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An Overview of Park–People Interactions in Royal Chitwan National Park, Nepal

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ABSTRACT

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Long-term success of national parks and protected areas requires a shift in management philosophy that combines resource management with a sensitive understanding of the social and economic needs of the local people. This paper analyses current conflicts and issues between local people and Royal Chitwan National Park (RCNP). The role of cattle in local subsistence economy is highlighted, and problems of agricultural/livestock depredation by wildlife are discussed. Potential solutions discussed emphasize the need for the RCNP to accept the responsibility of meeting subsistence needs of firewood and fodder of people living in an "impact zone" by initiating community forestry programs and by promoting ways and devices to increase the efficient use of available resources.

CONCEPTUAL BASIS

Many conservationists believe that the success of national parks and protected areas depends upon the extent of support and positive attitudes and perceptions of local people towards such establishments (Dasmann, 1984; Machlis and Ticknell, 1985; Zube, 1986). In developing countries, ignoring the dependence of local people on park resources for their subsistence needs and emphasizing law enforcement can aggravate conflicts between indigenous people and park managers. Park planning, therefore, should be holistic, taking into consideration cultural, political, socio-economic, as well as ecological issues (Lusigi, 1984). The old concept of shielding parks from outside human influences must gradually evolve to adapt to changing socio-economic realities while still fulfilling the primary objective of nature conservation (McNeely, 1984). Efforts should be made to educate park managers and policy makers to discard the "fortress" mentality of park protection, a misconception that

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lands) with the help of foreign donors. Almost simultaneously, a resettlement program was launched, which triggered the influx of hill people into this frontier land.

Population growth and deforestation are serious problems in Chitwan and throughout Nepal. In Tarai, of which Chitwan forms a part, 1.8 million ha of forest in 1963–1964 was reduced by 1978 to 0.4 million ha (having up to 50% crown cover): an astonishing loss of 78% in 14 years (Jaakko and Madecor, 1987). Most of these deforested lands went into cultivation. The Land Resource Mapping Project data* also show that about 60% of Nepal's total land is not put to proper use. Most of these lands are poorly stocked (having no more than 10% crown cover) or consist of denuded shrublands and grasslands (Nield, 1985). The population in Chitwan has increased 274% between 1920 and 1980, with a rise from 97 to 223 persons km^{-2} between 1952–1954 and 1981; the annual population growth of Nepal is still 2.66% (Gurung, 1984).

Realizing the seriousness of the situation, the government established Royal Chitwan National Park (RCNP) in 1973, which was enlarged in 1977–1978 to encompass a substantial area of 932 km^2 in the Rapti Valley.

Several factors have contributed to the rapid deforestation in Nepal and current provisions seem inadequate to halt those trends. In Chitwan, for example, the government could not plan an effective resettlement program. The powerful lobbying of the government by the timber merchants had been responsible for maintaining the flow of timber exported to India even at the expense of losing forests. The public at large were relatively unconcerned about the forest destruction, and forest conservation policies were not properly thought out. For example, the policy to nationalize forests during the late 1950s without adequate infrastructure jeopardized the future of forests further as it destroyed the traditional system of protection. Effective reforestation programs are few and far between. Currently, the firewood demand, on which 80% of Nepalese depend for their energy needs (Nield, 1985), is being met by deforestation at an estimated rate of about 0.1 million ha per year (Jaakko and Madecor, 1987). Without major changes in this situation, the future for forest ecosystems in Nepal is bleak.

Excessive cattle grazing is another major cause of forest destruction. Lacking any controls on grazing in forests, farmers were motivated by short-term profits, that are made possible by grazing cattle on nearby forest lands. Owning more cattle was cheaper than buying artificial fertilizers and renting or owning tractors. The extra amount of manure and traction required for almost year-round cropping could be fulfilled by spending a small number of man-hours on shepherding because farmers could freely graze any number of cattle in the forests. This is illustrated by a study in Chitwan, which shows a village at the park border, in 1976, supporting a livestock biomass of 41 764 kg km^{-2}, whereas a village 6 km away supported only 27 895 kg km^{-2}. The difference in densities is almost wholly due to the added number of cattle that could be supported by grazing nearby forests (Seidensticker, 1976). The problem is that as the livestock population builds up near a forest edge, excessive grazing prevents natural regeneration, and the long-term result is loss of forested lands.

Furthermore, because of religious taboos against beef eating and a law that prohibits cow slaughter and export of cattle to nearby India, the cattle population in the park-adjoining villages could not quickly be reduced even after the nearby park forests were closed for grazing. The overpopulation of cattle puts substantial pressure on the forests outside of the park, which are still open for grazing.

From the local people's point of view, the park is more of a nuisance than a source of

*Land Resource Mapping Project (LRMP), a joint project of His Majesty's Government of Nepal and Canadian International Development Agencies, completed an extensive land-use survey of Nepal in 1985 (Nield, 1985).

benefits (Mishra, 1984). Every year local farmers lose substantial quantities of crops due to damage caused by wildlife, mostly rhino (*Rhinoceros unicornis*), wild boar (*Sus scrofa*), Chital (*Axis axis*), and parakeet (*Psittacula kremeri*).

Rhinos raid crops in Padampur almost all year round: June through August on maize, August through November on rice, October through January on lentils, and from December through March on wheat (Milton and Binney, 1980). Gyawali (1986) reported that during the rice harvest (November), 43% of the rhino diet for a "village-edge population" consisted of this paddy crop. Substantial man-hours are spent by farmers driving rhinos and other wild animals away from their fields and watching their farms overnight from raised platforms built at the edge of the farm. Some villagers in Padampur panchayat (a panchayat is a village-level political unit of at least 5000 people) reported 80–90% crop losses; as a consequence, many fields are taken out of cultivation or some species are not planted at all (Milton and Binney, 1980).

ANALYSIS OF CONFLICT ISSUES

Since the establishment of RCNP, several changes in resource management policies have occurred that directly affected the local people's way of living: livestock grazing is no longer allowed; local people's movements are confined to the daytime use of defined public right-of-ways passing across the park; seasonal gathering of wild fruits, vegetables, medicinal herbs, bird's eggs, fishing in ox-bow lakes, and occasional hunting and trappings of wild animals are forbidden. A large number of armed guards, almost at the rate of one guard km^{-2}, are deployed for law enforcement.

Subsistence farming in Nepal involves a set of economic strategies in which crop production is supplemented by the use of forests and grasslands for livestock grazing and by the exploitation of other forest resources. Livestock allow effective use of natural resources by their conversion of inedible materials for human consumption such as grasses and fodder to useful products such as manure and milk. Besides oxen, the basic instruments of subsistence agriculture (Harris, 1966), cattle provide traction power for tilling lands and transporting materials. Pandey (1985) estimates that 30% of the fodder of domestic stock in Nepal comes from the public forests. In other words, cattle not only convert resources otherwise useless to humans into useful forms but also make available a substantial quantity of resources that are not grown in farmers' fields. Wyatt-Smith's (1982) rough estimates, moreover, throw light on the extent of dependence of subsistence farmers of Nepal on the forests. He estimates that under the current state of forests in Nepal, 3.48 ha of forest are required for 1 ha of cultivated land (2.80 ha for fodder, 0.36 ha for fuelwood, and 0.32 ha for timber). However, the current ratio of available forest to the cropland in Tarai is only 0.48:1.00 (Nield, 1985, calculated from Table 1, p. 4).

Cattle are important to local people for several other reasons. Farmers holding small pieces of land, less than 1 ha (Milton and Binney, 1980), are typical residents of park-adjacent villages of Chitwan. Such farmers can increase production by optimizing the use of cattle for manure and traction (Sprangue, 1976; Simpson, 1988). Cattle are practically their only source of cash income, acquired by selling milk, yogurt, ghee and calves. Besides, livestock are an important source of protein to the villagers. Cows satisfy several religious needs and are an important component in the Hindu life for spiritual inspiration. Several folk tales, which are widely believed, describe the cow's divine power in bringing prosperity to the devoted. Cow dung mixed with mud is used to plaster house walls and floors. Even its urine is considered purifying and consumed on occasion.

In terms of ecological efficiency, Leon (1975) argues that cattle are more useful in

Indian society than in American society. In the U.S.A., 78% of the food consumed by cattle is edible for people whereas in India this figure is only 48%. Unfortunately, in many situations in India and Nepal, overgrazing has caused deforestation, desertification, soil compaction, and suppression of plant communities. Furthermore, they invade planted fields; and half-starving cattle may carry and transmit several diseases (Diener et al., 1978; Simoons, 1979). The use of cow dung for fuel, which Harris (1966) so naively believed a beneficial use, is only a sign of deterioration of the natural sources of firewood. The continuation of such practices can lead to a decrease of agricultural productivity or an increase in the dependence on artificial fertilizers.

The establishment of RCNP without provisions to stabilize the cattle population or to resolve the worsening firewood situation further heightened the incipient conflicts between the park management and local people. As more forests and grasslands outside the park were lost, such conflicts became more and more pronounced. The incidences of stealing firewood and illegally grazing livestock in the park forests increased. According to official records, 554 people were fined and 1306 cattle and buffalo were impounded in the fiscal year 1985–1986 (Table 1). These numbers are believed to represent only the "tip of the iceberg"

TABLE 1

People fined in the Fiscal Year 1985–1986 in Royal Chitwan National Park

Sector[1]	No. of people fined for stealing firewood or cutting grasses	People fined for grazing following no. of cattle/ buffaloes inside the park
Amuwa	55	379
Khagendramalli	10	18
Sauraha	120	343
Kasara	267	467
Bhimle	102	99
Total	554	1306

[1]Law enforcement units inside the park.

of the actual offenses. At Pancha Bhela a 2-day-long community meeting of local leaders which is organized every year by the park, the two biggest grievances raised are the lack of firewood and fodder in the villages. The leaders, in several such meetings, have demanded that the park meet such basic necessities of the local people.

People have adopted different strategies to meet their firewood needs in areas of shortages. A substantial portion of their firewood demand is met illegally by taking firewood from the park during the annual grass-cutting season (Lehmkuhl et al., 1986) and during other times of the year. Other sources of firewood include: collection of driftwood during the monsoon season when rivers are flooded; agricultural wastes; private trees. Nationally 74% of the firewood demand is met from public land (Jaakko and Madecor, 1987), and this average still seems to hold true for park-adja-

TABLE 2

Buffer forests available around Royal Chitwan National Park forests and grasslands south of Mahendra Rajmarg (highway) only have been taken into consideration

Panchayat(s)	Area (ha)
Jyamire and Piple	701
Bhandara and Kathar	545
Kumroj and Kathar	556
Bachhouli	117
Bachhouli, Debauli, Geetanagar and Patihani (Barandabhar forest)	5 927
Jagatpur and Sukranagar	97
Meghauli and Sukranagar	331
Meghauli and Dibyanagar	419
Gunjanagar and Sharadanagar	185
Pithouli	594
Kumarwarti and Agyouli	165
Kawasati and Pithouli	1 265
Koluwa, Narayani and Parsauni	594
Belhani	234
Belhani and Dumkibas	2 803
Tribeni	3 328
Gardi, Baghauda, Kalyanpur and Ayodhyapuri	15 970
Thori	7 681
Total	41 512

cent villages, despite the presence of armed guards.

The extent of crop damage and livestock depredation by park wildlife are not uniform and the effects seem localized on some uniquely placed villages. Table 2 provides subjective ratings of crop damages. The ratings are based on informal interviews with key informants. Panchayats with substantial crop-damage problems were found to have no protective natural boundaries such as a hill or a big river, and/or were placed adjacent to large grassland areas of the park. Most often livestock were lost to tigers or leopards when such livestock were illegally grazing inside the park. Humans have occasionally been killed by man-eating tigers. The park's prompt actions to remove or kill such man-eaters or potential man-eaters have greatly helped to reduce people's fear of the animals.

POTENTIAL STRATEGIES TO REDUCE CONFLICTS

Responsibility

Although the Forest Department is responsible for the management of all forests including deforested lands outside the park, it seems extremely unlikely that the department will implement effective programs in the near future, particularly with specific objectives to fulfill the local demands of firewood and fodder. Continued loss of trees and forest lands adjacent to the park means increased pressure on the park forests. To offset this pressure, the Department of National Parks and Wildlife Conservation (DNPWC) should act promptly to secure all public lands within a defined "impact zone" around the park. The RCNP should develop plans to meet the firewood and fodder demands of 37 park-adjacent panchayats, which Mishra (1984) estimates contain 320 villages and 261 300 people.

This proposition may sound too ambitious but such a holistic scheme seems to be the only long-term viable strategy to protect RCNP. By accepting such a challenge DNPWC would be committed to develop a new system of forest conservation based on multiple use and maximization of yields, to initiate community forestry programs at appropriate places, to implement energy-saving measures, and to provide provisions for a long-term conservation education program. Similarly, appropriate cattle development strategies should be designed and implemented to: (1) stabilize the cattle population by reducing the size of current herds and by providing additional sources of fodder resources; and (2) promote the efficient use of available resources such as agricultural wastes, community lands and farms. This means that DNPWC or RCNP must also act as a coordinating agency with other government agencies and foreign donors to foster rural development programs such as family planning, health care, education and agricultural development.

Impact zone

An impact zone outside the park should be identified based on field situations which include: the local availability of forests; the average distance traversed to collect firewood and fodder; the average linear distance cattle traverse for grazing on public lands; the transportation such as bullock carts or canoes for access to the buffer zone; the distance park wildlife traverse to raid crops; the availability of easily recognizable landmarks for making the boundary of the zone.

A survey of local people conducted during the grass-cutting season revealed that more than 73% of them walked between 3 and 10 km (Lehmkuhl et al., 1986), which gives an excellent guideline for the proposed impact zone (Fig. 1). The total area of all parcels of forests, from small to large, available within 5–10 km of park boundaries south of the highway (Mahendra Rajmarg) is about 42 000 ha (Table 3).

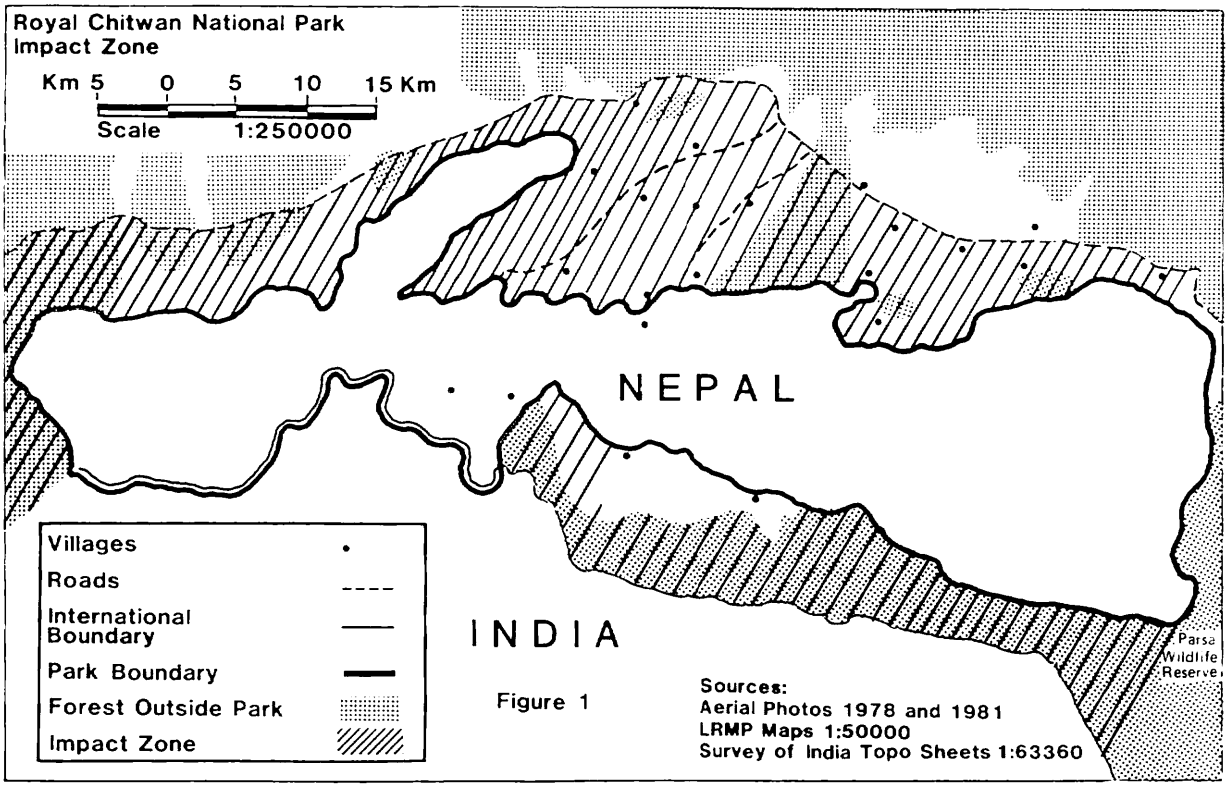

Fig. 1. Royal Chitwan National Park, showing forests available in the vicinity of the park. Forest south of Mahendra Rajmarg (highway) has been proposed as an "impact zone".

Cattle management and firewood sufficiency

Local people, particularly the village political leaders, should be motivated to participate in the existing community forestry programs. According to recently adopted government policies, a public land area of up to 125 ha can be handed over to a local panchayat for reforestation if two-thirds of the area is required to be replanted. The panchayat is entitled to all income generated by that land. Similarly each panchayat can request another 500 ha of forest in its area if the panchayat will protect it. In this case, the local village qualifies for 75% of the revenue generated from the forest. Such land can be managed to grow fodder as well as firewood. The community forestry programs have worked well in some areas of Nepal, primarily in fulfilling village firewood demands. However, the success of community forestry projects has been found to depend upon the extent of community awareness, motivation and involvement, as well as the skill and motivation of the supervisory government staff (Mahat, 1985).

Private trees

Farmers can be encouraged to plant their own trees for fodder and firewood in underutilized areas of their properties such as farm rises, around the houses, and along the roads and canals. Seedlings can be raised in community-run nurseries. In fact, the government's Community Development Project has already discovered that there is a tremendous demand for such seedlings. Their five-year target of distributing 900 000 seedlings was almost doubled prior to termination of the five-year period (Kayastha, 1985).

TABLE 3

Crop damages by park wildlife in the adjoining villages of Royal Chitwan National Park (scale[1]: nil, low, medium, high)

Name of the panchayat	Rhino	Chital	Wild boar	Parakeet
Chitwan district				
Piple	High	High	Low	Medium
Bhandara	High	Medium	Low	Medium
Kathar	High	Medium	Low	Medium
Kumroj	High	High	Medium	High
Bachhouli	High	High	High	High
Padampur	High	High	High	High
Debauli	High	High	High	High
Geetanagar	Medium	Medium	Medium	High
Patihani	Low	Low	Medium	Medium
Jagatpur	Low	Low	Medium	Medium
Sukranagar	Medium	High	Low	High
Meghauli	Low	High	High	High
Dibyanagar	Medium	Low	High	Medium
Gunjanagar	Low	Low	High	Medium
Sharada Nagar	Low	Low	Low	Low
Gardi	Low	High	High	High
Baghauda	Low	High	High	High
Kalyanpur	Low	High	High	High
Ayodhyapuri	Low	High	High	High
Nawalparasi district				
Mukundapur	Medium	Low	Low	Low
Amarapuri	Medium	Low	Low	Low
Rajhar	Medium	Low	Low	Low
Dibyapuri	Medium	Low	Low	Medium
Pragatinagar	Medium	Low	Low	Medium
Pithouli	High	High	High	Medium
Kawasati	Medium	Low	Low	Medium
Agyouli	High	High	High	High
Kumarwarti	Medium	High	High	High
Koluwa	Medium	High	High	High
Narayani	High	High	High	High
Tanasariya	Medium	Medium	Low	Medium
Parsauni	Medium	Low	Low	Medium
Belhani	Medium	Medium	Medium	Medium
Dumkibas	Low	Low	Low	Medium
Tribeni	Low	Low	Low	Low
Parsa district				
Thori	Nil	High	High	High
Makwanpur district				
Jyamire	Medium	High	Low	Medium

[1]Scale is based on perceptions of interviewees, considered over a 1-year time period. Nil: problems do not exist. Low: problems exist but interviewee does not specifically recall the extent of damages occurred due to being insignificant. Medium: interviewee recalls specific incidence(s) of damages, but would not consider it adequate to lodge complaints to the park office. High: interviewee recalls several incidences in which damages were extensive and would lodge complaints to the park office.

Gobar gas plants

Gobar (bio) gas technology based on cattle dung has several benefits and great potential for success in Chitwan. Dung mixed with water is fed to a dome-shaped structure of metal or masonry, which holds gas, released during the fermentation of the dung; the gas is piped to burners for cooking or lighting. Most of the materials required for the plant can be locally made. Although regular supervision and knowledge of the process are required by owners of the plants, it has worked well in several developing countries (Taiganides, 1980). Gobar gas plants maximize the use of cattle wastes, they produce combustible gas and the fertilizing constituents of the dung are conserved and even enhanced during the digestion process (Taiganides, 1980). Its adoption would encourage stall feeding of cattle as a desired change.

Adoption of gobar gas technology in the park-adjoining villages would benefit the Royal Chitwan National Park because conflicts between local people and park management are likely to be reduced. Devkota (1986) estimated the total costs of a plant sufficient for a small family as about Rs. 15 000 ($600). A 50% subsidy by the government could make the plant affordable to a majority of Chitwan farmers.

Efficient use of agricultural wastes

Rice straw is an important cattle feed. However, the energy contained in straw is poorly utilized. Jackson (1977) estimated that out of 80% of the potentially digestible materials only 45–50% are digested by ruminants due to an inadequate level of nitrogen in the feed. Furthermore, animals cannot eat more than 2% of the body weight of this fodder due to the slow rate of fermentation in the rumen. As a result, during the dry season livestock cannot gain weight. Instead, they lose weight as a result of low nitrogen content in the feed and its low intake. The nitrogen content in the feed can be enhanced by increasing the percentage of of-

fals out of cereal and pulse millings.

Jackson (1977) finds that the stems of rice straw, due to their lower silica content, are more digestible than the leaves. This means, during the paddy harvest, which is done manually, the stems should be cut as close to the ground as possible so that valuable stems are maximally harvested. To improve digestibility and intake of straw, Jackson (1977) recommends an alkali spray of the straw and mixing in of urea and other minerals. Chemical supplements, although desirable, are not locally manufactured and the farmers may not be able to afford them at imported prices. Thus, further research should be carried out to determine if locally available materials can work equally well.

Improved stoves

Traditional firewood stoves are poor in energy efficiency – only 15% of the energy of the wood is utilized with these stoves (RECAST, 1982). A design for an energy-efficient firewood stove has been developed which can reduce firewood consumption by 30–35% (CFP/SIU, undated). These stoves should be made available in the park-adjacent villages for free distribution or for sale at a nominal price. Programs should be launched to educate people about the benefits of using such stoves, particularly because the use of such stoves in other parts of the country has remained limited due to inadequate publicity (Joshee, 1986).

Management of forests for multiple use

All forests in the impact zone should be divided into two categories for the purpose of management. Forests which are close to villages and which require two-thirds of the area to be replanted, should be managed as community forests. The remaining forests should be managed by the park authorities as buffer forests for multipurpose use including firewood, fodder, timber, game and other minor forest products.

Law enforcement in these forests should be made stricter than presently exists. Cattle grazing should be gradually eliminated and entry of local people should be limited to licensed firewood and fodder collectors, when the forests are periodically opened for that purpose. The organized timber theft which occurs in some areas must be stopped by employing better security tactics.

Immediate measures

In order to successfully implement the above programs for making the communities self-sufficient in firewood and fodder, partial exploitation of park forests along park boundaries (up to 1 km within the park) and at a few locations, is proposed. Such proposed exploitation is not new as a partially exploited belt about 1-km wide adjacent to park boundaries already exists because of the regular theft of wood and grasses. By carefully planning such exploitation, trespassers' impacts on wildlife can be reduced and such resources can be equitably distributed in the community. An added benefit is that legalizing and managing trespassing may foster positive attitudes towards the park. The proposition is meant to solve the immediate needs of firewood and fodder in some critical areas and is only a temporary measure until fuelwood plantations are ready for harvest or until a substantial reduction in numbers of cattle is achieved. In the meantime research should be carried out to determine how much partial exploitation of such resources may be permissible in a park setting.

Firewood depots, run by communities, should be opened near villages using woods collected from the designated park forests, driftwood found along rivers, and confiscated firewood and logs from illegal collectors. The depots, run on a non-profit basis, should be closely supervised by park staff and under no circumstances should the firewood be sold to outsiders or exported out of the impact zone.

Permission to cut grasses within about 1 km of selected fringe areas should be given during

April through June, when the supply of grasses in the villages is at a minimum. The rest of the year the enforcement of park laws can be made even stricter than at present. Permission to cut grasses instead of allowing free grazing by cattle is necessary to encourage stall feeding of cattle. This will encourage the farmers to keep only the useful and most needed cattle and thus reduce cattle population in the area. Stall feeding reduces the trampling and soil compaction effects on forests, and it is compatible with the gobar gas program. Additionally, permits can be issued based on local people's cooperation to stall feed cattle and to sell old and unproductive cattle to outside animal dealers.

Agriculture depredation reduction and compensation for losses

Research must be conducted to address the problems of livestock depredation and, in particular, crop raidings by park wildlife. Monetary compensation for losses of crop/livestock is not practiced in Chitwan because there is no legal basis nor an available institutional framework for implementation. The unofficial claim of park officials is that "a form of compensation" has already been granted every year when the park is opened for grasscutting (Mishra, 1984, p. 202). However, this system has problems in terms of how well it distributes costs and benefits.

The measures discussed below address the socio-cultural nature of the problem and endorse Leopold's (1963) suggestion that unlimited growth of wild animals in national parks must be controlled.

Confining wildlife within park

A specific method of confining wildlife was tried in Padampur panchayat, an area adjacent to RCNP with limited success. A barbed wire fence was erected in combination with a six-foot-deep trench containing an escape bay for wildlife on the park side. Several reasons have been cited for its limited success including: the annual monsoon flooding that filled the ditch causing costly maintenance; the fence was not strong enough to sustain a rhino's impact; the rhinos could circumvent the fence walking across or along the river courses (Milton and Binney, 1980). In any case, the fence and trench option involves almost prohibitive costs; furthermore, a foolproof system would require double fence lines (Milton and Binney 1980).

The most important reason a fence, even an electric fence, would not work in Chitwan is the socio-cultural nature of the problem. The local people themselves must break fences in order to illegally enter, graze cattle, and collect firewood and other forest produce. Thus, the problem of wildlife raidings of crops cannot be solved in isolation and must be considered with other socio-cultural problems which arise due to shortages of firewood and fodder. If such fundamental problems are resolved by measures discussed above, the experiments to erect electric fences at strategic locations can be carried out.

Hunting in buffer forests and monetary compensation

The population of four species of wildlife: rhino; chital; wild boar; and parakeet, are responsible for the major crop damages. In the designated buffer forests (see above), hunting should be used as a management tool to reduce numbers of those species which are not endangered. A recent law has already empowered the park-adjacent landowners to shoot or trap wild boar. This excellent provision should be extended to chital too. Parakeet may be declared as a "pest" outside the park and trapping or killing allowed.

Rhino and tiger, being endangered species, compound the problem. However, a hard decision on their management must be made rather quickly. Live rhinos and their parts fetch handsome sums of money (Martin, 1985), which can be utilized for the purpose of conservation. A periodic culling of "problem" an-

imals should be given consideration. The current practice of killing occasional man-eating or potentially man-eating tigers should be continued.

Villagers should be monetarily compensated for their losses of crops and livestock. For livestock loss such provision should apply only if it happened outside the park. This would, however, substantially inflate the park budget as, besides the monies paid for compensation, it would require additional park staff to field-check every damage claim. Also a system of cross-checking by an independent institution may be required to ensure that settlements are done in an honest and fair manner.

Land acquisition

Acquisition of adjacent lands to resolve the crop damage problems can only produce short-lived success as there will always be other lands adjacent to those included. Nevertheless, at some specific locations, the acquisition of land can substantially reduce the problem for a long time. However, the land acquisition option is a costly affair and causes several, often unexpected socio-political problems.

CONCLUSIONS

A lasting resolution of "park–people conflicts" will not come with short-term solutions. Nepal's efforts to integrate national parks and reserves into the regional socio-economic system are praiseworthy. The current set of propositions stating that RCNP should accept the responsibility of meeting subsistence needs of firewood and fodder of people living in the 37 adjoining panchayats, and initiate measures to deal with crop and livestock damages by wildlife, will further reduce these conflicts and provide additional solid footings to ensure RCNP's success in the future.

A long-term strategy for making the surrounding areas of RCNP self-sufficient in firewood and fodder for subsistence purposes has an ultimate goal of transferring such responsibilities to the hands of local people themselves. The success of such a strategy can be enhanced by implementing extensive public education emphasizing importance of forests, strengthening law enforcement to maximize yields of buffer forests, providing opportunities to local people to develop community forests and their own sources of firewood and folder, maximizing the use of agricultural wastes, and popularizing the use of energy-saving stoves and use of gobar gas plants by educational and subsidy programs. The RCNP can play an important coordinating role not only by helping untangle the bureaucratic procedures to establish community forestry projects but also by making changes in its management policies to suit its unique requirements.

A key to success in RCNP and many other parks in developing countries is recognizing that parks are more than geographical entities. They are social institutions. Their existence inevitably affects local populations and their long-term success may be dependent on whether they are viewed as assets or unwelcome problems by these populations. To do this requires a park-management philosophy that combines resource management with a sensitive understanding of the social and economic needs of the local people.

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