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School of Environmental Science and Management

*Pokhara University*



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**PROTECTED AREA - PEOPLE RELATIONSHIP: A CASE STUDY OF PARSA  
WILDLIFE RESERVE, NEPAL**

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OF PARSA WILDLIFE RESERVE, NEPAL**

**KAMAL THAPA  
May, 2013**

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**PROTECTED AREA - PEOPLE RELATIONSHIP: A CASE STUDY OF PARSA  
WILDLIFE RESERVE, NEPAL**

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**Thesis report submitted in partial fulfilment of the requirements for the degree of  
Master of Science in Environmental Management**

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## CERTIFICATION

This is to certify that the thesis entitled, "**PROTECTED AREA - PEOPLE RELATIONSHIP: A CASE STUDY OF PARSA WILDLIFE RESERVE, NEPAL**" submitted by Kamal Thapa towards the partial fulfillment of the requirement for the degree of Master of Science in Environmental Management is based on the original research and study under the guidance of Prof. Dr. Ram Bahadur Khadka. This thesis in part or full is the property of **School of Environmental Science and Management (SchEMS)** and thereof should not be used for the purpose of awarding any academic degree in any other institution.

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## ABSTRACT

The main objective of this study was to assess the Park-People relationship in Parsa Wildlife Reserve, Nepal. The research methods employed were questionnaire survey (N=58) followed by focus group discussions, key informant's survey and participant observation. Secondary information was also used to support the study.

Overall, this study found that local people in and around the PWR have negative attitude towards reserve and buffer zone. Only 34% liked the presence of reserve with attitudinal scale score of 3.22. 42% of the respondents were happy to be included in the buffer zone with attitudinal scale score of 3.43. The reason for disliking the reserve was mainly due to crop and livestock depredation, restrictions in resource use, fear of wildlife attack, arrest, prosecution etc. Reason of liking the reserve was due to opportunities for natural resource use, biodiversity conservation, tourism/business, feeling of security etc. Most problematic animal was found to be Cheetal (*Axis axis*) and the highest amount of crop damage was found to be maize followed by rice, lentil and mustard. The compensation mechanism for crop and livestock depredation was very poor and almost all of the residents do not know the provision of compensation procedure. 8 types of resources were used by the residents of PWR which was highest for fuel wood and fodder, respectively. Conservation activities were more active in Amlekhgunj buffer zone area than in Nirmal Basti buffer zone.

The lack of natural resources in the buffer zone of Nirmal Basti VDC led local people to depend on reserve resources directly even though the law prohibits doing so. There was absence of conservation intervention programme and community development activities in the buffer zone. There should be strong participation of local residents in the decision making and benefit-cost sharing mechanism of reserve management. Wildlife damage compensation (relief) policy must be revised timely to address the appropriate level of damage and to compensate accordingly to the residents.

**Key Words:** Buffer Zone, Conflict, Conservation Attitude, Parsa Wildlife Reserve, Protected Area, Protected Area –People Relationship, Resource Use

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## **ABBREVIATIONS**

ACA- Annapurna Conservation Area  
BNP- Bardia National Park  
BZ – Buffer Zone  
CNP- Chitwan National Park  
DNPWC- Department of National Park and Wildlife Conservation  
GCA- Gauri Shankar Conservation Area  
IUCN- World Conservation Union  
ICDP- Integrated Conservation and Development Programme  
KTWR- Koshi Tappu Wildlife Reserve  
MBCA- Makalu Barun Conservation Area  
MCA- Manaslu Conservation Area  
NPWC act- National Park and Wildlife Conservation act  
NTNC- National Trust for Nature Conservation  
PA- Protected Areas  
PWR- Parsa Wildlife Reserve  
SWR- Shukla Phanta Wildlife Reserve  
TAL- Terai Arc Landscape  
UC – Users Committee  
UG – Users Group  
VDC- Village Development Committee  
WWF- World Wide Fund for Nature

# Chapter I

## INTRODUCTION

### 1.1 Background

Protected Areas (PAs) are the store house of bio-diversity worldwide. They are designed and established to protect the last remaining natural ecosystem, flora and fauna of the planet earth for the benefits of human lives. The World Conservation Union (IUCN) defines PAs as, “*clearly defined geographical space that is recognized, dedicated and managed through the legal and other effective means to achieve the long term conservation of nature with associated ecosystem services and cultural values*” (Dudley, 2008). They do not preserve only the threatening ecosystems and bio-diversity but also the key elements in climate change mitigation strategies and even shelter the threatened human communities and/or sites of cultural and spiritual values (Dudley, 2008; Getzner *et al.*, 2012). PAs provide livelihood and income for the people living in and around the protected areas, provides different form of ecosystem services at the national and global level. Present day PA management therefore, should not be viewed through the narrow concept of ecological perspective alone but should be able to address the social and economic dimension leading to sustainability (Getzner *et al.*, 2012). For the country like Nepal, with rural characteristics, prevalent of poverty and subsistence based agriculture; the role of PAs in alleviating poverty is ever increasing.

Globally, the number and extent of nationally designated PAs has increased dramatically over the past century. There are over 157,897 PAs (figure 1) covering more than 24 million square kilometers of land and sea (figure 2). Among nations there is a great deal of variation in protection: only 45% of the 236 countries and territories assessed have more than 10% of their terrestrial area protected, and only 14% had more than 10% of their marine area protected (WDPA, 2012). In comparison to the global figures, Nepal has done an exemplary work by establishing good number of PAs network that includes 10 National Parks, 3 Wildlife Reserves, 1 hunting reserve, 6 Conservation Areas and 12 Buffer Zones covering the total area of 34365.63 sq km which is about 23.35% of Nepal’s area (figure 3) (DNPWC, 2012). International categories of PAs in Nepal include 2 World Heritage Sites (Natural), and 9 Ramsar sites.

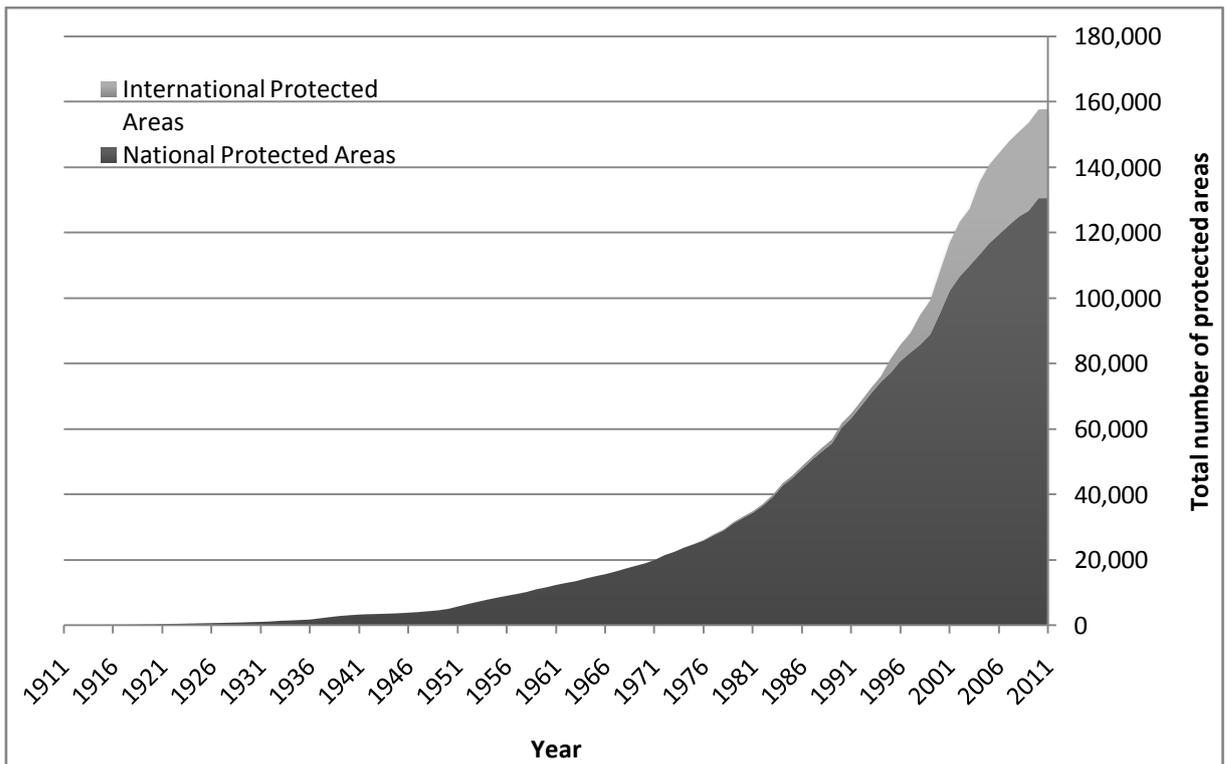


Figure 1 : Growth in number of nationally and internationally designated Protected Areas (1911-2011).

Source: IUCN and UNEP-WCMC (2012)

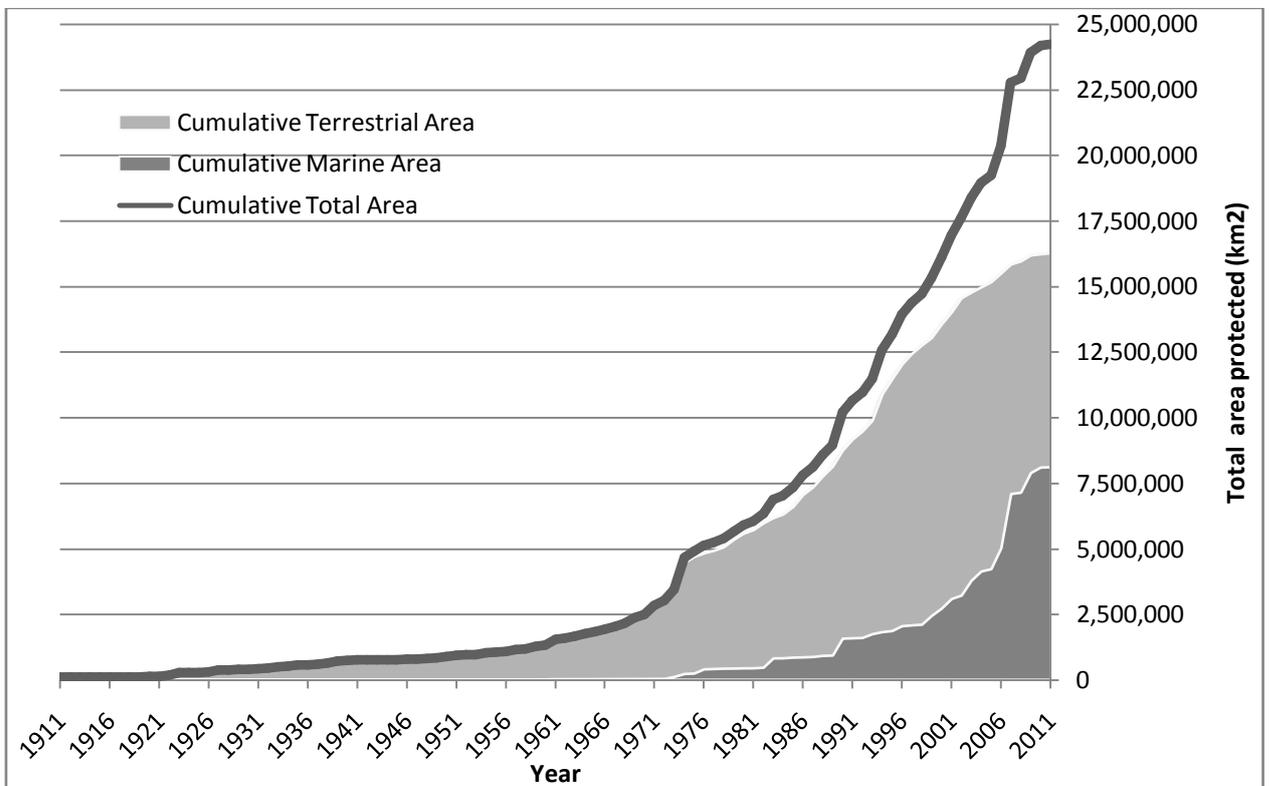


Figure 2: Growth in nationally designated Protected Areas (1911-2011)

Source: IUCN and UNEP-WCMC (2012)

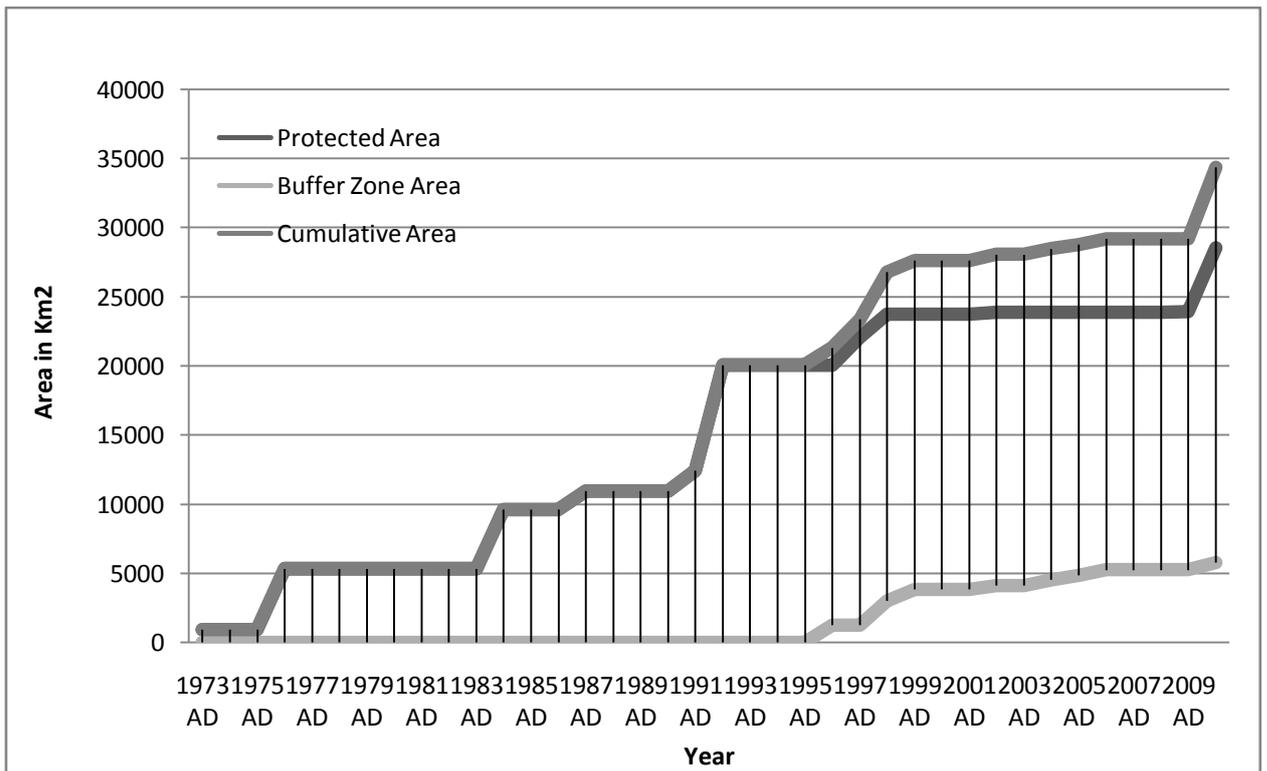


Figure 3: Growth in Protected Area coverage in Nepal by area (includes both PA and BZ)

Source: DNPWC, 2010; (graph by author)

National Parks in Nepal meets the criteria of the World Conservation Union (IUCN) PA category II, Wildlife Reserves and Hunting Reserves as category IV, Conservation Area as category VI and Buffer Zones as category V. However, this is subject to confirmation and validation by field study and acceptance by the scientific community and/or IUCN. Annapurna Conservation Area and Buffer Zone in Chitwan National Park has been categorized as category V protected areas (Phillips, 2002). For example, PAs with the label of National Parks according to the national law in Japan, Korea and United Kingdom are not the IUCN category II (National Parks), but category V (protected landscapes and seascapes). Similarly, Conservation Area in Canada (Ontario), Conservation Park in New Zealand, Hima Traditional Reserve in Saudi Arabia and Nature Conservation Area in Sweden belongs to IUCN category V PAs (IUCN 1998, cited in Phillips, 2002). There are also examples of National Park which meets the IUCN category of all the six categories but not merely category II (Dudley, 2008)

## 1.2 Statement of Problem

The expansion and increment of PAs are the result of lobbying and advocacy by global conservation organizations such as African Wildlife Foundation, Conservation International,

IUCN, The Nature Conservancy, World Wide Fund for Nature (WWF), among others (Vedeld *et al.*, 2012). However, these established PAs are not free from conflicts with local people who inhabit the area, either inside the PAs or in the buffer zone. Almost everywhere, these PAs are the breeding ground of conflicts. This happens especially when the traditional resource use rights of the people who are residing in the region since time immemorial, before the creation of park and PAs is revoked or their property is damaged by the wildlife. Africa's PAs were created by colonial administrators without taking any considerations of the local people and in most cases people were displaced with or deprived of the traditional use of resources, causing them to suffer economic hardships (Weladji and Tchamba, 2003) and vulnerable to poverty.

In Nepal too, many PAs have experienced human translocation and/or displacement after the PAs were established. Chitwan National Park and Shukla Phanta Wildlife Reserve are some of them. Currently, 2 settlements of Ramauli and Pratapur in northern part of Parsa Wildlife Reserve (PWR) are undergoing human translocation activities. Further, economic losses of the local people due to crop and livestock depredation is one of the major issue that triggers park people conflict and causing problem in achieving long term conservation of biodiversity (Tchamba, 1996; Gupta, 2005). Relationships between protected areas and local people are also one of the key features in achieving biodiversity conservation (Heinen, 1993; Allendorf, *et al.*, 2007). Besides conservation, PAs provides opportunities for information and education, recreation, scientific research and have impact on regional and local development (Getzner *et al.*, 2012). Importance of these aims and the significance of regional development depend on the peoples' participation, management objectives and governance type of PAs. Benefit sharing is one of the most important issues when it comes to the costs and benefits of establishing and managing PAs. In most of the protected areas, local people living in and around them are compelled to borne the indirect cost of managing protected areas in the form of restricted land use, restricted entry and use of resources, crop and livestock depredation (Mehta and Heinen, 2001; Weladji and Tchamba, 2003; Allendorf *et al.*, 2007; Karn, 2008). Against the background of these diverse issues between protected area and local people, it is important to explore the relationship between park and people which shapes the future of the protected area.

## **Chapter II**

### **LITERATURE REVIEW**

#### **2.1 Park People Relationship**

Protected areas are the milestone for conservation of biodiversity. These are recognized as the effective means of in-situ conservation. PAs in Nepal has played significant role in the conservation of biodiversity but restrictions of PAs in using park resources created resource conflict and wildlife induced damage in the form of human harassment or killings, crop damage and livestock depredation has brought negative sentiments towards it (Shrestha, 1996; Allendorf *et al.*, 2007). Livelihood of the local people is threatened due to the existence of park when there is low chance of gaining benefits from parks or reserves. Local people are also the core stakeholder in participatory management and conservation of PAs, which is recently realized in Nepal. In order to address the different aspects of stakeholders with strong focus on conservation, there are four different types of governance approach for PA management which are:

- Government managed PAs
- Co-managed PAs
- Private PAs and
- Community Conserved Areas (Getzner *et al.*, 2012).

There are several approaches of biodiversity conservation as such; fortress and fine conservation, participatory conservation, and landscape conservation (Baral, 2005). Conflicts in Nepalese PAs are inevitable as the park finite resources are used by the local people whereas park authorities impose ban on access, as these resources are also required for the natural maintenance of ecosystems and for wildlife. It is already proved in Nepal that stick and fence or fortress approach to conservation is not viable for protecting PAs that is advocated by strict conservationists. Even the fortress approach did not bring positive achievement on biodiversity conservation management and much lower on addressing local benefits and livelihoods (Vedeld *et al.*, 2012). This has led the conservationist and government to rethink on park policy. Crop damage and livestock depredation due to the wildlife are major economic losses for the people living adjacent to PAs whereas local communities have threatened PAs by poaching and causing habitat loss through encroachment into protected areas (Shrestha, 1996; Weldaji and Tchamba, 2003; Gupta 2005).

Conflicts that often occurred in PAs is due to the evictions, removal and resettlements, exclusion from resources access and use, cost incurred from crop/livestock damage, threats to human lives, health and property damage, insufficient share of park incomes, disparity between costs and benefits accrued to various groups (Vedeld *et al.*, 2012). As high as 86% of the villagers were suffered from crop damage in Benoue Wildlife Conservation Area, Cameroon whereas 31% of crop income lost on average (Weladji and Tchamba, 2003). In Shivapuri Nagarjun National Park, Nepal, total loss (opportunity cost) for the local people through restricted land use, crop and livestock depredation and restriction on using the park resources was NRs. 26,873/household/year (US\$ 304) (Karn, 2008). Similar studies carried out in Koshi Tappu Wildlife Reserve (KTWR) showed that the economic losses to the local farmers due to the crop depredation (potato, wheat and paddy) by park animals is NRs. 2917 per head/ bigha of cultivated land (Limbu and Karki, 2003). Contingent valuation study in KTWR showed that willingness to accept by local people (per household) for forgone access to natural resources was found to be US\$ 238 equaling to nearly \$ 1.64 million for the neighboring region (Shrestha *et al.*, 2006).

People in the Annapurna Conservation Area (ACA, 74%) and former Makalu Barun Conservation Area (MBCA<sup>1</sup>, 96%) reported that they are severely suffered from wildlife depredations and also faced restrictions on using forest and other natural resources. Despite the depredation, conservation attitude in ACA (87%) and MBCA (83%) was very positive (Mehta and Heinen, 2001). The rationale behind the liking and acceptance of ACA is due to the presence of community forestry, community development activities, wildlife conservation, environmental awareness, tourism and trainings. However, the dislike of conservation area (ACA) is mainly due to the restrictions on killing pest animals (wildlife), inequitable distribution of development projects, low attention to agriculture and livestock, strict impose of forest rules (Mehta and Heinen, 2001).

In Chitwan National Park (CNP), wildlife caused several problems including crop damage (78%), livestock depredation (13%), and human harassment (9%). Problem animals were reported as Rhinoceros (*Rhinoceros unicornis*, 71%), Deer (*Axis axis*, 18%), Boar (*Sus scrofa*, 8%) and Pigeons (3%). Most of the economic loss occurred due to damage in Maize (60%), Rice (32%) and Mustard (8%) (Shrestha, 1996). In the buffer zone of Bardia National Park (BNP), 88% of the surveyed people responded that wildlife of the park created problem

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<sup>1</sup> MBCA is no longer existed but transferred into Buffer Zone.

with crop and livestock losses, human harassment that have negative implications on health, well being and livelihoods (Thapa, 2010). Farming of alternative crops to reduce the damage from wildlife was initiated but it was not much promising and use of different mechanism to protect crops meant investment of resources and time by local people (Thapa, 2010). This indirect cost of park management to locals trigger to negative attitudes towards conservation.

Despite the cost imposed to the local people that led to park-people conflict, PAs offers several benefits. Various eco-system services are delivered by the PAs to the local people. Still, most of the people living in rural areas in Nepal rely on firewood for domestic energy needs and it is true for people living nearby PAs as well. Main resources used by the local inhabitants of PAs, for instance BNP and Shukla Phanta Wildlife Reserve (SWR) are firewood, thatch grass for roofing, timber for construction and furniture, grasses and fodder for livestock (Baral and Heinen, 2007). In BNP, people were using 8 different types of park resources and more dependent on it whereas in SWR, 7 types of resources were used, but not timber. Similarly, the pattern of resource usage was quite different in two PAs (Baral and Heinen, 2007). Locals in BNP had more positive attitudes towards conservation in compare to SWR. This can be attributed to more accessible resources, lower population densities, big size of park, long time conservation and socio-economic intervention, and more functional UGs in BNP then in SWR (Baral and Heinen, 2007). Heinen (1996, cited in Baral and Heinen, 2007) stated that more external economic intervention is required for effective protected area management that has higher population and ethnically diverse.

In KTWR, conservation attitudes of local people was positive (76%), however, the poorest of the community had not benefitted from the reserve, rather their life was turning into hardship every other day (Laim, 2004). People who favor and like the KTWR did so because of actual material benefits gained such as thatch grass and fuel wood collection, potential benefits from tourism and community development activities. Generally, the local people living in and around the PAs showed negative attitudes towards conservation if they do not receive direct benefits. Earlier studies indicate that majority of people (65%) in KTWR had their negative feelings in conservation while 80% in BNP expressed their negative attitudes towards conservation. Wildlife damage and restrictions in the use of park resources led to negative attitudes whereas opportunities for thatch grass collection and forest conservation was the main reason to bring positive attitudes (Heinen, 1993; Leisure and Mehta, 1993 cited in Mehta and Heinen, 2001). However, the recent study by Baral and Heinen (2007) showed that

the local people in BNP have increased positive attitudes due to several socio-economic interventions. Buffer Zone programme and its provision of sharing park income might have brought positive attitude towards nature conservation. But, economic losses from the crop damage and livestock depredation together with restrictions in accessing park resources is the main issue that bring park people conflicts.

The National Parks and Wildlife Conservation (NPWC) Act, 1973, and its subsequent amendments, and the Buffer Zone Management Regulations, 1996, represent the most important legislative measures focusing on the needs of local communities as well as minimizing impacts on protected areas to avoid parks and people conflicts. Buffer zones may include forests, settlements, agricultural lands, open spaces in villages, and many other land use forms. In Nepal, people interact with protected areas in numerous ways. There has been a growing conflict over land use rights and practices (Nepal & Weber 1993; Studsrod & Wegge, 1995). The right to collect firewood and graze animals was denied in PAs in the Terai, while for the collection of thatch grass, access was restricted by limiting the collection period to two-three weeks a year during the dry season. As a result, parks and people conflicts are common in all the reserves of Nepal, but the extent of the conflicts varies in different reserves.

## **2.2 Protected Area Management System in Nepal**

Conservation awareness in Nepal began in 1950 under the leadership of late King Mahendra. However, first formal approach in conservation started in 1957 after the publication of law that provided protection for Great One horned Rhinoceros (*Rhinoceros unicornis*) along with its habitat. Nepal's first five year plan (1956-1961) also gave due consideration for the conservation and management of floral and faunal species (BPP, 1995). Rhino sanctuary was established in 1964 which later became part of Chitwan National Park. Protection unit, Rhino Guards (Gaida Gasti), was recruited to support the task of stopping poaching of large mammals and was considered successful (BPP, 1995; Majpuria and Majpuria, 1998; HMG/MFSC, 2002). Nepal's present system of protected areas started as Royal Hunting Reserve that consisted of six in Terai and one in the mountains, gazetted in 1969 for the protection of wildlife. Lack of proper legislation and bylaws resulted in ineffective conservation (Majpuria and Majpuria, 1998).

Modern era for wildlife conservation and protected area management in Nepal started only after the passage of NPWC Act (1973) , with the goal of biodiversity conservation , sustainable rural development and ecotourism promotion (Heinen, 1993; Heinen and Mehta, 1999; Heinen and Shrestha, 2006). This act has also created the Department of National Parks and Wildlife Conservation (DNPWC) in the same year and made provision for the establishment of four categories of protected areas: Strict Nature Reserves, National Parks, Wildlife Reserves and Hunting Reserves. Subsequent amendments of this act made the legal provisions to establish two more categories of protected areas: Conservation Area and Buffer Zone. Legal definition of various categories of protected areas in Nepal under the NPWC act 1973 (with subsequent amendment) are as follows (BPP, 1995; Majpuria and Majpuria, 1998; HMGN/MFSC, 2002).

*Strict Nature Reserve:* an area of ecological significance set aside for the purpose of scientific studies.

*National Park:* an area set aside for conservation, management and utilization of animals, birds, vegetation and landscape together with natural environment and utilization.

*Wildlife Reserves:* an area set aside for conservation and management of wildlife (animals and birds) and their habitats.

*Hunting Reserve:* an area set aside for the management of animals and bird necessary for the purpose of sport hunting for legal hunters.

*Conservation area:* an area set aside for the conservation of the natural environment and the natural resources for its utilization in a balanced way on the basis of an integrated management plan.

*Buffer zone:* an area designated surrounding national parks and reserves in order to provide for the use of forest products to local people.

Further, this act also provides right to the government to declare any area as protected area, if it deemed necessary, with a detailed description of the boundaries and notification published in Nepal Gazette. Nepal's protected area can be divided in two categories: Himalayan and Terai. In the Himalayan Parks and Reserves, traditional and local villagers are allowed to stay inside the parks but in Terai, no settlement has been permitted and no legal exploitation of resources is allowed except in the opening of grass cutting season for thatching purpose (Majpuria and Majpuria, 1998). Himalayan National Park Regulation (1979) have made special provisions for people living within mountain parks to collect natural resources for

their daily requirements, such as firewood, leaf litter, small pieces of timber and fodder. The Regulation also allows people to continue to graze their domestic animals on park rangeland. However, no provision has been made for handing over parcels of parkland to be managed by the community (Sharma, 1999 cited in HMG/MFSC, 2002). Despite this, communities can organize harvests and grazing plans as long as they are compatible with the park's management objectives. They can also control or even stop "outsiders" from entering the park or reserve to harvest resources, and thus help reduce the pressure on the natural resources of the area. Nepal's present status of PAs is given in the annex 1.

### **2.3 Park People Conflict and Its Resolution**

In most of the area local people have long history of residing in a particular geographical location before the establishment of any kind of PAs. Especially in the Terai region of Nepal, people from the hill migrate after the eradication of Malaria in 1950s. Prior to the establishment of protected areas, local people were *de facto* free to collect natural resources such as firewood, fodder, timber, grasses and grazing their livestock and hunting in the national forests. Such resources have direct linkage with their livelihoods. Conflicts between the local people and protected area management often arises due to (BPP, 1995, p 8-8):

- Prohibition of the free collection of forest products
- Prohibition of the setting of fires in grasslands and forest areas
- Prohibition of the hunting of birds and animals
- Prohibition of the harassing of wildlife or destroying /disturbing bird nests and eggs
- Restrictions placed on livestock grazing and watering
- Restrictions placed on channeling of water to agricultural land
- The clearing of settlement of agricultural areas from within the protected areas.

The level of these conflicts is intensifying in protected areas. Lack of understanding and sense of partnership between the protected areas staff and local communities pose a direct threat to both the biodiversity and economic value of protected areas. Escalating park people conflicts led the park authority to rethink their policy as this was the threat to achieve conservation goals. Government realized that sustenance of PA is only possible in co-operation and partnership with local people, those residing around the park/reserve border. Accordingly, NPWC act 1973 was amended in 1989 to make provision of conservation area as new form of protected area and fourth amendment in 1993 led to the provision of buffer zone designation. The Buffer Zone Management Regulation is the most important legislative initiative focusing

on the needs of local communities who are most likely to be adversely affected by protected areas, and subsequently avoids conflicts between parks and people.

## **2.4 Policy and Legislation**

Out of 118 ecosystems identified by Dobremez (1970 cited in BPP 1995) in different physiographic zones in Nepal, 80 are represented in the present protected areas system. Ecosystems and genetic resources are protected *in-situ* within the protected areas system of Nepal. DNPWC mandate is to administer and manage PAs of the country. However, management responsibility of ACA, Manaslu Conservation Area (MCA) and Gauri Shankar Conservation Area (GCA) lies with National Trust for Nature Conservation (NTNC). Nepal has developed several policies, strategies, regulations, act and rules to protect its natural resources which have direct implications on biodiversity conservation and rural livelihoods. Some of the legislations that are of importance for biodiversity conservation are briefly described below.

### **2.4.1 Aquatic Animals Protection Act, 1961**

This act provides legal protection of the habitats of aquatic species. However, no agency has been designated to administer and enforce the act. This has led to conflicts over the jurisdiction and working strategy that sometimes converges or diverges between different governmental agencies.

### **2.4.2 National Parks and Wildlife Conservation (NPWC) Act, 1973**

The NPWC Act has been a key instrument in protecting biodiversity within the protected areas system. Section 3 of the NPWC Act prohibits hunting of any animal or bird, building any house, hut or other structure, clearing or cultivating any part of the land, harvesting, cutting, burning or damaging any tree, bush or other forest product, and mining within national parks or protected areas. In spite of the absence of adequate data on the wild flora and fauna of Nepal, which makes comprehensive management and conservation difficult, Section 10 of the act provides complete protection to 27 species of mammals, 9 species of birds and 3 species of reptiles.

### **2.4.3 Buffer Zone Management Regulations, 1996 and Buffer Zone Management Guidelines, 1999**

The NPWC Act was amended to incorporate provisions for conservation area and buffer zone. Subsequently, the Buffer Zone Management Regulations (1996) and Guidelines (1999) were approved to design programmes compatible with national park management and to facilitate public participation in the conservation, design and management of buffer zones. The amended NPWC act makes provisions for 30% to 50% of the park (or reserve) revenues to be ploughed back for environmental restoration and community development activities in the buffer zone. The revenue is disbursed through the Buffer Zone Management Council and Users Committee. The Buffer Zone Management Regulation is the only regulation to promote community forestry programmes in buffer zones and to improve the forest condition by community. All type of property: government, public or private can be within a buffer zone and land ownership is unaffected. Natural boundaries have been taken as the primary demarcation of buffer zones around the periphery of national parks and reserves. Factors taken into consideration for the demarcation of buffer zones include areas likely to be affected by the existence of the PA, the geographical situation of the PA, status of the villages and settlements located within the PA, and areas practicable and appropriate for management purposes (DNPWC/MoFSC 1999). The concept of buffer zone calls for sustainable utilization of forest resources and environmental conservation within the buffer zone for community development. Legal provision allows for buffer zone forest to be managed under community forest, religious forest, and private forest structures. However, these regulations need to be revised for today's context and must be made clear and easy to understand at the field level (Sharma 1999 cited in BPP, 1995).

Implementation of the Buffer Zone Management Regulation is a natural outcome of previous policy and planning initiatives. The National Conservation Strategy (HMGN/IUCN, 1988) emphasized the need for sustainable use of land and natural resources. It specifically pointed out that the forests outside of protected areas must also be protected from deforestation, that people should be made self-reliant in timber, fuel wood, fodder and other forest products, and that local communities should be given the responsibility of managing forests according to geographical conditions and societal needs.

Box 1: Park people programme: ICDP approach in Protected Area Management

**Park people programme: ICDP approach in reserve management**

Department of National Parks and Wildlife Conservation (DNPWC) through United Nation Development Programme (UNDP) assisted Park people programme (PPP) launched various activities in seven protected areas of Nepal in 1998. The main objectives were to improve socio-economic well being of buffer zone communities and biodiversity conservation of parks/reserves and their surroundings.

There were several activities conducted in PWR in the year 1998. Total of 176 user groups were formed out of which 100 were males and 76 were females. From the community savings and credit scheme, a sum of Rs. 467,000 was generated and more than Rs. 552,000 was mobilized.

Under productive infrastructure, the programme supported 9 boring activities and 5 drinking water schemes.. Total of 120 hectare of land was irrigated benefitting 118 households. Likewise, drinking water scheme provided clean drinking water to 164 households.

Various achievements were made in forestry and conservation areas in this reserve. Total of 87 hectare of land was brought under community plantation. Two community forests were formally handed over to forest users group. Likewise, 1,708 gabion boxes were filled and erected to control flood. These structures were expected to benefit 1,000 households.

Capacity enhancement trainings such as leadership development and account book keeping trainings were conducted to 152 users groups. Facilitators training were aimed to empower women members of the community (HMG/UNDP, 1998, p. 12)

### **Chapter III**

## **JUSTIFICATION**

Protected areas cannot be conserved in isolation and fortress and fine approach alone is not sufficient to secure these areas. There must be support from the wide range of stakeholders if the objective of bio-diversity conservation is to achieve. Often, PAs face significant management challenges due to the park people conflict. The damage done by wildlife of PAs is threatening the local livelihoods making them vulnerable to poverty. Crop and livestock depredation from wildlife, human harassment and injuries leading to death, restrictions to previously used areas are some serious issues in the buffer zone of PAs (Bhatta, 1994). On the other side, PAs also provide resources to the people which supports for their subsistence economy. Several park resources can be used by local people to support their rural livelihood. The participation of local people in park management activities also determines the success or failure of any kind of PAs. Research shows that, community based conservation or participatory conservation leads to more favorable attitudes of local people towards conservation when they receive more tangible benefits from intervention programs over the period of time (Mehta and Heinen, 2001).

In order to achieve the sustainable management of protected areas, one should understand the park people relations which can be applied in designing appropriate management framework. The supply and demand of resources by the local stakeholders, the conflict patterns triggered by the crop and livestock depredation, ban on using park resources and the conservation attitude of local people should be explored. It is also important to know how the park authority views local people in terms of conservation and if local people participate in conservation intervention and decision making activities.

There have been several studies carried out in park people issues and conservation attitudes in several protected areas in Nepal. These studies are carried out only in those PAs which are very much popular in terms of its management intervention and conservation success. Protected areas that are the destination of ecotourism have also been widely researched. But, latest research on those issues in Parsa Wildlife Reserve is lacking though it is one of the most important protected areas in central Nepal. It is the eastern most protected area of Terai Arc Landscape (TAL) which shares the boundary with widely known Chitwan National Park and World Heritage Site in the west and Valmiki Tiger Reserve (India) in the Southern part. Besides TAL, it forms the Chitwan-Parsa-Valmiki complex as Tiger Conservation Unit. Thus,

it is very much important and should receive priority on the study related to the dynamic facets of park people issues. Natural resource use, wildlife induced damage, impact of conservation and development activities are the important ways of understanding relationship between local people and protected areas.

## **Chapter IV**

### **OBJECTIVES**

#### **4.1 General Objective:**

The main objective of this study was to assess the Park – People relation in Parsa Wildlife Reserve and Buffer Zone, central Nepal.

#### **4.1.1 Specific Objectives:**

Specific objectives of this study were to:

- Identify conflicts between the park and people regarding usage of resources and the quantification of property damage done by wildlife.
- Identify the types and intensity of resources used and the villagers' level of dependency on park resources.
- Identify the local people's conservation attitude towards park and park authority attitude towards local people.
- To assess conservation activities adopted by local communities and authority.
- To come with recommendation for the sustainable management of protected areas.

#### **4.2 Research Questions:**

To achieve the above stated objectives following research questions were explored:

- 1) What are the conflict types between people and park and what type of property damages occurred in buffer zone?
- 2) What type of park resources are extracted and used and what is its livelihood significance?
- 3) Do the local people have favorable conservation attitudes towards protected area?
- 4) Is PWR supporting in increasing poverty or decreasing poverty?
- 5) What types of conservation action are adopted by local people and park authority?
- 6) What could be the best model for park management?

## **Chapter V**

### **SCOPE AND LIMITATIONS**

This study covered the park people issues in 2 buffer zone villages adjoining Parsa Wildlife Reserve that consists of Amlekhgunj V.D.C. in the East and Nirmal Basti V.D.C. in the South. The problems faced by local villagers due to the existence of reserve and their resources usage pattern in buffer zone and from the reserve was covered. Attitudes towards conservation of PWR and buffer zone programme was explored through attitudinal scale score. Major conflicting activities in the region was also the focus of this study. However, the study of vegetation pattern, different wildlife density and supply and demand of resources were beyond the scope of this study. This work came with the general overview of relationship between local people and reserve on several issues of protected area management. Social science reserach methodology was employed to carry out the field study.

The number of surveyed household (sampling intensity and sampling design) might have influence the research result. The result derived from this study may or may not imply to other protected areas. This study was carried out in limited time and resources for the academic fulfillment towards the master degree. Further limitations were:

- Not any specific measurement was carried out regarding damage to crops and livestock, thus this study relied on respondents own judgment. This may have overestimate or underestimate of damage.
- Respondents were reluctant to answer all the survey questions as they were fed up with several researchers coming every year to their village; but the situation had not changed for long time. Similarly, they were very skeptic if the research was merely for academic purpose or something else.
- Respondents do not reply all the questions accurately and there could have been biasness in replying the answers.

## Chapter VI

### MATERIAL AND METHODS

#### 6.1 Study Area

PWR is located between 27° 15' – 27° 33' N and 84° 41' – 84° 58' E covering an area of 499 sq km. It was established in 1984 for the conservation of Elephant (*Elephas maximus*), Tiger (*Panthera tigris*), Gaur (*Bos gaurus*) and so on of Terai region. This region was popular as the hunting place of the then ruling class, Rana family. Buffer zone of PWR was declared in 2005 covering the total area 298.17 sq km over 3 districts and 11 V.D.C. (Figure 5). PWR extends from Chitwan National Park in the west to Hetauda-Birgunj highway in the East. Northern border consists of Rapti river alongwith Churia range and forest road acts as the southern boundary. Small settlements, Rambori and Bhata, is within the reserve that spread over 55 hectare and other two settlements<sup>2</sup>, Pratpur and Ramouli lies in inner Terai that covers 150 hectare.

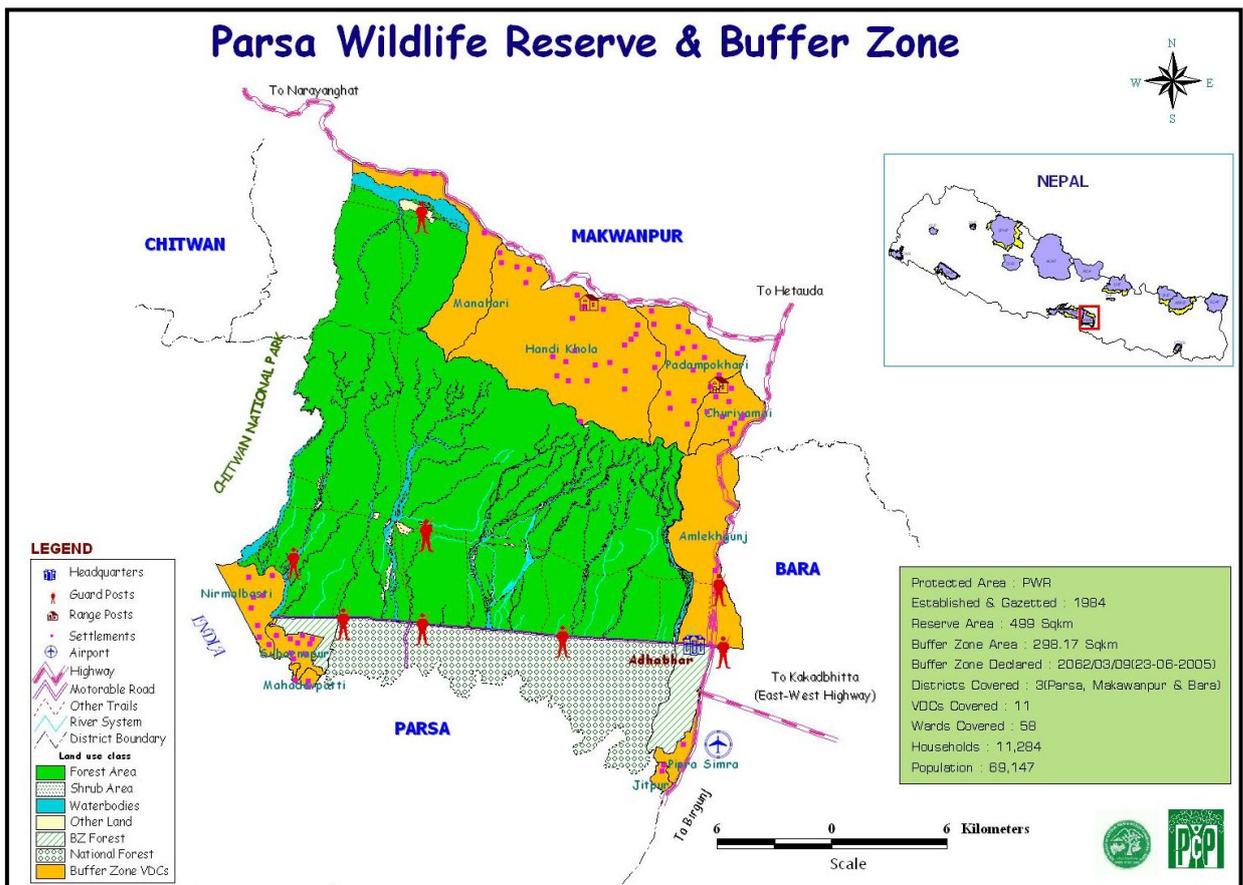


Figure 4: Parsa Wildlife Reserve with Buffer Zone

<sup>2</sup> Pratapur and Ramouli settlements were undergoing translocation out of the Reserve during this study.

### **6.1.1 Physical Features**

The main landscape of the reserve is Churia hills/ Siwalik hills that ranges from 750 m to 950 masl running east to west. Hills are susceptible to erosion as soil are primarily composed of loose gravel and conglomerates. The hills have a rugged appearance with numerous gullies and dry stream beds. Foothills of the hills are very porous thus, the water flows underground and surfaces at a distance of about 15 km south of the hill. This is making water crisis in the immediate vicinity of the foot hills of Churia hills.

### **6.1.2 Vegetation/ Flora**

PWR consists of tropical and subtropical forest types with Sal (*Shorea robusta*) forest, covering 90% of the vegetation cover (Pandey, 1999). Chir Pine (*Pinus roxburghii*) grows well in the hilly region. River banks and stream contains vegetation species such as Khair (*Acacia catechu*), Sissoo (*Dalbergia sisoo*), Simal (*Bombax ceiba*). The grass land is composed of Sabai grass (*Eulaliopsis binata*) on the southern part of Siwalik hills which is commercially important in the region (Majpuria and Majpuria, 1998; DNPWC, 2004).

### **6.1.3 Fauna/ wildlife**

PWR offers habitat for several wildlife including, Wild Elephant (*Elephas maximus*), Tiger (*Panthera tigris*), Gaur (*Bos gaurus*), Leopard (*Panthera pardus*), Sloth Bear (*Ursus maximus*), Blue Bull (*Boselaphus tragocamelus*), Wild Dog (*Cuon alpinus*). Other common mammals of the region are Cheetal/Spotted Deer (*Axis axis*), Laguna/Hog Deer (*Axis porcinus*), Sambar Deer (*Cervus unicolor*), Ratuwa/Barking Deer (*Muntiacus muntjak*), Langurs (*Presbytis entellus*), Rhesus Macaque (*Macaca mulatta*), Striped Hyaena (*Hyaena hyaena*), Ratel (*Mellivora capensis*), Palm Civet (*Paradoxurus hermaphrodites*), Jungle Cat (*Felis chaus*) (Majpuria and Majpuria, 1998).

300 birds species are found in the reserve. Giant hornbill (*Buceros bicornis*), which is one of the endangered species found in certain forest patches and Red Jungle Fowl (*Gallus gallus*) are two key indicator species of the bird found in the reserve (Shrestha, 2000). Paradise fly catcher (*Terpsiphone paradisi*), Dark throated thrush (*Turdus ruficollis*), Swamp partridge (*Francolis gularis*), Wigeon (*Anas penelope*), Gadwals (*Anas strepera*), Mallard (*Anas platyrhynchos*), Tufted pochard (*Aythya fuligula*) and Wood peckers (*Picus sps.*) are also common birds found in the reserve (Shrestha, 2000). Tropical climate is suitable for several

kinds of herpetofauna that includes, King Cobra (*Naja hannah*), Krait (*Bungarus sps.*) Rat snake (*Ptyas mucosus*) and Python (*Python morulus*) (Majpuria and Majpuria, 1998).

## **6.2 Study Site**

Two buffer zone V.D.C. were chosen for this study purpose. Amlekhgunj buffer zone users group in Amlekhgunj VDC was taken in Bara district and Nirmal Basti VDC was taken in Parsa district. Different site was taken in the study to determine the different pattern of resource uses between the people who live near and far from the reserve boundary. Buffer zone in Amlekhgunj was adjoining to reserve headquarter whereas another site was far (about 70 kms road distance) from the headquarter. Nirmal Basti do not have buffer zone community forests thus they have to rely completely on reserve resources whereas people in Amlekhgunj has buffer zone community forest and also the national forest was within easy reach.

Total population of Amlekhgunj V.D.C. in 2011 was 6709 with 1370 household. This population comprises of 3413 male and 3296 female with average family size of 4.897. Population in NirmalBasti V.D.C. was 9772 with total household of 2055. This was comprised of 4773 male and 4999 female with family size of 4.755 (CBS, 2011).

## **6.3 Data Collection Methods**

### **6.3.1 Primary Source of information**

#### **6.3.1.1 Questionnaire Survey:**

The main source of primary data was questionnaire survey among the households in study area of buffer zone. The survey instruments contained closed and open ended questions aiming to explore the answers of the questions that were addressed in this research. Information was sought on economic losses, conflict issues, resource uses, conservation attitude and conservation intervention. The questionnaire also consisted of statements based attitudinal survey that was awarded the attitudinal score of 1 (strongly disagree) to 5 (strongly agree) with score 3 being neutral (5 point Likert scale).

The household in the buffer zone community was considered as sampling frame. Respondents were selected for the survey by employing simple random sampling method. Lottery method without replacement was used to select the household under study. Study site was determined and confirmed purposively by researcher's own judgment. Sampling unit for questionnaire

survey was household. I did not pretest the questionnaire as the survey instrument was adopted from similar studies (Heinen, 1993; Mehta and Heinen, 2001; Baral, 2005) and modified as per my study requirement.

#### **6.3.1.2 Key Informant Survey and Focus Group Discussion:**

Besides questionnaire survey; key informant survey was also carried out. Chairperson and executive member of buffer zone user group, chairman and secretary of buffer zone user committee, village leaders and field staff of PWR were contacted for the survey. Focus group discussion was conducted with the group of farmers' and community forestry personnel from the district.

#### **6.3.1.3 Participant Observation:**

Each and every kind of information may not be sought from survey and discussions. Therefore, in order to cross check the information obtained from survey and discussions, researcher spent about 2 weeks in the study village to closely monitor the villagers' activities. It was aimed to determine impacts and effects of the activities to the reserve and vice versa.

#### **6.3.2 Secondary Source of Information**

Secondary information was used to backup this study. As it was impossible and beyond the capacity of researcher to collect all the required information from field, various sources of published materials were used. Journal articles, earlier research findings, project report, grey report, proceedings etc were reviewed as per requirement. Libraries of various institutions including both the academic and professional institutions were accessed.

#### **6.4 Data Analysis:**

Quantitative data was processed and analyzed with the help of MS Excel computer software. Descriptive statistics were used and presented in the form of table, graphs, charts, pie charts etc.

## Chapter VII

### RESULT AND DISCUSSION

#### 7.1 Result

##### 7.1.1. Respondents' Demographic Characteristics

A total of 58 structured questionnaire survey (house to house interview) was conducted in the Buffer Zone of Parsa Wildlife Reserve. Two districts and two Buffer Zone communities were covered for the study. Amlekhgunj Buffer Zone Community Forest User group in Amlekhgunj V.D.C. ward number 3,4,5 and 6 was chosen in Bara district and Nirmal Basti V.D.C. ward number 6 was chosen in Parsa district. The first one lies along the East West highway and has more economic opportunities than in Parsa. Most of the questions were close ended; however there were open ended questions as well to give chance to elaborate the answers on some questions. Respondents' were 30 male (52%) and 28 female (48%) (figure 6).

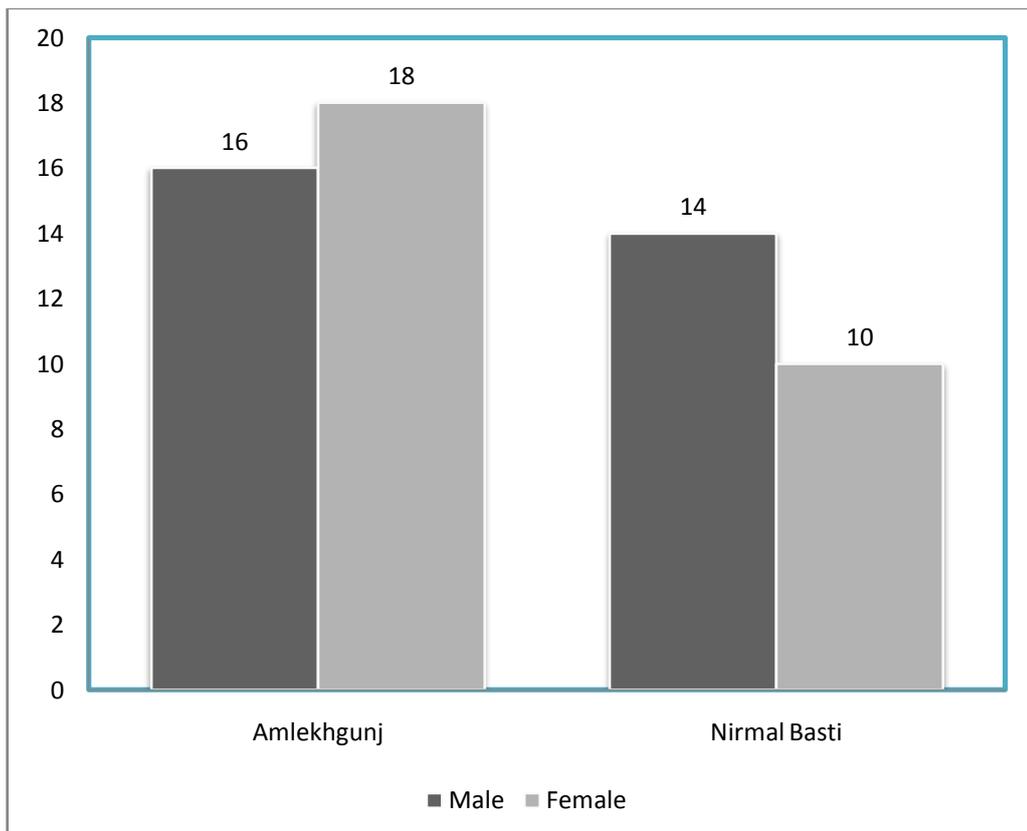


Figure 5: Number of respondent by gender

Source: Field survey, 2013

These group of respondents belonged to 9 different ethnic groups. The highest number of respondents' were Tamang (47%) followed by Gurung and Brahmin (both 10%), Newars (9%), Chhettri and Thakuri (5%). Occupational castes were also represented in the study which was 5% of the sample and included one Magar and 3 madhesis households (Figure 7) (for details on Nepalese caste and ethnicity, see Bista, 1987). The mean age of the respondents was 42.83 years and ranged from 18 to 79 years old. The average household members were 6.68 which was high then the VDC average.

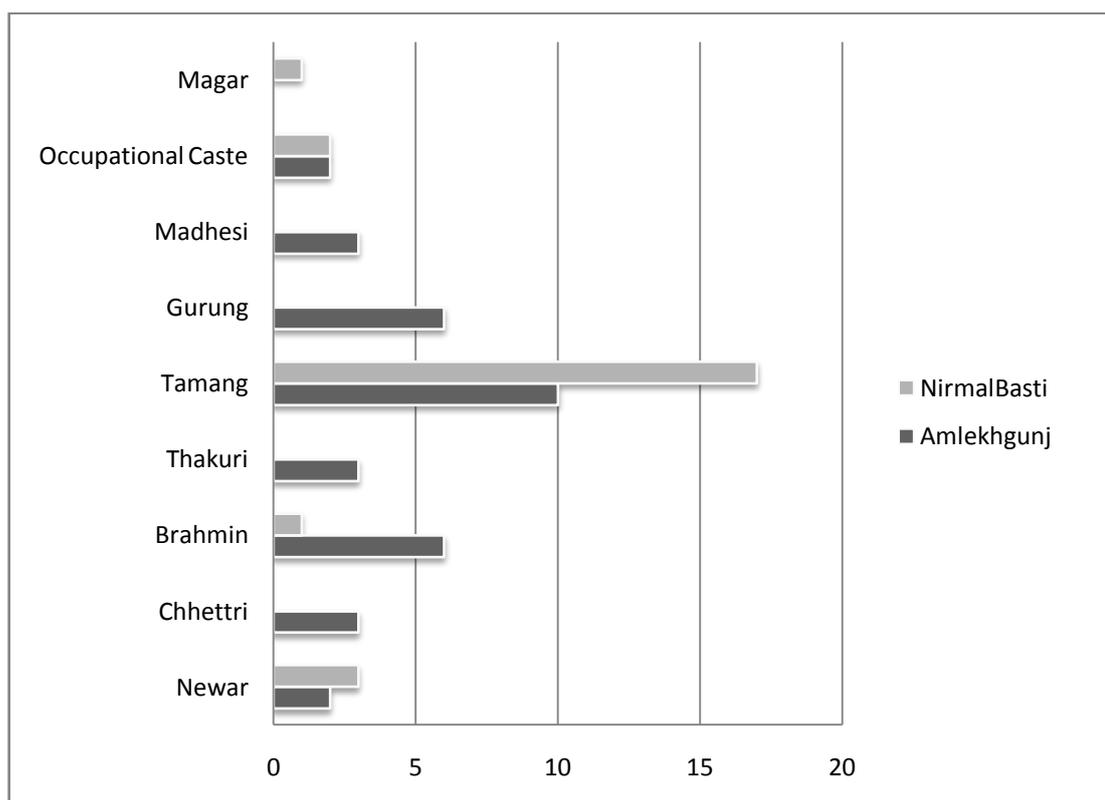


Figure 6: Number of respondent by caste

Source: Field survey, 2013

The study villages are backwards in terms of education. 34 % of the respondents were illiterate or they don't know how to read and write whereas 14 % knew to read and write with no prior formal education.16 % had primary level education (upto class 5), 22% had lower secondary level education, 9 % had secondary level (10/SLC) and only 5 % had higher secondary and Bachelor level qualification (figure 8).

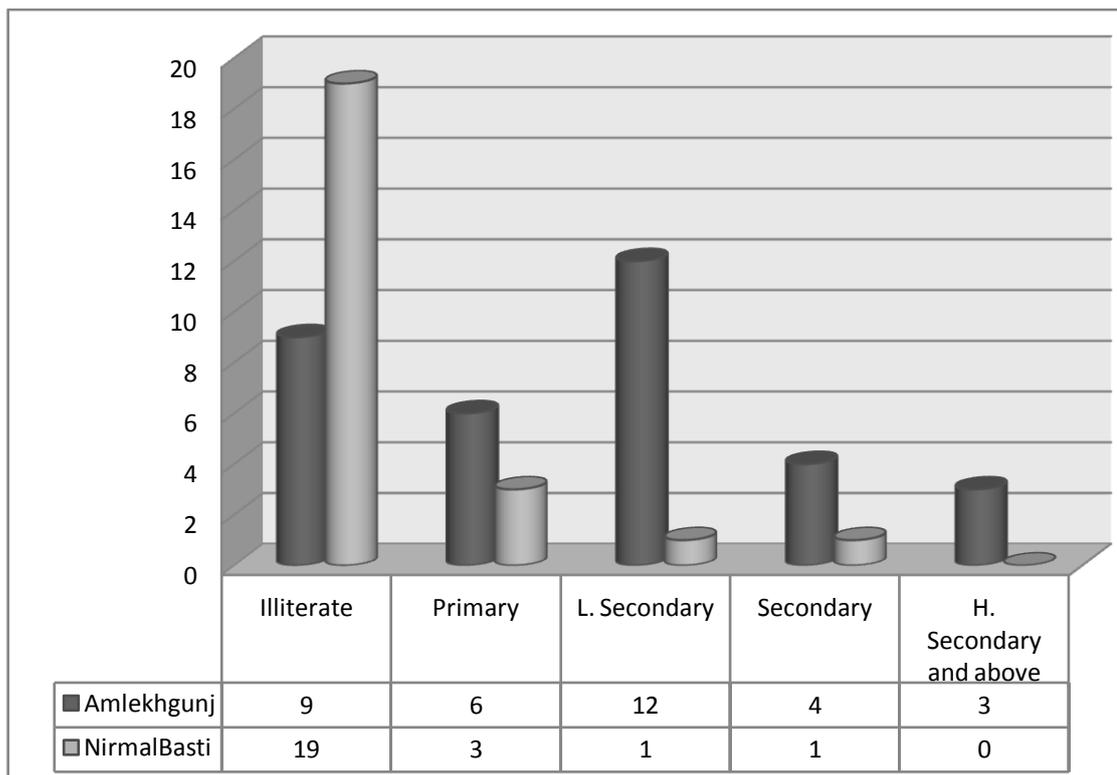


Figure 7: Number of respondents by level of education

Source: Field survey, 2013

### 7.1.2 Attitude Towards Conservation

41 % of the respondents replied that buffer zone was created for the betterment of their locality whereas 42 % showed indifference towards it and 17 % people disagreed (Figure 9).

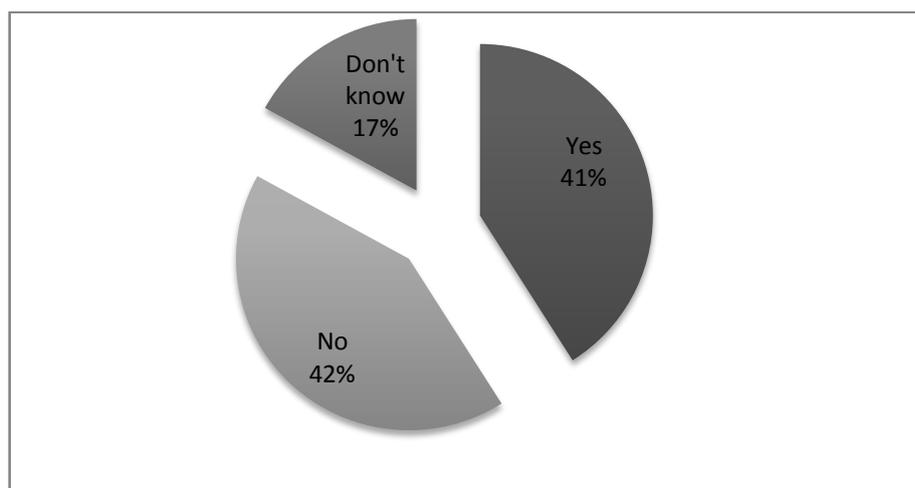


Figure 8: Attitude towards buffer zone. BZ was created for betterment of our locality.

Source: Field survey, 2013

Most of the respondents (37%) agreed that the buffer zone programme has helped them to support their livelihoods and community development activities. 29% respondents were

neutral showing no concept on this issue. 34% were disagreed and believed that buffer zone has done nothing on supporting livelihoods and community development action. The attitudinal score was 2.77 which was below neutral attitudinal score showing disagreement on this. However, 42% respondents were happy to be included in buffer zone area of the reserve. 20% were unhappy to be within buffer zone and 37% had neutral attitude about inclusion within the buffer zone area. Attitudinal scale was found to be 3.43.

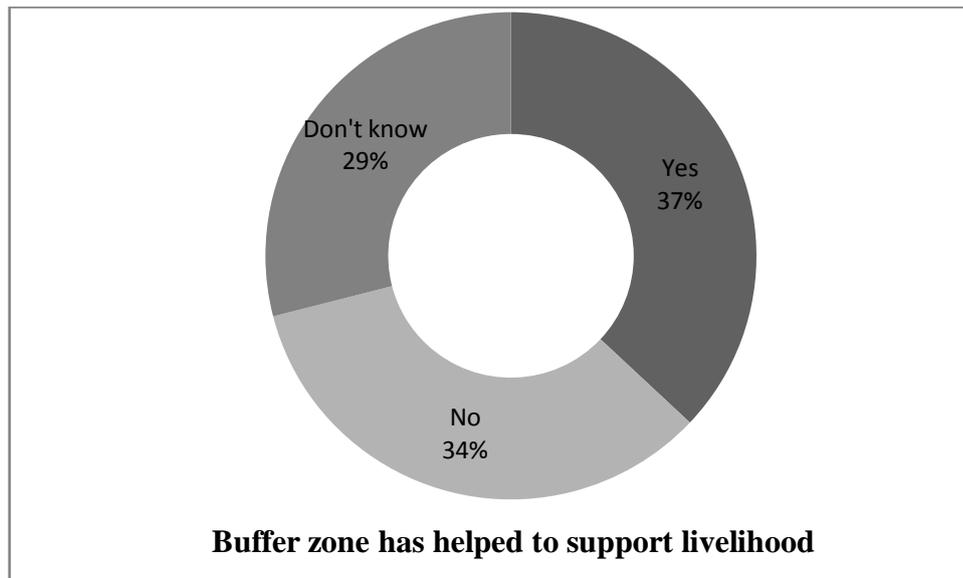


Figure 9: Attitude towards buffer zone

Source: Field survey, 2013

Majority of people did not like the presence of reserve in their vicinity. 40% of the surveyed people replied that they do not like it at all whereas 34% replied that they liked the reserve because of several benefits. 26% were indifference towards the presence of reserve and were not either for or against it. Overall attitudinal scale of the local people about the presence of reserve nearby their village was found to be 3.22, which shows the sign of neutral attitude.

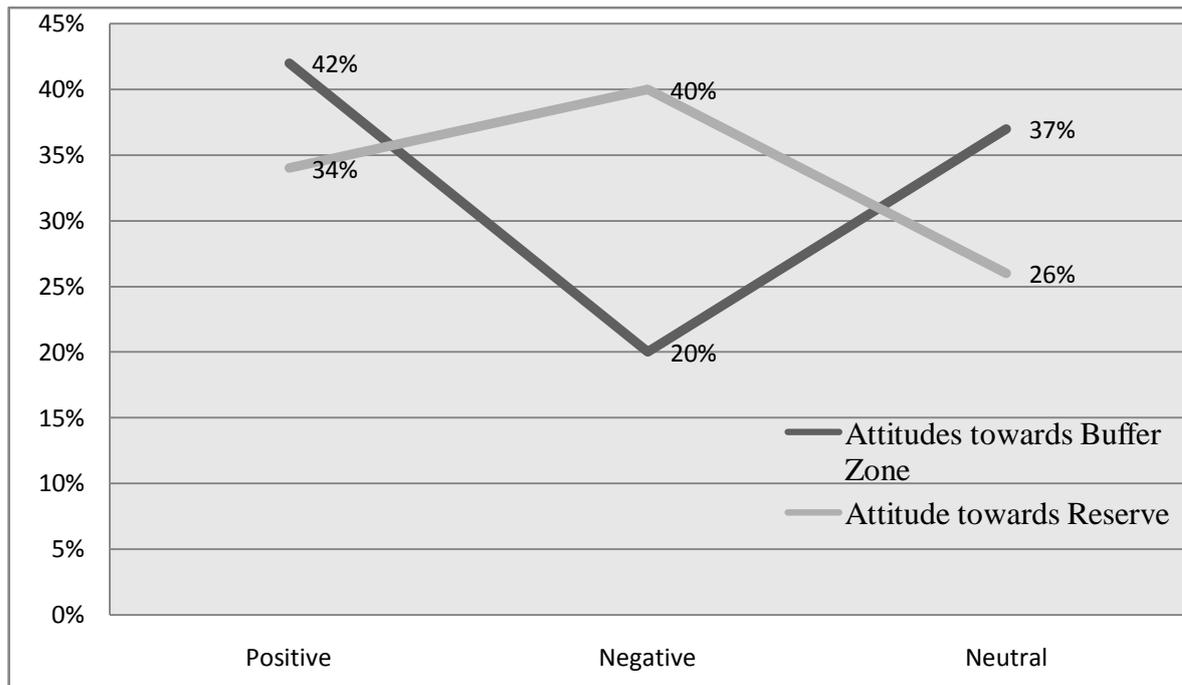


Figure 10: Attitude towards PWR and buffer zone

Source: Field survey, 2013

There was not much difference about the preference of saving crops and livestock against forest and wildlife. They valued more or less equally to biodiversity conservation together with the farming practices. 36 % of the respondents showed no idea on which is to be valued more or preferred more. But overall attitudinal scale was 3.51, that showed the people and their livestock/crops are more important than biodiversity from villager's perspectives.

Though the majority of respondents (47%) replied that the living condition has been improved after the creation of reserve, mean attitudinal score showed that it did not support in the improvement of living condition of the people living nearby the reserve. The score was found to be 2.58. Crop and livestock depredation is prevalent in the reserve. Among this study area, Nirmal Basti experienced more economic losses than Amlekhgunj because this area is a farming community who owns farm and livestock. The compensation mechanism provided by the reserve management for the losses due to crop and livestock depredation is very poor. Most of the respondents replied that they do not have any idea about the compensation mechanism and never claimed for it. 64 % of the local people replied that the compensation received from the reserve is not sufficient, not systematized and never get it. 17 % did not have any idea on compensation mechanism as some of the respondents (mainly in Amlekhgunj) do not have any farm or livestock who never faced crop and livestock

degradation. Mean attitudinal score was calculated to be 1.72 showing strongly disagree or disagree over compensation mechanism.

People are aware about conservation of plants and animals by designating certain places. 74% agreed on this and 19 % had neutral attitude. Mean attitudinal score was found to be 3.72 that showed positive attitude. Buffer zone users group and users committees are community organization in the buffer zone region of protected areas that help empower people and promote environmental conservation and development activities in the society. People are satisfied (45%) with the functioning of users group and users committee and 24 % showed dissatisfaction over its working procedure. 31 % had no idea on this if they are working well as per rules and regulations (figure 12).

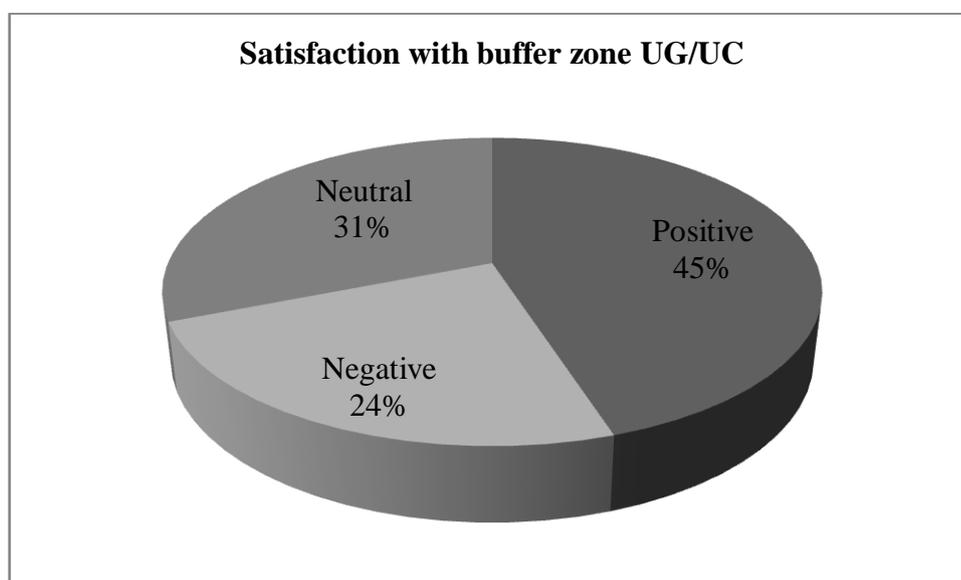


Figure 11: Response towards buffer zone user group/user committee

Source: Field survey, 2013

Distribution of common pool resources and benefits was revealed to be equitably done. 69 % agreed that it was on equitable basis with 20 % having neutral attitude and 10 % disagreed. Overwhelmingly, almost every people are willing from their side to contribute for biodiversity conservation. 46.55 % strongly agreed, 46.55% agreed and 5.17 % were neutral for biodiversity conservation. Attitudinal score was 4.37 that showed positive attitude.

Table 1: Score summary of conservation statement (N=58)

Conservation statement	Response (%)					Mean <sup>4</sup> ± S.D.	
	SA <sup>3</sup>	A	N	D	SD		
Buffer zone area was created for the betterment of our locality	6.77	33.89	42.37	13.55	3.38	3.43	0.79
Buffer zone programme has helped us to support our livelihoods and community development	1.69	35.59	28.81	28.81	5.08	2.77	0.87
I am happy to be included in the Buffer Zone area	0	42.37	37.28	16.94	3.38	3.43	0.97
I like the presence of Reserve nearby my village	3.44	31.03	25.86	32.75	6.89	3.22	1.06
People and their livestock and crops are more important than saving forests and wildlife	1.72	31.03	36.20	24.13	6.89	3.51	0.70
My living condition improved after the creation of Reserve	3.44	43.10	20.68	25.86	6.89	2.58	0.99
Wildlife damage compensation received from reserve/government is sufficient	8.47	10.16	16.94	22.03	42.37	1.72	0.81
It is important to set aside a place for the animals and plants to live in	3.44	70.68	18.96	6.89	0	3.72	0.69
I am satisfied with the functioning of BZUG/BZUC	3.44	41.37	31.03	22.41	1.72	3.22	0.91
There is an equitable distribution of common pool resources and benefits.	13.55	55.93	20.33	10.16	0	3.72	0.85
You are willing to contribute for bio-diversity conservation.	46.55	46.55	5.17	1.72	0	4.37	0.67

Source: Field survey, 2013

<sup>3</sup> SA= Strongly Agree (5), A= Agree (4), N= Neutral (3), D=Disagree (2), SD= Strongly Disagree (1)

<sup>4</sup> Higher mean score indicates positive attitude and vice versa (Mean ± St. Deviation).

### **7.1.3 Factors Affecting Attitudes towards Parsa Wildlife Reserve and Buffer Zone**

Number of factors affects attitudes towards protected areas. Level of satisfaction with user groups, participation in training and harassment from wildlife were predictors of conservation attitude in western Terai landscape protected areas of BNP and SWR (Baral and Heinen, 2007). Gender (Men), ethnicity, participation in trainings, poor people tend to have positive attitude in ACA and education level, benefit from tourism, ethnicity and no killing of wild pest animals led to positive attitude in MBCA (Mehta and Heinen, 2001).

Local residents' perception and attitude towards the PWR was neutral. The mean attitudinal score of statement about the liking of Reserve's presence nearby the village was  $3.22 \pm 1.06$  (Mean  $\pm$  SD) on a 5 point scale, showing indifference about it. However, 34.47 % strongly agreed or agreed, 25.86% were neutral and 39.64% strongly disagreed or disagreed on this statement. This showed that people have both the positive and negative attitudes towards PA and the perceptions are diverse, complex and contradictory. Nevertheless, higher percentage of respondents (39.64%) disliked the existence of PWR in the periphery of their village. People are often neither completely in favor of nor opposed to the park (Allendorf *et al.*, 2007). This may happened due to the dynamic relationship between local people and protected areas. Cost and benefits of managing protected areas could be one of them. For instance, local people are dependent on the protected areas resources, either from the core zone or buffer zone, and they harvest such resources either legally or illegally and accrue benefit from other natural resources. On the other hand wildlife pose several threats to the human lives, impose cost to local people through crop and livestock depredation and the entry to the protected areas for the collection of resources is restricted. There are various reasons why the local people have positive and negative attitudes towards the forest and wildlife of protected areas and have been documented elsewhere (Allendorf *et al.*, 2007).

The reason for liking PWR by the local people is due to the role in biodiversity conservation, employment, tourism and business, provision for natural resource use, security and moral attachment to the place (figure 13). The reason for having negative attitude or disliking PWR is due to the restrictions in resource use, crop and livestock depredation, fear of wildlife harassment and forced evictions, human casualties, beating, arrest and prosecution (figure 14).

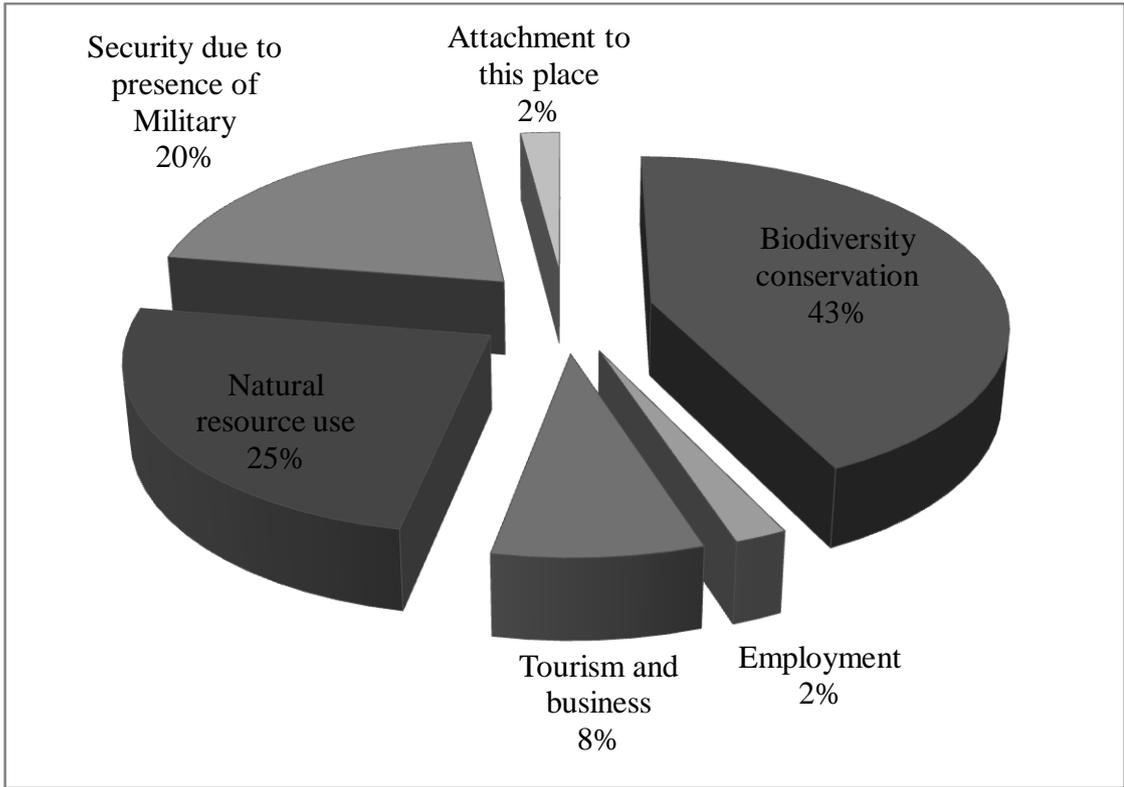


Figure 12: Reason for liking the PWR

Source: Field survey, 2013

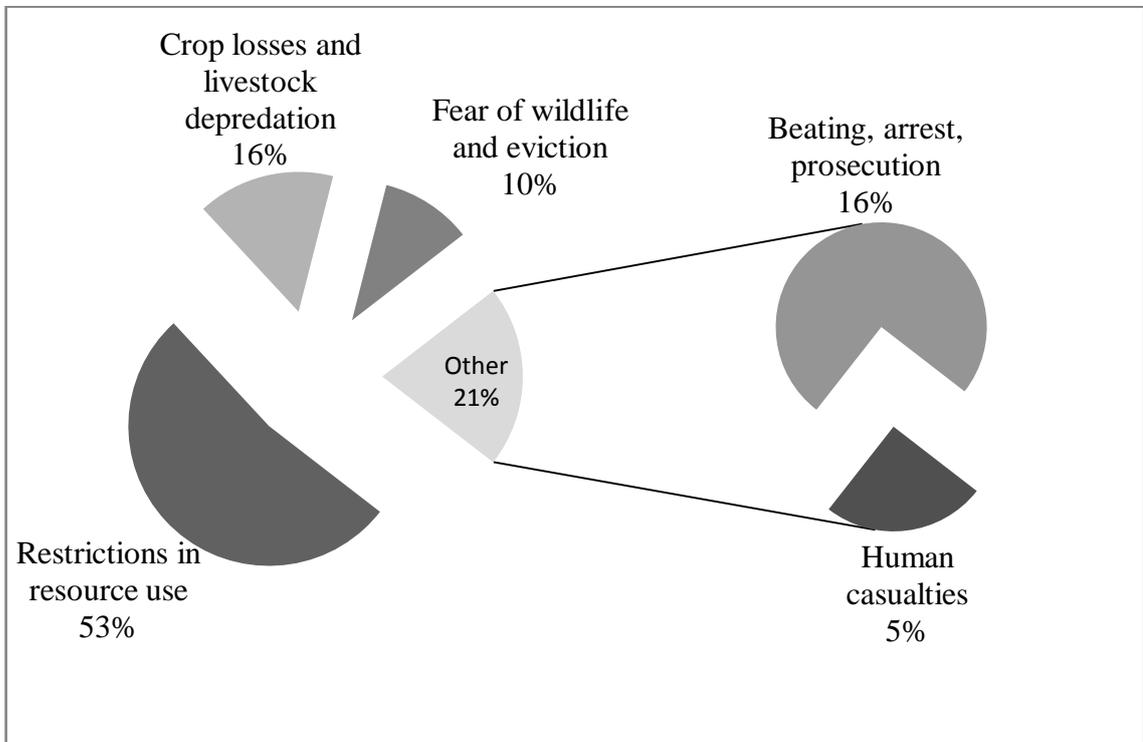


Figure 13: Reason for disliking the PWR

Source: Field survey, 2013

#### **7.1.4 Conservation Activities**

Nepalese protected areas that are managed by government which falls under IUCN category II and IV are guarded by Nepalese Army to control illegal activities such as poaching of wildlife, illegal harvest of resources and timber. Only exceptions to army deployment are Makalu Barun National Park and Dhorpatan Hunting Reserve (Paudel, 2011). Protected areas managed by non government organization, National Trust for Nature Conservation (NTNC), are also free from military protection but strong local participation is initiated and encouraged. Anyone found with such illegal activities are subjected to prosecution for legal action. This is often attributed to stick and fence approach or fortress and fine approach or Yellowstone model of conservation (Baral, 2005; Vedeld *et al.*, 2010) and is criticized worldwide as this approach has not been able to contribute well on biodiversity conservation, livelihoods, local benefits and so on (Vedeld *et al.*, 2010).

This study has found that local people are involved in several conservation activities. Such activities were more active when there was donor funded conservation projects such as Park People Programme and Participatory Conservation Programme (both UNDP funded projects). From the key informants' survey, it was revealed that local people in Nirmal Basti V.D.C. devoted their time and efforts to plant several tree and fodder species in the barren land (of course public land) and bank of torrential river of buffer zone area. This was done aiming to grow the plantation forest to meet the local needs of fodder for livestock, fuel wood for domestic energy demand and timber for construction purpose and furniture requirement of the buffer zone residents in the long run. However, there is not the single buffer zone community forest (natural forest) in the study ward (ward 6) of Nirmal Basti V.D.C. to meet the daily requirements for their livelihoods. The absence of buffer zone community forest led the local residents to enter into the Reserve area for natural resources that support their livelihood. Though it is illegal to enter into the protected areas without permit, and to harvest or collect any kind of natural resources, local people do so because of the absence of resources in the buffer zone region. Residents have the long history of residing in this place and resided in this region before the establishment of Reserve. Some were settled under government relocation programme, by clearing the forest. Therefore, I assume there must be the customary rights over the usage of park resources. Despite conflict with the Nepalese army (mandated to patrol the reserve to control illegal activities inside the reserve and if found, should handover such persons to the park authority) such as risk of confiscating harvesting tools and beating, arrests

and prosecution, they struggle to harvest resources such as fuel wood, fodder, leaf litter and take livestock inside the reserve for grazing and feeding water.

On the contrary, local residents in Amlekhgunj buffer zone region have BZCF which provided the opportunities for the collection of fuel wood, grasses, leaf litter and timber as well for private use. This helped the people not to depend on reserve resources for livelihoods. Residents in this region go for patrolling in rotational basis from every household in the forests to check if any illegal activities are going on and if the illegal loggers and wood cutters are chopping down any trees. They also make observations into the reserve boundary to make sure that there are not any illegal activities. Collection of fuel wood in this BZCF is allowed only twice a week, in Tuesday and Saturday. Therefore, local people who need more resources go to the national forest, east of the present BZCF, where there is no control due to inefficiency of forestry staff. One respondent replied that:

*“We go to patrol our BZCF to check if any illegal harvest of resources is done. Sometimes we have caught people harvesting fire wood illegally and handover to the committee of BZUG for appropriate action. But, if we need more resources then what we are allowed to collect in the BZCF, we go to the government forest as there is no body to control us. Nevertheless, we risk of encountering with forest guard who can confiscate our tools and punish us”.*

Forest fire was prevalent both inside the reserve and in BZCF. I observed forest fire in day and night time inside the reserve, even near the reserve headquarter (less than 500 meter) and in BZCF bordering the reserve. In both study area forest fire was rampant that showed not a single sign of control mechanism by the reserve staff. It was clearly visible that small living organisms and plants dying due to less resistant power to fire. Awareness programme on forest fire conducted by federation of community forestry users group, Bara district was already late to address this problem. It was encouraging finding that majority of the people are positive on biodiversity conservation. This study revealed that local people are willing to contribute for conservation cause. 93.1 % of the respondents are willing to contribute for conservation whereas only 1.72 % did not show any interest for conservation. 5.17 % were indifference for contribution for biodiversity conservation (figure 15). Score for willingness to contribute for conservation was  $4.37 \pm 0.67$  (Mean  $\pm$  SD) in 5 point Likert scale.

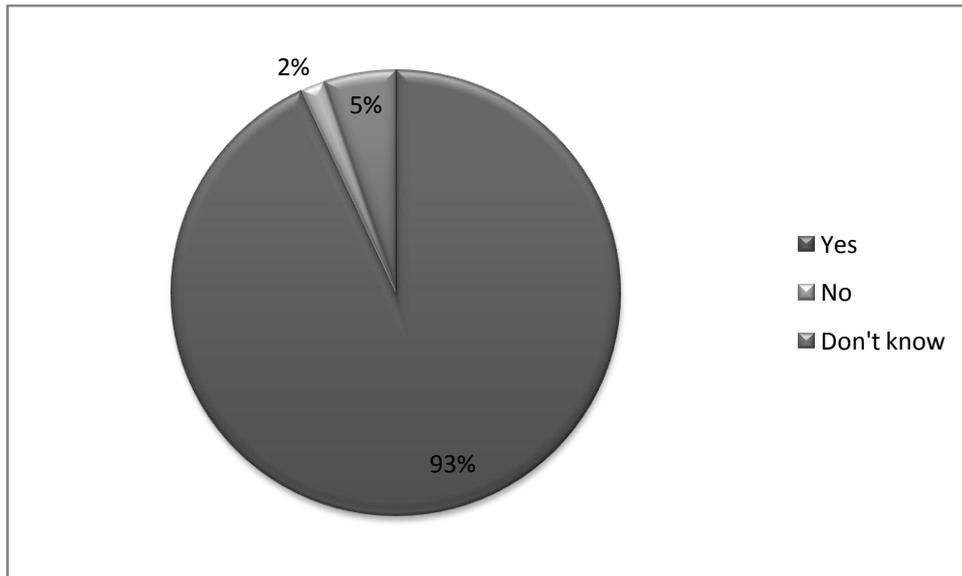


Figure 14: Willingness to contribute for biodiversity conservation

Source: Field survey, 2013

#### 7.1.5 Conflict issues and wildlife induced damage

Major conflict arised in PWR due to the restrictions in the use of reserve resources for the buffer zone people. Especially, in the study ward of Nirmal Basti VDC there is no presence of community forest or national forest for their daily requirements of fuel wood, fodder and grazing land for livestock. This has compelled villagers to enter inside the reserve for such resources, though it is illegal. When encountered with the Army, they pose risk of being fined, prosecution, confiscation of tools and harassmt. Even the beating from Army was experienced by male users, who enter the reserve illegally to harvest natural resources. Besides this, wildlife induced damage also create severe conflicts and led to substantial economic loss for the villagers. Though it was difficult to quantify which animal was most liable to damage the crops it was identified qualitatively. This happened because the damage varied between year to year and crop to crop and it is not the same for all time. However, major wildlife in the region liable to crop damage was found to be Wild Boar, Elephant, Cheetal, Blue Bull and Porcupine. Peacock and Monkey also visited the farm but they are less in compare to other problem animals.

Table 2: Problem animals damaging various crops

Animals liable to damage	Crop damage
Elephant ( <i>Elephas maximus</i> )	Maize, Rice, Wheat
Cheetal ( <i>Axis axis</i> )	Maize, Rice, Millet, Lentil, Mustard
Boar ( <i>Sus scrofa</i> )	Maize, Rice, Wheat, Mustard
Porcupine ( <i>Hystrix indica</i> )	Maize, Rice
Blue Bull ( <i>Boselaphus tragocamelus</i> )	Lentil, Mustard

Source: Field study, 2013

Most problematic animal, depending on the damage to various crops, was Cheetal as it feeds on almost every crop grown. Other animals mostly feed on Maize, Rice and Wheat but, the crop loss depended on the situation of the field and varied year to year.

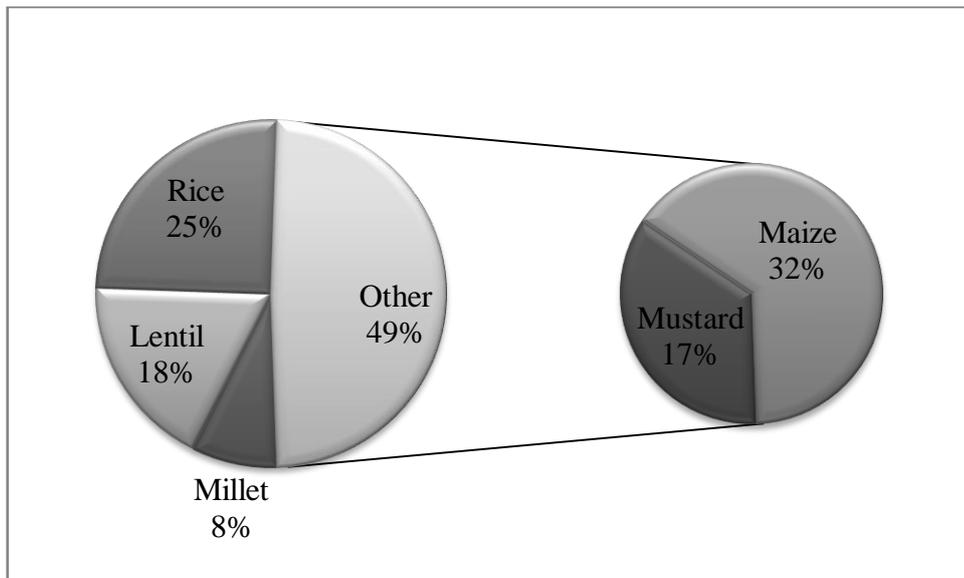


Figure 15: Percentage of loss for each crop due to wildlife

Source: Field study, 2013

In Nirmal Basti region, crop and livestock depredation was much more pronounced than in Amlekhgunj. The study found that the highest percentage of damage was in Maize (32%), followed by Rice (25%), Lentil (18%), Mustard (17%) and Millet (8%). Almost half of the crop losses incurred in Maize and Mustard whereas, damage to Rice accounted to a quarter of total loss.

In monetary term the greater loss was incurred in Maize. This amounted to NRs. 99,800. The second most damaged crop was Rice (NRs.78,500) followed by Lentil (NRs.57,000), Mustard (NRs.53,800) and Millet (NRs. 25,000). It was found that local people grew cash crop, Tobacco, in winter and spring. This crop are grown and sold to the Surya Tobacco Company in Bara district. Respondents do not have any problem with the wildlife when the field is full of Tobacco as this crop is not eaten/preferred by those problem animals.

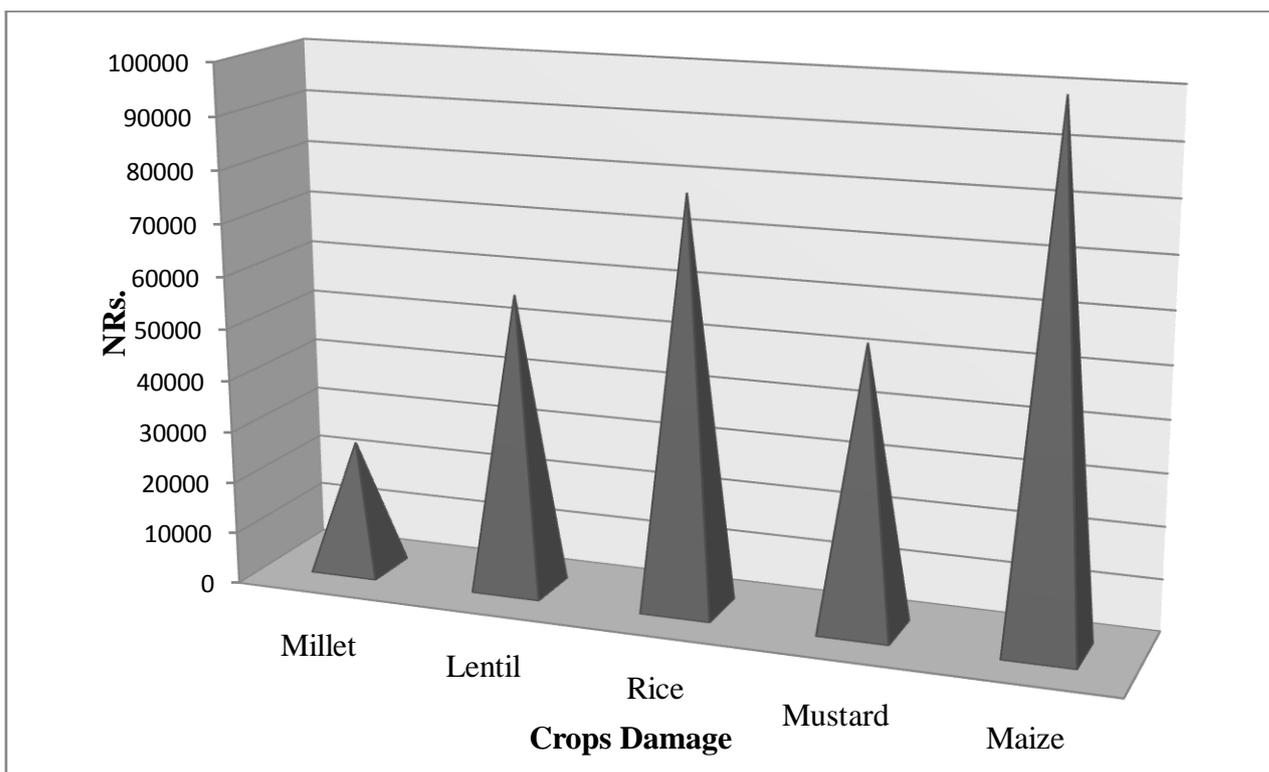


Figure 16: Loss of crop damage in monetary unit (NRs.)

Source: Field study, 2013

It was revealed from the field study that 39 individuals of livestock were predated by tiger and leopard in the last three years. Among them 32 goat (6.4 LSU), 6 cattle (4.8 LSU) and 1 calf (0.4 LSU) were killed. This is equivalent to 11.6 livestock unit. Besides this, it was identified from key informant's survey that elephant also caused damage to private property. One person from the village (Ward 6), bordering the reserve, in Nirmal Basti was killed by elephant recently whereas tiger has attacked an adult boy in the nearby village during my field study. 3 houses were demolished by elephant in the last one year and destroyed and ate the stored Rice and Maize in 2 houses.

Table 3: Property damage due to wildlife

<b>Incident</b>	<b>Loss</b>
House destruction by Elephant	NRs.20,000
House destruction and ate stored Rice by Elephant	NRs.26,000
House destruction and ate stored Maize by Elephant	NRs.16,000
Attacked by Elephant	Death
Attacked by Tiger	Seriously injured

Source: Field study, 2013

#### **7.1.5.1 Conflict Mitigation Mechanism**

There was varying approaches to mitigate the wildlife induced damage. It was found that local people adopted locally available techniques to mitigate the crop depredation problems whereas, there was not a single practice to mitigate livestock depredation. Major techniques implied was watch tower (*Toong*), sound producing, guarding the farm, tin hitting, and erection of scarecrow. This was similar to the practices adopted elsewhere (Bhatta, 1994; Thapa, 2010). Watch tower and scare crow was very common as it was clearly visible in every field bordering the reserve. Modern means of mitigation measures such as electric fencing, barbed wire fence, scaring devices, trench construction and net wires as practiced in Bardia National Park (Thapa, 2010) was not practiced in the study site. This revealed that local people do not have sufficient financial source to finance such activities on their own and there was very little conservation intervention from government and non-governmental organization in PWR in compare to other protected areas, for instance CNP or BNP. One respondent, in anonymity, replied that:

*‘I take gun with me while I go to the field to guard crops at night. I sleep in watch tower and when I see (wild) animals entering to my field and raiding crops, I dare to open fire (bullet). It depends upon situation if I open fire (bullet) in the space or target at crop raiding animals’.*

### 7.1.6 Resources Use Pattern

People from the buffer zone of PWR are dependent on reserve resources. Depending upon the socio-economic characteristics of the households in particular and the community characteristics in general, the resources use was determined. As stated earlier, local people in Amlekhgunj study site has less farmland and less livestock holdings in compare to study area of Nirmal Basti.

Local people used 7 types of resources from the buffer zone community forest and reserve. The resources used were Fodder, Fuel Wood, Thatch grass, Leaf litter, Edible plants, Timber and others (resources other than this listed above). Majority of the people used fuel wood (84.48%) as this was the only source of energy for domestic purpose; cooking and heating. Fodder was used by second highest number (36.2%) followed by leaf litter (27.58%), Timber and other resources (3.44% each), edible plants (1.72 %) and thatch grass (1.03%). Edible plants and/or medicinal plants were used by none of the respondents.

Table 4: Resources used by respondents

<b>Natural Resources</b>	<b>Respondents<sup>5</sup></b>	<b>Percentage<sup>6</sup></b>
<b>Fodder</b>	21	36.25%
<b>Fuel wood</b>	49	84.48%
<b>Thatch grass</b>	6	1.03%
<b>Leaf litter</b>	16	27.58%
<b>Medicinal herbs</b>	0	0%
<b>Edible plants</b>	1	1.72%
<b>Timber</b>	2	3.44%
<b>Others</b>	2	3.44%

Source: Field study, 2013

In Amlekhgunj buffer zone community forest, timber was sufficient for the members of user group as this was explored by researcher and later proved by president of the user group during key informant survey. Extra timber, which was not consumed by the villagers, was stacked and kept within the office boundary of user group that was in sale, subject to approval

<sup>5</sup> Number exceeds the total respondents as some people used more than one resource.

<sup>6</sup> The total respondent's percentage exceeds 100% as some respondents used more than one resource.

from the reserve office. On the contrary, local people in Nirmal Basti do not have access to timber as they do not have community forest in their locality. Harvesting of timber from the reserve is illegal therefore they do not have any option if they are required to get timber for construction purpose.

Local people are heavily relied on traditional mud stove which uses firewood from the local buffer zone community forest and reserve. 93.10% replied that they have traditional mud stove. Liquefied Petroleum Gas (LPG) was used by 43.10% whereas presence of biogas, improved cook stove and other form of eco-friendly stove was negligible. The percentage of respondents exceeded 100% because households have more than one form of cooking stove.

Reserve authorities permitted to collect thatch grass once a year inside the protected area, whereas in the BZCF permission for collection of firewood is granted frequently, twice a week. People complained that the thatch collection period had been reduced from 2 weeks in earlier days to less than a week at the moment. This has reduced the total thatch grass extraction from the reserve. However, grassland coverage is less than 20 sq km (4% of the reserve area) in PWR in comparison to the Chitwan National Park (185 sq km), Bardia National Park (190 sq km), Shukla Phanta Wildlife Reserve (76 sq km) and Koshi Tappu Wildlife Reserve (60 sq km) (Baral, 1999).

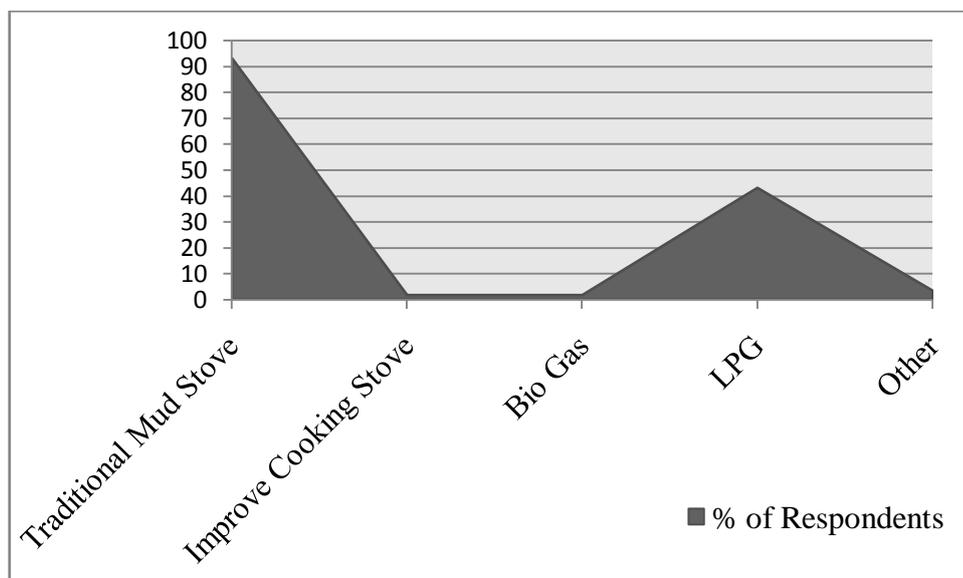


Figure 17: Types of cooking stove used by respondents

Source: Field study, 2013

It was impossible during my field study to measure (quantify) the use of firewood and fodder by local residents in the buffer zone region. Therefore resource use, mainly firewood and fodder, was projected by implying benefit transfer method (IUCN/The Nature Conservancy/The World Bank, 2004). Thapa (2010) reported that fuel wood consumption in Subarnapur buffer zone VDC of PWR was 4622.8 kg/hh/year. This amount equals to 757.83 kg/capita/year. Another study in Handi Khola VDC buffer zone of PWR found that fuel wood consumption was 253.71 kg/hh/year (Upreti, 2011). Average fuel wood consumption in Terai region for cooking, heating and lighting purpose was reported to be 322 kg/capita/year (Regmi, 2000).

Considering previous studies from the buffer zone of PWR and Terai region as a whole, it can be projected that average fuel wood use by the local residents in PWR is 444.51 kg/capita/year or 2969.32 kg/hh/year (2.96 ton/hh/year). In the worst case scenario the fire wood consumption is 5.06 ton/hh/year. In the optimistic scenario the consumption is 1.69 ton/hh/year.

## **7.2 Discussion**

### **7.2.1 Conservation Attitudes**

An attitude among the local people towards buffer zone and reserve was not encouraging. Only 39% of the respondents (N= 58), showed favorable attitudes towards various conservation statement that was aimed to assess their attitude towards buffer zone and reserve. 61 % of the respondents had no opinion or held negative attitudes towards the protected area. This was similar finding to the study carried out by Heinen (1993), who reported that 65% of the surveyed people in Koshi Tappu Wildlife Reserve had negative attitudes. However, respondents in PWR showed more favorable attitude than the respondents in Bardia National Park, where only 20% respondents held favorable attitude. Mountain protected area of Annapurna Conservation Area and Makalu Barun Conservation Area had exceptionally favorable attitude towards conservation (Mehta and Heinen, 2001). Mehta and Heinen (2001) found that 87% of the local people in ACA and 83% in MBCA had positive attitude. This was very high in comparison to the traditional reserves and parks in Nepal. This can be attributed to strong participation of local people in management and benefit sharing of resources. In some cases, people can neither be completely in favor of or in opposition to the protected area (Allendorf *et al.*, 2007), rather it depends on how much benefits they took or costs borne by the local people.

Individual mean attitudinal score on various conservation attitudes towards BZ and PWR ranged from 2.77 to 3.43 on a 5 point Likert scale. The main motive behind the liking of reserve was due to the opportunity to extract natural resources. Though the buffer zone programme was initiated with the aim of bringing peoples' participation in protected area management and conservation (HMG/DNPWC, 1996), it has not been able to deliver so in PWR as shown by this research. 49.70% of the respondents in buffer zone of Makwanpur district, PWR did not have any idea about the buffer zone activities (Bhandari, 2011). This proved the absence of participation and communication in buffer zone management and reserve conservation.

### **7.2.2 Factors Affecting Attitudes Towards Parsa Wildlife Reserve and Buffer Zone**

Number of factors affects attitude towards protected area. Level of satisfaction with user groups, participation in training and harassment from wildlife were predictors of conservation attitude in Western Terai Landscape protected areas of BNP and SWR (Baral and Heinen, 2007). Gender (Men), ethnicity, participation in trainings, poor people tend to have positive attitude in ACA and education level, benefit from tourism, ethnicity and no killing of wild pest animals led to positive attitude in MBCA (Mehta and Heinen, 2001).

From the informal discussion with user group members in Nirmal Basti, it was revealed that they like the reserve because they were able to extract the resources from the reserve, though it was illegal. They try their best to avoid encounter with the Army and Reserve staff because it is problematic when reserve personnel stop and question on resource extraction issues. It was revealed that a kind of informal agreement has been started in Nirmal Basti region with local people that they can enter the reserve assuming they won't destroy the healthy trees and enter without possession of big harvesting tools. This is done because of the lack of alternative resources in the buffer zone surroundings and also to pay back for the crop and livestock depredation from reserve animals. Big utensils are not allowed to take in-person while entering the reserve fearing that villagers could chop down the healthy woods. However, small tools to cut the leaf and twigs are possible to carry with. This informal and unwritten agreement between local people of Nirmal Basti and Reserve staff to use the resources is well accepted by the villagers. Reserve staff also admitted that this has helped to reduce park people conflict to some extent. Due to the absence of local resources such as fuel wood, fodder, grazing lawn in the buffer zone, people are dependent on reserve.

26% are neutral about liking or disliking the reserve. Role of reserve in biodiversity conservation and possibility for natural resources use was the main motive behind the liking of reserve. Presence of military in several outposts (for conservation purpose) all over the reserve also provides sense of security to the locals bringing positive attitude among them. Restrictions in resource use from the reserve freely and crop and livestock depredation due to reserve wildlife brought negative sentiments among the villagers. According to the NPWC act (1973), not a single resource can be extracted and harvested from the reserve without the prior approval from authority and this is still governed to be fortress and fine approach to conservation.

### **7.2.3 Conservation activities**

Still most of the traditional protected areas in Nepal practice Yellowstone model of conservation where the entry into the reserves and park boundary without permission is prohibited. Similarly extraction of natural resources from the protected areas is strictly prohibited besides granting permission to collect thatch grass once a year for 2 weeks period at the modest fee. However, after the passing of conservation area management regulation (1991) and buffer zone management regulation (1996), the old system of 'stick and fence' approach to biodiversity conservation has been discouraged and Nepal entered into the new era of protected area management.

The provision of channeling fund for the development projects along with environment conservation activities has led people to be more active on conservation. During UNDP funded Park People Programme several conservation activities were carried out but now local people seems to be passive in conservation sector. Forest fire was rampant within the reserve and BZCF during my field visit and it seemed that there was less focus or awareness to control it.

Despite negative attitude towards the reserve, majority of the people are positive on biodiversity conservation and they were willing from their side for conservation cause. Overwhelmingly, 93.1% of the respondents were willing to contribute for conservation whereas only 1.72 % did not show any interest for conservation and 5.17% were indifference for contribution for biodiversity conservation.

#### 7.2.4 Conflict Issues

Wildlife induced damage, restrictions in using protected area resources and restrictions in land use have been the major issue in park people relationship (Shrestha, 1996; De Boer and Baquete, 1998; Mehta and Kellert, 1998; Regmi, 2000; Gupta, 2005; Allendorf *et al.*, 2007; Karn, 2008; Dorji, 2009). Major conflicts arised in PWR due to restriction in the use of reserve resources for the buffer zone people. Wildlife induced damage also created severe conflicts and led to substantial economic loss for the villagers. Access to natural resources was easy before the creation of PWR but now the law prohibits the resource use. This was experienced same in the protected areas of Bhutan too. Local people in Jigme Dorji National Park (Bhutan) expressed that access to the park resources like timber, fuel wood and fodder was better before the establishment of the park. Implementation of forest act (1995) and rules (2006) has imposed ban on them to use the resources freely (Dorji, 2009), threatening the biodiversity in long run. However, majority of the people (87%) were positive about the establishment of the park.

Major wildlife in the study region liable to crop damage was found to be Wild Boar (*Sus scrofa*), Elephant (*Elephas maximus*), Cheetal (*Axis axis*), Blue Bull (*Boselaphus tragocamelus*) and Porcupine. This was similar to problem animals (cheetal and wild boar) in Bardia National Park (Bhatta, 1994) and Chitwan National Park where, Rhinoceros (*Rhinoceros unicornis*), Bear (*Melursus ursinus*) and Parakeet (*Psittacula kramiri*) were additional problem animals in CNP. While Cheetal (*Axis axis*) was the most destructive animal in PWR; Rhino (*Rhinoceros unicornis*) was the most destructive animal (71% damage) followed by Deer (*Axis axis*) (18% damage) and Boar (*Sus scrofa*) (8 % damage) in CNP (Shrestha, 1996).

Almost half of the crop income lost incurred in Maize and Mustard. Rice accounted to quarter of total loss in PWR. The greater loss was incurred in Maize. Several livestock was also killed by tiger and leopard totaling to 11.6 livestock unit but no compensation was offered. In CNP too, highest economic loss was in Maize (60%), Rice (32%) and Mustard (8%) (Shrestha, 1996). Another study in Thori buffer zone of CNP showed that crop depredation by Elephant was Rice (50%) followed by Wheat (25%). Deer destroyed Wheat (47.1%) followed by Maize (30.9%) and wild Pig damaged vegetables (52.9%), Maize (13.2%) and Wheat (10.3%) (Air, 2010) Paddy/Rice ( $3.25 \pm 3.01$  quintal) and Wheat ( $1.16 \pm 1.05$  quintal) was the most damaged crops in Shukla Phanta Wildlife Reserve buffer zone which was depredated by Wild

Boar (58.3%) and Elephant (12.9%) (Badu, 2012). In Thakurdwara VDC of BNP, paddy was highly affected (29%) followed by lentils (23%) and vegetables (17%). This was quite different than in Shivapur VDC where the loss was highest in vegetables (31%) followed by paddy (20%) and wheat (18%) (Thapa, 2010). This implies that intensity of crop losses varies from place to place and site specific appropriate measures should be adopted to reduce or mitigate the loss.

It has been documented that several approaches to mitigate crop depredation from wildlife has been carried out worldwide such as control shooting (Perez and Pacheco, 2006); electric fencing (Sukumar, 1991); crop (farm) guarding by mass of people (Cai *et al.*, 2008). Use of watch tower to guard the crop with group shouting had been effective to mitigate damage from all depredators in Bardia and Chitwan National Park (Nepal and Weber, 1995; Thapa, 2010), combinations of different means to guard the crops was effective in Bardia and India (Strudsrod and Wegge, 1995; Sekhar, 1998). Implementation of such measures depends on the particular situation only which do not violates the national legislation and socio-economic characteristics of a particular protected area.

There were very few cases of people who complained for the crop and livestock depredation. Government of Nepal has formulated wildlife damage compensation policy (2009) which is targeted to reduce the park people conflicts by providing compensation for the damage occurred due to wildlife. This policy did not seem to work as expected. People who went to claim for compensation often came back home with empty hands. Sometimes, villagers had to spend more money then what they are expected to get from compensation. Thus, they do not trust for the compensation scheme and almost the entire incident goes unreported. The wildlife damage compensation (relief) policy states that maximum of NRs. 5,000 is available for human injuries, NRs. 50,000 for serious injuries and NRs. 1.50,000 for human death. Further, the compensation of maximum NRs. 10,000 is provided for livestock death, compensation upto NRs. 4,000 is available for house damage and upto NRs. 5,000 is available for the destruction of stored food items (GoN/MoFSC, 2009). The family member who was died due to attack of elephant got NRs. 1,50,000 and were unhappy with the compensation amount. Another respondent replied that he went to the reserve headquarter three times for claiming compensation for house damage by elephant but the hurdles to get the money did not complete. Therefore, he gave up the compensation procedures as the one time travel to the PWR headquarter requires more than NRs. 500 and the whole day of time.

64 % of the local people replied that the compensation received from the reserve was not sufficient, not systematized and never get it. Study in CNP showed that local people (73.3%) were not satisfied with the present compensation amount and 65.7% replied that compensation amount for the tiger victims must be in between NRs. 3,00,000 to NRs. 10,00,000 (Das, 2012). 29.37% respondents replied that the compensation amount should also be released immediately (Das, 2012).

### **7.2.5 Resource Use Pattern**

7 types of resources were used by local people from the buffer zone community forest and reserve. This was similar to the resources used by residents in BNP and SWR. 84% of the respondent used fuel wood as this was the only source of energy in the study area. Resource use pattern varied quite differently between PWR and other two PAs in Western Terai Landscape region. In PWR, 84% of household used fire wood in compare to 68% in BNP and 58% in SWR. Fodder was used by 36% in PWR and this was 20% in BNP and much lower in SWR (2%). Likewise, leaf litter was collected by 28% in PWR which was lower than BNP (62%) and SWR (34%). None of the respondents used timber in SWR and this was very low in PWR (3%) in compared to BNP, where 41% of local people used from BZCF. Thatch grass was collected by more households in BNP (93%) and SWR (78%) than in PWR (1%). Edibles and herbs were collected by 57% households in BNP and 11% in SWR which is higher than in PWR (5%), which includes edible plants and other resources.

Firewood, fodder for livestock and leaf litter were the most important resources for local people in the study area. Lack of alternative resources in the BZ region in Nirmal Basti region has led more people to depend on reserve resources directly. This has created resource use conflicts between authority and local people; local people are entering the reserve for resources and reserve staff imposing ban on harvesting of such resources. Forestry resources are mainly used for providing a safety net to maintain the current level of income and not to come out of poverty (Vedeld *et. al.*, 2004). Research in Kosovo indicated that there was negative relationship between household income and collection of forest products, showing low income household using higher number of forest products (Jupolli, 2010).

## **Chapter VIII**

### **CONCLUSION AND RECOMMENDATION**

#### **8.1 Conclusion**

This research has highlighted about the relationship between Parsa Wildlife Reserve and local people living in the buffer zone. Overall, the attitude of local people towards the reserve and buffer zone was found to be negative. The lack of natural resources in the buffer zone of Nirmal Basti VDC led local people to depend on reserve resources directly even though the NPWC act (1973) prohibits doing so. The absence of conservation intervention programme and low community development activities in and around the buffer zone of reserve was the main thing that brought negative attitude towards buffer zone. Similarly, wildlife induced damage to the local people in the form of crop and livestock depredation and property damage brought park people conflicts. The damage to the crop could vary by year to year and from animal to animal but no modern means of mitigation measures were adopted. The compensation mechanism that was aimed to reduce park people conflicts in protected areas did not seem to work in the study site. Low amount of compensation in compare to damage and the long bureaucratic hurdles to get refund was the main reason why affected people do not claim for the compensation. Further, majority of the respondents did not know that compensation mechanism exists in protected areas or in Nepal and the process to claim for it. Firewood and fodder was the main natural resources used by local residents either from buffer zone community forest or from reserve. Conservation activities also seemed to be weak as the reserve and buffer zone forest was caught in fire almost every day during my stay in the field. Though the conservation activities were active during the UNDP funded project, it is almost dead at the moment. Parsa Conservation Programme of NTNC is in progress near reserve headquarter but it has no significant impact on conservation. Whatever is the current situation about the conservation in reserve and buffer zone, local people are very much willing to participate in biodiversity conservation. This study showed very optimistic scenario for local peoples' participation in conservation of PWR and buffer zone in the future. Appropriate programme, plan and policies should be developed and design to integrate local residents in reserve management for the long term sustainability of PWR. Participation and communication must be the integral part of any project.

## 8.2 Recommendation

For the long term survival of PWR and to win peoples' steward for conservation, this study came up with several recommendation at the local level, reserve level and policy level.

- ✓ Executive members of buffer zone user group and buffer zone user committee should be responsible towards buffer zone users. Information about the activities of buffer zone programme must be communicated to them effectively.
- ✓ Buffer zone development fund disbursed from buffer zone management council did not reach to every community, therefore every community must be treated equally and highly affected zone must receive more priority than others.
- ✓ As proved from elsewhere, community based conservation approach and participation of local people in decision making process in reserve and buffer zone management is likely to improve residents' attitudes towards protected area and thus improves park people relationship. Therefore, strong focus must be give on this.
- ✓ While promoting community development projects in the buffer zone, the project should be launch on demand driven basis but not supply driven. This helps to address the most demanded problem or help to address prioritized project by local people.
- ✓ Alternative resources should be promoted in the buffer zone so that people will be less dependent on reserve. Promotion of alternative energy and improved cook stove helps to reduce consumption of fuel wood and promotion of fodder trees and grasses, especially agro-forestry practices helps to address resource deficiency for the buffer zone community.
- ✓ Conservation activities should be carried out together with buffer zone people and especially fire control measures should be adopted well in advance before the spring season.
- ✓ Regular interaction between the reserve staff, army personnel and buffer zone people should be initiated. Extension and communication programme must be the regular part of reserve management.
- ✓ Wildlife damage compensation policy must be revised timely to address the level of damage and to compensate accordingly. Farmers must get the amount what they loose from wildlife. The indirect cost of managing reserve should not be borne by the villagers.
- ✓ Further study should be carried out to design the site specific appropriate strategy to reduce park people conflicts, mitigate crop and livestock depredation, and to improve local livelihoods so that park people relationship will be better.

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## Annex 1: Protected Areas of Nepal (including Buffer Zone)

Protected Area <sup>7</sup>	Year of estd.	Area (sq.km.)	Buffer Zone	
			Declared year	Area (Sq.km.)
Chitwan NP	1973	932	1996	750
Bardia NP	1976	968	1996	507
			2010	180
Khaptad NP	1984	225	2006	216
Rara NP	1976	106	2006	198
Shey phoksundo NP	1984	3555	1998	1349
Langtang NP	1976	1710	1998	420
Makalu Barun NP	1991	1500	1999	830
Sagarmatha NP	1976	1148	2002	275
Sivapuri Nagarjun NP	2002	159	---	---
Banke National park	2010	550	2010	343
Suklaphanta WR	1976	305	2004	243.5
Parsa WR	1984	499	2005	298.17
Koshi Tappu WR	1976	175	2004	173
Dhorpatan HR	1987	1325		
Annapurna CA	1992	7629		
MAnasalu CA	1998	1663		
Kanchenjunga CA	1997	2035		
Krishnasar CA	2009	16.95		
Api Nampa CA	2010	1903		
Gaurisankar CA	2010	2179		
<b>Total Area</b>		<b>28582.95</b>		<b>5782.67</b>

<sup>7</sup> NP- National Park, WR- Wildlife Reserve. HR- Hunting Reserve, CA- Conservation Area

## Annex 2: Household Questionnaire Survey Form

Name of interviewer: ..... Date survey: .....

Household identification number: ..... Village name: .....

### Respondent's Demographic Data:

1. Gender: ----- Male ----- Female
2. Age: ----- 3. Ethnicity (Caste): -----
4. Education: ----- 5. Occupation: -----

### Nr of Household Members:

### Migration:

6. Have you migrated to this place from elsewhere? Yes: ----- No: -----

7. From where have you migrated to this place?

A district in mountain ----- A district in the Terai ----- (please name district)

Other villages of the same district ----- Others -----

8. When did you migrate here? ----- years ago.

9. What was the reason to migrate here?

Landlessness ----- Insufficient land -----

Unemployment ----- Under Government's relocation scheme -----

Others -----

### Landholding Size and Tenure Status:

10. Do you have land for farming? Yes/size ----- No -----

11. What is the ownership of land?

Own registered land (Khet/Bari) ----- Pubic land without title -----

Lease land or Adhia cultivation ----- Others -----

12. Do you get enough agricultural products to support your family for whole year?

Yes ----- No -----

13. If no, how many months you can fulfill from your agricultural products?

-----Months.

14. What are alternate sources of income to fulfill your requirements?

Government employment ----- Pension -----

Business ----- Paid labor (daily/monthly) -----

Remittances ----- Others (Specify) -----

**Livestock Holding:**

15. Do you own any livestock? Yes ----- No -----

16. What kind of livestock and how many of them do you have?

Sn.	Livestock	Number	Local breed	Improved breed
1	Cattle			
2	Buffalo			
3	Calves			
4	Goat/Sheep			
5	Chicken/Ducks			
6	Pigs			
7	Others (pls specify)			

**Resource Uses:**

17. What kind of materials do you collect from the Reserve/ Buffer Zone (community) forest/National Forest? If you collect any resources, please give an estimate harvest per unit of time.

Sn.	Types of Resources	Quantity & Frequency (NRs. equvt.)	From where ...
1	Fodder		
2	Fuel wood		
3	Thatch grass		
4	Leaf litter		
5	Medicinal herbs		
6	Edible plants		
7	Timber		
8	Others (pls specify)		

18. Do you ever face restrictions in accessing these resources? By whom and for what?

19. From where you bring fodder for your livestock?

Own farms ----- Buffer zone, protected or national forest -----

20. Where do you take your livestock for grazing?

National Forests ----- Private farms -----

Stall-fed ----- Public grazing lawns ----- inside Reserve -----

21. What kind of cooking stove do you use in your house?

Traditional mud stove ----- Improved Cook Stove (ICS) -----

Kerosene stove ----- Bio-gas ----- LPG -----

22. From where do you get fuel wood?

Private farm/trees----- BZ (community) forests ----- National forests -----

Reserve -----From market ----- Others (specify) -----

23. Do you have sufficient fuel wood to meet your demand? Yes ----- No -----

24. If no, how much quantity you are lacking to meet your demand?

-----

25. Any sales or purchases of forest products in last 12 months?

Forest product sold	Amount sold	Sale price/unit	Where sold?
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Forest product bought	Amount bought	Buying price/unit	Where bought?
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**Conservation Attitudes:**

26. People who live in this area may have different opinions about the reserve. Could you please tell me your attitude to the following statement:

Sn.	Statements	SA(5)	A	N	D	SD(1)
1	Buffer Zone area was created for the betterment of our locality					
2	Buffer Zone programme has helped us to support our livelihoods and community development					
3	I am happy to be included in the Buffer Zone area					
4	I like the presence of Reserve nearby my village					
5	People and their livestock/crops are more important than saving forests and wildlife.					
6	My living condition improved after the creation of Reserve					
7	Wildlife damage compensation received from reserve/government is sufficient					

8	It is important to set aside a place for the animals and plants to live in.					
9	I am satisfied with the functioning of BZUG/BZUC					
10	There is an equitable distribution of common pool resources and benefits.					
11	You are willing to contribute for bio-diversity conservation.					

27. What are the conservation activities adopted by you/your community?

28. Do you like or dislike the reserve? Give reason.

### Participation and Benefits:

29. Are you or any of your family members elected in any grassroots organizations?

Youth clubs, mothers/fathers group etc.

No ----- Yes ----- (Mention the Name -----)

30. Have you or your family members ever received any kind of trainings?

No ----- Yes ----- (Which? -----)

31. Are you benefited from any conservation organizations? (Benefits include free seedlings, vaccination, biogas/toilet construction support etc.)

No ----- Yes ----- (Mention the items -----)

32. Are you a member of saving-credit group?

No ----- Yes -----

33. Are you engaged in income generating activities promoted by NGOs?

No ----- Yes ----- (If yes how much do you earn per month? ----- NRs.)

### Conflict Patterns

34. Do you suffer from any wildlife damage? Yes ----- No -----

35. Which animal most frequently damage your crops?

Crop Types	Wildlife liable to damage	Loss in NRs.	Months


36. How do you mitigate the crop damage? Please list.

37. Do you suffer from livestock depredation due to predators?

<b>Livestock loss</b>	<b>Wildlife liable to damage</b>	<b>Loss in NRs.</b>	<b>Months</b>

38. How do you mitigate the livestock loss against predators? Please list.

39. Do you experience any other property damage?

<b>Property Types</b>	<b>Wildlife liable to damage</b>	<b>Loss in NRs.</b>	<b>Month</b>

40. Have you ever killed wildlife? If yes please list them.

**41. Do you have any suggestions/comments for conservation and development?**

### **Annex 3: Guiding Questions for Key Informant Survey**

What is the compensation mechanism in your buffer zone area?

What is the mechanism of receiving fund from PWR for buffer zone development?

What are the activities conducted by UG/UC?

How often you present in the meeting with PWR administration?

How often you participate in conservation activities?

#### Annex 4: Photo Plates



Picture 1: Watch Tower (Toong) in the field, bordering reserve



Picture 2: Key informants survey



Picture 3: Firewood from reserve and buffer zone area



Picture 4: Scare crow to protect crops from pest animals



Picture 5: Livestock inside the reserve



Picture 6: Buffer zone user committee office building



Picture 7: Encroachment! Tree stump in the field and PWR in the background.



Picture 8: Stakeholder discussion on diverse issues of forest fire control and forest management.



Picture 9: Damaged tree by local residents.



Picture 10: Firewood from PWR and stored for future use.



Picture 11: Firewood harvested from the PWR.



Picture 12: Field prepared for cultivation and Watch Tower to guard crops against wildlife, with PWR in the background.



Picture 13: Turning into ash. Forest fire has damaged vegetation and turned it into ash.



Picture 14: Wood burned due to forest fire. This incident took place less than 100 metres from military guard post in Nirmal Basti VDC, PWR.



Picture 15: PWR caught in fire. Green trees are burned due to forest fire.



Picture 16: Watch Tower in the border between PWR and agricultural field.