

CHAPTER - ONE

INTRODUCTION

1.1 Introduction

Peoples are the nations pillar, Human beings living and occupying the particular land or country are known as people. According to oxford dictionary “peoples are human beings in general or considered collectively, members of particular nation, community or ethnic group” People do the different activities within their life period which affect the natural or artificial environment. By the activities of people ecosystem and biodiversity are affected. Rather people also contribute the nations development for all aspects by providing services or producing goods to strengthen the GDP of nation. Wildlife human interaction, such as crop and livestock depredation, human toll by wildlife and resource utilization by local people, in and around the protected area is one of the main issues of protected area management. Numerous national parks in developing countries are surrounded by agricultural lands and the people living in and around such parks have interacted with them in multifarious ways (Nepal and Weber, 2013).

A national park is a park in use for conservation purposes. Often it is a reserve of natural, semi-natural, or developed land that a sovereign state declares or owns. Although individual nations designate their own national parks differently, there is a common idea: the conservation of wild nature for posterity and as a symbol of national pride (European Federation (eds.) 2009) .The concept of national park and protected area was developed in U.S.A. (Zebu and Bush,1990) and has been adopted in many countries, including Nepal (GON 1973, Wildlife conservation after the establishment of National Park and Wildlife Conservation (NPWC) Act 1973 has been quite successful from the viewpoint of habitat conservation of several threatened species and steadily increasing population of wildlife in national parks and protected areas . Chitwan National Park is one of main area of such experiences. The intimate interception of people in protected areas results in conflicts between wildlife and human . Most definition of national parks, including that of the World Conservation Union (IUCN, 1982) excluded human habituation and significant impact. The local people were often considered as an obstacle to, rather than a means towards, conservation objectives (UNESCO ,1974).The establishment of national parks has had severe

adverse impacts on local traditions and beliefs or cultures as such, in some instances resulting in disastrous side effects and the park is more the source of wildlife nuisance than a source of benefits for the local peoples (Mishra ,1984).

There is always cost of leaving with wildlife both direct costs such as the effect of marauding crops and animals, and opportunity cost of limited access to land set aside as wildlife which might otherwise generate income from agriculture, livestock, logging. Crop raiding is the main issue due to which conflict arises between wildlife and human. Similarly, livestock depredation can cause substantial economic losses, and makes the very idea of wildlife conservation unpopular among local residents (Bhatnagar et al.,1999). Wildlife human conflicts are acute when the species involved is highly imperiled while its pressure in an area possesses a serious threat to human welfare (Saberwal et al.,1994). Besides, human encounters with wild animals around the park were common Which is also a cause of wildlife human conflict (Jackson 2013) .

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 of the government to curtail access to their traditional rights of resource use. As a result, illegal activities such as hunting and poaching have intensified, and there are many cases of confrontation between park official and local people (Nepal and Weber,2014). Conflicts often arise when conservation regulations are imposed roughly to avoid natural resources usage, such as grazing land, firewood collection, fodder, medicinal plants and land for hunting without alternatives being provided (Lewis ,2015).

This study explores to identify the causes of conflict and its impact on the economic life of the people at Buffer zone area of Devchuli Municipality Ward No 1and 2 of Nawalparasi district on the north-western boundary of Chitwan National Park. Moreover this study also examines the relationship between park and people and tries to understand existing preventive measure applied by the local people and park in the study area.

1.2 Statement of the Problem:

Chitwan National Park is the first National park in Nepal and it is categorized as world heritage site which is situated to cover the larger biodiversity areas. Along with the establishment of the national park local people who depend upon the park were deprived from their everyday life ways. Since the establishment of the park, local people were dissatisfied from the park which is the major cause of the conflict. Along with the establishment of the National Park, the number of wild animals has been increasing. As a result, these animals raid the farm fields of the local people in search of proper food and shelter which create conflict. To save wild animal as well as bring local people in management mainstreaming, park started to work with the people in the name of collaborative management system but the targeted people still deprived from the park management system moreover the poverty of local people remain same Ecosystem management also recognizes that humans cannot be divorced from the ecosystem but, rather, are an integral part of it. (Wright 1996). By seeing conservation issues as development issues, we locate people very firmly in the conservation equation. Wright had pointed out some threats to protected areas which are identified as follows: 1) Lack of policy commitment at nation state level to adequately protect systems. 2) Ineffective management by trained staff of individual protected areas . 3) Funding is insufficient or unsure.

It is equally important to note that participation does not equal local development, nor does local development equal participation. They are mutually dependent. For participation to be meaningful, local involvement and consultation must mean a partnership of equals. If local people are consulted and action based on mutual cooperation and a better understanding of the variety of issues involved is the result, then meaningful participation is achieved. It is evident that there are several reasons for conflicts to take place among park authority and people residing within or outside the park boundary. These reasons are 1) Neglecting the core as well as outward sphere of culture 2) Difficulties faced by local people because of inability to adjust with frequently changing government rule, red-tapes and other kind of bureaucratic systems. 3) Attitude and behavior of the park staff and local people to each other. 4) Differences in the understanding the need of park by people and park staffs. 5) Lack of people participation in planning and

implementation of park management activities 6) Based on these reasons, pointed out by previous studies this study will especially be focused to seek the following answer;

- 1)What are the main causes of the conflict?
- 2)How do people maintain the relations to the park?
- 3)How do the local communities depend upon present National Park's forest resources?
- 4)What is the general attitude of the local population towards the park?
- 5)Do local people get benefit from park or not?
- 6)What kind of benefit do they get from park?
- 7)What kind of loss do they bear after the establishment of NP in the study area?

1.3 Objectives of the study:

The specific objectives of the study are as follows:

- i)To examine the impact of the park for damage of crops and loss of livestock.
- ii)To identify the relationship and conflict between National Park and People.
- iii)To understand the existing preventive measures developed by the local people and the National park authorities and analyze its effectiveness.

1.4 Importance of the Study:

The objective of this study is to find out the relationship between the National park and people; park's impact on the economic life of the people and to identify the existing preventive measures from wild animals' depredation and checking its effectiveness. Hence this study tries to show the causes of conflict existing in the Chitwan National Park, particularly in the area of Devchuli Buffer zone. This study will also helps to show why Chitwan national park regularly bears the problem from the local people. Similarly it helps to give the ideas of conflict resolution mechanism to park authority and to create awareness to local people about the system of park management activities .This study would be beneficial for the students of sociology and to the individuals who have an interest related with this kind of research.

1.5 Organization of the Study:

The whole thesis is divided into five chapters. Chapter one includes the introduction which contains the brief introduction about park people conflict relation with statement of problem, objectives of the study, importance of the study and organization of the study itself. Chapter two contains literature review in which Theoretical review , Empirical review with conceptual framework . Methodology is included in chapter three in which rationale of research site selection, types of sources of data, ways of data collection and data analysis & presentation are included. In chapter four analysis of the collected data are presented which represent the sources of conflict & preventive measures with its effectiveness. Finally chapter five describes the summary and conclusion.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical Review:

Literary review regarding with the conflict relation between Park and People in terms of Theoretical review observed for the different perspectives concept are explained as follows:

Damage of Crops:

Since the establishment of National Parks and Reserve, conflict has been observed between local people and park. Crop depredation by wildlife is very common in neighboring villages of protected areas in Nepal and other countries. It is one of the main causes of wildlife human conflict both in mountain and Terai parks of Nepal.

Damage to Livestock:

Livestock depredation by wildlife is another issue of the protected area management. Conflict between livestock owners and predators dates back 9,000 years to the time when animals were first domesticated by human it is not recent phenomenon caused by the establishment of protected areas or wildlife protection laws as commonly believed (Jackson ,1998). Tiger and leopard were identified as livestock depredators in Chitwan National Park (Mishra and Margaret, 1991) have been reported as livestock lifter around the CNP (Uprety ,1995). Livestock depredation has led to wildlife human conflict in Dhorpatan (Kharel ,1993). Leopard, jackel, jungle cat and mongoose were identified as livestock depredating wildlife at Gokarna (Gurung, 1997). Snow leopard was identified as livestock depredator in LNP (Kharel ,1997), leopard, jackel, wild dog (*Cuon alpinus*) and grey wolf (*Canis lupas*) in Makalu Barun Conservation Area (Jackson ,1990 and Chalise, 1998), Tibetan wolf, snow leopard, wild dog, jackel and the fox in SPNP (Basnet ,1998).

2.2 Empirical Review:

Literary Review in terms of empirical review is explained as follows:

Prior to the malaria eradication programme in Chitwan Valley, the ruling Rana of Nepal had protected the habitat and utilized Chitwan Valley as a hunting reserve

(Milton and Binney, 1980:5). The toll on wildlife was often heavy. Massive hunts were organized such as that held for King George V of Great Britain, when 39 tigers, 18 rhinoceros and great numbers of smaller game were killed (Milton and Binney, 1980:5). The biggest toll recorded this century during the 1937/38 season included 38 rhinoceros and 120 tigers (Smythies, 1942 as cited in Lauries, 1978:15). After the fall of the Rana and the launching of the malaria eradication program, the massive population migration into this pristine area resulted in large-scale devastation of wildlife habitat by opening it up for agricultural land and subsequent intensification of poaching. Aside from crop cultivation, traditional modes of extraction of natural resources by villagers continued. These included livestock grazing and collecting fodder; burning grasslands to facilitate thatch collection and improve grazing; utilization of forest to fulfill various household needs such as for beams, poles, fences and other building materials; for firewood, wild edibles, tubers, oats, medicinal herbs, and honey; and for game and fish. The contemporary ecosystem represents the cumulative effect of all these activities which greatly modified succession patterns of vegetation and directly as well as indirectly changed the patterns and densities of wildlife species likewise. In 1927, out of the total area of Chitwan District (148,062.5 hectares), 126,621.5 hectares or 86 percent were under forest cover, which in 1977 was reduced to 64,964 hectares or 44 percent of the total area. There was an absolute decrease by 61,657 hectares or 49 percent of forest from the original forest coverage (Gurung, 1984:232). Similarly, the wildlife habitat was destroyed extensively, which resulted in the rapid decline of the wildlife population. The rhinoceros population dwindled from 1,000 in 1951 to 90 in 1969, a relative decrease by 91 percent. The population of tigers was reduced to 25 heads. Wildlife species such as water buffaloes and swamp deer became extinct.

Crop Depredation:

In Chitwan National Park, wild ungulates such as rhinoceros boar and spotted deer are chief crop depredators of rice, maize and mustard (Mishra and Margaret, 1991). According to Nepal and Weber (1913), crop raiding by wild ungulates continued from May to March in any cropping cycle.. Bhattarai and Basnet (2014) estimated Rhinoceros caused 70 percent damage and the lowest 0.2 percent by barking deer (*Muntiacus muntjak*). Wild boar, and Elephant

(*Elephas maximus*), Rhinoceros, Blue bull (*Josephus tragocamelus*), Monkey (*Macaca mulatta*) and spotted deer were crop raiders in Bardia National Park (Jnawali ,2002). The depredators raid varieties of crops, such as rice, maize, wheat, lentil and vegetables grown in kitchen garden (Jnawali ,2012). In Koshi Tappu Wildlife Reserve, wild buffalo (*Bubalus arnee*) and wild boar raided paddy, wheat, and jute (Adhikari ,2015).

Spotted deer, wild boar, elephant, blue bull, monkey, porcupine (*Hystrix indica*) and peacock were identified as pests in Suklaphanta Wildlife Reserve (Pande,2015).

In Shivapuri and Gokarna wild boar, monkey, porcupine, and bird species were identified as crop pests (Gurung,1997) that affected crops like maize, millet, rooted crops, rice and wheat.

In high mountain region the identified crop pests were two species of monkey barking deer and porcupine at Shankhuwa Valley, Makulu Barun National park (Chalise , 1998). In addition to these pests, Kharel (2015) identified wild boar as the major pest in Langtang National Park. Monkeys, bears (*Selenartus thibetanus*), musk deer (*Moschus chrystogaster*), blue sheep (*Pseudois nayaur*) at Langtang National Park (Chalise et al. ,2011) as well as Porcupine, and rodents were identified as major crop wildlife pest in Shey Phoksundo National Park (Basnet ,1998), and Himalayan tahr (*Hemitragus jemlahicus*) at Sagarmatha National Park (Shrestha ,2015).

Livestock Depredation:

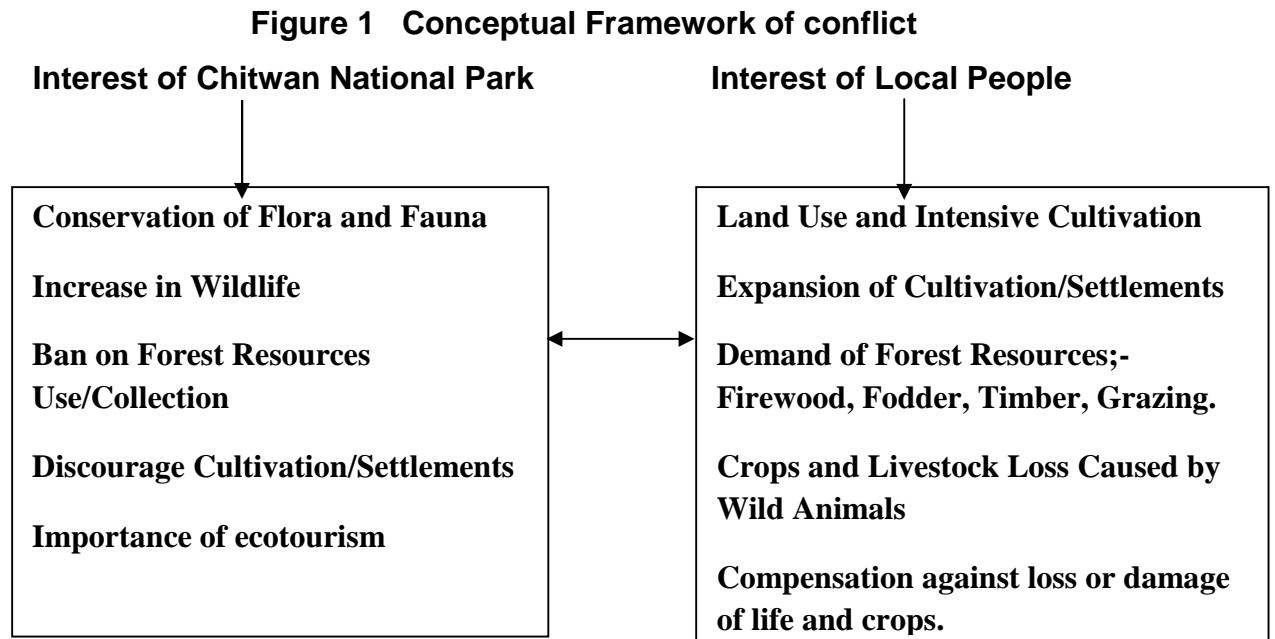
According to Bhadauria and Singh (1994) the frequency of domestic livestock being killed by tiger increases during the rainy season because grasses and number of bushes increase which act as a good ambush cover for the tigers. The large livestock depredators such as lion (Srivastav, 1997), snow leopard (*Uncia uncia*), wolf resulted a human wildlife conflict and hindered conservation efforts of these predators. Jackson (1991) estimated an average loss of US \$ 25 per household at Qomolangma Nature Reserve due to livestock depredation by wildlife and calves were the most frequent targets of wolf depredation at Wisconsin, United States (Treves et al. 2012). Frequency of attacks to livestock increased by 22.9 percent in Spain from 1999 to 2009 (Blanco, 2015).

Attacks to Human Life:

The encounters with wild animals around the park were common (Nepal and Weber,1993). This included an encounter with rhinoceros in Chitwan National Park (Jnawali, 1989) and human injury and loss of property by elephant in Suklaphanta Wildlife Reserve (Pande, 2000). A total of 78 accidents were recorded in a period of 10 years from1978 to1988 (Jnawali 1989). Srivastav (1997) recorded 164 man-leopard encounters at Gir, and Mukherjee (2003) recorded tiger – human conflict in Sundarban Tiger Reserve. Human casualties in protected areas, loss of human life in wildlife related incident is one of the most painful experiences faced by park managers and conservationists (GON/ MFSC 2001). Old age, injuries, displacement and lack of prey species sometimes turn tigers and leopards in problem animals and they attack human beings (Mukherjee 2003 and GON/MFSC 2001). Intrusion of people into habitat of wildlife was causes of attack to human life for instance honey collectors and fisherman were victim in Sundarban Tiger Reserve (Mukherjee , 2013).

Many studies of wildlife human interaction have been conducted. It should be conducted in every affected area because the interaction issue and its solution differ significantly depending on places. Regular recording of the crop and livestock depredation is necessary for better management of protected areas.

2.3 Conceptual Framework:



The main objective/interest of the Chitwan National Park is to conserve flora and fauna which helps to in the number of wildlife in the park. The park authorities ban on forest resources use/collection and discourage cultivation and settlements. While the interest of local people is to use land with intensive cultivation, expansion of settlements, increase in agricultural land, collection of firewood, fodder, timber, grazing etc. The increased wild animals also cause crops and livestock loss to the people. This kind of differences in the interest of two bodies creates conflict.

CHAPTER -THREE

RESEARCH METHODOLOGY

3.1 Research Design:

The design of the research of this study is descriptive and analytical . It describes the quantitative effect or impact to the selected area of the study.

3.2 Rationale of the Research Site Selection:

Before the CNP establishment, local people used forest resources and managed forest based on their cultural practices. In the long run, the ratio of resources utilization was high due to the increase in the human population. There was big depredation in the flora and fauna and created problem in the ecosystem. Thus, the Chitwan National Park (CNP) was established in 1973 which is Nepal's first National park. On the basis of its management objectives, it falls in IUCN's category II which has strict protection against consumptive human activities. Since then the conflict between the park and people started. Resolution of the conflict is a great challenge of the nation. Therefore, the area will suitable to find out the causes of the conflict and its economic impact on local people.

As the CNP authorities restricts for the peoples of BZ area for free usage of CNP resources for themselves conflict arise. Due to the effect of wildlife wandering to BZ area causing the death toll and the gaining of less compensation raises the conflict. Devchuli BZ area is shortest boarder area of CNP rather than the distance of neighboring place. Comparing to other places the selected area is more suitable to me to study the damage of crops and loss of life stock. So that area was selected for study.

3.3 Nature and Sources of data:

This study is entirely based on both primary and secondary data. The primary data includes information collected from the study area. Secondary data includes records and reports from different sources and office on different aspects of the study. Secondary data were collected from BZ office, Municipality, library, park headquarters, DNPWC, INGOs, NGOs etc. Other sources were articles, dissertation works on related fields.

3.4 Sampling Design:

Stratified random sampling was done to collect the socio-economic data. At first, the study area was differentiated into two strata i.e. villages bordering the National Park boundary (Upto 1 km from CNP) and villages not bordering the National Park boundary 1/2 km from CNP). The village is divided into two parts to know whether the distance from the park boundary affects the movement of wildlife and which village faces the more problem. About 10 percent HHs were selected from total HHs from each stratum. The details of these two strata are as follows.

Table 1 :
Sampling Design for the Study Areas of Devchuli BZ

Strata	Total HH	Surveyed HH	Percentage
VBNPB	280	28	10
VNNPB	280	28	10
Total	560	56	10

3.5 Data Collection Technique:

The data for the study were collected by using the following techniques:
The household survey for 56 households out of 560 households was used to collect the information about crop damage, livestock depredation, and other socio-economic data that directly affect the national park.

a) Interview

The loss of crops/livestock made by wild animals and local people's attitude towards the national park and wildlife conservation along with local existing preventive measures from wildlife destruction will also be collected. The loss of crops estimated in local scale e.g. *pathi*, *muri* and quintal .

B) Observation

We the view that a structured Schedule cannot cover all aspects of the reality, an observation for getting the idea of Machan Guarding and View Tower was done.

b) Focus Group Discussion

Focus group discussions were conducted among the local people in two different groups. These discussions helped to understand the collective views of the local communities, about the causes of conflict between the park and the local people

along with its economic impact on local people and different kinds of preventive measures and their effectiveness to reduce the conflict of pest species in and around CNP. The frequency of wildlife visit was categorized into three types such as very frequent for wildlife visiting every day or night during crop season, frequent for wildlife visiting once or twice a month; and Rare for wildlife visiting once or twice a year for fewer times.

3.6 Data Analysis and presentation:

Simple data analysis technique was done for this study. After conducting Schedule survey mean crop loss per household is calculated. By multiplying mean crop loss and total household of the village, the total crop loss of the village was calculated. Therefore, total crop loss of the village = mean crop loss x total household of the village in (kg). The price of the crop was multiplied by total crop loss. So the total economic loss of the village was calculated. Therefore, total economic loss of the village = price of crop x total crop loss of the village.

3.7 Limitation of the Study:

The present study was mainly based on the household survey, field observation and focus group discussion. Therefore, it may not have succeeded to capture some ground realities. Due to availability of short time period and lack of adequate budget, the study has been carried out on a small geographical area-focused only on around Chitwan National Park. The study is purposed only for partial fulfillment of the requirement for the master degree of arts in sociology under Tribhuvan University. The result may not be extrapolated or generalized for other protected areas of the country.

CHAPTER - FOUR

SOCIO-ECONOMIC AND DEMOGRAPHIC INTERPRETATION OF DATA

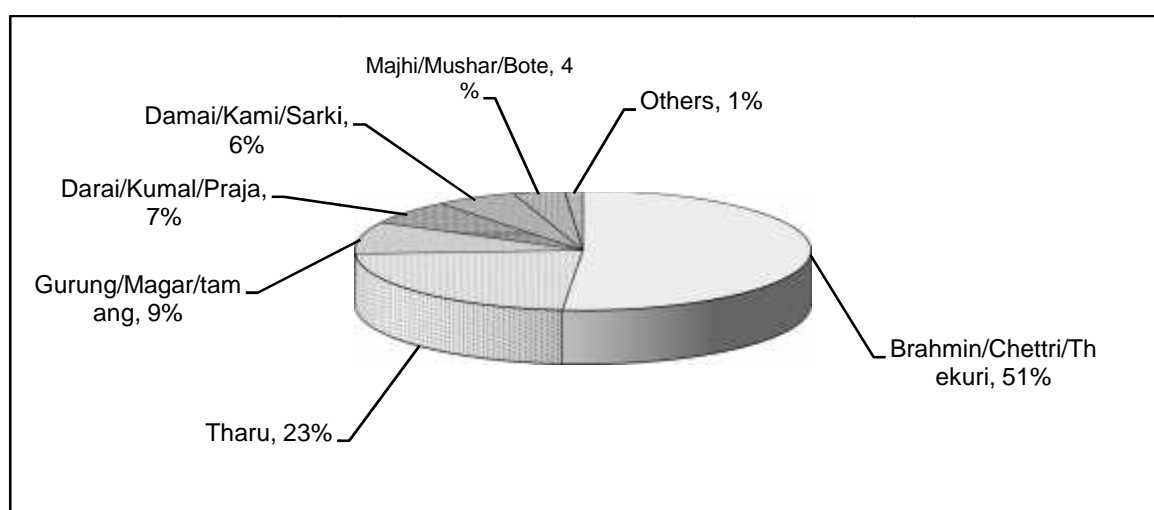
Chitwan National Park (IUCN category II Protected Area) was established in 1973 as the first national park of Nepal to conserve the wildlife habitat of many endangered wildlife species and biodiversity richness. Chitwan National Park (CNP), one of the World Heritage Site (WHS), stretches mostly across the Churia region and has been accommodating the Rapti valley, lowlands and wetlands of Terai. CNP spread over an area 932 sq. km is known for its Sal (*Shorea robusta*), riverine forest and grassland. The parks hosts 570 species of flowering plants, 56 species of mammals, 525 birds species, 47 reptiles and 68 fish species World Heritage Site in 1984 (NTB, 2011).

4.1 Social Aspects

According to respondents, the population growth has leaped fast due to hill migrant and is continuous. Traditionally, local people of Dibyapuri VDC depend upon agriculture and livestock rearing. But some people like Bote and Musahar depend upon forest resources and fishing into the Narayani River for their subsistence economy. People who live near the park used both timber and non-timber forest product such as thatch grasses and seeds, tree fodder, fibers, wild vegetables, driftwood, medicinal herbs and fruits.

Figure 1 :

Ethnic Composition of BZ of Devchuli Municipality 1 and 2



Source: BZ Office of Devchuli Municipality Ward No 1 and 2 - 2016

The figure 4 presents the caste/ethnic composition in the study area. Brahman/Chhetri is 51 percent and Tharu are 23 percent which is higher proportion in compare with others. Other ethnic people comprise Gurung/Magar/Tamang 9percent , Kumal/Darai/Praja 7 percent , Dalit (Kami, Sarki and Damai) 6 percent , Bote-Majhi-Mushar 4 percent , and others 1 percent . The proportion of Brahman/Chettri seems to be higher in the study as most of them have migrated from the hills after the eradication of malaria.

4.2 Economic Aspects

Agriculture is the main source of income in this village and livestock rearing is another important source. 1 percent of the members of this study area are also engaged in corporate job. Fishing is another important source of income for ethnic groups like Majhi, Bote and Musahar. They also collect seasonally the wild vegetables (e.g. "*Niuro*") and get income by selling it at the town.

4.2.1 Farming System

Paddy and wheat were the major crops in the study area. According to the villagers, since 7/8 years, cultivation of wheat has been decreased and ultimately the wheat cultivation has been going to stop due to depredation of wheat crops completely by wild animals. Paddy and Maize have become the major crops in the study area, in which paddy is grown rain fed low lands while maize is mostly cultivated on the uplands area (i.e. in *Tandi*). Non cereals crops such as legumes, oil seeds, potatoes, pulse and variety of vegetables are also cultivated by most of the households but in low proportion. Kitchen plants like tomato, radish, cauliflower, cabbage, onion, garlic, chilly etc. are also grown in their vegetable garden. People sell their surplus food grains and vegetables in nearby village market.

The cropping pattern in the area consists mostly of either sequential or mixed cropping. Sequential cropping or the cropping cycle depends upon the quality of land, irrigation facilities, ability of the farm holders to invest, credit facilities and extension services. However, in general practice, the cropping cycle in this area is paddy-oil seeds-fallow, paddy - fallow-maize, paddy-pulses-fallow and paddy only in a year. Paddy is generally planted in late June to mid-August and

harvested in October-November and after then pulses or oil seeds are sown in different quality of land as their suitability. In the low lands a local variety of rice called "Sabitri" or "Mota Dhan", which has a short life cycle are usually planted in late May and harvested in late August. Such fields are then used to cultivate either oil seeds or pulses. Maize is generally sown in late February or March and harvested in late June to July (Table 3).

**Table 2:
Growing Season for Different Crops in Study Area**

Months												
Crops	J	F	M	A	M	J	J	A	S	O	N	D
Paddy							←	→	→	→	→	
Maize		←	→	→	→	→						
Mustard	←	→									←	→
Lentil	←	→								←	→	→
Rajma	←	→	→								←	→
Linseed	←	→	→								←	→
Phaper	←	→								←	→	→
Potato	←	→	→								←	→
Vegetables	←	→	→	→	→	→	→	→	→	→	→	→

J: January, F: February, M: March, A: April, J: June, J: July, A: August, S: September, O: October, N: November, D: December .The table 2 shows that the specific cycle of crop production within the month of a year which is designated by the arrow headed line, such as paddy from July to November, Maize February to June and so on.

4.2.2 Land Holding

To determine land holding, questions were asked to 56 households of study area of Devchuli Municipality ward No 1 and 2. According to their response, the status of the land holding is presented in table 3.

Table 3 :
Land holding size by household

Land holding size in <i>bigha</i>	No. of Household	Percentage
Land less	2	3.57
Blow 0.5 (0.5-1.0)	13	23.21
(1.0-2.0)	15	26.79
Above 2.0	18	32.14
Total	8	14.29
	56	100.00

Source: Field Survey 2016.

There was 3.57 percent landless household, 23.21 percent have below 0.5 *Bigha* land, 26.79 percent have 0.5-1.0 *Bigha* land, 32.14 percent have 1-2 *Bigha* and 14.29 percent have above 2 *Bigha* land as shown in Table 2. Those families who have got land below 0.5 *Bigha* can have food for 5 months, 0.5-1.0 *Bigha* can have food for 10 months. Similarly those families who have got land in between 1-2 *Bigha* and above it can have surplus amount of food. Those families who can't grow enough food from their farm field, they were engaged in different kinds of jobs like drivers, either subsistence kind of job or self employed in small shops. One Dalit was found landless during the survey. Especially Brahman, Chettri, Thakuri and Tharu has got more land than other ethnic people.

Land holding in between the two strata was calculated to find out differences in the rate of crops depredation and /or causes of conflict. As when the cultivation rate is higher near by the park boundary, it helps to attract the wildlife in the cultivated land.

Table 4:

Total Land Quantity and Land Holding /HH in Surveyed HH (in *Bigha*)

Area	Total No. of HHs	No. of HHs	Total Calculated land in HHs	Land Holding per HHs
VBNPB (0-1km)	280	28	57.04 <i>Bigha</i>	0.89 <i>Bigha</i>
VNNPB (1-2 km)	280	28	51.56 <i>Bigha</i>	0.81 <i>Bigha</i>
Total	560	56	108.60 <i>Bigha</i>	0.85 <i>Bigha</i>

Source: Field Survey 2016

Table 4 shows that the total cultivated land owned by the sampled household in BZ of Devchuli M. ward no 1 and 2 was 108.6*Bigha*. Table 5 shows that cultivated land and land holding per family is higher in villages bordering the National Park (NP) boundary (0-1 km from NP) i.e. 57.04 *Bigha* and 0.89 *Bigha* respectively and lower in villages not bordering the NP boundary (1-2 km) of which total cultivated land and land holding per family is 51.56 *Bigha* and 0.81 *Bigha* respectively.

4.3 Crop Raiding and Depredation

However several crops were damaged by wild animals, four major crops paddy, maize, lentil and oilseed were included in this study. Crop raiding was mainly associated with three principal wild ungulates of the park; those are rhinoceros, wild pig and *chittal*. Crop raiding by wild ungulates is a common phenomenon in the vicinity of CNP. Feeding in the fields by these wild animals could only be hindered by human interference. During the cropping seasons, the farmers built elevated pole platforms (*Machan*) on which they sat out at night to guard their crops. If detected, they simply scared the animals off their fields into fallow land, or someone else's crop field and sought the neighboring guards to their attention. Wherever they failed to be on guard, they suffered crop damage. The respondents said that during misty or cloudy nights, and during the dark periods of the lunar cycle, crop raiding was more. Crop raiding by the wild ungulates continued throughout from May to March in any one cropping cycle.

Table 5 :**Wild Pests of Different Crops and Livestock and Their Raiding Time**

Species of Wildlife	Raid Crops/Livestock	Preferred Crops/Livestock	Time of Raiding	Unpreferred Crops
Rhinoceros	Wheat,Paddy,Maize, Lentil,Potato, Barley, Buck wheat, Garden	Wheat, Paddy, Lentil, Potato	Night	Mentha,,Linseed, Rajma, Tora, Jhuse Til
Wild Boar	Maize, Wheat, Arum, Potato, Yam	Maize, Arum, Potato, Paddy	Night	Chilli, Ginger
Spotted Deer	Mustard, Lentil	Mustard	Early Night	Potato
Bear	Honey, Termite	Honey	Night	Paddy
Rabbit	Paddy, Wheat, Mustard, Barley	Paddy, Wheat	Night	Tall plant
Tiger	Goat, Sheep, calf	Goat, sheep	Night	Crops
Leopard	Goat, Sheep, Calf	Goat, sheep	Night	Crops
Wild cat	Chickens	Chickens	Day/ Night	Crops
Jackel	Chickens, Ducks, Maize	Chickens	Day/ Night	Oilseed
Python	Chickens	Chickens	Day/ Night	Crops

Source: Field Survey 2016

Table 5 shows that the pests of different crops and livestock and their raiding time along with their preferred and unpreferred crops. Such as rhino especially raids wheat, paddy, maize, lentil, barley etc. but likes wheat, paddy, lentil, and potato and unlike mentha, linseed, rajma, jhuse til etc and the raiding time is at night. Similarly, other wild animals do the same kind of thing as shown in table 4

4.4 IMPACT OF WILD LIFE ON THE ECONOMY OF PEOPLE

This chapter describes the economic impact of park on local people. The chapter especially deals with economic loss by crops depredation and livestock loss due to wildlife in the study area. As the economic loss of people increases people get deprived financially and then the group of people try to struggle with park which

may affect the promotion of protected areas like CNP which is the subject matter of sociology.

4.4.1 Economic Loss by Crop Depredation

Crop depredation is very common in BZ of CNP. Most of the respondents crop depredation are the assumed crop yield and crop depredation given by the respondents. The table 7 shows the crop depredation in the study area. The data used were collected for the production or yield and loss of yield of crops in local unit eg. Muri, Pathi, etc. as provided by correspondents and they were changed into standard units eg. Kg.

Table 6 :
Total Yield if not Loss by WL, Average Yield and Crop Loss by WL in
Surveyed Households

Crops	Yield if not loss due to WL		Average yield		Crop depredation		Loss percent in each crops
	In Kg	In NRs	In Kg	In NRs	In Kg	In NRs	
Paddy	241572.5	7247185.5	196818.4	5904552.6	44754.5	1342632.9	18.52
Wheat	2490.27	87159.45	1424.1	49843.5	1066.17	37315.95	42.81
Maize	35592.07	1067762.1	28349.84	850499.7	7242.23	217262.4	20.34
Mustard	9545.04	1097679.6	7685	883775	1860.04	213904.6	19.49
Lentils	11256.59	1181941.9 5	7757.5	814537.5	3499.09	367404.45	31.08
Pot+veg	26948.25	943188.75	20082.4	702887.5	6865.85	240301.25	25.48
Linseed	2169.53	184410.05	1901.3	161587.55	268.23	22822.5	12.37
Total	329574.6	11809327. 4	264018.5 4	9367683.3 5	65556.0 6	2441644.0 5	20.74

Source: Field Survey 2016

On the basis of their total yield if not loss due to wildlife, their actual loss percentage of each crop as shown in table 7 was paddy (18.52 percent), wheat (42.81 percent), maize (20.34 percent), mustard (19.49 percent), lentil (31.08 percent), potato and vegetables (25.48percent) and linseed (12.37percent) in

the study area of CNP. According as the data provided by the correspondents the main causes for damage of crops were as follows:

- i) Regular wandering of wildlives to BZ area and grazing to cultivating land,
- ii) Low rate of compensation and disappointment of people against it
- iii) Irregular in change of climatic factors and disturbance for timing of cultivation

Table 7 :

Loss of Agricultural Crops Due to Depredation by Wildlife

S. N.	Name of Crops	VBNPB		VNNPB		Total loss of wt. in kg. (each crop)	Total Eco loss of each crop (NRs.)	Loss per cent
		Loss of wt in kg.	Economic loss (Rs)	Loss of wt. in kg.	Eco Loss Rs.			
1	Paddy	29500.5	885015.3	15253.95	457617.6	44754.45	1342632.9	54.97
2	Wheat	1066.17	37315.95	0	0	1066.17	37315.95	1.52
3	Maize	4742.51	142275.3	2499.72	74987.1	7242.23	217262.4	8.94
4	Mustard	1027.76	118192.4	832.28	95712.2	1860.04	213904.6	8.76
5	Lentils	2178.33	228723.6	1320.76	138680.85	3499.09	367404.45	15.1
6	Pot + Veg	4174.57	146109.6	2691.28	94191.65	6865.85	240301.25	9.85
7	Linseed	209.28	17787.95	58.95	5034.55	268.23	22822.55	0.95
	Total	42899.12	1575420.1	22656.94	866223.95	65556.06	2441644.05	100

Source: Field Survey 2016

Table 7 shows that economically, paddy (61.92 percent), wheat (1.84 percent), maize (9.02 percent), mustard (6.18 percent), lentils (10.89 percent), potato and

vegetables (9.5 percent) and linseed (0.65 percent) were the most raided crops which are mostly affected during their mature stage. The depredation was not only by eating the crops but also by roaming and wallowing on the crop fields by rhinoceros and other wild animals. According to the field survey, it was estimated the total economic loss of Rs. 996,933.64 per annum and Rs. 11,328.79 per household based on 88 households survey (Table 8). The maximum economic loss was for paddy followed by lentils, potato and vegetables, maize, mustard, wheat and linseeds in Devchuli BZ of CNP.

Table 7 also shows that the crop depredation rate is higher in the area which is 0-1.5km far from the park boundary than the area which is 1.5-3km far from the park boundary. According to the respondents, the cultivated land in 0-1.5 km far from the park boundary is higher as the land owned is higher in that area. The land in that area is also more fertile with good irrigation facilities.

Table 8 :
Comparison of Crop Loss Percent in Two Different Strata

Crops	VBNPB			VNNPB		
	Total Yield in <i>muri</i> if not loss due to wildlife	Loss due to wild life in <i>muri</i>	Loss percent	Total yield if not loss due to wild life in <i>muri</i>	Loss due to wild life in <i>muri</i>	loss percent
Paddy	2388.18	560.84	23.48	2204.46	290.00	13.16
Maize	268.01	60.93	25.72	249.29	36.33	14.58
Mustard	81.91	16.96	20.71	75.60	13.73	18.16
Lentil	86.59	32.21	37.21	79.92	19.53	24.44
Linseed	25.40	4.71	18.55	23.44	1.33	5.69
Wheat	13.80	19.03	42.81	0.00	0.00	

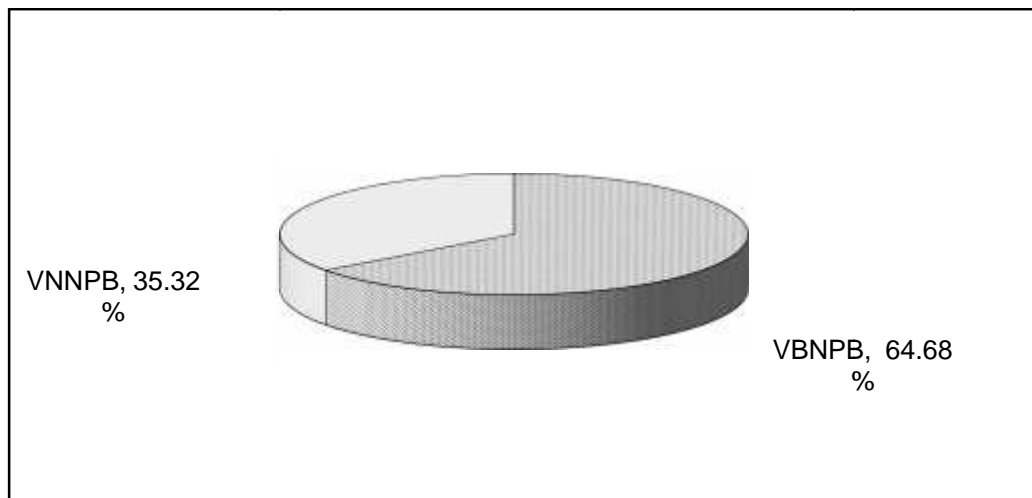
Source: Field Survey 2016

The analysis shows that the crop loss varied in the different areas, depending on the intrusion by wild ungulates responsible for crop damage. While the rhinoceros was mainly responsible for paddy and wheat losses, wild boar caused heavy loss

to maize and chital to oil seed. The crop loss declined as the distance from the park increased.

The volume of crop loss increased as the size of landholding and frequency of crop raid increased. Distance and crop loss had an inverse relationship, i.e. the shorter the distance from the park, the higher was the loss.

Figure 2 :
Economic Losses in Two Strata Due to Crop Depredation



Source: Field Survey 2016

Figure 2 shows that loss due to crop depredation was unequal in two strata. Comparison of the crude economic loss in bordering area (0-1km) Rs. 6,48,415.65 which is 64.68 percent and non bordering area (1-2km) Rs.3,48,517.99 which is 35.32 percent of the total loss.

4.4.2 Livestock Loss by Wildlife

Livestock depredation is another problem after crop damage. The tiger, leopard, bear, Wild boar etc. killed the domestic animals on the edge of the forest and on the Shed (*chor*) at night time. According to Tamang (1982) domestic cattle constitute 30 percent killed by the Tiger in areas near park boundaries. According to the record of CNP in 2009, the rate of depredation of goat by leopard is maximum than other in the study area that was registered for compensation. This is the number however represents only those cattle which

were killed or attacked while they were shed. This result shows that the number of cases of depredation finally high than it is reported to CNP office. (i.e .BZDC).

Figure 3 : Cattle grazing in buffer zone area



Figure 3 shows cattle in buffer zone area where they could be a victim of wild predators because wild animals also come there for getting foods. This kind of grazing also reduces the food resources of wild animals due to which wild animal raids the farming field in search of food. When they fight each other, people get loss economically and or loss of lives.

Table 9 :**Quantative and economic description of livestock depredation for last 5 years**

Kill ed site	Year	Specie s	No of killed	Killed by (Predator)		Jackal/ cat/Python	Place	Amoun t of Compen sation	Real price	
				Tiger	Leop ard					
VB NP B	067/68	Goat	11	*			Shed	6200	24800	
			1		*		Shed	500	2000	
		Cow	2	*			Shed	5000	20000	
		Buffalo	2	*			Meadow	7000	28000	
	068/69	Goat	10	*			Meadow	5000	10000	
			5		*		Jungle	10000	20000	
			Buffalo	4	*			Shed	16250	32500
	069/70	Goat	4		*		Shed	7550	15100	
	070/71	Ox	2	*			Shed	6000	12000	
			Chicke n	27			*	Trap/Cage	2125	4050
071/72	Goat	2		*		Shed	2500	5000		
Sub-Total			70					68125	173450	
VB NN PB	067/68	Goat	4		*		Shed	2925	11700	
		Buffalo	1	*			Shed	525	2100	
	068/69	Goat	1		*		Meadow	1000	2000	
		Buffalo	3	*			Shed	2000	4000	
			2		*		Shed	1250	2500	
	069/70	Goat	5		*		Meadow	8700	17400	
	070/71	Goat	2		*		Shed	2000	4000	
071/72	Goat	3		*		Shed	2000	6000		
Sub-Total			21					20400	49700	
Total			91					75900	198100	

Source: BZ Office of Devchuli & Field Survey 2016

Up to a year 067/68 the BZDC give compensation only the 25 percent of the total valuation, if the livestock is killed by wild life. The rate of compensation is increased to 50 percent from 063/64. From the data of field survey 2016 as shown in table 8 altogether 88 livestock killed (35from tiger, 26 from leopard) during the period of five years (from fiscal year 067/68-071/72). Among them 70

livestock from VBNPB and 18 from the VBNNPB .The field survey revealed that Tiger caused maximum economic loss (Rs 133400) being goats, cows, buffaloes as a chief domestic prey. The village area mostly affected near by the park boundary (i.e VBNPB) than that not the area near by the park boundary(VBNNPB) as the economic loss made by wild animals near by the park boundary is Rs 173,450 and not near the park boundary is Rs 43,700 only.

4.5 CAUSES OF CONFLICT

This chapter describes the causes of conflict in between the park and people and the relationship in between them along with the efficiency of local crop preventive measures.

Sources of Conflicts

Protection of natural environment through the establishment of parks and reserves are of great importance to mankind. But establishment of NP and reserves become a matter of conflict in developing countries as well as in most developed countries. National parks and wildlife reserves of Nepal are no exception to this (Adhikari 2015). Like other protected areas, CNP is also facing this problem with local people. The park has affected their life in both direct and indirect way. Thus conflict is due to problem arises between reserve and local people. There are two types of problems.

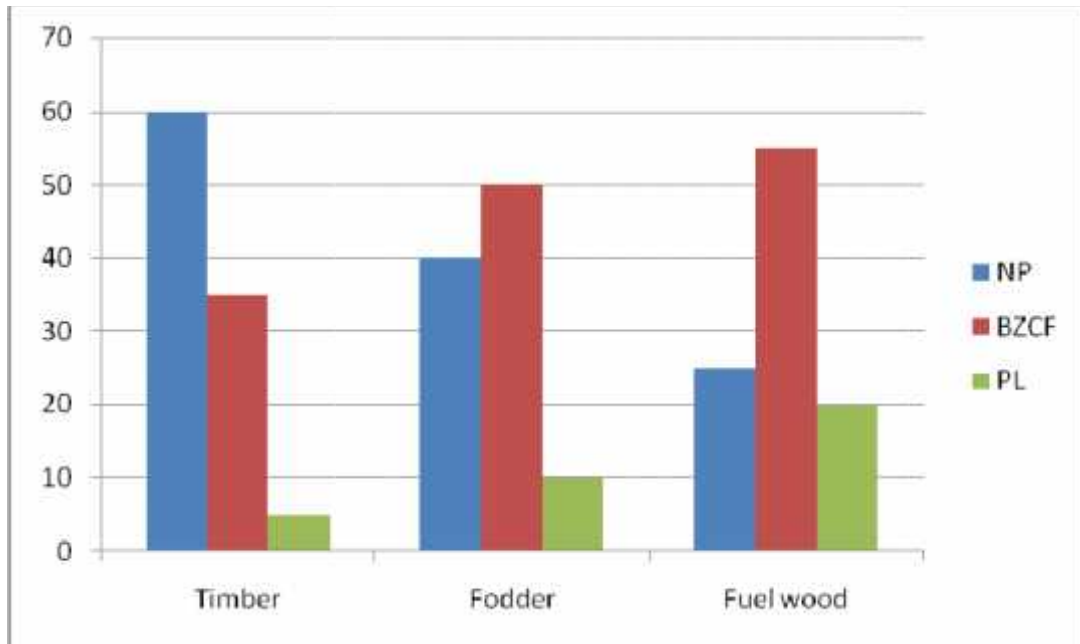
4.5.1 Human impact on Park

4.5.1.1 Demand and Use of Fodder, Timber and Firewood Cutting

People living around the park fulfill their fodder requirement from their land but it is not sufficient to feed their livestock. They can get various species of fodder plants for their livestock from the park. So people enter the park to lop off green branches of the trees, bushes and grasses for fodder. Local people are also involved in timber cutting to build house and furniture. Kerosene is rarely used by villagers and firewood is insufficient in the Municipality, so they enter the park for firewood. Due to all these reasons, conflict arises between local people and the park. Cutting of timber and fodder destroy wildlife habitat greatly during dry season. It has a great effect on wildlife.

Basically, people residing there; get forest products from National Park (NP), Buffer zone community Forest (BZCF) and Private Lands (PL) which are differentiated as follows with the extraction percentage from those areas.

Figure 4 :
Resource utilization Pattern



Source : Field survey 2016

Buffer Zone community forest, private land and National park are the major sources of fodder in the study area that as shown in the figure 4 and the explanation is mentioned below.

a. Timber: Timber is used for the construction and maintenance of houses and agricultural implements. Indicating local people the trend of using timber is gradually decrease due to practices of modern infrastructure. In the study area 35 percent respondent fulfilled the timber from BZCF and 60 percent from National Parks and 5 percent from the private lands.

b. Fuel wood: In the study area there are three major sources of fuel wood namely national Park, Buffer zone community forest and Private land. Local people collected maximum fuel wood in the period of *Khar- Khadari* as it is allowed once a year inside the National Park. About 55 percent of the respondents reported that their fuel wood requirement is fulfilled from BZCF, 25 percent from National park, 20 percent from private lands (PL).

c. Fodder: In the study area 55 percent of the respondents reported that their fodder is fulfilled from the BZCF, 25 percent from the National Park and 20 percent from the private land. According to the respondents, basically National Park does not allow people to collect forest resource throughout the year as it

opens for 15 days in a year, generally in January- February and it does not provide as per the demand of the local people. People holding more private land and who have higher income from other sources (agricultural farming) use less timber, fodder and fuel wood while those having low income and less private land, use more timber, fodder and fuel wood from buffer zone. But around 1percent of them found to be using more timber and fuel wood for business purposes.

4.5.1.2 Total Land Coverage by Major Crops

In this study area there are various types of soil structure noted. The main crops are paddy and maize. Almost all farmers grow these crops. Besides these crops mustard, lentils, vegetables and potato, linseed and fruits are also cultivated in small quantity. Total land area and coverage by major crops in the surveyed household in two strata of Municipality are given in the Table 10

Table 10 : Land Coverage by Major Crops in Devchuli BZ (Comp. Studies of Two Strata)

Village Area	Land covered	Paddy		Maize		Mustard		Lentil		Veg.+Pot		Linseed	
		Land	percent	Land	percent	Land	percent	Land	percent	Land	percent	Land	percent
VB NP B	57.04	43.35	76.10	17.6	30.89	3.37	5.93	4.00	7.02	3.14	5.52	1.15	2.03
VN NP B	51.56	36.62	71.03	16.76	32.52	3.47	6.74	3.33	6.46	3.55	6.89	0.81	1.59
Total Area	108.60	79.97	73.69	34.36	31.66	6.84	6.32	7.33	6.75	6.69	6.17	1.96	1.82

Source: Field Survey 2016

The table 10 shows that out of 43.56 *Bigha*, in villages bordering the national park boundary, paddy grown land was 33.12 *Bigha*, which was 76.10 percent of

total cultivated land. Similarly maize grown land was 13.46 *Bigha* (30.89 percent), mustard grown land was 2.58 *Bigha* (5.93 percent), lentil grown land was 3.06 *Bigha* (7.02 percent), vegetables and potato grown land was 2.40 *Bigha* (5.52 percent) and linseed grown land was 0.88 *Bigha* (2.03 percent).

In case of villages not bordering in the national park boundary, total cultivated land was 40.04 *Bigha*. Paddy grown land of this site was 28.44 *Bigha* (71.03 percent), maize grown land was 13.02 *Bigha* (32.52 percent), mustard grown land was 2.70 *Bigha* (6.74 percent), lentil grown land was 2.59 *Bigha* (6.46 percent), potato plus vegetables grown land was 2.76 *Bigha* (6.89 percent) and linseed grown land was 0.63 *Bigha* (1.59 percent).

This coverage of land by the crops attracts the wild animals of the park which causes loss to the people.

4.5.1.3 Poaching

Poaching of wild animals is a reality in CNP. Hunting in Chitwan has been a practice since historical times. Rhinoceros is heavily poached for its highly valued horn. According to "Rhino Count 2005" the total Rhinoceros killed by poachers is 108 in CNP from May 1996 to 2005. The annual report of Department of National Parks and Wildlife Conservation 2009 depicts that among 18 casualties of Rhino 9 were killed by the poachers for its horn. So poaching has created huge conflicts between the park and the local people.

Table 11: Wildlife Casualties in BZ of Devchuli Municipality

Wildlife species	Sex	Date	Place	Cause of death	Remarks
Chital	Juv.	057/12/26	Field	Killed by street dog	Chaudhary Industrial area.
Rhino	Un	058/11/7	Com. forest Dev	Gunshot	Horn missing
Rhino	F	059/3/2	Com. forest Dev	Poaching	Horn missing Hooves found
Rhino (Infant)	M	059/6/9	Near Narayani River	Natural death	Horn and Hooves were found
Rhino (3yrs)	M	059/6/22	Com. Forest of Dev	Killed by Natural death	Horn and Hooves present
Rhino	F	059/6/26	Com. Forest of Dev	Gunshot poaching	Horn missing Hooves present

(Source: Annual Reports DNPWC) M = Male; F = Female, Juv. = Juvenile, Un = Unknown

One chital and five rhinoceros were found (recorded) dead in different places of Devchuli BZ, which were killed by different causes. The table 11 shows the details of the wild life casualties in Devchuli BZ.

Along with the establishment of BZ concept, the Users' Group Committee of Dev. BZ community Forest has been taken many strong actions against the poacher and illegal dealers of wildlife products in BZ area of Devchuli .

4.5.1.4 Fishing and River Poisoning

Another impact practiced by local people is fishing in Narayani River which is against the regulation of national park. Only 1 percent of the total population of the village is engaged for fishing daily. Narayani River is the habitat of endangered aquatic mammals such as gangetic dolphin (*Platanista* spp.) and crocodiles, marsh mugger and gharial. The crocodiles are left in the Narayani River by the park authorities to increase their number. Some indigenous people also doing nuisance of poisoning of small Ox – Bow Lake to catch large amount of fishes impacting the aquatic flora and fauna.

4.5.2 Parks Impact on Local People

4.5.2.1 Attack to Human beings

Every year people are killed or injured by wild animal like Tiger, rhino, bear, wild elephant etc. According to Jnawali (1989) a total of 125 accidents (42 killed & 83 injured) between 1978 to 1997 of which 97 percent occurred outside the park. Similarly Shrestha (1994) point out the animal human casualties reach as high as 6 even 10 and cases of rhino attacking people in the park and farm are common.

Wildfauna in Devchuli have killed two people and seven people have injured so far as shown in Table 10. The killing of Mitralal Pandey was happened during daytime when he was entering the community forest of his village. Similarly, Jogeswar Mahato, worker of Hattisar was killed by tiger on the day time when he was entering the park for the collection of thatch grass for elephant. During the field study a victim of rhinoceros was found. A woman of forty-five years was severely wounded by rhinoceros. Her son spent more than Rs. 20,000 for her treatment but he had got only Rs. 5,000 as compensation by BZ council, Sauraha.

Table 12 :
Number of People Injured/Killed by Wildlife in BZ of Devchuli Municipality Ward No 1 and 2.

Name of Person	Encounter Place	Date	Treat men	Killed	Predator	Compensation
Devkala Dhakal	Home	2057	√		Rhino	Rs 4000
Megh Nath Bastakoti	Way Home	2058	√		Rhino	Rs 4500
Bishnu Pageni	BZ Jungle	2059	√		Rhino	Rs 5500
Mitralal Pandey	BZ Jungle	2059		√	Rhino	Rs 20000
Hiradevi	Farm	2060	√		Rhino	Rs 6700
Sailo	BZ Jungle	2061	√		Rhino	Rs 6000
Jogeshwar Mahato	Park	2062		√	Tiger	Rs 28000
Poudel Dai	Com. Forest	2063	√		Rhino	Rs 5800
Damber's Mother	Com. Forest	2066	√		Rhino	Rs 5000
Gurung Saila	Com. Forest	2067	√		Rhino	Rs 5000
Damai Maila	Com. Forest	2068	√		Rhino	Rs 6500
Bhattarai Kanchha	Com. Forest	2069	√		Rhino	Rs 5200
Binod Mahato	BZ Jungle	2070	√		Rhino	Rs 6500

Source: BZ Office of Devchuli M.& Field Survey 2016

4.5.2.2 Preferences of Crop by Rhinoceros and Crop Abandoned by Local People

Table 13:
Preference of Crops by Rhinoceros

S.N.	Preferred Crops	No. of Respondents	percent
1	Wheat	32	57.14
2	Paddy	5	8.93
3	Potato	6	10.71
4	Lentils	4	7.14
5	Radish	2	3.57
6	Vegetables	2	3.57
7	Buck wheat	2	3.7
8	Maize	2	3.57
9	Not known	1	1.79
Total		56	100

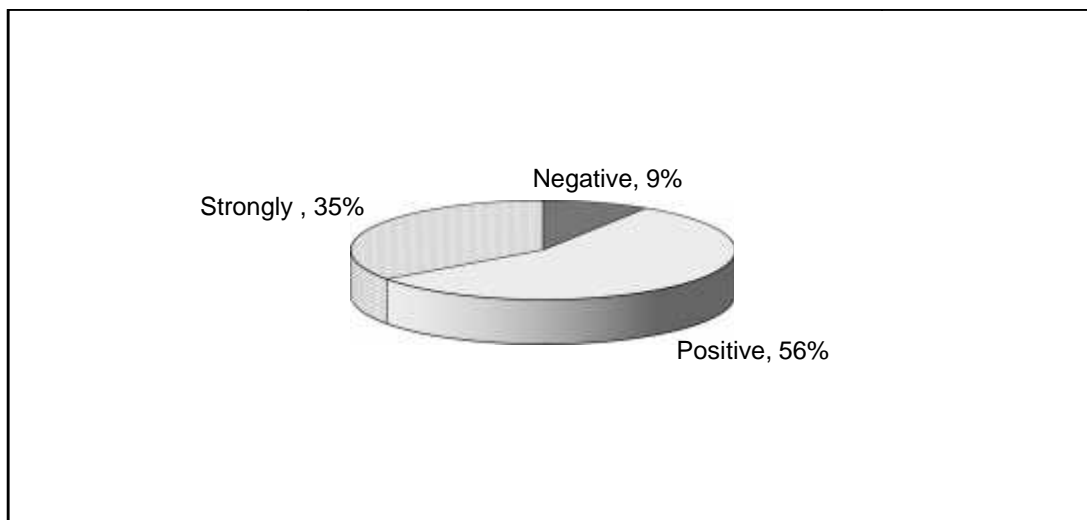
Source: Field Survey 2016

According to responses collected from the household survey, it showed that the crop preference by Rhinoceros was wheat (57,14 percent), potato (10.71 percent), paddy (8.93 percent), lentils (7.14 percent) and so on as shown in Table 12. The most of the local people had completely abandoned wheat cropping in their cultivated land because of increasing crop (especially wheat) depredation by Rhinoceros and people get only 50 percent compensation of the total damage made by wild life.

4.5.2.3 Attitude of Local People towards Park/BZ Community Forest Conservation and its Management

Attitude of people towards the park conservation and its management were categorized into three aspects i.e. strongly positive, positive and negative towards the park conservation and its management.

Figure 5 :
Attitudes of People towards Wildlife and its Management



(Source: Field Survey 2016)

In the study area it was found that about 35 percent of total respondents expressed strongly positive attitude, 56 percent of total respondents expressed positive attitude and about 9 percent respondents were not in favor of park conservation and its management as shown in Figure 8. That might be due to loss of their properties by wildlife.

4.5.3 Cause of Wild Animals Visiting Settlements

The field study and scheduled survey revealed that most of the park animals visited the crops field due to the lack of abundance of food at the time of breeding season in the park. Details of the causes are given below.

4.5.3.1 Lack of Abundance Fodder

According to the respondents of the study area, the area of CNP is limited and due to effective protection the numbers of animals in the park are increasing. There is high demand of food inside the park. Food inside the park might not sufficient for subsistence, so wild animals mainly rhino have to come out of the park and damage the agricultural crops.

4.5.3.2 Taste of Agricultural Crops

Crops such as paddy, wheat, maize, pulses etc. cultivated around the park are rich in protein and carbohydrate as well as some minerals than most of the wild plants available in the park. Agricultural crops tender, clumped than wild mature plant species. In spring season, wild animals come more frequently outside the park because they find nutritious food outside the park easily. Wild animals also need to spend much energy in search of qualitative food in the park as the foods are found scattered.

4.5.3.3 Lack of Effective Physical Barrier

Strong physical barrier is important to prevent the entering of wild animals in the settlement. In the study area, although there is large Narayani river in-between NP and study area but animals like rhino easily cross the river and raid the adjoining agricultural fields. 80 percent of the respondents suggested to get electric fence installed by the park authorities.

4.5.3.4 Succession

Succession is the gradual change of barren land to forest. Many ecologists suggested that due to succession, grass land of CNP is changing towards forest and the animals that live in grassland migrate outwards in the surrounding field in search of food.

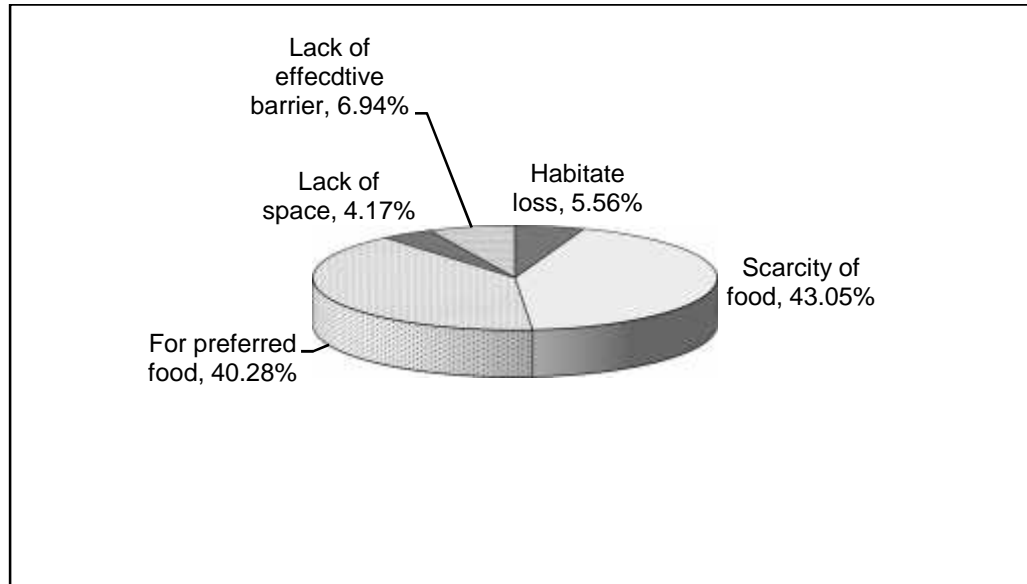
4.5.3.5 Introduction of New Plant Species in Forest Land

Introduction of exotic species in the park causes the alteration of their habitat by wildlife. Some introduced exotic species of plants such as "*Banmara*" and "*Mile a minute*" in their new habitat allowed them to dominate in their new ecosystem and

wipe out the natural food habitat of wild animals and it ultimately causes the migration of animals towards the crop fields.

Figure 6:

Attitudes of People towards the entering of Park Animals into Their Crop Fields



Source: Field Survey 2016

Attitude of people towards the entering to the park and wild animals into people's crop fields seems ecological imbalance in the area. According to the responses collected from the study area as shown in figure 5, the cause of raiding crops by wild animals is divided into five categories among which, the figure 6 shows that For scarcity of food is 43.05 percent , preferred food is 40.28 percent , Lack of effective barrier is 6.94 percent , Habitat loss is 5.56 percent , Lack of space is 4.17 percent .

4.5.4 Benefits to Local People from BZ and the Park

The people were totally restricted from the entry of park; when there was political conflict of maoist and the insurgency in the nation 18 years ago, but they were taking resource benefit and developmental support continue from the BZ community forest and fund of BZ. Except these benefits, I found that 20 percent people of the total population in my study area are benefited from skilled training and educational tour funded by BZ budget collected by the revenue of NP. The revenue collected from the park and the buffer zone were also utilized in the sector of agricultural farming improvement training, non timber forest products (NTFP) utilization for commercial use to generate income among the poor, and

local developmental works such as road gravelling, biogas support, electric poles etc.

4.5.5 Preventive Measures and its Effectiveness

4.5.5.1 Local Preventive Measures /existing preventive measures

Quite a number of different local methods are applied to reduce wildlife damage as per the respondents' response given during the field survey 2015 Machan guarding, chasing with fires, shouting, drumming, fencing etc. are most commonly used methods in Devchuli Municipality.

Table 14 : Means Applied to Reduce Damage for Different Crops

Means guarding	Rice	Maize	Mustard	Lentil	Pot+Veg.
Machan			-	-	-
Chasing with fires					-
Shouting					
Drumming					-
Fencing	-			-	

Source: Field Survey 2016

(indicates the methods applied to reduce individual's crops)

Table 14 shows that for rice prevention Machan, chasing with fire, shouting, drumming means of guarding are applied to reduce the damage from wild animals. Machan guarding, chasing with fires, shouting, drumming, fencing means of prevention are used to protect for the maize where as for the mustard all means of guarding except Machan guarding are applied. Similarly for lentil and potato-vegetable prevention means are applied as shown in the table 14.

Table 15 : Effectiveness of Techniques Used to Protect Crops

Techniques	Rhino	Wild Boar	Deer
Machan guarding	III	III	II
Chasing with fire	III	-	-
Shouting	I	III	III
Drumming	I	II	III
Fencing	I	III	III

Source: Field survey 2016

Note: I - Very little effective, II - Little effective, III - Most effective

Methods used depend upon the type of crop and the type of animal. In the case of rhinos, they use all these methods. Machan which is installed to protect rice

and maize from the pests, is the most common and useful technique. Deer and wild boars are kept away by drumming. Fencing is not very useful against huge animals like rhinos, although it does often keep wild boars and deer away. Chasing with fires is very effective for rhinos along with shouting and drumming. Effectiveness of those local preventive techniques has found different level to chase animals

CHAPTER FIVE

SUMMARY AND CONCLUSION

5.1 Summary

Peoples are the nations pillar, Human beings living and occupying the particular land or country are known as people. According to oxford dictionary “peoples are human beings in general or considered collectively, members of particular nation, community or ethnic group” People do the different activities within their life period which affect the natural or artificial environment. By the activities of people ecosystem and biodiversity are affected. Rather people also contribute the nations development for all aspects by providing services or producing goods to strengthen the GDP of nation. Wildlife human interaction, such as crop and livestock depredation, human toll by wildlife and resource utilization by local people, in and around the protected area is one of the main issues of protected area management. Numerous national parks in developing countries are surrounded by agricultural lands and the people living in and around such parks have interacted with them in multifarious ways

The study of Chitwan National Park is the first National park in Nepal and it is categorized as world heritage site which is situated to cover the larger biodiversity areas. Along with the establishment of the national park local people who depend upon the park were deprived from their everyday life ways. Since the establishment of the park, local people were dissatisfied from the park which is the major cause of the conflict. Along with the establishment of the National Park, the number of wild animals has been increasing. As a result, these animals raid the farm fields of the local people in search of proper food and shelter which create conflict.

Relation and conflict between National park and people was conducted during year 2016 in BZ of Devchuli Municipality Ward No 1 and 2 of Nawalparasi district, located adjacent to the northwestern side of CNP. Main problems facing by the people due to conflict of park and people for different issues were limitations for resource utilization , time bounding movement in and around park/BZ area, damage of crops and loss of livestock ,compensation against loss, attitudes of people and park authorities, etc.The specific objective of the study was set to examine the impact of the park for damage of crops and loss of livestock, identify

the relationship between Park and People, specially creating conflict and understand the existing preventive measures developed by the local people and the park authorities and analyze its effectiveness.

Problems facing by the people living adjacent to the CNP were found as crop damage, harassment and livestock depredation and forest resource usage. Ten pest species were identified such as rhinoceros (*Rhinoceros unicornis*), Tiger (*Panthera tigris*), common leopard (*Panthera pardus*), wild boar (*Sus scrofa*), spotted deer (*Axis axis*), Jackel (*Canis aureus*), wild cat (*Felis chaus*), Python (*Python morulus*), rabbit (*Lepus nigricollis*) and sloth bear (*Melursus ursinus*). Among them rhinoceros, deer and wild boar were very frequent pest species in and around the park. Jackal and wild cats were frequent in all study sites but the remaining pest species such as tiger, common leopard, bear, rabbit and python were occasionally visiting pest species.

Present study indicated that the poor socio-economic condition creates conflicts between local people and park. The main causes of conflict are breaking the rules and regulation of the park; crop and livestock depredation and human harassment due to wildlife; livestock grazing, hunting and poaching and fodder, timber and firewood cutting by local people inside the park.

There was 3.57 percent landless household, 23.21 percent have below 0.5 *Bigha* land, 26.79 percent have 0.5-1.0 *Bigha* land, 32.14percent have 1-2 *Bigha* and 14.29 percent have above 2 *Bigha* land as shown in Table 2. Those families who have got land below 0.5 *Bigha* can have food for 5 months, 0.5-1.0 *Bigha* can have food for 10 months. Similarly those families who have got land in between 1-2 *Bigha* and above it can have surplus amount of food. Those families who can't grow enough food from their farm field, they were engaged in different kinds of jobs like drivers, either subsistence kind of job or self employed in small shops. One Dalit was found landless during the survey. Especially Brahman, Chettri, Thakuri and Tharu has got more land than other ethnic people.

On the basis of their total yield if not loss due to wildlife, their actual loss percentage of each crop as shown in table 7 was paddy (18.52 percent), wheat

(42.81 percent), maize (20.34 percent), mustard (19.49 percent), lentil (31.08 percent), potato and vegetables (25.48percent) and linseed (12.37percent) in the study area of CNP.

Up to a year 067/68 the BZDC give compensation only the 25 percent of the total valuation, if the livestock is killed by wild life. The rate of compensation is increased to 50 percent from 063/64. From the data of field survey 2016 as shown in table 8 altogether 88 livestock killed (35from tiger, 26 from leopard) during the period of five years (from fiscal year 067/68-071/72). Among them 70 livestock from VBNPB and 18 from the VBNNPB .The field survey revealed that Tiger caused maximum economic loss (Rs 133400) being goats, cows, buffaloes as a chief domestic prey. The village area mostly affected near by the park boundary (i.e VBNPB) than that not the area near by the park boundary(VBNNPB) as the economic loss made by wild animals near by the park boundary is Rs 173,450 and not near the park boundary is Rs 43,700 only.It was estimated that the total economic loss of Rs. 24,41,644.05 due to crop depredation by wild herbivores. The comparison of the crude economic loss at two strata showed that people near the park boundary were in heavy loss. Wheat, lentil, potato and paddy were preferred crops of rhinoceros. This forced people to partially abandon the affected crops such as wheat, potato etc in affected areas. The incidents of livestock lifting by wild predator were becoming common at the peripheral villages of CNP. The estimation of total economic loss due to livestock depredation by wild predator was equal to Rs. 198100. There were altogether nine accidents occurred in my study area. Among them two men were killed and other seven were seriously injured. Local people were getting resource utilization (fodder, grass, firewood, timber, khar khadai, wild vegetables, medicinal plants etc) from community forest and park and developmental support (graveling, electric pole, biogas support, ham pipe, wells, building material for school, irrigation support etc) from the BZ management committee. People of BZ have also gained benefits from education tour and skilled-training co-ordinated by BZ office. People were aware of the declaration of the national park and hunting/poaching as illegal. Only 9 percent of local people had negative attitude towards wildlife protection but the most of the people had negative feeling towards rhinoceros as the main culprit of crop loss at the study sites.

Local people were practicing direct methods such as shouting, drumming, Machan guarding, chasing with fire and fencing to control the depredation and practicing stall-feeding and open grazing with attendant as indirect methods to control livestock depredation by wild predators.

5.2 Conclusion :

According to data analysis in the preceding chapters about the effect of Park on people and vice versa, major findings of the study are listed in the following ways: People residing in VBNPB faces economic loss of Rs 648415.65 and people from VNNPB faces Rs 348517.99 due to the Park animals and especially those people who reside near by the park boundary face more economic loss than the people living not near by the park boundary. The main causes of conflict between the Park and people conflict can be pointed out as follows:

People especially residing near by the park cultivate the lands which attract wild animals towards the crop field.

- 1) People do not have much alternative means of income generation rather than agriculture.
- 2) People do not get enough compensation from the damages done by the park animals.
- 3) Park's vegetative composition is changing so that there is not enough palatable and suitable food for the wild animals and park is not well managed. Less resources and increase in human population.
- 4) People are not getting enough benefits from the park and lack of awareness program etc.
- 5) Machan guarding, Shouting, Chasing with Fire, Drumming, and Fencing are the existing local preventive measures. Machan guarding, Chasing with fire are the most effective preventive measures for the Rhinos whereas Drumming and Shouting are most effective preventive measures for the deer and these depend with the animal type as well.

At last of this study it can be said as a conclusion that both the National park and people conflict and relation for doing or obeying regular duties and responsibilities as far as their necessary.

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ANNEX I
Questionnaires Sheet

Name :

Address: Municipality/VDC

Ward No. :

Education :

Ethnicity :

Sex :

Age :

Occupation :

Family Member :

1. How much land do you have ?

Khet _____ Bari _____

2. How far is your land from the Park ?

3. Which crops do you grow in your land ? And what is their average yield ?

Name of Crops	Seasons	Average Yield	Yield if not loss due to wildlife	Loss due to wildlife	In which stage wildlife visit	Remarks
Paddy (Rice)						
Wheat (Gahun)						
Maize (Makai)						
Masuro						
Millet (kodo)						
Potato (Aalu)						
Others						

4. Do you practice mix cropping system ?

Yes

No

5. If yes, which crop do you plant combine ?

6. Do you have any problem from park animals ?

Yes

No

7. If yes, what kinds of problems do you have ?

a. Crop Damage

b. Harassment

c. Livestock Depredation

d. Others

8. Do the wild life raid/damage crop in your land ?

9. If yes

Name of Wildlife	Crop Raid/	Most preferred	Time of Raiding	Un-preferred	Frequency of Visit	Number at a Time

	Damage	Crop		Crop		
Rhinoceros						
Wild boar						
Chittal						
Elephant						
Monkey						
Bear						
Others						

10. How far is your home from the Park?

11. Do you raise livestock

Yes No

If yes

Types of Livestock	Number		How you raise them	Remarks
	M.	F.		
a. Cow				
b. Buffalo				
c. Goat				
d. Sheep				
e. Pig				
f. Chickens				

a. Stall Feeding

b. Open grazing with attendant

c. Open grazing without attendant

d. Dhuto/Dana/Pitho

12. Have you seen any wild mammals species graze or visit the same area where the livestock graze ?

Yes No

13. If yes, which months

14. How often livestock depredation take place at your village ?

a. Most frequently

b. Frequently

c. Rarely

15. Is your livestock were killed recently, fill up the following from.

S.No.	Name of Livestock	Killed Month	Annual Injured	Lost of livestock	Time morning/day	Name of Predator
-------	-------------------	--------------	----------------	-------------------	------------------	------------------

				Killed	/evening/ night	
1						
2						
3						
4						
5						

16. How did you know which predator killed the livestock ?

- a. Saw predator b. presence of pugmark c. other

17. Where did the wildlife kill your livestock ?

- a. Shed b. Meadow/forest c. Road. d. Agricultural field

18. Did the kills dragged on the ground ?

If yes, how much meters ?

19. Have the wildlife attack human ? Yes/No

If yes

S.N.	Where	Who	Date	Treatment	Death	Remarks
1						
2						
3						
4						

20. Do you remember any case you injured wildlife while saving your crop livestock life ?

21. What are the preventative methods you are using to control the damage ?

- a. Shouting b. Chasing with fires c. Drumming
d. Fencing e. Traps /Trench f. Poisoning
g. Current h. Others i. machan guarding

22. Have you noticed how many animals enter your village annually ?

Types of Pest	Number
Rhinoceros	
Tiger	
Leopards	
Wild boar	
Chital	
Elephant	
Jackal	
Wild cat	
Others	

23. Why do you think the wildlife kill livestock and damage crop ?
- a. Habitat loss b. Lack of space c. Encroachment
d. Other e. Scarcity of prey f. food.
24. Did you get compensation from the park ?
25. What benefit do you have from park ?
26. Is there any difference between conflict before and after the establishment of BZ.
27. Have the wildlife caused any damage to human life
28. What would be the best controlling measures? Any idea or recommendation you have ?

The End