STUDY ON PARK-PEOPLE RELATIONSHIP IN ROYAL SUKLA PHANTA WILDLIFE RESERVE

A Dissertation submitted for partial fulfillment of the Masters' Degree of Science in Botany

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CERTIFICATE

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EXECUTIVE SUMMARY

Royal Suklaphanta Wildlife Reserve is one of the protected areas of Nepal, rich in valuable natural resources. A random questionnaire was done in 300 sample households of Beldadi, Dodhara, Chandani VDCs and Mahendranagar municipality to assess the issues of park-people conflict and impact of buffer zone. Three major problems firewood scarcity, lack of grazing area and food deficiency to the people were identified. Similarly, animal poaching, illegal use of park resources, burning of forest are the local activities causing problem for the reserve management. Among the problem of the local people, firewood scarcity (48%) was found to be the most acute followed by lack of grazing area (30%) food deficiency (26%), fodder problem (18%). In Dodhara VDC, flooding was considered as the main problem with ranking value 50%. While pest ranking wild boar (*Sus scrofa*) was found to be major pest on the average. Wild elephant, chittal and other animals were ranked second and third respectively. To minimize the park-people conflict, buffer zone forest plays an important role by preventing.

(a) Illegal collection of firewood and timber,

(b) Illegal grazing within the reserve,

(c) Harvesting the fodder for domestic (fodder collection)

(d) Raiding of crops in the surrounding villages by wild animals.

In 1999, plantation was carried out in 81.13 hect. Most of the plantation was carried out in Dodhara and Chandani VDCs. The major species of plantation are Sisso, Bakaino, Ipil-Ipil, Bamboo, Teak,

Eucalyptus, Koiralo and some fruit bearing species like Mango, Litchi and Jackfruit.

On the basis of findings of this study for proper management of buffer zone area, some measurements are proposed to resolve the problem and formulation of future plans by recognizing indigenous resources need on biological needs of the wildlife.

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LIST OF ACRONYMS

BSU – Bufferzone Support Unit

CO – Community Officer

CA – Conservation Area

DDC – District Development Committee

DNPWC – Department of National Parks & Wildlife Reserve

KMTNC – King Mahendra Trust for Nature Conservation

NP – National Park

RSWR – Royal Suklaphanta Wildlife Reserve

UG – User Group

UNDP – United Nations Developments Program

PPP – Parks and People Programs

CHAPTER – ONE

INTRODUCTION

CHAPTER – ONE

INTRODUCTION

1.1 Background

All living beings including human beings are dependent on many kinds of biological resources. Biological resources mainly consist of forest resources and wildlife resources. The people are dependent on many kinds of forest resources which comprise medicinal and food plants, other non-timber forest products and timber, fodder, fuel wood, thatch grass, sabai-grass, etc. Wildlife resources are used as food source of economy and for recreation purposes. Due to increase in human population, over exploitation of these natural biological resources begins. As all human beings are completely depends on these biological resources, the need of biological resource conservation was realised.

The aim of conservation is to bring biological resources to use for society by making the people and communities knowledgeable about, capable of and responsible for its management. Biodiversity can be conserved by two methods i.e. (a) Ex-situ conservation, (b) In-situ conservation.

The conservation of plants and animals outside their natural habitats is called ex-situ conservation. In Nepal, ex-situ conservation of natural resources is carried out by the development of botanic gardens, seed banks, field gene banks, in-vitro storage and zoo, etc.

The conservation of natural biological resources in their own natural habitats is called in-situ conservation. National Parks and Wildlife reserves are the examples of in-situ conservation. It also

comprises conservation of domesticated or cultivated species in the surroundings where they have developed their distinctive properties. For many species, in-situ conservation in the natural habitat is the most appropriate method of conserving gene pool. In-situ conservation ensures future availability of the required genetic resources and preserves evolutionary processes which allow the plants to adopt to environmental change.

Habitat destruction, population pressure and food shortages are exerting tremendous pressure on the ecosystem and natural resources of the whole world and Nepal is no exception. Threat to biodiversity in Nepal is initiated by the activities of high human population. High human population growth rate (2.08%) and poverty in rural areas in Nepal have led to habitat loss, forest destruction and degradation, over exploitation of forest resources for fuelwood, timber, fodder, medicinal plants and food plants resulting in the loss of biodiversity.

Establishment of a conservation area is only a first step in protecting biological resources. The continual existence of these species depends on effective protection and management of the protected areas.

The United States created the first National Park in 1872 in the modern world by establishing the Yellowstone National Park. That was a milestone in the evolution of the concept of national parks in the developing countries, particularly Asia, were established beginning in the second quarter of this century (Mishra, 1991).

The Commission on National Parks and protected Areas (CNPPA) defined National Park as Natural area of land or sea, designated to- (i) protect the ecological integrity of one or more ecosystems for present and future generation, (ii) exclude exploitation or occupation inimical of purposes of designation of the area and (iii) provide a foundation for spiritual, scientific, educational,

recreational and visitor opportunities, all of which must be environmentally and culturally compatible.

Global efforts towards biological resource conservation includes a number of treaties and conventions:

- **Ramsar convention on Dec. 17, 1971**: Various wetlands of international importance established under the term of the convention. Nepal introduced Kosi Tappu Wildlife Reserve KTWR) for inclusion in the list of wet lands of international importances which is an important habitat for population of wild water buffalo (*Bubalus bubalis*).

- **The convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973**: An international treaty to govern trade in wildlife named as the convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) came into force. It is the most widely accepted international treaties on the conservation of natural resources. One hundred thirty countries including Nepal have joined CITES so far.

- In 1982, in Bali, World congress on national parks laid stress on programmes with revenue sharing, local participation and complementary development schemes adjacent to protected zones for the people who lives on the perimeter of them.

- **Global convention on Biological Diversity, 1992**: Global convention on Biological Diversity which is a Park of UN Conference on Environment and Development (UNCED) held in 1992, gives guidance to formulate national biodiversity strategies for inventory, conservation and sustainable utilization of the resources.

1.2 Establishment of Protected Areas in Nepal

The conservation history in Nepal starts since the time of late king Surendra (1847-1881) when some legal provisions were established to penalise and fine poachers of wild animals. The protection of rhinoceros (*Rhinoceros unicornis*) in Chitwan started during the premiership of Jung Bahadur Rana in 1946. But the concept of conservation first came into existence during 1950's and the first wildlife law was promulgated in Nepal in 1957. Since then almost all five-year development plans have stressed the need for conserving wildlife. By 1960's after the malaria eradication, land hungry people from the hills arrived in Terai (Bhatta & Shrestha, 1977, Upreti 1985). Nepal, especially the Terai, continued to suffer from environmental degradation due to deforestation, population migration from the hills and unplanned resettlements programmes and development activities. The Aquatic Animal Protection Act, (2017) was passed in 1961 in which the importance of wetlands and aquatic animals was emphasized. The act prohibits the use of poison and explosive materials in water bodies and the destruction of dam, bridge, or water system and to catch or kill aquatic bodies.

First of all, a small rhino sanctuary was established in Chitwan in 1964 to protect the population of one-horned rhinos (*Rhinoceros unicornis*) with the help of a group consisting of soldiers and trained poeple. Subsequently, in 1969, Six Royal hunting reserves in the terai and one in mountain area were gazetted under the wildlife Protection Act 2015 but effective management could not be achieved because of absence of adequate regulations, organization and staff.

Late His Majesty the King Mahndra approved in principle the establishment of the Royal Chitwan National Park and Langtang

FIG. 1 : NEPAL'S PROTECTED AREAS

KNP = Khaptad National Park
RNP = Rara National Park
SPNP = Shey Phoksundo National park
RSWR = Royal Sukla Phanta Wildlife Reserve
RBNP = Royal Bardia National Park
DHR = Dhorpatan Hunting Reserve
ACA = Annapurna conservtion Area
RCNP = Royal Chitwan National Park

SWR = Shivapuri Wildlife Reserve
LNP = Langtang National Park
SNP = Sagarmatha National Park
PWR = Parsa Wildlife Reserve
MBNCA = Makalu barun National Park and Conservation Area
KCA = Kanchenjunga Conservation Area
KTWR = Koshi Tappu Wildlife Reserve
MCA = Manaslu Conservation Area

Courtesy : Rèsources Nepal, 1998 / WWF 1999

national park in 1970 and since then the conservation movement in Nepal has effectively initiated.

In 1973, a National Park and Wildlife Conservation Act was promulgated and the beginning of a long-term project was held with the help of FAO and UNDP. The Act provides the fundamental basis for the establishment of protected areas and conservation of wildlife including their habitats. Since 1973, the act has undergone through four amendments, one in each 1974, 1982, 1989 and 1994.

1.2.1 Types of Protected Areas in Nepal

National Parks and Wildlife Conservation Act 1973, has recognized six categories of protected areas namely National Parks, Strict Nature Reserves, Wildlife Reserves, Hunting Reserves, Conservation Areas and Buffer Zones. First five types correspond to the World Conservation Union's (IUCN) international systems of protected areas categories II, I, IV, VIII and V respectively. In Nepal, at present altogether 16 protected areas exist viz., 9 National Parks, 3 Wildlife Reserves, 1 Hunting Reserve and 3 Conservation Areas, covering 15.65 percent of total land area of the country.

- **Khaptad National Park**: It covers an area of 225 sq. km. and was declared as Khapted National Park in 1984. it lies on mid hills and high mountainous physiographic zone. Himalayan black bear, barking deer, wild dog, wild boar, leopards are major wildlife of this Park. Khaptad Daha, a shallow lake lies at an altitude of 3050 m. (Mid-hills ecosystem of western Nepal).

- **Rara National Park**: it covers a total area of 106 sq.km. and was declared in 1976. It is located at high mountainous physiographic zone. it contains Lake Rara which is an important high mountain

wetlands (at an elevation of 2990). The park provide habitat for the threatened species like leopard and musk deer.

- **Royal Bardia National Park**: It contains an area of 968 sq.km. It was gazetted in 1988. It lies on Terai and Siwalik physiographic zone. it provides habitat for threatened species like tiger, swamp deer, elephant, gangatic dolphin, rhinoceros, black buck, etc.

- **Shey-Phoksundo National Park**: it has a total area of 3,555 sq.km. and was gazetted in 1984. it lies on high mountainous physiographic zone. it is famous for Tibetan plateau ecosystem. it provides habitat for blue sheep, snow leopard and musk deer. It is also an important religious site for Buddhists.

- **Royal Chitwan National Park**: It covers a total area of 932 sq.km., lies on Terai and Siwalik physiographic zone. it provides habitat for endangered species like tiger, rhinoceros, gharial, python, etc. It was gazetted in 1973. World Heritage Committee of UNESCO included Royal Chitwan National Park as a World Heritage site.

- **Langtang National Park:** It was gazettd in 1976 and covers a total area of 1,710 sq.km. It lies on high mountainous and Himalayan physiographic region. it provides habitat for 15 species of endemic plants of Nepal. Faunal species includes the threatened species such as wild dog, clouded leopard, leopard and Himalayan musk deer. It is also well known for red pandas, the protected wildlife species of Nepal.

- **Sagarmatha National Park**: It was gazetted in 1976 and covers a total area of 1,148 sq.km. It lies on high Himalayan physiographic region. It has highest terrestrial ecosystem and includes the highest peak Mt. Everest (8,848 m.) in the world. it

provides habitat for endangered species such as snow leopard and Himalayan musk deer. Sagarmatha National park is designated as a World Heritage Site by IUCN.

- **Makalu-Barun National Park**: It was gazetted in 1991 and covers a total area of 1,500 sq.km. It lies on high Himalayan physiographic region. It provides ecological support of low altitude habitats to Mount Everest ecosystem. It also provides habitat for threatened species such as black bear, red panda, musk deer, leopard, snow leopard, thar, 14 rare species of birds.

- **Sivapuri National Park and Watershed Area:** It was gazetted in 1985 and contains total area of 145 sq.km. It lies on middle mountainous zone. It protects the main watershed, rich in bird species, habitat for Himalayan dragonfly.

- **Royal Suklaphanta Wildlife Reserve**: It was gazetted in 1973 and covers a total area of 305 sq.km. It lies on Terai region. Main characteristic features of the reserve is the presence of largest herd of endangered swamp deer in the largest grasslands of the Terai's protected area. It contains floral species such as sal, asna, simal, sisso, khair, imperata and provides habitat for tiger, swamp deer, wild elephant, pythons, snakes, etc.

- **Parsa Wildlife Reserve**: It was gazettd in 1984 and covers an area of 499 sq.km. It lies on Terai and Siwalik zone. It was established as an extended habitat and also for the conservation of Churia ecosystem. It harbours a resident wild elephant population of about 35 individuals.

- **Kosi Tappu Wildlife Reserve:** It was gazetted in 1976 having area about 175 sq.km. The main objectives is to protect the last

remnant population of critically endangered wild water buffalo and their habitat.

- **Dhorpatan Hunting Reserve:** It was gazetted in 2987 and covers total area of 1,325 sq.km. It lies on high mountainous zone.

- **Annapurna Conservation Area:** It was gazetted in 1992 and covers a total area of 7,000 sq.km. It lies on high mountainous physiographic zone. it provides habitat for snow leopard and blue sheep.

- **Makalu-Barun Conservation Ara:** It was gazetted in 1992, covers an area of 830 sq.km.

- **Kanchanjung Conservation Area:** It was gazetted in 1997, covers an area of 2,011 sq.km. It contains characteristic east Himalayan vegetation type such as *Larix* sp. with *Juniperous* spp. The common fauna include snow leopard, common leopard, red panda, musk deer, blue sheep, common langur, etc.

World heritage Committee of UNESCO included Royal Chitwan national Par and Sagarmatha National Park in the World Heritage Sites list for the criteria of important habitat for endangered species of universal value and outstanding example of geological formation respectively. The Koshi Tappu wildlife Reserve in included in the list of wetlands of international importance, Nepal's only Ramsar site.

As of 1997, there were 13,221 different parks and equivalent reserves internationally recognised by the World Conservation-Monitoring Centre (WCMC), which covered a land area of about 6,145,310 sq.km. (IUCN, 1997).

1.3 Park People Conflict

Wildlife conservation had been quite successful from the point of view of habitats of several threatened species (Mishra et, al., 1992). Active conservation of habitats has increased wildlife population within protected areas which start causing damage outside the Park. The relation between park and people is imbalanced when the park animals damage outside and disturb the adjacent settlement. Damage of agricultural crops, human harassment, injuries and death and livestock depredation are the common causes of this imbalance relationship (Sharma, 1996; Jnawali, 1989 and Shrestha, 1994).

The local people, who once were enjoying free access to areas henceforth covered by parks and were able to meet their needs from inside resources, now no longer have legal access. Local people have seen the park as an attempt by the government to curtail their access to their traditional rights of resource use. However, the park has become a very good source for villagers into illegal poaching, logging and hunting, all of which are directly conflicting with the park's objectives.

With the establishment of wildlife reserve, people have been denied the rights to use the resources inside the reserve and they have no rights to claim compensation for the damage to their crops by wildlife. Similarly, except in specialized area within buffer zones, the responsibility for managing resources has been taken from the people who live in the vicinity and has instead been transferred to a government agency.

In the contest of RSWR, livestock holders continue to practice livestock grazing within the reserve not only because of lack of alternatives, but also due to a strong will to practice their tradition of livestock rearing. In the absence of alternatives, however, such activities

continue to increase despite of risk of being caught. This pose a threat not only to the existence of the wildlife reserve but also to the endanged plant species.

It is very difficult to villagers to understand why wildlife may damage their crops, while they must not kill any wild animals in return. They are not convinced of the rationale of protecting forests and wildlife, which they have been utilizing for thousands of years.

Besides the problem of grazing and crop damage there are some other problems too, which create park-people imbalance. These include fodder problem, couection of fuel wood, timber, illegal hunting inside the reserve, etc.

1.4 Buffer Zone Concept

Buffer zone has been defined as the areas adjacent to a protected area on which land use is partially restricted to give an added layer of protection to the protected area while providing valued benefits to the neighbouring rural communities. Thus, it is an area of controlled and sustainable land use which separates the protected area from direct human pressure (Nepal and Weber, 1993).

World National parks Conference at Bali in 1982 focused on the relationship between protected areas and human needs and stressed the relevance of integrating protected areas with other major development issues (Mishra, 1982). The message is widely accepted today that the protected areas should respond to the needs of local people in the management of the protected areas for mutual benefits. This ultimately leads to harmony and sustainability between the natural heritage and the well being of the people living on the periphery of the park (Anon, 1993). These days buffer zone concept has been widely accepted in protected areas management in order to reduce conflicts between protected area authorities and the local people.

As the park and people conflict emerged and the government realised that conservation of wildlife inside the protected areas is not productive in lack of local people participation and also the issues that were repeatedly raised e.g. who should benefit from conservation efforts, the local people or the wildlife. Through the 4th amendment in the NPWC Act of 1973 in 1992, HMG has allowed to create buffer zone surrounding the National Park and reserves in order to provide the use of forest products to local people. The Act defines buffer zone as "The peripheral area of the National Park or the reserve under section 3A for providing facilities to local inhabitants to utilize forest products regularly."

The concept of buffer zones is recently developed in Nepal. The DNPWC proposed a buffer zone concept for the protected areas of Nepal in 1984. However, for the declaration of a buffer zone, the factors such as; geographical situation of the reserve, area affected by the reserve, status of settlements and appropriateness from the point of management, have to be considered.

In the proposed buffer zone of RSWR, many user committees such as Satya Adarsha UG, Baijanath, Srijana, Bhagawati, Gayatri, etc. (Total 92 user groups were formed consisting of 35 male the buffer zone Regulation 1996, has empower and 57 female) red the user groups to carry out community development activities, especially those that maintain a sustainable use of forest products without disturbing the wildlife habitat of the protected areas.

For the buffer zone management, Park- people programme has been initiated since March 1995 in RSWR with the support of UNDP and DNPWC. The main objectives of this programme is to resolve the conflicts between the adjoining communities and park authorities. Buffer programme includes community organization, community capital

generations, micro-enterprise, eco-tourism promotion activities, woman empowerment programme, etc.

1.5 Justification of the Study

Although the problem of park-people conflict is an old issue, it is getting critical every year. This is not the problem of only our country but a global one. The declaration of World Congress on National Parks, held in Bali 1982, laid stress on programs with revenue sharing, local participation and complementary development schemes adjacent to protected zones for the people who live on the perimeter of them.

The existing provisions and arrangements deprive surrounding people of national parks reserves from the use of forest products which they had been using traditionally early before the parks/reserves were created. Once an integrated and comprehensive system of protected areas and buffer zone is established and the people recoginze their importance, then it is hoped that Nepal's parks-reserves will be able to enclose all representative ecosystems of the country.

Although the impact of buffer zone is unknown, as the plantation has just started in the buffer zone areas, it is essential to know the forest types used by local people and attitudes towards the establishment of forestland buffer zone.

1.6 Objectives of the Study

Following are the main objectives of the present study:

1. To identify the key issues and conflicts that Royal Suklaphanta Wildlife Reserve is facing at present. The problems and causes of conflicts between the reserve authorities and the local people.

2. To know whether the people are diverting their use pattern from the reserve forest resources to buffer zone area or not.

3. To study the attitude of local people towards the forestland buffer zone and Royal Suklaphanta Wildlife Reserve.

4. To survey the plantation and alternative source of energy in the buffer zone initiated by PPP/RSWR and participation of local people.

1.7 Limitations of the Study

Following are the limitations of the present study:

1. The study is based only on the data available from the visits made to the proposed buffer zone area during one single year.

2. Although the proposed buffer zone area of Royal Suklaphanta Wildlife Reserve covers 11 VDCs and 1 Municipality, the reports covers only 4 VDCs and 1 municipality around the reserve.

3. Since each reserves has its own problems and programmes based on its uniqueness, the findings, inferences and implications may not be fully applicable to other reserves and national parks located in other regions of the country.

CHAPTER – TWO

LITERATURE REVIEW

CHAPTER – TWO

LITERATURE REVIEW

Since the establishment of National park and Reserves, conflicts has been observed between local people and park authorities. Crop loss by wildlife is a common thing in the adjoining villages of the park and reserves where as human activities also exert pressure to the park and reserve. So many protected areas of the country are in crisis due to the expanding human activities and sometimes- wild animals also interfere in the crop fields. The management of the protected areas requires people's participation for this sustainability.

The establishment of park and reserve, without provisions to stabilize the cattle population or to provide fodder and grazing facilities, and to resolve the incident conflicts between the park management and the local people. As more forest and grassland outside the park were lost such conflicts become more pronounced (Sharma & Shaw, 1993).

Survey in January 1999, commissioned by WWF and led by Dr. John Mac Kinnon (Bhutan) also revealed some other topics of concern to wildlife migration throughout Bhutan. First, forests that were once contiguous from west to east are now being isolated into large fragments as forest is cleared within the main river valleys that run north to south through Bhutan. Reasons for clearing native forest include a desire for more grazing pastures at the higher elevation, and farms and plantations at the lower elevations, Mackinnon's study finally affirmed the need to develop a 'green buffer' of forest along Bhutan's southern boarder with India.

"The long term stability of parks in developing countries can be assured it. Some measurable benefits flow out of the park to the region" (Sharma, 1989).

"Wildlife management necessitates practices to regulated the abundance of wildlife so that it is beneficial and not harmful to humans interests" (Smith, 1971) wildlife management polices should also cover providing wildlife education to people. Saliva (1968), has put forward the proposition on training school." "The old concept of shielding parks from outside wildlife human influences make a large gap between the park and the local people" (Mac Neely, 1984).

Buffer zone first received wide spread attentions as a result of UNESCO's Man and Biosphere Programme (MAB) in 1971. The programme was the first attempt to link protected areas with local social and economic development.

Many researcher have carried out the investigations associate with park and people conflict, Mishra (1971) studied the crop damage by wild elephant in Palamau district, Bihar, India. He suggested that at least 50% of the value of the damaged crops should be paid as compensation and rest for the damaged field waived to maintain the brighter future for the elephants in Palamau district.

Upreti (1985) found crop damage as a cause of conflict. In 1995, he found that rhino (Rhinoceros unicorns) as highly crop raider to wheat and paddy, the chattel (Axis axis) on paddy and maize, the wild boar (Sus Scruta) raid on potato and the parakeet (Psittacula sp.) raid on harvestable maize in Royal Chitwan National park.

Sharma (1991) identified crop and livestock depredation as a cause of conflict in RCNP. In 1991, he calculated crop damage by two methods, Interview & Net Area Damage (NAD). He found that real crop

damage was five times less by NAD method than interview. He also reported that paddy is severely damaged followed by wheat, corn oil seeds, lentils, vegetables and miscellaneous.

Jnawali (1989) studied the case of human harassment and crop damage by greater one horned rhinoceros in Sauraha adjacent to RCNP. The economic loss was reported Rs. 1,72,000.00 of which 68.6% occurred within a distance of 500m. heights economic loss 27.6% occurred to rice.

Nepal and Webr (1995) found rhinoceros (*Rhinoceros unicornis*), Chital (*Axis axis*) and wild boar (*Sus scrofa*) as principal crop raider in RCNP. They calculated rhino, wild boar and Chital destroyed 60%, 27% and 12.9% of total crop damage respectively. They also analyzed the local peoples perceptions, attitudes and motivation towards wildlife conservation. It was found that although local people disliked the restrictions imposed by the park authority, curtailing the use of park resources, they took a positive attitude to wildlife conservation. Their active involvement in protection and conservation could be secured if due consideration is given to their needs, which would have to be addressed in the overall planning and management of the Park (Nepal & Weber, 1995).

Sharma (1995) reported that wild buffalo (*Bubalus bubalis*) and wild boar (*Sus Scrota*) are important crop raiders in Kosi-Tappu Wildlife Reserve.

Shrestha (1994) and Upreti (1995) identified park regulation, crop damage, livestock depredation and loss of human life as source of conflict in RGNP. They also identified rhino (*Rhinoceros unicornis*) as principal crop raider in RCNP.

Poudyal (1995) conducted a study on an average each affected households lost approximately Rs. 3,132 annually due to crop loss by wild animals in Shivapuri Watershed and Wildlife Reserve.

Baral (1999) studied wild-boar-man interaction in RBNP and estimated a heavy economic loss of Rs. 20, 95, 346 of which 52.73% occurred in Thakurdwara and 47.27% in Shivapura. Highest economic loss (28.27%) occurred to paddy crop, followed by potato (15.40%), maize (15.21%), wheat (13.80%), mussuro (12.42%) and yam (7.57%).

Nakarmi (1999) studied on impact of livestock grazing in RSWR and grazing of livestock was found higher in the bordering area (1000m-300m). Grazing by cow (46.7%) and ox (40.2%) was found highest amongst the livestock. In the reserve, grazing by livestock was found year round while crop damage was of seasonal. Rice and wheat are the two most affected crops by wild animals, wild boar, elephant, monkey, peacocks are the most important crop raiders.

Despite of above contributions cited, little is known about the effect of buffer zone on park-people conflict in RSWR in detail. To bridge long felt gap of knowledge, present study is udnertaken.

CHAPTER – THREE

STUDY AREA

CHAPTER – THREE

STUDY AREA

3.1 Kanchanpur District

Kanchanpur district is situated at the distance of 488 km. west from Kathmandu. It covers an area of 1610 sq.km. One-fifth of the district (305 sq.km.) is covered by the reserve. The topography of the area is flat plain (if the Churia hill is excluded) at the elevation of 176 m. from the sea level which lies between 80° 3' and 80° 31' E longitude and 28° 33' and 29° 08' N latitude. Dadeldhura and Kailali districts are located at the north and east of Kanchanpur and river Mahakali flows through the western and southern edge of Kanchanpur. Dhodhara and Chandani, two VDCs of this district are located at the next bank of Mahakali River. Mahendranagar is the administrative centre of Kanchanpur district.

The climate is sub-tropical, monsoon brings the heaviest rainfall. The temperature ranges from 4° C (minimum) in winter to 42° C (maximum) during the summer. Sandy loam, clay, silty loam and alluvial are the common types of soil of this district. Tharus are the original local people of this region but most of the areas are covered by Pahadi people (people of hill regions who migrated after the eradication of malaria during the sixties). Farming is the main occupation of these people. They grow mainly rice, wheat, mustard and pulses.

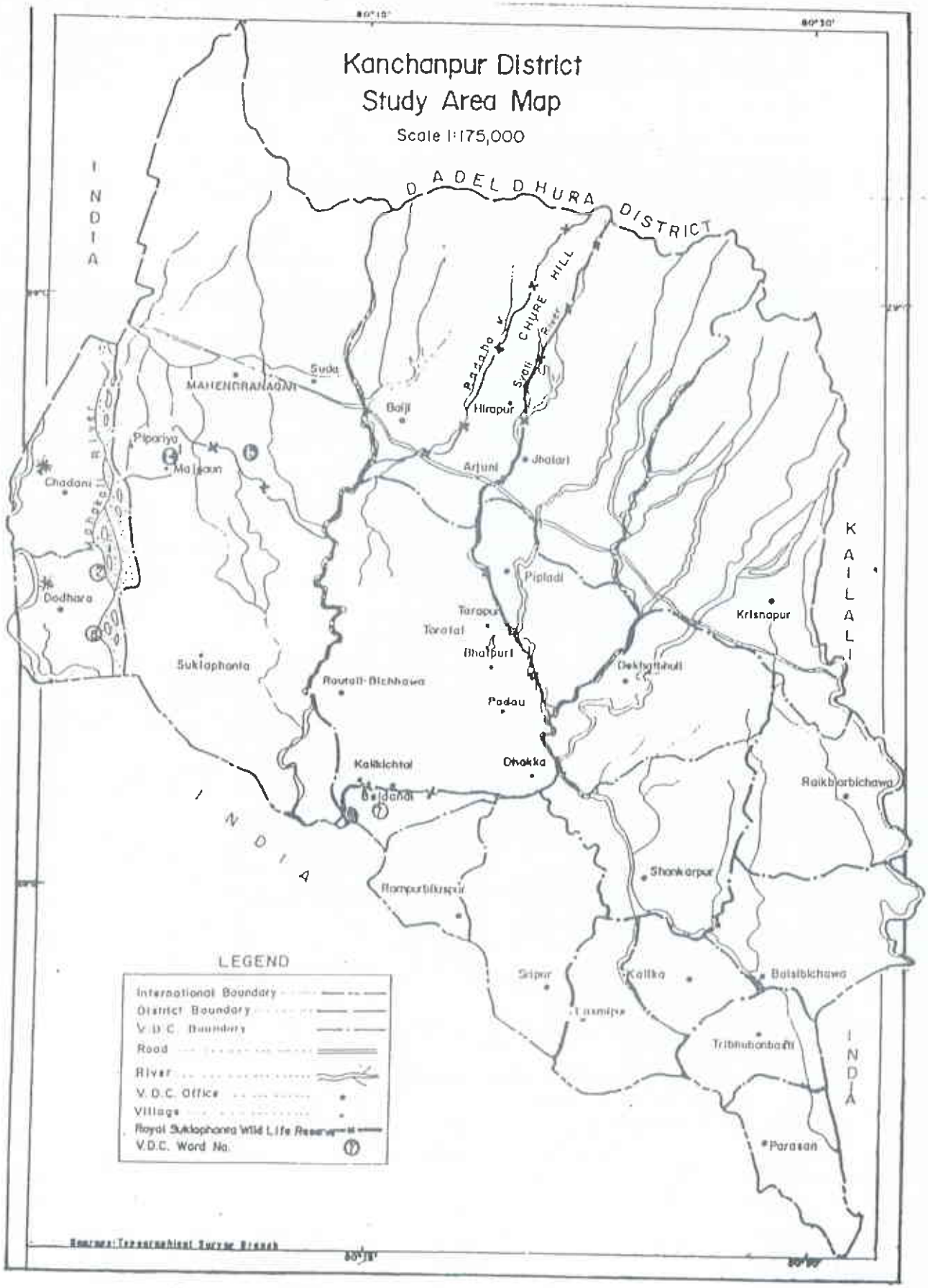
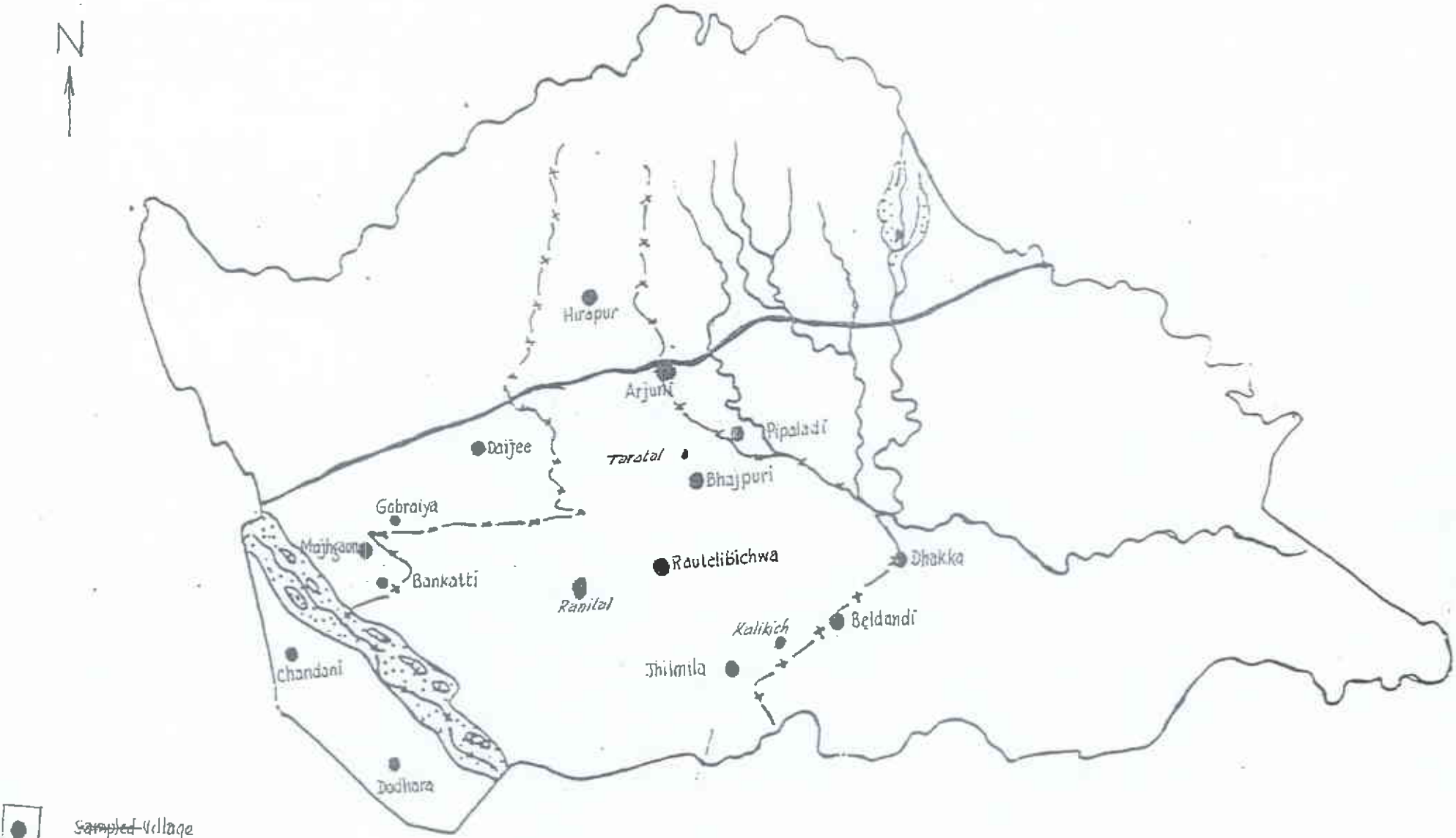


Figure 2.4 - Map of study area

KANCHANPUR DISTRICT



3.2 Royal Suklaphanta Wildlife Reserve

3.2.1 Location and Physiographic Features

Royal Suklphanta Wildlife Reserve is situated in the southern part of Far Western Development Region of Nepal. it is situated between 28° 45' 16" and 28° 57' 23" N latitude and 80° 06' 04" and 80° 21' 40" E longitude, with an area of 305 sq.km. Royal Suklaphanta Wildlife Reserve's physical boundary reaches up to the southern part of Dadeldhura district in the north, Nepal-India boarder in the south, Syali River in the east and Mahakali River in the west. The area extends from the feat lands in the south to the Churia hill range in the north comprising different ecosystems and habitat types.

3.2.2 History of the Reserve

The reserve was well known for hunting area and as declared as Royal hunting Reserve in 1969 with an area of 131 sq.km. Later in 1976 it was gazette as a Wildlife Rserve with a total area of 150 sq.km. Later further extension was done in 1984, making its total area of 305 sq.km.

The name 'Suklaphanta' is derived from a plot of about 5400 ha. having grass species like Dhaddi (*Saccharam* sp.), Narakat (*Phragmites* sp.), Siru (*Imperata cylindrica*) which provide white appearance to the plot. Tharus called it as Sukla Phant which means dry white plain. In this phanta the largest herd of swamp deer (*Cervus duvauceli*) inhabits. This is one of the endangered species and about 2500 are found in this reserve.

3.2.3 Extension Program

In the initial stage, it covered an area of 155 sq.km. and after completion of an extension it now covers a total area of 305 sq.km. With royal directives an extension program was started in 1982. The main purpose of program is to create more habitat and passage from the terai

to the Churia hills for the seasonal migration of wildlife. According to the proposed program, 13 villages from 5 VDCs were to be resettled with compensation of land holdings. A total of 2740 bigha of land was allocated for the resettlement program in Kanchanpur district. A total of 2502 bigha of land had already been distributed to 1170 families up to August 1997. Local people who have been compensated with land deliberately occupy and cultivate their former land and also cultivate their newly allocated land as well. legally the extension area is a part of the reserve but dual farming and illegal encroachment by immigrants pose a serious problem in the effective management of the area (DNPWC, 1997).

3.2.4 Climate

The reserve has four seasons; winter, spring, summer and monsoon. December and January are fairly cold and misty with occasional frost. The climate is predominantly tropical to monsoon with more than 90% of the annual precipitation. The average daily temperature during winter ranges from10-20° C and rises to 22-25° C in spring and reaches as high as 32-35° C in summer. The maximum temperature reaches up to 42° C in summer.

3.2.5 Flora

3.2.5.1Grassland

One third of the total land of reserve is grassland. Dhaddi (*Saccharam* sp.), Narkat (*Phragmites karka*), Siru (*Imperata cylindrica*), Kans (*Heteropogon contortum*), Beldande are the major species of grass with tree species like *Bombax ceiba* and *Butea monosperma* growing along the periphery of the phantas. The extensive grasslands are locally known as 'phantas' and provide ideal habitat for different animals. These grasses are extensively used by the local people for thatching

(PPP/RSWR, 1997). Due to extensive use of *Imperata* sp., *Saccharum* sp. and *Heteropogon* sp. for mainly thatching purposes, these species are being endangered.

3.2.5.2Riverine Deciduous Forest and Sal Forest

On the southern boundary of the reserve along the Mahakali River, forests of *Dalbergia sisso* (Sisso) and *Acacia catechu* (Khair) are found. Another mixed forest of *Trewia nudiflora, Ficus glomerata* follows Bahuni River.

Shorea robusta (Sal) is the most predominant tree species (Balson, 1976). Sal forest is found at a higher elevation from the grassland area. The main tree species of sal (*Shorea robusta*) occurs in association with other tree species like *Terminalia tomentosa* (Asna), *Syzygium cumini* (Jamun), *Adina cordifolia reflucta* (Akas bel), *Bauhina vahlii* (Bhorla).

3.2.6 Fauna

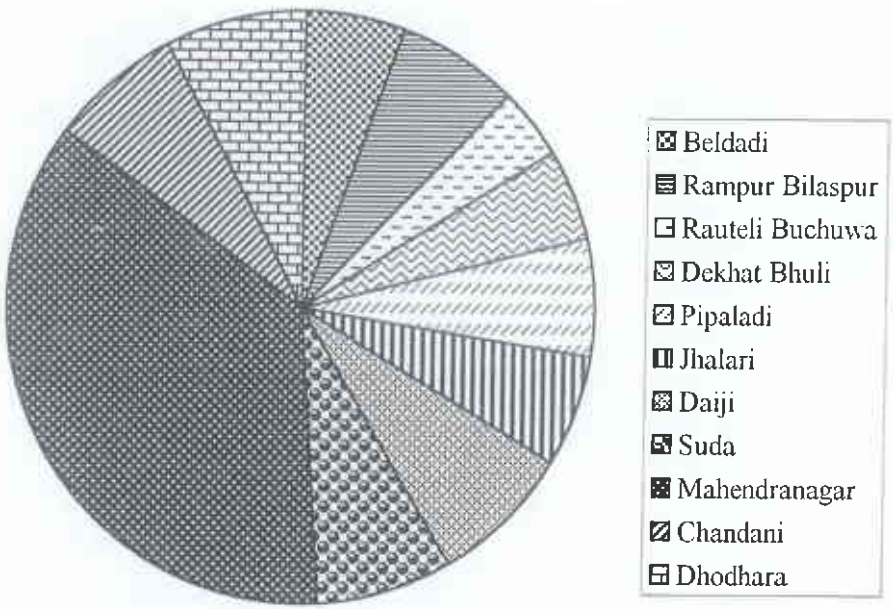
The reserve provides habitat for several wildlife populaation. The grassland of the reserve provides (*Cervus duvauceli*). Other wild animals found here are wild elephant (*Elephas maximus*), tiger (*Panthera tigris*), leopard (*Panthera pardus*), common langur (*Presbytis enteus*), blue bull (*Boselephus tragocumelus*), wild boar (*Sus scrofa*), Python (*Python molurus*), etc. along with more than 300 species of birds and insects (Baral, 1997).

3.3 Human Settlements, Land use and Buffer Zone

3.3.1 Surrounding Human Settlements

The population of Surrounding 11 VDCs of the reserve is 62050 in Mahendranagar Municipality and 6718 in Rauteli Bichuwa and total 171,604 (HMG/UNDP, 1994). sixteen wards of 11 VDCs and one

Population of Adjacent VDCs of the Reserve



municipality are situated around the reserve. The proposed buffer zone area covers approximately 153 sq.km. of the VDCs above and has a population of 98,000 people (PPP/RSWR, 2000). The total population of the adjoining VDCs of the reserve is given in table below:

Table No. 1

Population of Adjacent VDCs of the Reserve

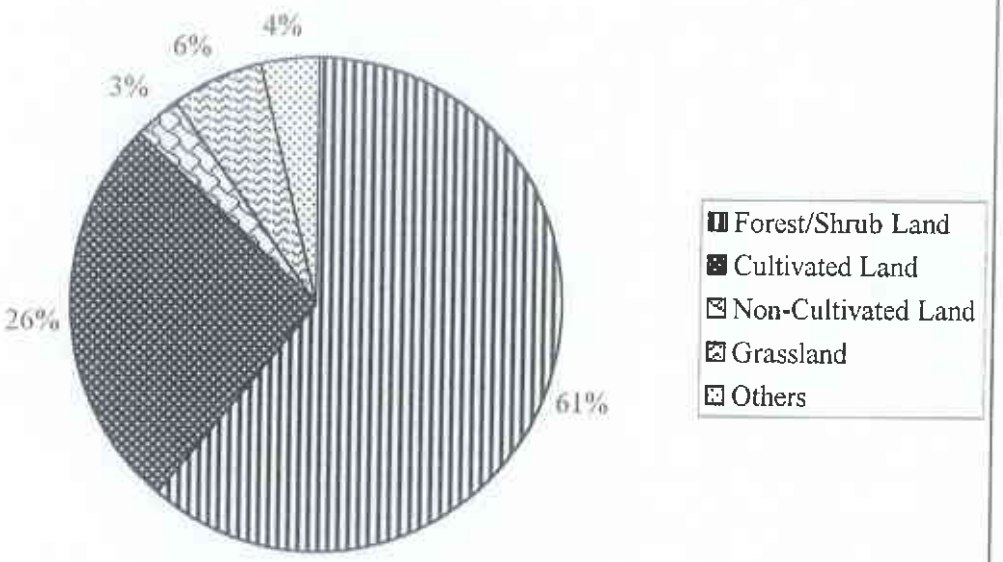
S. No.	Name of VDCs	Total Population
1.	Beldadi	9,301
2.	Rampur Bilaspur	11,841
3.	Rauteli Buchuwa	6,718
4.	Dekhat Bhuli	8,304
5.	Pipaladi	11,071
6.	Jhalari	10,590
7.	Daiji	12,967
8.	Suda	12,948
9.	Mahendranagar	62,050
10.	Chandani	12,385
11.	Dhodhara	13,429
	Total:	**171,604**

Source: PPP Document, HMG/UNDP, 1994.

3.3.2 Land Use

According to the census (CBS, 1991) the Kanchanpur district covers an area of 1610 sq.km. The land area used for different purposes is shown in the table below:

Land Use Pattern in Kanchanpur District



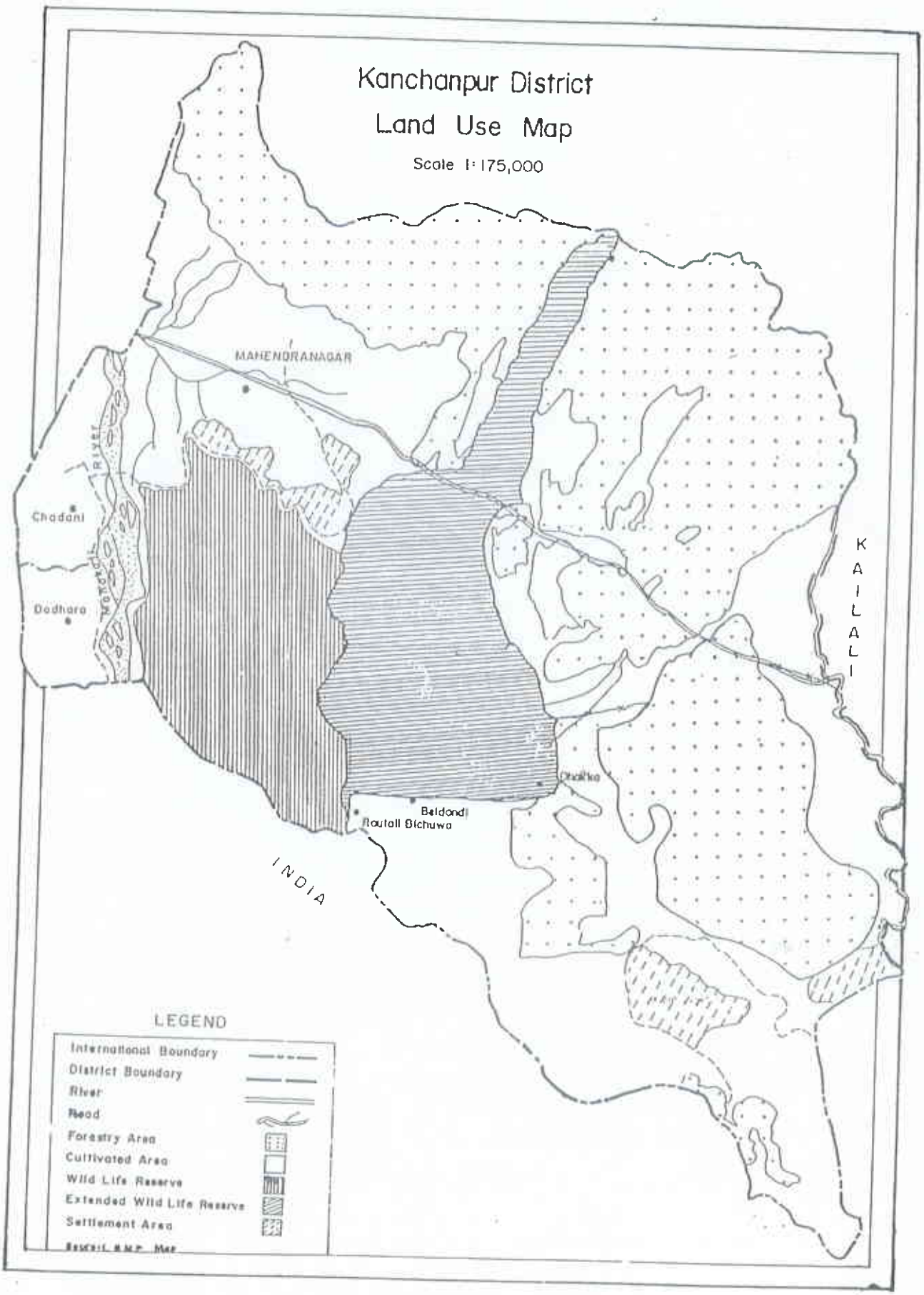


Figure 2.1 - Map of Kanchanpur district

Table No. 2

Land Use Pattern in Kanchanpur District

S.No.	Distribution	Area/ha.	Area in percentage
1.	Forest/Shrub Land	100063	61.1
2.	Cultivated Land	42233	25.8
3.	Non-Cultivated Land	5024	3.1
4.	Grassland	9755	6.0
5.	Others	6490	4.0
	Total:	**1,63,566**	**100**

Source: PPP Document, HMG/UNDP, 1994.

The agricultural land consists of 25.8% of the total area of the district. Forestland consists of 61.1% non-cultivated land 3.1%, grassland 6.0% and others 4%. Majority of the land area is protected as a forest area.

3.3.3 Buffer Zone Area

For providing support to buffer zone development (also part management and tourism development),the Park and People project at Royal Suklaphanta Wildlife reserve started in March, 1995. It is dedicated to resolve the people and reserve conflicts and ensures the sustainability of the reserve. The total area of Royal Suklaphanta wildlife reserve is 305 sq.km. The buffer zone area of the reserve is 153 sq.km., which includes 52 wards of 11 VDCs and one municipality.

Table No. 3

Buffer Zone Coverage Till 1999

S. No.	Covered VDCs/Municipality	Covered Wards
1.	Dhodhara	1, 2, 3, 4, 5, 6, 7, 8 & 9
2.	Chandani	1, 2, 3, 4, 5, 6, 7, 8 & 9
3.	Mahndranagar Municipality	13, 14, 15, 16, 17, 18 & 19
4.	Beldadi	1, 7, 8 & 9
5.	Rauteli Bichuwa	7, 8 & 9
6.	Shankarpur	7 & 8
7.	Dekhatbhuli	1
8.	Rampur Bilaspur	9
9.	Pipaladi	3, 4, 5, 6, 7, 8 & 9
10.	Daiji	2, 3, 6 & 7
11.	Suda	7, 8 & 9
	Total: 11 VDCs, 1 Municipality	**52 Wards**

Source: PPP Document, HMG/UNDP, 1994.

The total surrounding buffer zone population is 98,000 (Annual progress Report 2000, PPP/RSWR). The buffer zone area is managed by park staff in close co-operation with Buffer Zone Users Community. The park people program is trying to resolve the park people conflict by developing alternatives to reduce dependency on park resources for e.g. fuel, fodder, timber, etc. Conservation initiatives in the buffer zone and forestry initiatives outside the buffer zone are two main components of park people program.

All the buffer zone development program is based on the participatory approach to form community based organizations, community capital generations, inter sector collaboration between different agencies, ownership and cost sharing of the program. Since 1995, PPP/RSWR has been working in and around the reserve area and has gradually formed self-reliant, self-managed and self promoted community based organizations at the settlement level for the partnership of biodiversity conservation and socio-economic upliftment of the surrounding buffer zone through community mobilization process.

There are three types of plantation programs in buffer zone namely community plantation, private plantation, school and temple plantation. Besides these community nurseries are also there.

CHAPTER – FOUR

METHODOLOGY

CHAPTER – FOUR

METHODOLOGY

Different methods like reconnaissance survey, questionnaire survey, informal interviews and discussions, and field observations were used for this study. Thus the study depended upon primary as well as secondary data collection.

4.1 Preparation of Questionnaires

In the beginning sets of questionnaires were prepared for the local household survey, for user group chairpersons and for park authorities. These three sets were protested and translated into Nepali. For the household survey 30 questions were included and for user group chairpersons and park authorities 20 questions were selected (Appendix). Questionnaires were prepared focused mainly on the existing causes of the conflict so as to learn how creation of buffer zone has been helpful in resolving these problems.

4.2 Study Area Selection

The study area included surrounding four VDCs which are within buffer zone area. Selected VDCs were Dhodhara, Chandani, Beldadi and one Mahendranagar Municipality (4 out of 11 VDCs/MM and 6 of 29 wards).

4.3 Household Selection

A total of 180 households were selected as a sample for collection of information from the study area. Thirty households from each of the 6 wards were selected randomly giving a total sample of 180 households.

4.4 Data Collection

This study includes both primary and secondary data. The primary data includes a large amount of assorted information items collected from the study area. The sources of these primary data are local people and park authorities. Secondary data includes records and reports on different aspects of the previous study.

4.4.1 Primary Data Collection

(a) **Household Survey**: In the first phase of field survey the information was gathered by household interview. For this questionnaire Set A was used (Appendix I).

(b) **User Groups Chairperson Survey:** User groups are formed from the local people and they have direct involvement in the community development activities in the proposed buffer zone, 25 respondents were interviewed with the help of the questionnaire Set B (Appendix I).

(c) **Field Survey:** Survey of plantation area was made and data concerning total plantation and survival of sampling were collected. All the planted samplings were not found alive.

4.4.2 Secondary Data Collection

For general information, secondary data were collected from relevant institutions. Data obtained from these sources were related background information about the study and study area. progress reports and status papers were collected from PPP/RSWR, office about the buffer zone management and PPP activities. General information about VDC and district development committee were obtained from their respective head quarters. Land utilization data obtained from D.F.O., Kanchanpur.

4.5 Data Analysis

Minitab and Excel programs were used to summarize all data responses of the completed questionnaires were numerically coded and analyzed.

4.6 Ranking

All respondents were asked to rank their vies on issues and problems. The questionnaires were developed with several option scores. Scores for each respondent were added together to obtain a total score for the option. The percentage of each score for that option was calculated as recorded score divided by the maximum possible score that option could have and multiplied by 100.

CHAPTER – FIVE

RESULTS

CHAPTER – FIVE

RESULTS

5.1 Description of Problems

(a) Problem Faced by local People

Local people of the study area facing many problems most of which are related to basic needs for survival for example: Problem of firewood, food, fodde, grazing land for livestock, etc.

Table No. 4

Summary of Ranking of problems Faced by Local Residents

S. No.	Problems	VDC/Wards					Remarks
		Dodhara-2 Dodhara-8 (%)	Chandani –7 (%)	Beldadi-1 Beldadi-8 (%)	MN-15 (%)	Average (%)	
1.	Firewood	68	60	27	40	48	Firewood was reported as the highest problem ranked by all the respondents
2.	Grazing Area	40	30	20	46	30	
3.	Food deficiency	34	20	30	20	26	
4.	Fodder	18	10	25	18	18	
5.	Crop damage	0	0	10	50	15	
6.	Agriculture Land	9	7	25	18	15	
7.	Irrigation	20	18	13	5	14	
8.	Timber	15	6	20	3	11	
9.	Settlement Area	0	0	15	5	5	
10.	Flood	4	4	0	0	2	

Source: Interview of the Local Residents.

Household survey shows that in all studied VDCs and Mahendranagar Municipality (MN), scarcity of firewood, lack of grazing area for livestock, food deficiency, crop damage by wild animals, lack of agricultural land were found to be the most serious

problems. Most important one among all was found to be the scarcity of firewood (48%), followed by lack of grazing area (30%), food deficiency (26%) and fodder (18%). Respondents from different VDCs ranked them differently (as seen in Table – 5).

(b) Problems Faced by user Group's Chairperson

Local people who are associated in user groups are directly involved in community development activities in the buffer zone area carried out by PPP/RSWR. Their main problem with ranking are listed below:

(i) Lack of firewood - (50%)

(ii) Lack of grazing area - (32%)

(iii) Lack of employment - (30%)

(iv) Flooding - (0% except Dodhara VDC)

(v) Crop damage - (15%)

(vi) Irrigation - (5%)

In Dodhara VDC, flooding was considered as a main problem with ranking value 50%. In all the rest VDCs they ranked firewood as the 1st problem.

(c) Problem Faced by Reserve Staff

Their main problems are listed below with ranking:

(i) Grazing by livestock - (90%)

(ii) Firewood collection - (85%)

(iii) Crop damage complaint - (40%)

(iv) Irrigation - (17%)

(v) Timber - (15%)

(vi) Encroachment - (10%)

(vii) Fodder - (10%)

(viii) Wildlife depredation - (2%)

They ranked grazing as the 1st order problem with 90% ranking value, firewood was given second priority (85% ranking value).

5.1.1 Energy and Firewood

The different sources of energy which are used in the study area are illustrated in Table No. 5:

Table No. 5

Different Sources of Energy in the Vicinity of RSWR

S. No.	Source	VDC/Wards					Remarks
		Dodhara (%)	Chandani (%)	Beldadi (%)	MN (%)	Average (%)	
1.	Firewood	99	98	98	75	92	Firewood was found as the main source of energy in all studied VDCs
2.	Kerosene oil	1	0	2	4	2	
3.	Bio gas (Gobargas)	0	0	2	4	2	
4.	Dung cake	10	0	8	6	6	
5.	Agriculture residue	0	0	0	8	2	

(Some use multiple sources so the percentage exceed more than 100%)

Firewood is the main source of energy in all VDCs. 92% of the households use firewood. Other sources are dung cake (6%) and Biogas (2%).

The different sources of firewood in buffer zone area are reserve forests, driftwood, buying from market, crop residues and others. They are listed in Table No. 6:

Table No. 6

Different Sources of Firewood in the Buffer Zone Area of RSWR

S. No.	Source	VDC/Wards					Remarks
		Dodhara (%)	Chandani (%)	Beldadi (%)	MN (%)	Average (%)	
1.	Reserve Forest	45	48	100	85	70	Most of the firewood come from reserve forest.
2.	Draft wood	70	65	0	10	36	
3.	Market	10	8	0	8	3	
4.	Remanant of former cutting	3	2	0	8	3	
5.	Others	12	8	0	0	5	

In total very few people (5% ranking value) reported to buy firewood from market, only 5% ranking value uses dung cake as a source of firewood. Most of the firewood come from the reserve forests. Driftwood was the main source of firewood (70%) in Dodhara. The Mahakali Jogbudha Rivers are the main contributors of driftwood.

To solve the firewood problem, local people suggested different solution too, during field visit. They proposed dry wood collection facility from the reserve with a permit, without reserve source and some interested in depot system.

5.1.2 Grazing and Fodder

In the study area about 95% of the people keep 6 cattle per household. During the period of May/June they graze their cattles in the farmlands. During rest months of the year, people generally take their cattle near the reserve so that they could enter and graze inside the reserve. Many people were found to collect grass from the reserve illegally. Some have started planting fodder species in their own farmland.

5.1.3 Human Food Deficiency

Table No. 7

Responses Regarding Food Sufficiency in the Buffer Zone area of RSWR

S. No.	Source	VDC/Wards				
		Dodhara (%)	Chandani (%)	Beldadi (%)	MN (%)	Average (%)
1.	Sufficient	55	45	52	85	60
2.	Deficit	45	55	48	15	40

In the study area, 40% of the households reported to suffer from food deficit (Table No. 7). The deficit was highest in Chandani (55%) and lowest in Mahendranagar (15%)

5.1.4 Crop Damage

Table No. 8

Responses Regarding Crop Damage by Wild Animals in the Buffer Zone Area of RSWR (in percentage)

S. No.	Source	VDC/Wards				
		Dodhara (%)	Chandani (%)	Beldadi (%)	MN (%)	Average (%)
1.	Yes	0	0	75	83	40
2.	No	100	100	25	16	60
3.	No response	0	0	0	11	-

In total 40% of the respondents reported to suffer crop damage by wild animals (Table No. 8). This problem was found to be noticeable in Mahendranagar (83%). No. crop damage was reported from Dodhara and Chandani.

Wild boar was the most important crop raider. Others were wild elephants, blue bull, chittal, deers, birds and monkeys. (Table No. 9)

Table No. 9

Contribution of Different Wild Animals to Crop Damage Based on household Survey in the Buffer Zone Area of RSWR (in percentage)

S. No.	Reported Wild Animals	VDC/Wards				
		Dodhara (%)	Chandani (%)	Beldadi (%)	MN (%)	Average (%)
1.	Wild boar	0	0	50	40	31
2.	Wild elephant	0	0	3	20	12
3.	Chittal	0	0	7	15	7
4.	Blue bull	0	0	0	4	1
5.	Deer spotted	0	0	3	2	1
6.	Birds	0	0	7	13	10
7.	Monkey	0	0	0	5	2
8.	Swamp deer	0	0	2	1	1

Wild boar was the most important crop raider. Others were wild elephants, chitals, blue bull, birds, monkeys and deer.

5.1.5 Lack of Agricultural Land

Scarcity of agricultural land was found to be an important problem of about the same magnitude as crop damage.

Table No. 10

Agricultural Land Holding in Percentage

S. No.	Land Holding	VDC/Wards				
		Dodhara (%)	Chandani (%)	Beldadi (%)	MN (%)	Average (%)
1.	Land less	8	7	0	6	5
2.	Smallest land owner (0.68 ha.)	38	35	37	34	36
3.	Small farmer (up to 1.30 ha.)	38	41	55	25	40
4.	Medium farmer (up to 2.70 ha.)	13	12	8	30	16
5.	Large farmer (> 2.70 ha.)	3	5	0	5	3

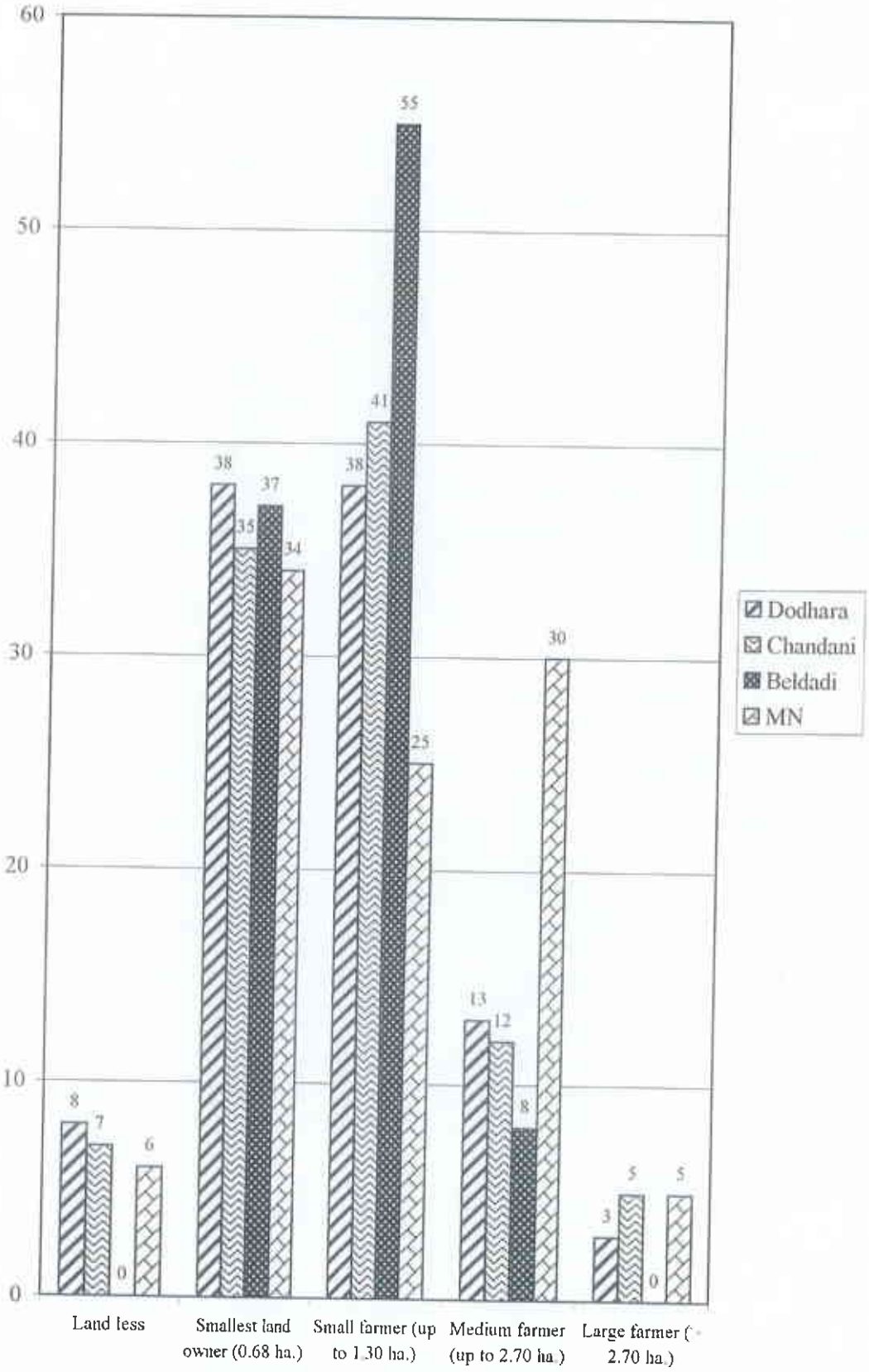
Of the total, 5% were found to be the land less. 36% were found to be near land less, 40% small farmers, 16% medium farmers and only 3% were found to be large farmers. Inequalities in the land distribution was quite common in the studied VDCs.

5.2 Socio-economic and Environmental Implications Started in Buffer Zone Area by Park-people Program/RSWR

5.2.1 Local People Participation through the Formation of user Group

Mobilization of local people in the buffer zone area is carried out by park-people program, through the formation of user groups. Total 87 user groups had been established by park-people program, involving both male and female. Only 14% user groups were pure women groups.

Agricultural land Holding in Percentage



5.2.2 Credits

Park-people program provides loan for the development of alternative source of energy to local people of the buffer zone area. In total, maximum number of respondents (42% ranking value) reported to have PPP loan. More people is Beldadi (70%) had loans compared to Dodhara (40%), Chandani (35%) and Mahndranagar (20%). Uses of credits were reported to be different in different areas. Main areas of expenditure were found to be in agriculture household expenditure (food and cloth purchase, medicine and treatment, house construction, etc.), purchase of livestock, small business, establishment of mills. Of the total amount, the highest percentage (35%) was found in agricultural inputs.

5.2.3 Buffer Zone Forest Plantation

Table No. 11

Plantation in the Adjacent VDCs in Buffer Zone Area of RSWR

S. No.	VDC	No. of Household that Planted Seedlings	Planted (%)	No. of Survival (%)	Sampling Mortality (%)
1.	Dodhara	20	1	100	0
2.	Chandani	15	1	100	0
3.	Mahendranagar	48	97	85	15
4.	Beldadi	6	1	90	10

Source: Field Survey.

People were asked to report about any plantation which they had performed. 27% of the sampled householdls had planted trees. From Mahendranagar 48% respondents reported that they had planted trees while the percentage of planted seedlings were found less in the rest of the VDCs. (Dodhara 20%, Chandani 15% and Beldadi 6%). The rate of survival was found to vary between 85-100% across the VDCs (as shown in Table No. 11).

5.2.4 Irrigation Change in Buffer Zone Areas

The PPP has carried out different source of irrigation in buffer zone of RSWR. Ground water boring work and sprinkler with a nozzle has started. In Dodhara (17%) households were benefited by ground water boring. The percentage of beneficiaries from Chandani was (15%). There was no irrigation intervention in Mahendranagar and Beldadi.

CHAPTER – SIX

DISCUSSION

CHAPTER – SIX

DISCUSSION

This study was conducted in the proposed buffer zone area of Royal Suklaphanta Wildlife Reserve. The study area includes Ward No. 2, 3, 7, 8 of Dhadhara: Ward No. 3, 4, 6, 7, 9 of Chandani; Ward No. 15, 16, 17 of Mahendranagar and Ward No. 7, 8 9 of Beldadi VDC.

This study shows two types of problems concerning conflict. They are- (i) problem created due to reserve and (ii) problem created due to local people. The first type includes- (a) crop damage, (b) human harassment and penalty discriminations while second type includes- (collection of firewood, (b) utilization of natural resources, (c) livestock grazing, (d) hunting and poaching and (e) fishing.

In past many investigators identified park and people conflict in national parks and wildlife reserves of Nepal. Upreti (1985), Sharma (1991), Shrestha (1995) made very important contributions in the subject.

Upreti (1985) found (a) crop damage, (b) encounter between man and wildlife, (b) loss of wildlife to predators, (c) fishing and hunting, (d) antipathy towards parks and reserves and (e) tourism as a cause of conflict. Sharma (1991) identified four causes of conflict in Royal Chitwan National Park. They were- (a) Regulation of Royal Chitwan National park 2030, (b) crop and livestock depredation, (c) loss of human life by wild animals and (d) river erosion. Shrestha (1995) described clearing of forest for agriculture, grazing of livestock, lopping of trees, burning of grasses, collection of thatch grass, harmful fishing

methods as major factors of conflict in Royal Bardia National Park. Shrestha (1994) and Upreti (1995) identified park regulation, crop damage, livestock depredation and loss of human life as sources of conflict in Royal Chitwan National Park.

In study area local peoples face many problems. The main problems identified were scarcity of firewood, lack of grazing land and fodder, flood, crop damage by wild animals, lack of agriculture land and irrigation facilities. Among them scarcity of firewood is the most important problem reported so far.

Most of the households of the study area (92%) use firewood as their source of energy and most of the firewood is collected illegally from the reserve. it has been reported that in Royal Chitwan National Part 45% of the respondents had acquired firewood illegally from the park (Sharma and Shaw, 1993).

Bhatta and Shrestha (1993) reported extensive illegal collection of firewood from the park. In Royal Suklaphanta Wildlife Reserve, the illegal firewood collection makes a serious problem. Most of the households (92%) use firewood. See (Table No. 5). Generally poor people prefer to collect firewood rather than buying it from the market (Bhatta, 1994) and they have a tendency to exploit near by forest first rather than to think about a sustainable use. The continuous illegal collection of firewood inside the forest causes the depletion of source that causes adverse effects on biodiversity.

The park-people program has started establishing nurseries and supplying seedlings to local people in buffer zone area. But the number of nurseries is still insufficient. Some of the mango seedlings supplied by these nurseries were reported to be rootless and hence did not survived which have discouraged formers in planting such seedlings. To develop buffer forest, altogether 27.5 hect. of land is brought under

plantation. About 20 ha. of land has been developed into agro-forestry plantation. The park-people has also started canal plantation but it seems unsuccessful due to lack of preventive measures. It is helping for the development of biogas (*Gobargas*) but until now nothing is done for the development of solar powers and improved stores.

Grazing problem was ranked as the second important problem by the local peoples. The grazing problem can be minimized if there are good sources of fodder supply. But as far as the study area is concerned, all households do not have other sources of fodder. The PPP/RSWR provided only a few fodder tree seedlings and livestock management training only to a few people. The local people do not seem to be interested in developing grazing areas. Instead local people extract grasses and graze their cattles inside the reserve (Plate I & II). Generally in the studied buffer zone areas, farmers collected grasses from the local canal sides which are very limited and landless farmers collect crop residues (such as paddy, maize and sugarcane tops). It was found that the local people generally go to the reserve and collect grasses and sometimes twigs of the trees from the reserve. In Beldadi and Mahendranagar, people seems to graze their cattles frequently inside the reserve. The problem is serious, urgent need to solve this problem seems very essential.

Crop damage by wild animals is also very serious problems in the study area. However, it varies between different crops and distance from the park. Crop damage was ranked in the 4th most important problem and from Dodhara and Chandani, no any reports about crop damage. The reason may be due to the presence of Mahakali River in the boarder line between these VDCs and the reserve.

Present study indicated that wild boar was the most important principal crops raider, followed by wild elephant, chittal, blue bull,

Among studied areas, Mahendranagar and Beldadi were most effected. These are probably due to the close proximity and uncontrolled grazing. The PPP has tried to minimize the problem in different ways. The common ways implemented are (a) construction of trenches, (b) wire fencing and (c) bio-fencing (cactus plantation).

However, these measures have been taken is limited areas only. Generally, trenches can not control the worst crop raider, the wild boar, and others (elephant, blue bull, chittal, etc.). So, the PPP/RSWR should think about this problem more appropriately.

Food deficient is another problem in the studied buffer zone area. Due to the lack of enough size of agricultural land and increasing number of population, the problem increases day by day. It ultimately affects the reserve resources. Out of the total human populations of the study area, 6% are landless. People without access to land or employment will remain poor and tend to destroy forest and natural resources. The PPP/RSWR has started to conduct the training that may help local people to earn some cash from the alternative sources.

However, the landless people are not benefited much from PPP activities because facilities like irrigation, agro-forestry, fencing etc. are related to land holders only.

In the study area people mostly depended on monsoon rains except in Mahendranagar where Mahakali irrigation canal provides water for irrigation to a part of population. Due to lack of agricultural land, more irrigation facilities should be managed to increase the yield of the existing cultivated land. But due to economic problems, most of the people from the study area can not afford newly build irrigation facilities. For this reason, PPP/RSWR started 40 smaller irrigation projects mostly in Dodhara.

Illegal hunting inside the reserve is also another problem. It is being done mostly for three reasons:

(1) Affluent family members for fun and recreation as well as for meat and skin (hide).

(2) Poor people hunt wild animals for petty economic gain by selling meat and skin.

(3) People from adjacent area kill animals as an average to their crop damage.

Present study indicated that people are slightly diverting their use pattern from reserve to buffer zone. So the buffer zone creation is going to minimize the park-people conflict.

CHAPTER – SEVEN

CONCLUSION AND RECOMMENDATION

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CONCLUSION AND RECOMMENDATION

7.1 Conclusion

It has been concluded from the present study that local people slightly diverting their use pattern from reserve forest to buffer zone forest. In buffer zone different types of plantation is carried out by PPP/RSWR by the formation of local user groups. Still all the people from the buffer zone area are mostly dependent on reserve for firewood, grazing their livestocks, fodder collection and timber collection. Alternative source of energy (firewood) are not popular among the local people, however, a few started to use Gobargas. So, the majority of the people are using firewood illegally from the reserve. Due to lack of grazing area, livestock encroachment is also serious. The PPP/RSWR has tried to solve the problem by carrying different types of plantation, for example: School plantation, private plantation canal plantation; community plantation. But, it seem insufficient as compared to the seriousness of the problem.

7.2 Recommendations

Villages in the proposed buffer zone area have various problems in common. The main problems, directly causing a reduction of the forest resources are scarcity of firewood, lack of grazing area, lack of fodder and timber. Local people also suffered from crop damage by reserve animals. To overcome the situation following recommendations are made:

(1) Top priority should be given to the problem of firewood scarcity. Different types of plantations should be carried out properly in buffer zone areas. Without promotion of firewood plantations and agro-forestry and without alternative sources, people next to reserve will continue to exploit reserve resources. For this development of private and community forests should be encouraged.

(2) Raising awareness to conserve bio-diversity is also very essential. Local people should be encouraged to grow fast growing multipurpose tree species on their own land, that can provide fodder, firewood, timber, fruit, etc.

(3) Alternative source of energy should be developed instead of firewood. Improved stoves and bigas plants are potential alternative sources which could be initiated. Proper utilization of driftwood should be highly encouraged which help to reduce firewood scarcity.

(4) Social mobilization should be strengthened. Mostly women collect resources from the forest. Therefore, women should be encouraged to involve in user group's and providing them with more economically gainful opportunities.

(5) Protective measures should be carried out against crop damage. Local people should be supported to build their own fences and to construct trenches near their croplands to control crop damage. The PPP should provide money and materials needed for the concerned construction work. Bio fencing should be encouraged on the banks of their own lands.

(6) Eco-tourism program should be launched. This is an immediate need for promotion of tourism and diffusion of benefits among

locals. When the eco-tourism becomes the main source of income of the reserve, it is supposed to support the community development programs in the buffer zone areas.

(7) Unauthorized harvesting, encroachment and burning of the vegetation inside the reserve should be checked. Illegal hunting, poaching, logging should be completely controlled.

(8) The problem of conflict should be solved compensating farmers directly in cash for their loss. It can help to minimize the problem to some extent. But crops compensation reduce their extent. But crops compensation reduce their efforts to watch fields and it may not be really very feasible. At least, local farmers injured by attack of wild animals should be helped during medical treatment.

(9) Crop damage also depends upon the taste of crop plants. Possible biological solution in controlling the wild animals should be effective to control crop depredation. The food habit of the wildlife should be thoroughly studied and local people should be encouraged to grow less preferable crops and other varieties of unpalatable crops.

(10) Most of the people in the buffer zone area are illiterate and do not have knowledge about the issues of environmental degradation and its overall impact. They do not know the importances of protected wild animals and forest resources. Again, they have negative attitude towards the reserve. If education on the importance of reserve, conservation of natural resources were given to them time to time, they may realize the importance of such reserve for present and future generation and can enjoy the nature. So, the program concerning peoples awareness, participation and sense of responsibilities should be lunched.

(11) In buffer zone area local peoples are practicing a traditional system of animal husbandry. To reduce the no. of domestic animals, new improved varieties of cow and buffaloes should be introduced by providing loan and other facilities to the surrounding villagers by which they can able to sustain without cattling less product animals in large number.

(12) More forest nurseries should be established in order to provide seedlings of fodder species and leguminous herbs and shrubs in their own land.

(13) Community capital mobilization should be instituted through co-operatives. Credit facilities should be provided to encourage off-farm activities such as handicraft development, training to the local people for electrician, pump set machines, mid-wife, radio mechanics and vegetable farming as well.

(14) Regular and more efficient monitoring and evaluation is needed to carry out different types of activities.

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APPENDIX

List of Protected Areas of Nepal

Name	Area (Sq.km.)	Gazetted Date	Range	District
1. Shey-Phoksundo National Park	3555	1984	Mountain	Dolpa & Mugu
2. Ra Ra National Park	106	1976	West-Himalayan	Mugu & Jumla
3. Langtang National Park	1710	1976	Central Himalayan	Rasuwa
4. Khaptad National Park	255	1984	Mid-Mountain	Bajhang, Bajura, Achham & Doti
5. Sagarmatha National Park	1148	1976	East-Himalaya	Khumbu area
6. Royal Chitwan National Park	932	1973	Inner terai	Chitawan
7. Royal Bardia National Park	968	1976	Terai Bhabar	Bardia
9. ShivaPuri National Park and Watershed Area	145	1992	Mid-mountain	Kathmandu Nuwakot
10. Annapurna Conservation Area	7629	1992	Mountain	Kaski, Manang, Mustang, Lamjung
11. Suklaphanta Wildlife Reserve	305	1976	Terai bhabar	Kanchanpur
12. Kositappu Wildlife Reserve	175	1976	Terai bhabar	Saptari, Sunsari, Udayapur
13. Parsa Wildlife Rserve	499	1984	Terai bhabar	Chitawan, Parsa, Makawanpur
14. Dhorpatan Hunting Reserve	1325	1987	High-mountain	Rukum, Baglung, Myagdi
15. Kanchanjangha C.A	2011	1997	Mountain	Taplejung

QUESTIONNAIRE

Questionnaires to Evaluate Park-People Conflicts and the Effect of Buffer Zone in Areas Adjacent to the RSWR

"GROUP A"

Name: _____ Age: _____
Ethnicity: _____

(1) How much land do you have?

(2) Is your land irrigated or not?

(3) What kinds of crop do you grow?

(a) Maize
(b) What
(c) Rice
(d) mustard
(e) Lentils
(f) Others

(4) Do you have any problems from park animals?
(a) yes [ ] (b) No. [ ]

(5) If yes, what kind of problems do you have?
(a) Crop damage
(b) Harassment
(c) Cattle loss due to carnivores
(d) Others.

Crop Damage

(6) Which animal mostly visit your field?
(a) Deers
(b) (Boars
(c) Elephant
(d) Tiger
(e) Others

(7) When do they usually enter the field?
(a) At night
(b) At daytime
(c) Any time

(8) How often do they come?
- (a) Every night
- (b) Every week
- (c) One, two times/month
- (d) Occasionally

(9) Which way do they use mostly?
- (a) They use the roads
- (b) They come crossing the river
- (c) They come crossing the crop field
- (d) They come from other sides
- (e) They come crossing the fence

(10) In which season do the park-animals mostly affect the crops?
- (a) Rainy
- (b) Winter
- (c) Summer

(11) Which animal damage which crop most?

Name of the animal	Crop	Season

(12) At what growth stage of the crop do the park-animal cause maximum damage to crops?

Stages	Maize	Rice	Mustard	Wheat	Others

- (a) Juvenile stage
- (b) Flowering stage
- (c) Teaseling stage
- (d) Mature stage
- (e) Tuber formation

(13) Do you apply any technique to repel the animals to protect the crops from damage?

(a) Yes [ ] (b) No [ ]

(14) If yes, which technique do you apply?

(15) Does your technique help to chase away the park-animals?

(a) Yes [ ] (b) No [ ]

(16) Do you grow all kinds of crops which are common in the surrounding areas?

(a) Yes [ ] (b) No [ ]

(17) Which of the following crops you do not grow?
- (a) Maize
- (b) Wheat
- (c) Mustard
- (d) Lentils
- (e) Rice
- (f) Others

(18) Why don't you grow?
- (a) Land is not suitable
- (b) Low yield
- (c) Less market demand
- (d) Damaged by park-animals
- (e) others

(19) Do you think damage problem is growing every year after the establishment of the reserve?
(a) Yes [ ] (b) No [ ]

(20) Why do the park-animals come to the crop field in your opinion?
- (a) To change the taste
- (b) They like field crops
- (c) They come to damage
- (d) The jungle cannot fulfill their food and other requirements
- (e) Other causes

(21) Do you lodge complain with reserve authorities?
(a) Yes [ ] (b) No [ ]

(22) Do you get compensation for the losses?
(a) Yes [ ] (b) No [ ]

(23) Do you have any suggestions to improve the situation?

Local Harassment

(24) Had any body in your family ever been attacked by reserve animals?
(a) Yes [ ] (b) No [ ]

(25) If yes, when was he/she attacked?

(26) Which animal attacked the person?

(27) How does the animal attack a man? (*Describe the Situation*)

(28) Do you receive any help or medical facilities from the park authorities?

Livestock

(29) Do you have cattle?
(a) Yes [ ] (b) No [ ]

(30) What type of cattle do you have?
(a) Cows
(b) Ox
(c) Buffaloes
(d) Goats
(e) Others

(31) Do the reserve animals attack your cattle?
(a) Yes [ ] (b) No [ ]

(32) Which animal is mostly attacked?

(33) Your suggestions to solve the problem?

(34) (What do you feed to your cattle?

(35) What is the source of fodder for your cattle?
(a) Agriculture (crop residue)
(b) Fodder trees growing in the private land
(c) Fodder trees growing in the government forest

(36) Do you think the buffer zone is necessary to overcome your problems?
(a) Yes [ ] (b) No [ ]

(37) For what purpose do you mostly use reserve flora?
(a) Fodder
(b) Timber
(c) Fuelwood
(d) Others

(38) Do you have to face any problems for establishing buffer zone?
(a) Yes [ ] (b) No [ ]

(39) If yes, what kind of problems?

(40) What are preferred plant species found inside the parks for following purposes?
(a) Timber
(b) Fuelwood
(c) Fodder
(d) Miscellaneous (NTFS)

(i) food (fruits, vegetables etc
(ii) medicinal
(iii) for house thatching
(iv) for fibers
(v) for oil including aromatic plant

(41) What is the source of your preferred spices?
(a) Reserve area
(b) Government forest
(c) Community forest
(d) Plant growing in the personal agriculture land

GROUP 'B'GROUP 'B'

(1) Is there any problem the government has to face due to the habitation of local people around the reserve?

(2) Is the problem growing recently?

(3) What techniques and methods are being applied up till now to resolve problem?

(4) Would you say these techniques are effective?

(5) Does the government have some other new techniques under consideration for the future?

(6) Are the people allowed to enter into the national park? If no, then how do they effect park conservation?

(7) What action do the park authorities take when they get hold of people involved in illegal activities inside the reserve?

Legal or Othr Actions Taken by Reserve Authorities in Case

(a) Your cattle enter the reserve area for grazing.

(b) When people are caught collecting fodder or fuelwood from the reserve.

(c) When people enter reserve area to collection non-timber forest products.

Color Plate – 1 : Illegal Grazing Inside the Reserve.

Color Plate – 2 : Bomboo Plantation in the Buffer Zone Area.

Color Plate – 3 : Open Naked Vicinity of the Reserve.

Color Plate – 4 : Sisso plantation in the Buffor Zone Area.

Color Plate – 5 : Woman Carrying Fire Wood from the Reserve.

Color Plate – 6 : Deforestation Inside the Reserve.