu, is likely to be seen as distant as the government whose nationalisation of the forest led to their demise in the first instance. In addition, we should not be naive in application of traditional forms, as the *shing-i-nawa* would be asked to regulate a different world, one heavily stressed by the influx of tourists and cash competing with local needs. The social organisation of any community forestry projects will have to balance income expectations of different segments of local society and the needs of the Trust to obtain self-sufficient management.

## 5. THREE CRITICAL NEEDS

Three other issues must be addressed: architectural compatibility of any new construction; training; and alternative technology.

First, the use of local-style construction takes advantage of existing experience on climate stability, availability of local materials, and limited available skilled labour and avoids transportation problems. The goal is an infrastructure which can be maintained with local human skill and financial resources. All travel and trekking to the Park will start in Pokhara, 30 km south of the Sanctuary and the termination of the road, making it ideal to introduce concepts of cultural and natural conservation to trekkers. Proponents of the park generally agree, however, that the park headquarters are best located at the village of Ghandrung.

Second, with a growing system of parks, exchange of personnel and training with other parks in Nepal is an increasing option. In Sagarmatha, local Sherpas were sent for training to New Zealand with considerable success and the Trust should seriously consider these international opportunities. The Trust's goal should be to have management in local hands at the earliest practical moment. It has also been pointed out that in the absence of large mammals such as are found in Chitwan, it should not be necessary to have a large army or police force associated with the park. This in turn substantially lessens management expenses and increases prospects for self-sufficiency.

Third is the question of alternative technology, especially to meet the pressing fuelwood problem. The objective must be to address the problem if possible through sustainable use of existing resources before resorting to, or becoming enamoured by, more exotic technological alternatives.

The fuelwood issue is not simple and ill-considered efforts can cost time, money and valuable local credibility.

Attempts to improve use or efficiency of existing techniques may not be a good strategy. At least in Sagarmatha, Sherpas already use wood rather sparingly. Restraints of time, inconvenience, difficulty in cooking large amounts of food, and local resistance to food cooked out-of-doors, all made solar cooking an inappropriate alternative. Solar waterheating, however, did have a role for houses using large quantities of hot water, especially for those who have to pay cash for fuelwood. This was not the case for the poorest who collect wood themselves. More popular than solar energy for water heating was an auxiliary heater built into a traditional hearth. Finally, in isolated locales where labour costs are low, mini-micro hydro schemes can compete with large hydro schemes when the latter could not take advantage of economies of scale. These may be particularly appropriate for lighting and cooking in tourist lodges. An important element of the operational plan will be a realistic match of needs, alternative technology, and traditional techniques.

## 6. CONCLUSION

The Annapurna region contains a unique mix of human and natural values. The directive of His Majesty's Government (HMG) to conserve and develop the Annapurna Himal has inspired those concerned with conservation in Nepal to formulate an approach as unique as the resources they seek to preserve. Led by the King Mahendra Trust, public and private institutions will join hands to meet the needs of man and nature in the Annapurna National Park.

The equipment is manufactured by the local Yashwantrao Chavan Institute of Technology, Mumbai, India. The design is simple and reliable, and the construction is easy and efficient. Only the generator for the turbine was ordered outside the Indian subcontinent, but in the future other components will be produced locally.

Because of the high head available, a simple (water collection) tank and the propeller are used to drive the turbine, with the generator (the turbine) running directly on the water. The design feature has provided the following advantages: (1) it is simple and easy to construct, (2) it is reliable, (3) it is cheap, and (4) it is easy to maintain. The design is simple and reliable, and the construction is easy and efficient. Only the generator for the turbine was ordered outside the Indian subcontinent, but in the future other components will be produced locally.

### 2.1. Underground electrical transmission and distribution

For national parks it is important that the visual aesthetics are not compromised by man's activities. Micro-hydroelectric installations are often located close to villages, and the transmission distance and the cost of construction are

# Energy Alternatives for Sagarmatha National Park

A Case Study from Chautara, Nepal

Broughton Coburn

**ABSTRACT.** *Several steps are being taken to help meet the energy needs of expanding numbers of tourists to Sagarmatha National Park, including regulations regarding firewood collection, reforestation, and increased use of kerosene. But perhaps most interesting has been the Namche Micro-Hydroelectric Scheme, which provides 27 kilowatts of power to local houses and lodges. It involves underground electrical transmission and distribution, sealed fuse boxes, separate grids, and local management; it has proven to be quite cost-effective and might be useful elsewhere in the region where firewood scarcity limits its usefulness for meeting local energy needs.*

## 1. INTRODUCTION

Since 1976, when Sagarmatha National Park was officially gazetted by His Majesty's Government of Nepal, the number of trekkers visiting the park has increased almost tenfold. The increase in the number of visitors magnifies the local residents' traditional, albeit previously stable, demands on the park's alpine ecosystem. To mitigate the environmental pressure and threats to wildlife habitat caused directly or indirectly by man, the National Parks Administration has undertaken a broad range of conservation measures. In 1980, Sagarmatha National Park was designated a World Heritage Site by UNESCO. Since that time, with assistance from the World Heritage Fund and other sources, four nurseries for the propagation of indigenous fir, pine, birch, willow and rhododendron species have been established, and seedlings have been planted in many areas, particularly those near villages and where overgrazing and excessive firewood cutting has occurred. Nature conservation education programmes have been conducted in the local schools, and tourist pamphlets have been published stressing the scarcity of firewood and the fragility of the park environment. Regulations have been enforced controlling the collection of firewood and requiring trekking parties to be self-sufficient in fuel before entering the park. In 1983, the National Park Administration, with assistance from the Himalayan Trust, purchased all the domestic goats raised within the park, and has prohibited their future husbandry within park boundaries because even fir and pine seedlings will supplement a hungry goat's diet.

## 2. THE NAMCHE MICRO-HYDRO SCHEME

In addition to the above conservation measures, serious investigation has been made of alternate sources of energy particularly of domestic fuel, for Sagarmatha National Park. With assistance from the World Heritage Fund, a 27-kilowatt "micro" hydroelectric generating facility was completed in October 1983 in Namche Bazaar, a village of over 100 houses that includes the park headquarters. This facility features several unique, though not necessarily experimental, design aspects that can hopefully be incorporated in similar installations in the future.

The civil and mechanical works take advantage of water power, a resource that is abundant in the Himalayan national parks. Systems designed for high head can produce greater energy with smaller, more inexpensive equipment than that necessary for low-head systems.

The equipment is manufactured in Nepal. The Balaju Yantra Shala now produces inexpensive and reliable crossflow and "spitflow" turbines of improved efficiency. Only the generator for the Namche Project was ordered outside the Indian subcontinent. It is hoped that in the future other companies within Nepal will begin production of such equipment.

Because of the high head available, both the forebay (water collection) tank and the powerhouse are located in the stream itself, with the penstock (the pipe delivering water to the turbine) running parallel to the stream. This design feature has precluded the need for excessive excavation, alleviated the danger of landslides and rockfalls, and reduced the need for materials such as sand and cement. In the case of the Namche Project, the civil works are located directly along the stream bed and are not visible from any frequently used trail. Construction caused minimal environmental upheaval.

### 2.1 *Underground electrical transmission and distribution*

For national parks it is imperative that the visual aesthetics are not compromised by man's intervention. Micro-hydroelectric installations can often be installed in close proximity to villages, thereby reducing the transmission distance and the cost of underground armoured cable

which is a limiting factor for larger systems. The additional cost of placing the transmission and distribution lines underground at Namche is estimated to be less than 7 per cent of the total project cost. These lines will also lessen problems of safety, maintenance, and theft of electricity from exposed lines, making the underground lines cost-effective during their lifetime.

## 2.2 Sealed fuse boxes

All the distributional and household fuses are placed in locking fuse-switch boxes, and the size of each fuse wire is carefully gauged to burn out with the installation of an unauthorised load even if it is as small as a single light bulb. In this way we hope to reduce the potential problem of overload which is an occasional drawback of small rural installations. Only the manager of the facility will have the authority to replace burned fuse wires, an important safety as well as a control factor. In Namche to date there has been no theft of electricity, no faults in the transmission and distribution lines, and no electrical accidents.

## 2.3 Separate grids

All the houses in Namche receive current for lighting at night. During the daytime, the entire load for the system is distributed for cooking purposes to 6 lodges and staff quarters (2.5 kw each) on a trial basis. It is hoped that this will reduce firewood consumption since it is the above centres that have a virtually constant demand for cooking fuel in the day. The load factor, and therefore the functional capacity of the plant, is very high during hours of operation.

## 2.4 Local operation and management

Namche villagers, trained at the site, have wired the entire town, and selected individuals were trained as power-house operators. These local technicians are familiar with the layout of the entire grid, and have a vested personal interest in seeing that it functions smoothly. Officials are now discussing the possibility of transferring its management to the Namche Village Panchayat under the Decentralisation Act. Under the authority granted by this Act, the Panchayat will be able to form its own Electrical Management Committee, and to operate the plant and retain revenues within the Panchayat for maintenance and as principal for future development works.

## 2.5 Cost-benefit

The Namche Micro Hydel Project was completed for a cost of slightly more than \$2,000 per installed kilowatt (exclusive of household wiring), which compares favourably with the cost of hydro-electric installations anywhere in the world. This is of special interest when considering the economies of scale, which normally work against such small rural installations. It is clear that mini and micro-hydel plants are particularly suitable for the Himalayan national parks where isolation, aesthetic integrity and ecological considerations obviate larger facilities.

## 3. OTHER ENERGY ALTERNATIVES

In view of the prodigious amount of sunlight falling on the park and the residents' demand for hot water for domestic use, the potential for solar water heating in the park has also been investigated. Because of cost, technical complexity and freezing temperatures, the standard thermosiphon system (where water circulates according to temperature differential through a grid of pipes) was discarded in favour of a simpler and cheaper installation. The flat tank solar water heater is simply a large, insulated, flat collection tank that doubles as a storage tank and has performed admirably. However, at a cost of more than Rs. 2,000 for delivery and installation, there will be only a limited demand for this item in the Khumbu region.

A small energy-conserving item which has the widest potential application in rural mountain areas is the "back boiler" auxiliary hot water heater – simply a flat tank that is installed at the side or at the back of the household hearth. It circulates water to a nearby tank using the same thermosiphon principle as a solar water heater, often approaching boiling temperatures. The lodges in Namche Bazaar that sell hot showers to trekkers have recovered the cost of these units within three weeks of their installation, and demand for them appears to be unlimited throughout the Khumbu region. It is hoped that their value will be recognised sufficiently to become an attractive business option for local entrepreneurs during the off-season months. One lodgeowner has already ordered, delivered and sold several complete units.

Solar photovoltaics is still regarded as an expensive technology in the West, but for isolated locations in Sagarmatha National Park, where kerosene can cost more than Rs. 19 (US\$ 1.30) per litre, such installations are economical. For permanent structures that use a "mantle" pressure lantern more than 120 nights per year, the price of kerosene will eclipse the capital cost of an installed photovoltaic system in less than 7 years. Operation and maintenance is minimal since there are no moving parts, and manufacturers claim a lifespan of 20 years for solar arrays. Perhaps the most immediate and appropriate application for solar panels will be for solar-electric fences. There are many kilometres of restricted areas and reforestation enclosures within Sagarmatha National Park where electric fencing would be suitable. They are safe, invisible from a distance, and half the cost of stone or wood alternatives. The first solar-electric fence, for the reforestation plot surrounding the park headquarters, will be installed in May 1985.

## 4. CONCLUSION

Large-scale solutions that can be speedily realised do not appear feasible, at present, in the high mountain areas of Nepal. Smaller individual and village-initiated projects offer substantial hope for the eventual reduction of the dependence on firewood and kerosene, and this can be achieved with minimal impact upon fragile mountain environments.

# Community Protection of Forest Areas: a Case Study from Chautara, Nepal

T.B.S. Mahat

**ABSTRACT.** *This paper outlines in historical terms, using a case study from the Chautara Forest Division in the Pahad (Hill) Region of Nepal, how community involvement can be effective in forest protection and management for providing needs of the local people, conservation of natural resources, and checking environmental degradation. The key to success was providing the local people with the responsibility over their own forests, a return to a situation which had existed in the past.*

## 1. INTRODUCTION

In Nepal, forests form an integral part of the life of village people, providing innumerable benefits, both as goods and services. These benefits include: clean and permanent water; fuel for cooking and heating; fodder for livestock which in turn provide about the only fertiliser to crop production; timber and poles for construction of houses and animal sheds; protection from erosion; and other environmental, aesthetic and spiritual values.

The economy of Nepal is dominated by the rural sector, based almost exclusively on subsistence agriculture. But there is only about 0.27 ha of forest land and 0.21 ha of cultivated land per capita in Nepal (Nelson *et al.*, 1980; HMGN, 1982) making it one of the most densely populated areas in the world in relation to its land resources (nearly half of the country in the high Himalaya is uninhabited, as it is of no use to human enterprise).

During the past few decades, various factors have markedly reduced the ability of forests to supply the basic needs of the local people. The area of forested land has been decreasing at an alarming rate, especially in the Terai (about 4 per cent annually) and the Siwaliks (a little more than 1 per cent annually), but forest loss has been negligible in the hill region where land use is relatively stable (HMGN, 1983). Hence there is a critical need to concentrate effort on protection and management of existing forest and reforestation of denuded areas.

Historically, administration and protection of forest was effective wherever local control existed; forest degrada-

tion was largely related to outside interference. The interest of the local people is clearly tied to the forest and trees of the locality. They have a deep understanding of the trees and forests in their areas, and have practical experience in growing plants. Therefore, the protection and improved management of the local forest has tremendous potential through the involvement of the village people and communities. Given suitable encouragement and guidance, they could be a key to successful protection and management of forests over a large area of Nepal.

The case study involves the Chautara Forest Division, consisting of the Sindhu Palchok and Kabhre Palanchok Districts, for which the author was the Divisional Forest Officer (DFO), from 1973 to 1980. Some sources of information used are secondary but much material is derived from the author's personal knowledge and experience. The village of Thokarpa, the centre of the case study, is in Sindhu Palchok District; it is one of the most heavily populated areas of the Hill Region, with a population density of 1.63 persons per ha of agricultural and forest land combined. The forested land is of low quality with the lowest volume of timber per unit area (8.61 cubic m/ha) recorded in Nepal. Much of the forest land is shrubland. Strongly held local views based on personal interviews suggested that:

- there is no significant change in areas of agricultural and forested land in the past 100 years or so;
- degeneration in forest quality has, however, led to shortage of fuelwood and fodder supply;
- fuelwood consumption (409 kg/person per year) is one of the lowest for Nepal and 60 per cent of it comes from forested land;
- inadequate supply of fodder generally constrains stall-feeding of livestock; and
- timber is normally available as free goods but local households use little timber for construction.

## 2. HISTORICAL CONTEXT OF DEFORESTATION IN THE HILL REGION OF NEPAL

### 2.1 Government land use policies and deforestation

The deforestation of the Hill Region has a long history and is necessarily associated with the land use policies of governments in the past. Since unification, the country has been ruled by a series of power groups, mostly belonging to a relatively small number of elitist (*bhardar*) families, supported by their client families numbering only a few hundred (Regmi, 1975; Stiller, 1975, 1976; Rose and Scholz, 1980). The vast majority of the country's population living predominantly in the villages remained totally unrepresented and took little interest in machinations of power – no matter who was in power they remained deprived.

The ruling classes perceived agricultural land and labour as the major resources of the country, conferred favours by means of land grants (*birta*, or *Jagirland*), and generally followed administration policies aimed at converting as much land as possible to agricultural production in order to maximise the tax base. Reclamation of forest was generally open to anyone who undertook to bring it under cultivation. The introduction of maize and potatoes in the early 19th century led to much clearing of steeper and higher land for un-irrigated cultivation. By the late 18th century the pressure for land in the Pahad led to emigration of peasants to the Terai, Darjeeling, Kalimpong, Sikkim and onwards to Bhutan. The higher taxing measures after the 1814-16 war exacerbated this exodus. Labour (*jhara rakam* and other compulsory unpaid obligations) became a resource available directly to the state and the ruling classes as a source of wealth.

Many of the obligations were performed at cost to the forest cover, until 1950. When introduced up to the district level after the mid- 19th century, forest administration, as with all administration in Nepal, concentrated on revenue collection both during the Rana Period and subsequently, (Stiller, 1968, 1975; Regmi, 1971, 1976, 1978a, 1978b; Pradhan, 1976).

### 2.2 Local responsibility for forest: belongingness between the village people and their local forests

At the local level, however, the government, not long before the beginning of the Rana rule, gave enhanced authority in revenue collection to the local non-official functionaries (*talukdars*) (Regmi, 1978a, 1978b) on whom also evolved the direct responsibility for local forests (at least in the Pahad). Over time, these local functionaries came to administer fairly effectively the forest that still existed, and provided a reasonable amount of control and protection. The local population got what goods it needed from the local forest without paying any fees, although some sort of gift to the talukdars had become customary. Scope for the extension of arable agricultural

land had, disappeared already, so that the local forests were used only for fuelwood, fodder, leaf litter, grazing, small timber and poles.

Thus in the case of the remaining forest of the Pahad, despite the government's indifference towards forest administration and management, and the continuation of the traditional policy of agricultural land extension, there developed gradually after the mid- 19th century a sense of local responsibility, and subsequently a tradition of it, under the charge of local talukdars for protection and conservation of the forest and for using the resources reasonably and judiciously. What is more interesting and important is the fact that even the local people themselves had developed a faith in such a system, which provided for their needs and maintained forest in their locality. Over a period of time, there developed a sense of "belongingness" between the village people of Pahad Nepal and their local forests and scattered trees that still existed were considered by the local farmers as necessary for the sustenance of their hill farming system. This protection and conservation of forest by the local people was certainly true in the case of Sindhupalchok and Kabhre, as long as there was no outside interference.

Examples of local community protection of forests and trees, although in the form of scattered patches and single stands, are to be found all over the Hill Region of Nepal. Documents seen by the author from within the Chautara Forest Division show that places of intense community interest such as the water sources, places of religious or spiritual significance, resting platforms, trail sides, areas at upper and lower extremities of cultivated land, etc., attracted government attention to a degree that Royal Orders were passed at least by 1837 banning tree fellings from such sites (Pradhan, 1982).

### 2.3 Outside interference and loss of local interest

Within the Districts of Sindhupalchok and Kabhre which subsequently came to constitute the Chautara Forest Division, and particularly in the Thokarpa Region, the forest was administered and protected quite effectively under local supervision, but the steadily increasing interference from Kathmandu from about 1900 caused a deterioration. Most older persons remember seeing the exploitation of their forests, especially for sal (*Shorea robusta*) for use outside the local area. Examples of exploitation on orders from Kathmandu are many. From at least the beginning of the current century timber from these forests was used in buildings in the expanding towns of the Kathmandu valley. Timber from the Sun Kosi slopes below Thokarpa was used lavishly for the construction of Rana palaces in Kathmandu; timber from the area was used to build bridges on the Sun Kosi and Indrawati at Dolalghat and on the Tamba Kosi at Charange; and the great Kathmandu earthquake of 1933 also resulted in rebuilding using Sun Kosi sal forests. In all these operations the whole process of felling, conversion, and transportation was extremely wasteful and arduous.

Collapse of the Rana administration in 1950 was followed by a period of political instability throughout the country (Joshi and Rose, 1966), so from 1951 the effective control of forests by the local functionaries in the area under survey was rapidly lost. The district *badahakim's* increasing use of his overriding authority led to larger-scale exploitation of the forest resource for consumption outside the local area. The local people saw the resource disappearing for the benefit of others, leading to a free-for-all where no one had an interest in sustaining yield.

The Talukdari system of local forest control finally ceased with the Forest Nationalisation Act, 1957 and the introduction of a new forest administration in 1961. A professional forest officer, who headed the newly established Forest Division Office based at Chautara, took over the forestry responsibilities of the *badahakim*. Regrettably the function did not change, largely remaining the issuing of permits for harvesting timber. In theory, permits were to be issued only for timber from forest plantations but in practice anything merchantable was sold. The local people remained excluded from any effective control of the forest around them. Further, they found themselves subject to legal action for minor forest crimes, whereas more influential people often escaped such action even for serious breaches of the forest law. Moreover, post-Rana forest legislation, particularly the Forest Nationalisation Act 1957, was often misinterpreted by the local people as not being in their best interest.

Thus the sense of belongingness between the people of the region and their local forest and trees, developed over a period of more than 100 years, declined and was eventually lost. As a consequence the forest suffered and was not affected even by stricter laws introduced between 1957 and 1967.

With the institution of the Panchayat policy in 1962, the administration of local affairs was gradually transferred to local councils (Panchayats), resulting in a considerable degree of self-government at the village level.

This introduction of the Panchayat system of local government, its village-level assemblies and councils, and other local level representations also gave new possibilities for local control of forests.

In line with the new panchayat political order, the idea of transferring some government forest area for the use of panchayat communities was also introduced in the Forest Act, 1962. The provisions of the Act, however, clearly indicated the government's reluctance to part with either its ownership of forest land or the overriding authority over it (HMG, 1976).

As a result no further steps were taken to implement even these conservative provisions of the Act and gradual revival of interest in local community forests remained unattended for at least another decade. Initiation of community forestry in Thokarpa in 1973 contributed principally to the awakening of interest in the forests and

an awareness by local communities that they might be able to control their destiny as it related to forested land.

### 3. INITIATION OF COMMUNITY FORESTRY

As noted above, forest degradation in Thokarpa and other similar areas had become extreme by the early 1960s. This was accompanied by a demoralisation of local communities concerning the effective control of forest resources for their purposes. The new possibility for local government given by the introduction of the panchayat system in 1962 was eventually seized. A few exceptional leaders, notably Nil Prashad Bhandari, the long-standing Pradhan Pancha of Thokarpa, clearly foresaw the need for local action. In 1973, the Divisional Forest Officer at Chautara (the author) decided that conservation of forest resources would not be possible without community awareness, motivation and involvement. More important, the need for local community participation in protecting the forest from unauthorised harvesting, grazing and fire was recognised. People's acceptance would also be needed to reforest, involving land-use changes, the non-agricultural areas on denuded slopes excessively over-used for grazing. Involvement of recognised social and political institutions was postulated as important and necessary for success, in which local leadership played a very important and useful role. In all this exercise, motivation and willingness of the "government forestry staff" to stay and work in rural areas and to tolerate, sympathise, assist and encourage the village people was a necessary pre-condition for success.

A Forestry Committee was formed in Thokarpa Panchayat in 1973. The Committee, with the Pradhan Pancha as its chairman, was very widely based and had a membership of 103 drawn from various components of the local society. The DFO, Chautara, worked as its advisor. Initial informal and formal meetings and discussions among the Panchayat Forestry Committee members themselves, and between them and the DFO were followed by an agreement. The principal features of this agreement were that the Panchayat through its Forestry Committee would work for the protection and conservation of forests and trees within its area, and the Forest Division Office in turn would not allow any harvesting of forest produce without the concurrence of the Panchayat Forestry Committee. Letters of understanding between the Panchayat and Forest Division were exchanged in August 1973, to formalise such an agreement. This arrangement was made for an initial two-year "trial period" with prospects of future extension which would depend upon the success and experience gained during the trial period. The DFO also promised to bring other forest developments. The effective control of the forest thus gained by the local community was initially the most important motivating factor for the local population to work for the protection, conservation and development of forest and trees that followed.

The Forest Committee first set about protecting and conserving the remnant forest on the lower slopes of the

Sun Kosi below Thokarpa and a few other much smaller patches scattered over the settlement area. Felling and lopping of trees, free-range grazing and lighting of fires were prohibited in forest set aside for natural regeneration. Only grass and dead timber could be removed.

In addition to forest protection and management, other activities such as those to work for local people's participation in development and operation of tree seedling nurseries, establishment and protection of plantations, encouragement in planting of fodder, fruit and other useful tree species on private land and religious grounds, and conservation of forest products by encouraging stall-feeding of livestock, etc., gradually came within the purview of the Panchayat Forestry Committee and community forestry.

On the ridge above Thokarpa village, the forest had been reduced to poor, low, open shrubbery or sparse grassland. The DFO Chautara agreed to support a pioneering community plantation endeavour and a tree seedling nursery was established at Baghairab, Thokarpa in 1975. Its opening was marked by H.M. King Birendra's coronation and was performed by Rastriya Panchayat member Pashupati Shumshere J. B. Rana. Much of the area was planted with seedlings of pine *Pinus roxburghii* and *P. patula*, and a few broad-leaved species. Among the pines many volunteer trees and shrubs have come up of species characteristics of the original forest (Campbell and Mohns, 1984). Forest conservation, nursery establishment and planting programmes attracted much active participation and enthusiasm on the part of the local community and forest protection and rehabilitation became a part of the local way of life. Barbed wire fencing, an essential part of plantation programmes elsewhere in Nepal, became unnecessary in Thokarpa because of the enthusiasm of the local people for forest plantations and the restrictions imposed by them on free-range grazing and browsing by their livestock. In January 1979, Thokarpa became the first of the 17 panchayat communities in Sindhu Palchok, and hence in the whole of Nepal, to obtain forest land as panchayat forest and panchayat protected forest under the newly introduced Panchayat Forestry Act of 1978.

As a complementary activity the DFO demarcated forest boundaries to resolve and avoid subsequent disputes and to give further confidence to the local people.

Laxman Dong Tamang and Tej Bahadur Basnet, the Pradhan Panchas of Banskarka and Pipaldanda Panchayats respectively, had much the same perception as Nil Prashad

Bhandari. Community forestry in Banskarka has followed a similar pattern as that of Thokarpa. Strong leadership supporting the panchayat role in forest protection and other community forestry activities has continued in both Panchayats. There was similar motivation in Pipaldanda but as the influence of Tej Bahadur Basnet waned, the commitment to forest protection has fluctuated. This indicates the need to secure broad-based support for community forestry activities through appropriate education.

These activities in Thokarpa and a few other panchayats provided the foundations for the development of the subsequent Nepal-Australia Forestry Project stage 2 developed since 1978 (Campbell and Mahat, 1977, 1978; Griffin, 1977; Midgley and Mahat, 1978; Shepherd, 1981; Gilmour and Applegate, 1984). This development has since spread to other areas and projects throughout most of Nepal (Watanabe *et al.*, 1977; Campbell, 1978; Simeon *et al.*, 1979; Grunfelder, 1980; Rana, 1984). That development, however, is beyond the scope of this paper.

The experience in Chautara Division assisted also in the formulation of the new panchayat forestry legislation taking into account the new concept. The Panchayat Forestry Act of 1978 is particularly appropriate as it allows for forest areas to be placed under local control. The Act has yet to be proved in practice, in particular regarding the flow of benefits to the local panchayat communities, but it is certainly a step in the right direction.

The Chautara experience has proved that large areas can be reforested and protected through the involvement of local communities. Indeed, the innovative thinking embodied in the Panchayat Forestry Act must be boldly extended to establish a partnership in the protection and improved management of forest areas between the central government and local communities for all forest land in the Middle Hill Region of Nepal. The idea could well be extended to many areas surrounding national parks, biosphere reserves, wildlife reserves and sanctuaries and other protected areas for nature conservation in the mountain region throughout the Hindu Kush-Himalaya.

The emergence of a sense of local community-based responsibility for the forest land is seen as the most likely way to arrest, even reverse, the slow deterioration of forests, with all the adverse environmental impacts this implies.

# Partnership with Nature in the Nepal Himalaya

Chiranjeevi L. Shrestha

**ABSTRACT.** *People require the resources of the Himalaya in order to survive, yet these resources must be conserved if they are to be available for human use. The World Conservation Strategy provides guidance on solving this dilemma; based on this document, Nepal is preparing a national conservation strategy which will attempt to improve co-ordination among government agencies and to draw on the traditional concern of rural people about their living natural resources. Comparative research, monitoring, and a regional perspective are all required.*

## 1. INTRODUCTION

The intrinsic nature of life is to ensure one's own safety. In that context the topic of the workshop is deeply connected with human existence and happiness as it addresses the linkage between conservation and development. Furthermore, it is perhaps desirable to underline that man is a highly evolved member of the biosphere and his existence is entirely dependent on the various kinds of species in the plant and animal kingdoms. If the base on which he believes himself secure vanishes, he as well is destined to disappear.

## 2. THE SETTING

The Himalaya region is known for its water resources, which support the populations of the Indo-Ganga-Brahmaputra plain; and for its varying ecosystems, the rich and luxuriant wildlife and valuable forest products. The Great Himalayan peaks are majestic, beautiful and attractive; and the region has been the abode of migrated populations from north, south and west during the political upsurges and the socio-economic imbalances of the ages. It has been the seat of traditions enunciating partnership with Nature and the "Voice of the Forest" has been echoing in the philosophical insights, ethical considerations, and behaviour of the people.

The extensive lakes in the high plateau, the magnificent glaciers, the inspiring peaks, the wilderness below the snowline, the mountainous settlements flanked by cultivated terraces and pastured slopes, and the low-lying agricultural/industrial belts are the peculiarly fascinating but diagnostic features of the Himalayan

frontier. The river systems and the successive physiographic/ecologic belts from the Indus-Tsangpo plateau to the Indo-Ganga-Brahmaputra basin constitute a major ecological province.

The system nature has put to work in an interconnected pattern in this region has led to highland/lowland interdependence necessitating calculated land-use practices and ecological reservations. In that framework the various cultures developed, economic pursuits flourished, and the trend of migration and distribution of settlements came into balanced expression in the historical period.

## 3. PROTECTED AREAS

The present biosphere consisting of interconnected groups of organisms of widely diverse evolutionary ages (ranging from the most ancient to the highest representatives of the plant and animal kingdoms), forms an organised community with a balanced and interdependent totality of life. This is the concept which can be addressed by the oriental phraseology, "*Vasudhaiva kutumbakam*". Man is dependent on the various members of the biosphere, even including the bacteria. Thus extinction of the species means in a practical sense the limitation of human existence.

The national park movement started in Nepal in 1970; a separate division was created in the Department of Forestry in 1972; legislation was enacted in 1973; and the conservation education and publicity unit was created in 1974.

Nepal now has several national parks. They include glaciers, watersheds, and river catchment basins; rare Himalayan fauna and flora, including the blue sheep in Shey Phoksundo and varieties of migratory waterfowl in the special ecological niche of the lakes. In the Terai there is the unique riverine environment supporting luxuriant grasslands; this is the habitat of one-horned rhinoceros at Chitwan, wild buffalo at Koshi Tappu, endangered and vulnerable species at Royal Bardia Wildlife Reserve, and swamp deer at Royal Suklaphanta Wildlife Reserve.

The amphitheatre of the Annapurna Himalaya — the head watershed of the Modi Khola and the Seti River,

located north of Pokhara – was described for the first time by the British Expedition to Machapuchare in 1957. This region as described by Karna Sakya (1982) is a unique natural area in Asia, with prolific wilderness, lush rainforests and cascading rivers. Successive belts of sub-tropical forest, temperate rainforest, grassland, and alpine meadow give way to glaciers and moraines at the upper elevations. In the southeast watershed of the Seti River the proposed Pheasant Reserve of Pipar has four rare Himalayan Pheasant species – blood pheasant, satyr tragopan, koklass and impeyan. In addition, the culture and lifestyles of various ethnic groups are found unadulterated in the settlements located south of the region.

#### 4. CONSERVATION

The Himalayan region is strictly marginal in character; the nature of land use is variable; and its carrying capacity is limited. About a century ago, as an adaptive measure, a sizeable number of the mid-land population had to move outside Nepal to eke out their subsistence, later returning home for political reasons. The migrating waves from outside push their way into the marginal regions, putting increasing pressure on the ecosystem.

In a region which is subject to monsoon outbursts, the forest is essentially a cushion to limit the impact of the weather. The people need food, fuel and shelter, but they know that they also need to preserve the forest. The cultural trend of the orient is definitely not materialistic. There are numerous traditions which reflect a deep concern for nature:

- *dya chhayagu* – to set aside a nominal portion of food for “mother earth” before eating;
- if edible things fall on the ground, leave a small portion for the insects;
- *hulmulma jiu jogaunu anikalma byujogaunu* – protect yourself from being trodden into the ground and set aside seed at the time of famine.

All these support the idea that man is an integral member of the biosphere; and conservation is the prerequisite for development. The poor farmer knows very well that his action contributes to further degradation; but he has few alternatives.

The National Forestry Plan (Nepal, 1976) seeks to initiate a collective effort of all the people in conservation, management and development of the forest; but as yet the co-operation of the people remains limited because of the painful effects of the Private Forest Nationalisation Act 1957. While people have been retained inside the Sagarmatha and Langtang national parks as a part of the ecosystem, there was a proposal to remove the villages of Chapra and Rara in the Rara National Park (Bolton, 1976). This is a very involved and tricky matter, and experience has taught that conservation-oriented programmes can be

put to practice only with guaranteed co-operation of the local people.

Concern about soil erosion, certain land-use practices, the need of afforestation and measures about protection of wildlife can be traced in the Second and Third Plan; however, after the UN Conference on Human Environment (Stockholm, 1972) there was a major thrust in our activities and policy formulations. In the Fourth Plan period seven protected areas were established and in the Fifth Plan (1975-80) specific policies on conservation, land use and water resources were established.

Following the three main objectives of living resource conservation outlined by the IUCN in the *World Conservation Strategy* a prospectus on “National Conservation Strategy for Nepal” has been prepared; and the next phase of the Nepal National Conservation Strategy work has been undertaken with the assistance of IUCN.

The main objectives outlined in the *World Conservation Strategy* (IUCN, 1980) and “conservation” defined in the National Conservation Strategy (1984) remain the basic factors for thought-provoking exercises and guidelines for elaborate work programmes. Sincere efforts need to be made at the local, national and regional levels to explore the untapped resources which would release the stress on the marginal land and erase poverty in general.

But co-ordination among departments is failing, the people’s commitment seems too remote, and the environment is deteriorating. In this situation, mere proliferation of the institutes, enunciation of policies and enactment of legislation do not bear much productive fruit. The constraints do not seem to disappear and the gap between what we aim at and what we achieve enlarges more and more. And the people-oriented forest and land use policies do not mean much in the dearth of practical programmes.

After the UN Conference on Human Environment (1972) several institutes and organisations have emerged in Nepal; but as yet the problem of co-ordination (as was recorded in the Fourth Plan 1970-75 document) remains unresolved in practice. It must be realised that commitments at the political, economic and social level are imperative; and as long as people’s confidence and co-operation cannot be won there is no guarantee that the wheel of conservation and development will move one centimetre further ahead.

#### 5. RECOMMENDATIONS

Ecosystems in the Himalaya should be studied comparatively with similar belts in the region; and arrangements should be made for some of the protected areas to be declared as Biosphere Reserves. But such reserves cannot survive for long on grant or government subsidy; so specific thought needs to be given for exploring means to support each area through some resources generated internally.

Available resources should be examined to elevate the economy of the people around reserves, as the only way of seeking their co-operation and guaranteeing their commitments.

Conservation of wilderness and natural beauty should be taken up along with development of resort tourism. The local people will thus invent new avenues of earning instead of ploughing the marginal slopes.

Research findings on various ecosystems of the Tibetan plateau might prove notably contributive in the region to initiate research and fulfil objectives of the international network of biosphere reserves.

Studies should be made for determining whether the people settled in a particular area designated as a reserve can be allowed to remain there as part of the biosphere or should be shifted somewhere else.

A system of environmental monitoring with basic elements of observation, assessment, and forecasting should be organised.

The Indus-Tsangpo Valley of the Tibetan Plateau, the Himalaya, and the Indo-Ganga-Brahmaputra Basin form an integral part of one horizon with complicated interlinkages; which when isolated or partially looked into, is incomplete, truncated and imbalanced. This fact should be recorded and kept in mind when attempting to solve problems in the Himalaya.

The importance of enlarging national responsibilities should be stressed, and any input reasonably required be offered, not to overwhelm the national structure but to maintain a balance of progress and unfailing interest.

# “Adventure” Tourism and Sustainable Development: Experience of the Tiger Mountain Group’s Operations in Nepal

J.O.M. Roberts and B. D. G. Johnson

**ABSTRACT.** *Tourism is an important part of the economy of the Hindu Kush-Himalaya, but sensitivity is required if tourism is to bring lasting benefits to the people of the countries involved. This paper describes how one tourism organisation, the Tiger Mountain Group, works to bring benefits to local people through generating employment, providing markets for crops, and providing markets for local lodging. While “adventure” tourism can help demonstrate how wildlife can earn income without damage to the resource, the local people must also be prepared to take advantage of the opportunities presented.*

## 1. INTRODUCTION

Foreign tourism in developing countries can be a mixed blessing. It brings income and employment but distributes them unevenly. It can bring beneficial new ideas, but can also bring pollution of various kinds, some tangible, some cultural and intangible.

Within this context, we thought that it might be of interest and perhaps useful, if we tried, as candidly as possible, to consider the activities of the Tiger Mountain Group in Nepal against the five principles of sustainable development referred to in Sir Arthur Norman’s paper (this volume).

These are:

- Meeting basic needs of the poor;
- Sensitivity to culture and traditions;
- A proper consideration of the carrying capacity of the natural resource base;
- Technology appropriate to the place where it is applied; and
- Income generation for all those involved.

## 2. MEETING BASIC NEEDS OF THE POOR

Profit-oriented foreign investment is unlikely to be a significant vehicle for meeting local people’s most basic

needs, if we take these to be clean water, basic health care, reliable nutrition, shelter consonant with human dignity, gainful employment, and cultural and spiritual sustenance.

In the case of Nepal, His Majesty’s Government, helped by a variety of foreign aid programmes, concentrates on these basic needs. Yet any business operation of significant size will have some impact one way or another, however modest. Tourism is a particularly labour-intensive industry, and at the height of the peak season the Group employs some 5000 people in Nepal of whom all but a handful are Nepali. Depending upon assumptions, this may mean the economic support of somewhere between 4 to 8 times that number directly, or a substantially higher multiple indirectly, if we include the “multiplier effect.” Foreign exchange earnings for 1984 ran at about US\$ 1.5 million, which is roughly 3 per cent of Nepal’s 1984 foreign exchange earnings from tourism.

Furthermore, the Group, by being a long-term employer working in close and relatively intimate terms with employees in a service industry, makes some contribution to improving basic standards of life, even if it cannot claim to have a significant impact on general infrastructure services.

One example of this improvement of basic standards is a service offered to the people of the Tharu Village on the fringe of the Royal Chitwan National Park, who have access not only to improved medical facilities, but basic technical assistance in such things as well-digging and agricultural techniques including a demonstration “permaculture” project, designed to produce meat, eggs and vegetables on an ecologically efficient basis for the company’s needs, but also for villagers as well.

As regards the impact of basic needs of the mountain trekking activities of the Group, visitors will buy some food (which may, however, be in short supply), pay for cooked food and accommodation in lodges and above all pay good wages to guides and porters. As regards wages, the benefits are most uneven. Most of the guides (either

trekking or mountain) are from a single community, the Sherpas, and most of the load-carrying porters are professionals, coming often many kilometres away from the main trekking areas.

As trek operators, this situation has always worried the Group, as we would like to see the money being spent going to the people living alongside the trekking routes we use. As it is, by far the largest expense of agent-organised treks goes to wages, and the sums paid out, which are considerable, go, apart from in Khumbu, to people living far from the actual trekking routes. We can see no simple solution to this problem, though one can, of course, argue that the economy of the hill areas as a whole is being helped.

As regards food, the quantities bought by organised trekking groups on the trail are not large, and nor indeed should they be, as in few parts of the hills is food abundant. In the lodges, cooked food is sold, often at unnecessarily low prices, to the back-packing trekker, and this benefits the lodge owners, although not, probably, the community as a whole.

However, in this respect we feel that some villagers have lacked initiative, as trekking groups are avid buyers along the trail, of fresh vegetables, eggs, fruit and any consumable sort of meat. If these commodities could be produced on farms set up for the purpose, the trade would be both good and not a drain on normal resources.

It is a particular criticism of mountain tourism that the cost of food to the locals is forced up. To some extent this is true, but in places such as the larger centres of Solu Khumbu, Jomsom, Manang and the like, the effect of development works, the opening of hospitals, banks, schools and government offices, brings an increase of population and a demand for food that has little to do with trekking.

It is also claimed that market purchase of food raises prices in the Chitwan area, which will also have adverse effect on the poorest. However, here the true incidence – as opposed to impact – of local purchase is unclear. One clear result, though, is that again, additional income is unevenly distributed. We return to this point later.

### 3. SENSITIVITY TO THE CULTURE AND TRADITIONS OF THE INDIGENOUS PEOPLE

Trekking and mountaineering have undoubtedly had some impact on the customs, culture, way of life and beliefs of the hill people. The loss of such local culture is sometimes referred to as “detrribalisation” – the loss of tribal character, traditions and national dress, etc. During the last 40 years there have been very considerable, indeed immense, changes as regards the impact of the outside world on local culture and traditions. However, these go back much further than the relatively recent advent of mountain tourism. The changes have been due mainly to military enlistment in foreign armies, job-seeking in India,

and commercial ventures. The changes have seldom been for the better, but are presumed to be the price that must be paid for “development”, improved communications, and, one has to add, general education.

In our judgement, mountain tourism here must tread a difficult path. Just as the keepers of an ancient temple or other national monument strive to protect their edifice, so the mountain tourism industry must strive to protect their “product”. And this product is not only scenery but people. We must strive to protect and conserve the wildlife, forests and natural resources of the Himalaya, as these are the lifeblood of mountain tourism. At the same time, mountain tourism has an incentive to encourage and educate the Himalayan peoples to repossess their cultural heritage, their music, dance, and traditions: to cast off the drabness of frayed khaki shorts and soiled singlets and to emerge once again as the proud inheritors of ancient mountain traditions. Such changes as the replacement of tile and slate roofs, which use local materials and are labour-intensive to construct but highly durable, with costly imported corrugated sheets, produce a form of visual pollution which undoubtedly diminishes the scenic beauty of hill villages. The mountains are the hill peoples’ asset – they must be encouraged to use them so that the benefits are sustainable.

The above applies to reserve areas and protected mountain areas; but the Group also operates in a lowland national park (Royal Chitwan) and, in West Nepal, on the Karnali River in the Royal Bardia Wildlife Reserve. Here, the local people are generally not indigenous to the region but immigrants from hill regions who now practise settled agriculture in formerly malaria-infested forest areas of scant human population.

The true indigenous people are the Tharu, whose high resistance to malaria enabled them to inhabit the Terai region before it was cleared, and malaria was brought under control. The Group’s impact on the culture and traditions of the Tharu is best seen in its guest facility in a Tharu village. Here, the “longhouse” is modeled on the traditional Tharu style of building, believed to date back to the 12th century. The building is constructed entirely in local materials, and the decor carried out by local craftsmen with relief paintings representing the flora and fauna of the Chitwan valley.

It is the Group’s hope that, in presenting the arts and dance of the Tharu as an integral part of its operation in the Chitwan area, they can make a modest contribution to preserving the culture, showing the local people that their way of life is of interest to visitors from the outside world.

Naturally, such efforts, however well-intentioned, can have their negative effects as well. The very act of bringing foreign visitors into relatively close contact with traditional cultures poses threats to those cultures. The best control here is restraint of numbers, so the Tharu longhouse has only eight double rooms and visitors are not encouraged to stay for more than one night.

#### 4. A PROPER CONSIDERATION OF THE CARRYING CAPACITY OF THE RESOURCE BASE

This is a particularly large topic for a Group working in a variety of environments, and only a few examples of the sort of problem that may be faced can be cited here.

In general, the impact of the Group's Chitwan operations is governed overall by limits of size and numbers (20 double rooms limit at Tiger Tops, 12 at the Tented Camp). Yet there are clearly major problems inherent in running a tourist operation in a park from which a growing local population is excluded.

One example of the type of impact that it is hard to avoid is the fact that around the western end of Chitwan there is now scarcity of firewood and of the formerly-abundant river bank grasses used for grazing, thatching and fencing. Here human population pressures have caused the villagers to clear and graze the north bank of the Rapti River, which forms the park boundary, so intensively that it has been the subject of rapid erosion. Meanwhile on the south bank, which lies in the park, the trees and grasses are protected; when the monsoon rains swell the Rapti it washes the unprotected bank, and its whole course shifts. In much less than a decade it has "taken" upwards of a kilometre of the villagers' land and added a roughly equivalent amount to the park area, thus increasing further the pressure on local livelihoods.

Then there is the vexing question of the carrying capacity of a park for wildlife, where live baiting is practiced. Here respected authorities are divided as to whether such baiting — which has been considered essential to maintain client interest and thus sustain an exceptional quality of experience — produces regional over-population in the case of leopard or tiger.

Turning again to the mountains, there is the environmental impact of the trekkers and expeditions, and the wear and tear on the countryside. Aside from the aesthetic problems of garbage and toilet paper (proper code of conduct such as that of the Sierra Club can easily eliminate these), the felling of trees for firewood has an economic as well as an environmental impact.

Contrary to a popular image, trekkers do not move through Nepal cutting down trees and leaving a trail of destruction behind them. The trees are cut and branches are lopped by the villagers, and then sold to the trekkers as bundles of firewood. As long as the villagers are harvesting the wood in a controlled and sustainable manner, no serious damage may be done. But this is not always the case. Any afforestation project is of value in Nepal, but there is a particular need for more social forestry, in the sense of villagers growing trees as crops. If such tree farms could be established by Panchayat initiative along the trekking routes, the output, after a time, might both meet local needs and also provide a valuable cash crop, as wood is one commodity the trekkers must buy.

Regarding the situation in Khumbu, the recent (1984) observations of a well-informed Sherpa, who is both a trekking Sardar and a well respected figure in Khumbu life, are worth quoting:

"Although Sagarmatha (Everest) National Park is now generally accepted among the Sherpas as a positive thing, tree cutting is still being done by the local people. There are many new trekker's lodges and shops, particularly in Namche. Much of the cutting goes for cooking fires in the lodges. Trekking parties who are camping (almost entirely organised treks through registered trekking agencies) are required to use kerosene and absolutely cannot cook using wood, and certainly not have camp fires. Thus it is not the trekking companies that are responsible for the cutting in Khumbu, but rather the trekker's lodges who are catering to the private trekkers not dealing with a trekking agency" (Roberts, 1984).

Sagarmatha National Park contains some magnificent forests. It seems essential that these be husbanded, controlled and propagated so as to produce sufficient supplies of fuel for both the inhabitants of the park and its visitors.

When looking at the environmental impact of trekking, we should distinguish between "transit trekking" (e.g. around Annapurna) and "destination trekking" such as the Annapurna Sanctuary and Khumbu. In the case of transit trekking such as the Annapurna trail, trekkers seldom spend more than one night in each camp or village, seldom leave the trail, and do little damage. In the case of the Sanctuary and Khumbu, however, trekkers and expeditions fan out all over the place and extensive damage is being caused to the high-altitude scrub and bushes, such as junipers, which have a very slow growth rate — as little as 1 cm per year. There seems an excellent case, for instance, for HMG to ban all camping and lodges in the Modi Valley beyond Hinko, with the implication that the upper glacier basin of the Modi will be closed for mountaineering, for a trial period of five years. During this time, an investigation could be carried out of the high altitude ecology of the region and later camping permitted when new regulations have been formed, and the fuel situation studied.

#### 5. TECHNOLOGY APPROPRIATE TO THE PLACE IT IS APPLIED

There is less of relevance to comment on here. We have quoted the fact that registered trekking agencies are required to use kerosene and cannot have camp fires, so as to conserve fuel wood.

Regarding the lowland operations of the Group, we have also referred to the permaculture project at the Tharu Village. (Other permaculture experiments are being carried out in India at the Group's Ladakh facility).

In Chitwan and the Tharu village, solar heating is used for water to conserve fuelwood. It happens also to be a sound choice on general economic health and safety as

well as environmental grounds. The Group has examined the possibility of extending the use of solar power to photovoltaics, and perhaps even reintroducing the old technology of hydraulic ram pumping for a proposed hill-top operation not far from Pokhara.

Such "appropriate technology" choices must clearly be made primarily on economic rather than environmental grounds. However, with an environmentally-dependent industry like adventure travel and tourism, there is an obvious built-in incentive to opt for the most unobtrusive, low-impact technology where possible.

## 6. INCOME GENERATION FOR ALL THOSE INVOLVED

Regarding the final principle of sustainable development, the Group would have to re-adjust the wording slightly. The principal benefit to the host country – and region – of wildlife and adventure tourism is clearly income generation; and generally, with some exceptions in the case of trekking as mentioned above, all those involved *do* benefit, to some degree at least, in income terms. The problem lies first with those *not* involved, yet who are adversely affected by the existence of the park or the tourist operation (the people outside Chitwan, whose crops are destroyed by an arguably excessive population of roaming rhino, for example); second, with the inequality of income distribution, which is undeniable.

Should a degree of equality, or at least equity of income distribution, be a basic requirement of sustainable development? This is too large an issue to be argued here. To the extent that basic needs are denied in the course of the development – or at least not met – then there are arguably aspects of tourism that fall short of the first and last of the above general principles of sustainability.

Of these the outstanding one is loss of income – and food supply – on the fringes of a national park. There seems a clear case for greater compensatory action here along the lines suggested in point 5 of the Bali Declaration, which, in the context of the need for increased local support for parks, refers to "such measures as education, revenue sharing, participation in decision . . . and complementary development schemes adjacent to the protected areas."

## 7. CONCLUSION: THE NEED FOR MORE POSITIVE INPUT

As regards these "Point 5" recommendations, it seems clear that guidance should generally come from government rather than from the private enterprise operator.

Nevertheless, the Tiger Mountain Group has taken a few rather tentative steps towards meeting these Point 5 requirements.

One of these, the Tharu Village development, has been referred to above. In addition, in 1978 some Board Members of the Group, together with other like-minded individuals, established the International Trust for Nature Conservation, (ITNC). The purpose of this Trust was to promote the protection of, and research into, wildlife and its habitat both in Nepal and elsewhere. One of its principal activities has been a conservation education programme aimed at the villages that surround Chitwan. More recently, the scope of the Trust has been expanded to include more general concern with sustainable development in the areas surrounding the Group's operations, the idea being that the existence of the infrastructure of an adventure tourism operation offers a valuable support system for such activities.

The ITNC's philosophy is that wildlife – both plant and animal – if it is to survive in today's over-crowded and environmentally threatened world, must increasingly pay for itself. It can do this through the interest and enthusiasm which it evokes from people, both in its natural habitat and on screen and page. This is, of course, a philosophy shared with other wildlife organisations.

ITNC believes that adventure travel offers a special opportunity for the self-supporting potential of wildlife. Tourism of any kind, as we have seen, puts pressure on the object of touristic interest. These pressures affect not only flora and fauna but local people. Man the visitor, observer, and enjoyer, must in some measure repay what he has consumed.

New projects under study for ITNC support include revegetation of the north side of the Rapti river and other advice and support with tree cropping close to Tiger Mountain Group operations.

In this work, the Group hopes to co-operate closely with, and support the activities of the King Mahendra Trust for Nature Conservation, whose objectives it fully shares.