A Report on

Community-based Biodiversity Conservation and Rural Livelihood Improvement in the Buffer Zone of Royal Bardia National Park

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REPORT SUBMITTED TO

The Rufford Maurice Laing Foundation

Rufford Small Grant for Nature conservation (RSG)

The Rufford Small Grants for Nature Conservation
www.rufford.org/rsg

COLLABORATIVE INSTITUTE

Tribhuvan University

Institute of forestry, Pokhara, Nepal

December, 2006

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Recommended Citation: **Gaire, Damodar. 2006**. *An Assessment of community-based biodiversity conservation and rural livelihood improvements in the buffer zone of Bardia National Park*. A report submitted to The Rufford Maurice Laing Foundation, Rufford Small Grant for Nature Conservation (RSG), UK

Cover photo: Different activities conducted by local communities within buffer zone of Bardia National Park.

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ABSTRACT

Nepal has shown high commitment in biodiversity conservation with the promulgation of innovative conservation policies and laws. It has occupied over 19.42% of its total area under the protected area (PA) system that safeguards a rich varity of ecosystems and species. Bardia National Park (968 km²) is one of the well reputed parks for its unique biodiversity. The 327 km² area around the periphery of RBNP that extend in 17 VDCs of Banke, Bardia, and Surkhet districts has been declared as Buffer Zone. Community-based biodiversity conservations are bottom-up activities that bring individuals and organizations together to work towards achieving desired environmental goals. This study entitled "**An Assessment of Community-Based Biodiversity Conservation and Rural Livelihood Improvement in the Buffer Zone of Bardia National Park, Nepal "** was carried out in five Buffer Zone Community Forests (BZCFs) of Bardia and Banke districts. The main thrust of the study was to assess the impacts of buffer zone Program in the socio-economic indicators of the local communities (women, poor and disadvantaged groups (DAGs) and biophysical indicators of the buffer zone forest. Various tools of PRA including semi-structured questionnaire, focus group discussions were applied to collect the data. Simple qualitative method was used for data analysis.

Five BZCFs were selected in such a way that three from Bardia district and two from Banke district due to the criteria fixed by the park staffs, local people and several line agencies (NGOs/CBOs). Almost all the users have the positive responses toward the BZCF Program. Skill, attitude and behaviour of the users have positively improved after the formation of BZCF. Out of the five BZCFs, Rammapur BZCF was found more decision power, effective fund rising mechanism and poverty focus programs rather than four. Index of Relative Ranking (IRR), Index of Perceived Analysis (IPA) and x2-test were used to check the people perception toward BZCF. Index of Relative Ranking (IRR) was received the maximum value 0.9 on biodiversity conservation activities. It is the indication of increasing awareness level on biodiversity conservation due to different trainings and seminars conducted by NP office, CARE/Nepal, WWF/Nepal, etc. Although poor have the lower extension or approach in livelihood capitals than better off, their livelihood have been progressively increasing after the BZCF so natural capitals have gradually increased and more effectively implemented among five livelihood capitals in the present situation.

Programs focusing on poor, women and disadvantaged groups (DAGs) should be launched effectively and efficiency way in the near future. Free distribution of benefits among the poorest, encouraging the income generating activities and fair and equitable benefit sharing should be implemented for the better mechanism of reducing the poorest of the poor people in an area. Collectively, conductive policy, Poor's better access to resources and reduced vulnerability is positive indication of effectiveness of the BZ Program for biodiversity conservation and livelihood improvement. It was found that the CFUG in the area was very much active and was doing appreciative pieces of initiatives to motivate and mobilize local community towards conservation and management of their natural resources together with the wildlife conservation inside the park. Therefore, the management system of BZCF should be further boosted by providing economic, institutional and moral supports by the park and donor agencies so as to develop the well institutionalized local stewardship in conservation.

Key words: Biodiversity conservation, BZCF, disadvantaged groups, user committee

Acknowledgement

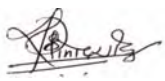
I am grateful to the Department of National Park and Wildlife Conservation (DNPWC) for providing permits for this project. My heartfelt acknowledgement goes to **The Rufford Maurice Laing Foundation, Rufford Small Grant for Nature Conservation (RSG), UK** for providing me financial support for the project work.

I thank Josh Cole (Rufford Small Grant Manager, UK) and Jane Raymond for their enduring patience with and support for this project. My especial thank goes to my referees: Ram Prasad Sharma (Ph.D. Fellow, University of Life Science, Norway), Raj Kumar Koirala (Head of Department, Department of Park Creation and Wildlife Management, Institute of Forestry, Pokhara, Nepal) and Rishi Ram Kattal (Program officer, CARITAS/Nepal, Pokhara Branch) for their constructive comments and feedbacks at the beginning of the study. I must acknowledge the support of the Institute of Forestry, Pokhara, who generously provide me the space for office work, library facility and volunteer contribution to the project.

I am grateful to the following officials of Institute of Forestry, Pokhara, who have provided assistance directly and/or indirectly to the project since its inception: Dr. A.K Das (Professor), Shree Prasad Dhoubhadel (Associate professor) and Dr. Bimal Keshari Paudyal (Head of Department of Forest Management and Social Forestry).

I wish to express my heartfelt thanks and colleagues Mr. Rabin Kadariya, Mr.Gandhiv Kafle, Mr. Rajesh Rajchal, Mr. Basanta Pant, Mr. Rajesh Malla, Mr. Keshav Acharya, Mr. Nagendra Regmi, Mr. Gopal Ghimire and Mr. Bijaya Neupane who have offered me encouragement and valuable supports/interaction.

Last but never least, the heartily encouragement from family members is the backbone to continue every endeavors for ever. I am very much grateful to them.



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Acronyms

ADB	Agriculture Development Bank
BCF	Biodiversity Conservation Fund
BNP	Bardia National Park
BPP	Biodiversity Profile Project
BZ	Buffer Zone
BZUG	Buffer Zone User Group
CARE	Co-operation for Assistance and Relief Everywhere
CBOs	Community Based Organizations
CFUG	Community Forest Users Group
DAGs	Disadvantaged Groups
DDC	District Development Committee
DNPWC	Department of National Parks and Wildlife Conservation
HH	Household
HMG/N	His Majesty's Government of Nepal
KMTNC	King Mahendra Trust for Nature Conservation
MP	Management Plan
MPFS	Master Plan for Forestry Sector
NBS	Nepal Biodiversity Strategy
NP	National Park
NRCA	Natural Resources Conservation Assistant
PA	Protected Area
PCP	Participatory Conservation Project
PRA	Participatory Rapid Appraisal
RBZCF	Rammapur Buffer zone Community Forest
SAPAP	South Asia Poverty Alleviation Programme
T.U.	Tribhuvan University
TAL	Terai Arc Landscape
UNDP	United Nation Development Project
VDC	Village Development Committee
WWF	World Wildlife Fund

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Glossary

Biological diversity or biodiversity: is the total variety of life on Earth. It encompasses the total number, variety, and variability of life forms, levels, and combinations existing within the living world. As such, biodiversity means the richness and variety of living beings from all sources including, *inter alia*, terrestrial, marine and freshwater ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. Ecosystem diversity comprises the variety of habitats, the dynamic complexes of plant, animal and micro-organism communities and their non-living environment, which interact as a functional unit, and their change over time. Ecologists have identified 118 ecosystems in Nepal representing distinct biological communities with their associated flora and fauna.

Brahmin: Members of the highest Hindu priestly caste, of Aryan origin

Buffer zone: Buffer zone has been defined as the area adjacent to the protected area on which land use is particularly restricted to give an added layer of protection to the protected area while providing value benefits to neighboring rural committees (Mac Kinnon et, al in well and Brandon, 1993).

BZMC: A park/ buffer zone level committee comprising of chairpersons of UCs representatives of DDCs and Chief Warden.

Eco-tourism: Traveling to and visiting relatively undisturbed or uncontaminated nature areas with the specific purpose of studying, admiring and enjoying the scenery, its flora and fauna, as well as existing cultural manifestations found in these areas (Thorsell, 1990 in Nepal and Weber, 1993).

Fauna: It is a collective term to denote all types of animals.

Flora: It is a collective term to denote all types of vegetation.

Habitat: Habitat means the place or type of site where an organism or population naturally occurs.

Household: A group of individuals related to each other by blood, marriage, or cooperation, living in one and the same residential unit, sharing a kitchen and same property.

Indigenous: Having originated in and being produced, growing or living naturally in a particular region or native environment.

Livelihood: Livelihood as a combination of the resources and the activities undertaken in order to live. According to Ellis (2000) “A livelihood comprises the assists, the activities and the access to these (mediated by institutions, social relations and organizations) that

together determine the living gained by the individual or households “

Livelihood strategies; the term used to denote the range and combination of activities and choice that people make in order to achieve their livelihood goals. The strategies are diverse at every level. For example, members of a HH may live and work different places, engaging in various activities, either temporary or permanently top be pursuing a variety of goals.
Local people: Individuals living within the same political boundary of the study sites.

Protected Area: Protected area means a geographically defined area that is regulated and managed to achieve specific conservation objectives.

Species Diversity: It refers to the frequency and variety of species (wild or domesticated) within a geographical area. The total number of species in the world has been estimated to range from 5 to 30 million, out of which approximately 1.7 million have been described (WCMC 1992). There are different ways to describe species diversity. One often used to measure species diversity is species richness, which gives the total number of species within a particular sample area or geographical area. Species evenness, also known as taxonomic diversity, is expressed as the relationship of the number of species in different taxa, and indicates the relative abundance of taxa. For example, an island with two bird species and one lizard species has greater taxonomic diversity than an island with three bird species but no lizards (Raven 1992). Species dominance refers to the most abundant species (Botkin & Keller 1995).

Tharu: Member of tribal ethnic group originally of Terai region, typically engaged in subsistence agricultural system having large number of traditional cattle grazing, fishing and the previous bonded labor.

User committee (UC): A representative organization formed from the representative of UGs under specific unit or area designed by the warden. According to the BZ regulation the formation of UC is initiated by the warden.

User Groups (UG): A community based organization formed by the male and female adult members of the households living within the BZ under the provision of various Pas rules and regulations. It is mandatory for UGs to set up saving system.

VDC: Second lowest political boundary having owned autonomous elected body to perform administrative and development activities. There are 3913 VDCs in Nepal.

Vulnerability: A combination of exposure to risk, sensitivity to shock (impact when it happens) and lack of resiliencies (to bounce back). The key features (Shocks, trends, seasonality) of the vulnerability context are not controllable by local people in the immediate or medium-term. The vulnerability or livelihood insecurities resulting from these factors is a constants reality for many poor people.

Ward: Lowest political boundary, a DVC consists of nine wards

Chapter 1 Introduction

1. 1 Background information

Community-based biodiversity conservations are bottom-up activities that bring individuals and organizations together to work towards achieving desired environmental goals. Community-based conservation seems compelling because it starts from the most fundamental principle: individuals will take care of those things in which they have a long-run, sustained interest (Bromley 1994, p. 428). These desired outcomes have led to increased acknowledgement of participatory activities as a means of achieving environmental and sustainability goals. While these concepts are not new, their application has increased dramatically in the last 10 years. For conservation purposes a community can be defined as a number of people who have a goal and decide to work together to do something about it. While groups can contain mutual, overlapping and divergent interests and perspectives, the goal binds people together, giving them a common identity despite individual differences. The minimal trappings of community according to Daly & Cobb (1994, p. 175) are: allowing all citizens to participate, accepting citizens' responsibility, respecting the diversity of citizens.

Community-based conservation reverses top-down, centre-driven conservation by focusing on the people who bear the costs of conservation. In the broadest sense, then, community-based conservation includes natural resource or biodiversity protection by, for, and with local communities (Western & Wright 1994, p. 7).

Nepal has joined hands with international communities and embarked on the modern era of biodiversity conservation since 1970s. Establishment of the national parks and other forms of protected areas has been considered as a key conservation strategy to protect these natural heritages. So far, Nepal has created an impressive network of protected areas that cover more than 18% of the total surface area of the country. By signing the global Convention of Biological Diversity held in Rio de Janerio in 1992, Nepal expresses its strong commitment to the conservation and sustainable utilization of biological diversity for the socio-economic development of the country (HMGN, 2000).

The traditional approach (people exclusive model) seems not appropriate to manage protected area systems and conserve biodiversity of Nepal. The needs of community participation on the conservation of biodiversity have been addressed in Nepal to maintain a balance between the protective and participatory approach of resource conservation. So, there is a need to be develop and practice with appropriate/ sound policies and programs for the conservation of Nepal's rich biological diversity and the sustainable use of it's natural resources for poverty reduction in the surroundings of protected areas (HMGN, 2000).

There has been a major shift in management paradigm of protected areas from protective to collaborative with the introduction of conservation area and buffer zone. It is not conceivable that protected areas could be managed for long time without people's goodwill and active support. Overtime management has now focused more on meeting people's basic needs so that resource use pressure on protected areas could be alleviated. Formation and institutionalization of different community based organizations in buffer zone is a stepping stone toward empowering and involving people in resource management (Maskey, 2001).

South Asia Poverty Alleviation Partnership Program (SAPAP) decentralization and poverty alleviation in Nepal in 1999 confirmed the basic hypothesis that decentralization, supported by social mobilization, can contribute to poverty eradication. It has reaffirmed the need for a supportive macro policy framework in the form of fiscal and monetary policies that direct the required public funds and credit resources to the poor, as well as participatory decision making processes at all levels, for successful local efforts at poverty alleviation.

Community based organizations have federated into cluster organizations like cooperatives, which have assumed some of the functions of the Program for sanctioning of loans. The Program has had a positive impact on income poverty through opening up new income generating opportunities to the poor by providing a judicious mix of demand-driven training and credit at non-usurious rates. In short, the Program, while mostly using micro-credit as a point of entry, is above all concerned with empowerment and building up the capacity of the communities it works with (SAPAP, 2002).

Nepal's biodiversity conservation initiatives have taken place against the background of a number of national needs and international commitments. A number of initiatives have been undertaken to conserve the rich biodiversity of Nepal. One of the main initiatives to date for protecting Nepal's biodiversity is the National Parks and Wildlife Conservation (NPWC) Act of 1973. Under this Act a number of key areas for wildlife and endangered species were given protection. Important areas for wildlife conservation were designated as protected areas. His Majesty's Government of Nepal (HMGN) has established 16 protected areas (PAs) of various types covering more than 19.42% of the country's surface area.

Most of the local people living adjacent to the protected areas are poor and vulnerable to wildlife damage. The animals create havoc by damaging agricultural crops and livestock. Even human lives are at risk. The rural economy is based on agriculture. On the other hand, the local communities have been creating pressure on the park to collect forest resources and graze their livestock inside the park.

The National Parks and Wildlife Conservation Act (HMG/N, 1973) has provided a legal foundation for the establishment and management of protected areas such as conservation areas and buffer zones new dimension in community based biodiversity conservation. The Act has also made provision for financing community development activities in buffer zones and conservation areas by ploughing back royalties accumulated from park generated business such as tourism. Buffer zone receives 30%-50% of royalties, while 100% of income goes to conservation areas (Sharma, 1998).

The park provides an excellent wilderness experiences for visitors. Unique flora, fauna and landscape of the park and indigenous culture of buffer zone communities are important attractions for tourists. In recent years the number of tourists visiting the park has increased remarkably. It is the main source of the park revenue that goes up to 50% to the local communities for their community development activities. A narrow strip of buffer zone covering an area of about 327 sq km adjoins the park in the west and south. More than 100,000 people of diverse ethnicity inhabit the buffer zone. *Tharus* are the indigenous (tribal) group and comprises above 60% of the total population. Agriculture is the main occupation of the buffer zone communities (RBNP, 2001). There are different government/ non-government organizations and various donor agencies (WWF, CARE-

Nepal) are implementing their activities in the buffer zone. Buffer zone program has been recognized as a major strategy for sustainable management of protected areas and surrounding natural resources with people's participation. Reducing park people conflict and gaining local community's support to biodiversity conservation is ultimately desired from this program.

Poverty, being the development challenge in Nepal, the government has been prioritizing on poverty reduction and employment generation at all levels. The ninth plan has envisaged poverty alleviation as the main objective with the view to securing welfare of the majority of the people of Nepal. In this direction, Buffer zone Program has adopted holistic approach to attain the overall goal of biodiversity conservation vis-à-vis improve livelihood of the buffer zone communities (PPP, 2000).

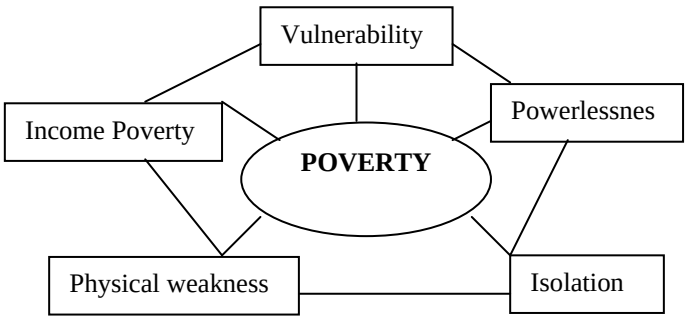
The UNDP, 2002 advocates poverty persisted in Nepal because of low economic growth, inadequate social and economic infrastructure, relatively high population growth, low asses to land, low access to non-agricultural income and deep-rooted cultural and historical practices. Poverty has generally been defined as having insufficient food, income and other inputs to maintain an adequate standard of living, with the latter sometimes being defined to include consideration of quality of life (Carney, 1998 cited by Arnold, 2001). Likewise, the indicators of sustainable livelihood outcomes are more income, improved well-being, reduced vulnerability, increased food security, and more sustainable use of natural resource base (Pokhrel and Tumbahangphe, 1999).

This welfare definition of poverty has recently been broadened to recognize the importance of access to assets. Asset poverty is defined as insufficient assets (natural, physical, financial, human, and social) or lack of an appropriate mix of assets, to be able to generate or sustain an adequate and sustainable level of livelihood. Livelihood defined in this connection as comprising the capabilities, assets and activities required for a means of living and sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities both now and in the future (Carney, 1998 cited by Arnold, 2001).

1.2 Linkage between biodiversity conservation and rural livelihood

Community-based biodiversity conservation is a vehicle for the change in community development. The study has focused the linkage between biodiversity conservation and rural livelihood improvement in the buffer zone of Bardia National park. Buffer zone community forest has been practiced as a community-based biodiversity model. The Poverty has two dimensions- low incomes, which is insufficient to maintain a dignified life, and low level of human capabilities, which restricts a citizen's options to lead a life of his or her choosing. Poverty is a form of deprivation, with strong interactive linkages to other forms such as physical weakness, isolation, vulnerability and powerlessness. Likewise, As Chambers (cited in Pokhrel and Tumbahangphe, 1999) sees 'poverty' is deprivation or '*dukhi*'. Poverty is a process that may involve vulnerability, powerlessness, physical weakness, isolation as well as income poverty.

Figure 1: Chamber's interpretation of poverty



The evaluation is generally understood as an assessment of the amount or the value of something. The buffer zone Program casts its impact on different development factors. Studies have been carried out to understand the impacts on institutional capacity, appropriate technology, socio-cultural aspects and gender aspect but little research has been done on policy, financial aspects and natural impacts of the buffer zone Program in contributing to poverty reduction. Therefore, in this research, policy, financial and natural aspects are to be selected to examine the impacts of the Program on poverty reduction. Thus, the primary research question is how does asset accumulation in the buffer zone Program contribute to reduce poverty?

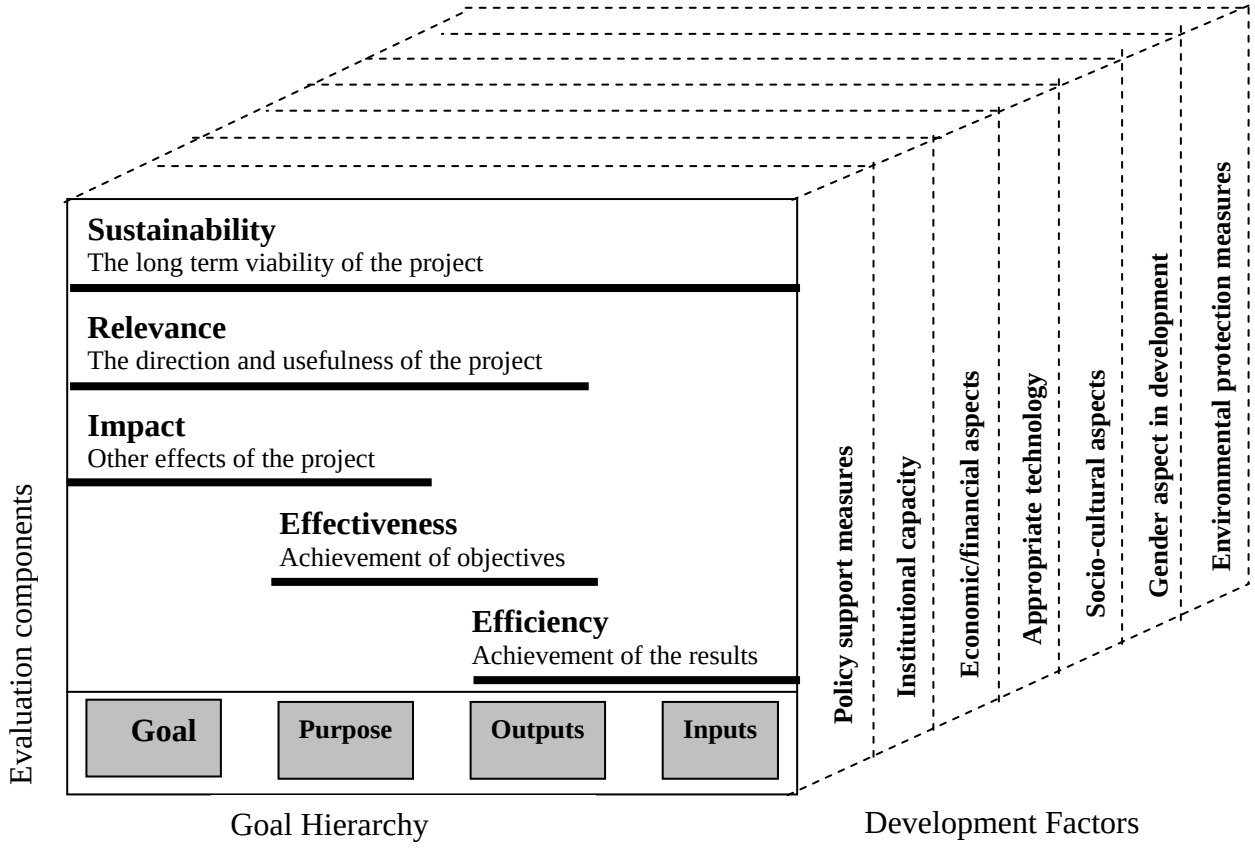


Figure 2: Fig: 2. Model for evaluation structured around the three dimensions: the goal hierarchy, a set of evaluation components and development factors
Source: Royal Ministry of Foreign Affairs, Norway (1993)

1.3 Conservation in Nepal

Located between India and China, Nepal is regarded as one of the richest countries in terms of biodiversity. The country covers a very small land unit (147,181 sq. km.) of the earth, but shelters 2.7% species of flowering plants, 3.4% of pteridophytes and 5.1% of bryophytes of the world flora. It harbors more than 9.3% of bird species, about 4.5% of mammal, 1.6% of reptiles, 1% of amphibians and 1% of fish species of the world (NBS/HMGN, 2002). The number of ecosystem per unit area in Nepal is greater than elsewhere in the world (MPFS/HMGN, 1988). About 35 forest types, 75 vegetation types and 118 types of ecosystems have been identified in Nepal.

Before 1950s there was no state's systematic attention for the conservation and protection of wildlife and forest resources in Nepal. However, the *Rana* rulers seem to have put some restrictions to hunt the big game species like tiger and rhino. Big game rich areas like Chitwan and Bardia were the private hunting areas for the *Ranas.* The importance of

conserving fauna and flora was first recognized by HMG in Nepal's First Five Years Development Plan (1956-1961). Rhino Patrol was created in Chitwan to protect rhino from poaching in 1961. An effective conservation in Nepal started only after 1970 when His Late Majesty King Mahendra proposed the establishment of Royal Chitwan National Park in the Terai and Langtang National Park in the mountain. A landmark legislation, the "National Parks and Wildlife Conservation Act 1973" came into force in 1973, providing a legal base for the establishment and management of National a Parks and Protected Areas. Under the provision of this Act with series of amendments 9 National Parks, 3 Wildlife Reserves, 3 Conservation Areas, and 1 Hunting Reserve have been established in Nepal. Almost 20% of the country's total area is occupied by protected areas.

1.4 Park and People Conflict in the context of Royal Bardia National Park

RBNP was formerly being used by local people for grazing livestock, firewood collection, hunting, fishing, and collection of minor forest products. Because of the low human density, there was probably a balance between resource need of local people and the forest resources, particularly for the indigenous Tharu communities, which were the dominant ethnic group of the area. At present, the internal population growth and immigration of the hill people have increased the pressure on natural resources.

Before the area was declared as a protected area, some parts of the park like Babai Valley, Bagaura and Lamkoli Phanta were being used for agricultural production as well. Hence, in case of RBNP, conflicts started right from the establishment of the protected area. Several villages are located around the southern boundary of the park. More than 1572 households were relocated in Tartar area only from Babai Valley. The southern part is also considered to be the richest in terms of wildlife. The people here have to bear considerable loss of crop damage by these animals.

Local people perceived restrictions on their use of park resources negatively and considered the protected area as being merely parked for the wild animals, which are of no use to them. Previous studies have shown main cause of conflict to be park regulations, crop damage, loss of livestock and harassment. Local people still use forest products illegally from the park and sometimes they are caught by the park staff. The harassment and penalties by the authority are other sources of conflict (Bhatta, 1994).

1.5 Rationale of the Study/ problem statement

Due to isolation of the local people from the park management and ignorance of their subsistence requirement from park resources, most of the PAs in Nepal are facing park – people conflict (Sharma, 1990). Similarly, agricultural crops and livestock depredation caused by animals also influenced the local people to behave adversely towards park management (HMG/UNDP, 1995). It was realized that without good relations and co-operations of the local people, no conservation measures would be successful.

The population growth of the country and immigration of hill people have increased pressure on the Park. Most of the people living around the park are illiterate and poor and depend on forest resources for their subsistence. They thus are putting heavy pressure on the park. Local people perceive restrictions on their use of park resources negatively and consider the PA as being only protected for the wild animals that are of no use to them. The conflicts that result from the destruction of crops and damage to property are serious conservation issues both in and outside the park. So minimizing the conflicts between local people and park is essential for the long run success of any conservation program. Efforts to keep animals out of crop fields by wildlife officers are often futile and sometimes result in people perceiving the animals as being malevolent. Crop raiding is likely to become one of the most difficult and pressing management problems in park due to increase in human population and expansion of agricultural land. On one hand, damages in a small extent may affect them seriously; on the other hand people who suffer from these damages are not getting compensation for what they have actually lost. Therefore, assessing the damages due to wild animals is necessary to minimize the park-people conflict. Continuation of such adverse impact will widen the degree of conflict, which will not only reduce the wildlife population but will also make them move away far from their habitat, disturb the ecological balance and reduce the sources of livelihood of the people. In these scenarios, it is crucial that the issues related with coexistence among people, wildlife and livestock in the area are properly understood.

Like most protected areas of the nation, the RBNP also faces several park and people related problems. Strict park regulations, crop damage, livestock depredation, and harassment are identified as main factors responsible for park and people conflict in this area (Nepal, 1991). The southern part of the park, which is considered the richest in wildlife diversity (Leisure and Mehta 1993), is bounded by several villages. In order to

reduce tension between park and surrounding communities, the HMGN has started buffer zone program in the RBNP and southern boundary of the RBNP has been a focus since its initiation in 1997. It is very important to assess wildlife damages occurred in this area. This research was also able to provide information about wildlife damages existing in RBNP and helps park officials to minimize the conflict especially due to wildlife damage. This study has forced to impose the Park officials to frame strategy and alleviate the problems at the field level..

It has been widely argued that rural people overuse and hence degrade and destroy forest resources because they are poor and have no viable alternative, and that this progressive erosion of the forest resource contributes to them becoming even poorer. This downward spiral will only be prevented, according to this argument, if the poor are provided with more attractive livelihood options, so that they move away from the destructive use of forest resources. This led to the development of the programs to introduce the new livelihood activities in and adjacent to protected areas that would compensate those living in them for the loss of use and encourage them to participate in the protection of the resources (Fisher, 1995, Wells and Brandon, 1992 cited by Arnold, 2001).

This study was focused to explore the contributing factors of buffer zone Program for poverty reduction. There was big gap between conservation and development. Poverty reduction is one of the main nation's goals. The activities of all government and non-government agencies should be incorporated in the main stream of the country with active people's participation. The study was helped some how to explore the potential areas of the contribution to reduce the poverty in the buffer zone which would be useful to design and implement the buffer zone activities in long term basis.

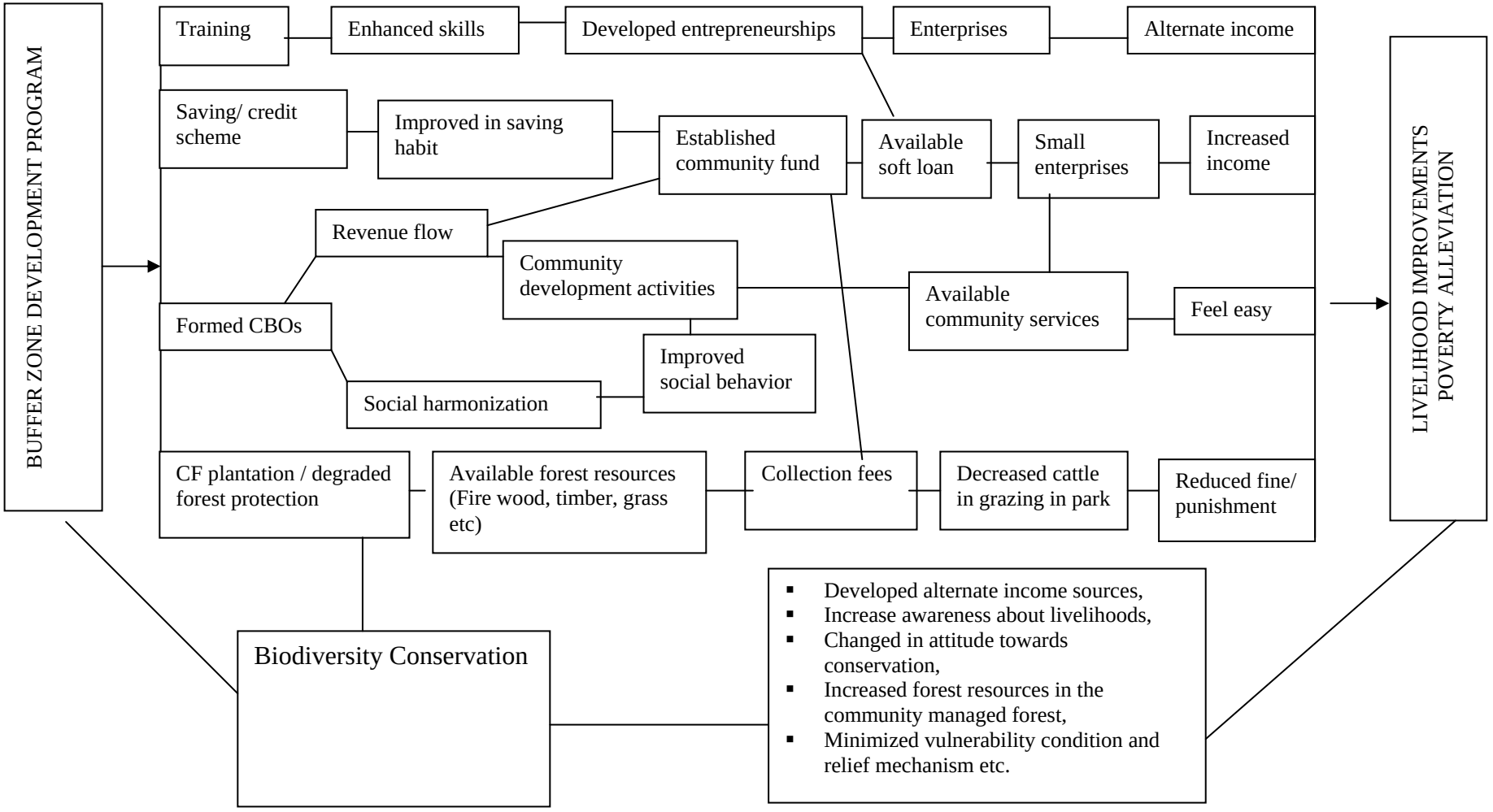
This research is to find ways to yield more sustainable livelihood opportunities out of biodiversity conservation for the local communities. It is recognized that the livelihoods of millions of poor people depend on biodiversity but, the patterns and forms of natural resource extraction, production and consumption that are encouraged by current development frameworks create an environment where this dependency can hinder rather than enhance poor people’s livelihoods. A more positive synergy between biodiversity and sustainable livelihoods can be created by identifying, developing and promoting the necessary processes and tools. A key element of this research was to understand: who

gains most from which component of biodiversity conservation, at what cost, to whom and with what short and long term consequences?

In nature conservation, balancing human needs with conservation priorities has become a growing concern worldwide. Conservation of biodiversity by making people poor is neither justifiable nor ethically possible in the long run. The active participation and partnership of all stakeholders particularly local community is the urgent need to increase the effectiveness of management by sharing the management responsibilities. Conservation problem is closely associated with the problem of poor, illiterate and under-privileged rural people. It should be considered as an effective tool for empowering communities to undertake increasingly in social, financial, human, natural and physical capitals at the community level.

Until recently, very few studies have been conducted to explore the contributing factors to poverty reduction through community mobilization process in the buffer zone. UNDP, 2002 states the continuing exclusion of women and disadvantaged groups from governance and mainstream development is reflected in their low levels of achievement. However, the community based organizations (CBOs- both of male and female separate user groups) have been established, supports from government and non-government development agencies are in progress in the buffer zone, what values are contributing to reduce poverty factors in their livelihoods and management practices are also not assessed. Therefore, this study was concentrated to identify the contributing factors of poverty and biodiversity conservation and their linkages in the study area.

Figure 3: Buffer zone Program, Biodiversity Conservation and Poverty Reduction (Conceptual Framework)



1.6 Objective of the research

1.6.1 General objective

The general objective of this study is to assess the community-based biodiversity conservation and rural livelihood improvements in the buffer zone of Bardia National Park, Nepal.

1.6.2 Specific objectives

a) To assess the impacts of buffer zone Program on rural livelihoods (capitals, vulnerability (wildlife), policy, institution, process) of local communities (men, women, poor, rich and dalit).

b) To assess the biodiversity conservation practices adopted by local communities after the buffer zone Program.

c) To recommend better mechanism for reducing the poorest of the poor people.

1.7 Limitation of the study

- People often manipulated the damages they received in seeking for the more compensation.
- People did not tell openly about frequency and quantity of taking fuel wood, fodder and timber from the park and also they were reluctant to tell about taking their livestock inside the park for grazing
- Due to unfavorable situation of the country, it was impossible to visit the entire site to collect the data.
- Due to the poor record keeping system in the park office it was not possible to separate cases, fines and punishments for illegal activities inside the park. Also separate record of grazing, firewood collection, timber smuggling were absent.
- The information of 1995 has been collected mainly from memory recall of the respondents through questionnaire.

Chapter 2 Literature Review

2.1 Protected area of Nepal

Before 1950s, natural resource primarily represented a source of useful commodities; and people had many traditional technique to preserve, manage and utilize them (Pradhan, 1995). Commercial harvesting and illegal poaching of wildlife were not significant because the country was isolated from the rest of the world due to difficult physiographic conditions in the hill and unfavorable climate and malaria in the Terai. The state of the forest resources of Terai deteriorate after eradication of malaria followed by the settlement of migrant people in the grassland and forestland areas (IUCN, 1995) although, rich wildlife habitats had been protected as Royal Hunting Reserves by Rana rulers (Majpuria, 1998).

The Government of Nepal developed different regulations pertaining, the protection of the natural resources from wanton exploitation but some of these attempts were the real cause of the deterioration of forests (UNEP, 2001). The modern era of conservation began in 1973 when His Majesty's Government of Nepal (HMGN) established the DNPWC and protected Area Legislation. Subsequently more National Parks and Wildlife Reserves were established in the mountain and Terai region in 1976 (Maskey, 2001). Throughout the following 2001). Throughout the following years, the DNPWC established several Protected Areas (PAs) which currently include nine National Parks, three Conservation Areas, three Wildlife Reserves, and one Hunting Reserve.

Table 1: Protected areas of Nepal

SN	Categories of Protected Areas	Year of Declaration	Area (km^2)	Physiographic zone	Conservation focus
National Parks					
1.1	Khaptad National Park	1984	225	Middle mountain	Wild goat, blue sheep and spiritual site
1.2	Langtang National Park	1976	1710	High mountain	Musk deer and red panda
1.3	Makalu Barun National Park	1991	1500	High mountain	High altitude endangered plants
1.4	Rara National Park	1976	106	High mountain	Musk deer, red panda, and high altitude lake

1.5	Chitwan National Park (WHS, 1984)	1973	932	Terai-Siwalik	Rhinoceros, elephant, tiger, bison etc.
1.6	Bardiya National Park	1976/88	968	Terai	Rhinoceros, elephant, tiger etc.
1.7	Sagarmatha National Park (WHS 1979)	1976	1148	High mountain	Musk deer, red panda, beer, snow leopard etc.
1.8	Shey Phoksundo National Park	1984	3555	High mountain	Wild goat, blue sheep, musk deer, lake
1.9	Shivapuri Watershed and Wildlife Reserve (Renamed as NP in 2002)	1984	144	Mid-hills	conservation of capital city
Wildlife Reserves					
2.1	Koshi Tappu Wildlife Reserve (Ramsite site, 1987)	1976	175	Terai	Wild buffalo and migratory birds
2.2	Parsa Wildlife Reserve	1984	499	Terai-Siwalik	Tiger, deer, antelopes, bison etc.
2.3	Royal Suklaphanta Wildlife Reserve	1976	305	Terai	Swamp deer, rhinoceros, tiger
Conservation Areas					
3.1	Annapurna Conservation Area	1992	7629	Middle mountain	Endemic plants and animals
3.2	Kanchenjunga Conservation Area	1997	2035	Middle mountain	Endemic plants and animals
3.3	Manaslu Conservation Area	1998	1663	High mountain	Endemic plants and animals
Hunting Reserve					
4.1	Dhorpatan Hunting Reserve	1987	1325	Middle mountain	Blue sheep
Buffer Zones					
5.1	Langtang Buffer Zone	1997	420	High mountain	Aimed at expanding biodiversity
5.2	Makalu Barun Buffer Zone	1998	830	High mountain	

5.3	Royal Chitwan Buffer Zone	1996	750	Terai-Siwalik	conservation and community development to reduce pressure on national parks and wildlife reserves. Also aimed at bringing the local people in the mainstream of biodiversity conservation.
5.4	Royal Bardiya Buffer Zone	1997	328	Terai	
5.5	Sagarmatha Buffer Zone	2002	175	High mountain	
5.6	Shey Phoksundo Buffer Zone	1999	1349	High mountain	
5.7	Royal Suklaphanta Buffer Zone	2004	244	Terai	
5.8	Koshi Tappu Buffer Zone	2004	173	Terai	
5.9	Parsa Buffer Zone	2005	298	Terai	
			4666		
	Total Area (km^2)		**28,585**	**19.4 percent of the total area of the country**	

To these sixteen PAs, nine PAs have established buffer zones where resource use by local peoples is regulated to promote sustainability. Presently, 19.42% of the total area of Nepal is afforded protected area status (Third national report to CBD, DNPWC, and March/2006).

2.2 Buffer zone

Buffer zone is defined as "An area adjacent to a protected area on which land use is partially restricted to give an added layer of protection to PA while providing valued benefits to neighboring rural communities". Thus, it is a way to improve land use systems around protected areas, and at the same time provide better protection for a core area. Participatory land management programs give right to use the productivity of the land in exchange for protection of the intended protected area. Buffer zone, therefore, has many advantages. Buffer zones may serve biological as well as social objectives. They provide extra protection to core Parks from human activities and biological changes. Buffer zones provide extension of habitats for wild animals. Socially, they allow local people to pursue their traditional way to utilize wild animals and wild plants (Pradhan, 1995).

2.2.1 Buffer zone in RBNP

BNP's buffer zone is confined only along the eastern, southern and western boundary covering an area of 327 km2 that extends in 17 VDCs of Banke, Bardia and Surkhet districts. Conflict

between park and people residing in these areas is serious, as local people are still unaware of basic values of protected areas. Poaching of wild animals and illegal collection of forest resources are the potential threats in bio-diversity conservation as no strict protection and management rules are imposed in the area. Besides, local communities residing along the northern boundary are deprived of 30-50% of park revenue channeled back for buffer zone development. Declaring buffer zone along northern boundary would help to earn public participation in conserving unique bio-diversity of the park (RBNP, 2001).

Department of National Parks and Wildlife Conservation (DNPWC) has been implementing the buffer zone initiatives Programs for the betterment of biodiversity conservation and the improvement of socioeconomic conditions of the local communities with the help of UNDP supported Park People Program in the buffer zone of tropical PAs including Bardia National Park through social mobilization process since 1995. Further the Program was extended to the other PAs of the country to participate local people in the mainstream of the conservation with the supports of different donor agencies.

Royal Bardia National Park (81 20' and 28 35') was established in 1976. The park is the largest tropical PA of Nepal. The park is located in the western lowland and encompasses a total area of 968 Sq. Km. The Park includes alluvial floodplain created by *Karnali-River* in the west and pristine ecosystem of *Babai* valley in the northeastern section of the park. The park is reputed for its rich biodiversity. The vegetal and faunal diversity ranges from successional stages to climax including endangered mega-herbivores like Rhinoceros (*Rhinocerous unicornis),* Elephant *(Elephus maximus)* and top carnivore Royal Bangal Tiger *(Panthera tigris)* are in viable population (RBNP, 2001).

2.3 Livelihood Assets

The livelihood approach is concerned first and foremost with people. It seeks to gain an accurate and realistic understanding of people's strengths (assets or capital endowments) and how the endeavor to convert these into positive livelihood outcomes. The approach is founded on a belief that people require a range of assets to achieve positive livelihood outcomes; no single category of assets on its own is sufficient to yield all the many and varied livelihood outcomes that people seek. This is particularly true for poor people whose access to any given category of

assets tends to be very limited. As a result they have to seek ways of nurturing and combining what assets they do have in innovative to ensure survival.

The asset pentagon lies at the core of the livelihood framework, within the vulnerability context. The pentagon was developed to enable information about people's assets to be presented visually there by bringing to life important inter-relationships between the various assets. The shape of the pentagon can be used schematically the variation in people's access to assets. The idea is that the center point of the pentagon, where the lines meet, represents zero access to assets while the outer perimeter represents maximum access to assets. On this basis different set pentagons can be drawn for different communities or social groups within communities.

It is important to be noted that a single physical capital can generate multiple benefits. If some one has secure access to land (natural capital) they may also be well endowed with financial capital, as they are able to use the land not only for direct productive activities but also as collateral for loans. Pentagons can be useful as a focus point for debate about suitable entry points, how these serve the needs of different social groups and likely trade-offs between different assets. However, using the pentagon in this way is necessarily representative. At a generic level there is no suggestion that we can- or should – quantify all assets.

2.3.1 Human Capital

Human capital represents the skills, knowledge, and ability to labor a good health that together enables people to pursue different livelihood strategies (Carney, 1999) and achieve their livelihood objectives. At a household level human capital is a factor of the amount and quality of labor available, this varies according to household size, skill levels, leadership potential, and health status. Human capital appears in the generic framework as a livelihood asset, that is, as a building block or means of achieving livelihood outcomes. Its accumulation can also be an end in itself. Many people regard ill-health or lack of education as core dimensions of poverty and thus overcoming these conditions may be one of their livelihood objectives.

As well as being of intrinsic value, human capital (knowledge and labor or the ability to command labor) is required in order to make use of any of the four other type of assets. It is

therefore necessary, though not on its sown sufficient, for the achievement of positive livelihood outcomes.

2.3.2 Social Assets

There is debate over the term social capital, about what are the things included in it. However, in the contest of sustainable livelihoods frame work it is taken to mean social resources upon which people draw in pursuit of their livelihood objectives.

2.3.3 Natural Assets

Natural capital is the term used for the natural resource stocks from which resource flows services (e.g., nutrient cycling, erosion protection) useful for livelihoods are derived. There wide variation in the resources that make up natural capital, from intangible public goods such the atmosphere and biodiversity to divisible assets used directly for production (tees, land, etc). Within the sustainable livelihoods framework, the relationship between natural capital and *vulnerability context* is particularly close. Many of the shocks that devastate the livelihoods the poor are themselves natural processes that destroy natural capital (e.g., fires that destroy forest, floods and earthquakes that destroy agricultural land) and seasonality is largely due to changes in the value or productivity of natural capital over the year.

Natural Capital is very important to those who derive all or part of their livelihoods from resource-based activities (farming, fishing, gathering in forests, mineral extraction, etc.). However, its importance goes beyond this. None of us would survive without the help of key environmental services and food produced from natural capital. Human health (human capital) will trend to suffer in areas where air quality is poor as a result of industrial activities or natural disasters (e.g., forest fires). And although our understanding of linkages between resources remains limited, we know that we depend for our health and well-being upon the continued functioning of complex ecosystems (which are often undervalued until the adverse effects of disturbing them become apparent).

2.3.4 Physical Assets

Physical capital comprises the basic infrastructure and producer goods needed to support livelihoods.

- Infrastructures consist of changes to the physical environment that help people to meet their basic needs and to be more productive.
- Producer goods are the tools and equipment that people use to function more productively.
- Following components of infrastructure are usually essentially for sustainable livelihoods:
  - Affordable transport;
  - Secure shelter and buildings;
  - Adequate water supply and sanitation;
  - Clean, affordable energy; and
  - Access to information (communication)

Infrastructure is commonly a public good that is used without direct payment. Exception includes shelter, which is often privately owned, and some other infrastructure that is accessed for a fee related to usage (e.g., toll roads and energy supplies). Producer goods may be owned on an individual or group basis or accessed through rental or 'fee for markets, the latter being common with more sophisticated equipment.'

2.3.5 Financial Assets

Financial capital denotes the financial resources that people use to achieve their livelihood objectives. The definition used here is not economically robust in that it includes flows as well stocks and it can contribute to consumption as well as production. However, it has been adopted to try to capture an important livelihood building block, namely the availability of cash or equivalent, which enables people to adopt different livelihood strategies.

- Available stocks: Savings are the preferred type of financial capital because they do have liabilities attached and usually do not entail reliance on others. They can be held in several: cash, bank deposits or liquid assets such as livestock and jewellery. Financial resources can also be obtained through credit –providing institutions.

Regular inflows of money: excluding earned income, the most common types of inflow are pensions, or other transfers from the state, and the remittances. In order to make positive contribution to financial capital these inflows must be reliable (while complete reliability can

never be guaranteed, there is a difference between a one-off payment and a regular transfer on the basis of which people can plan investment).

Framework for sustainability livelihoods

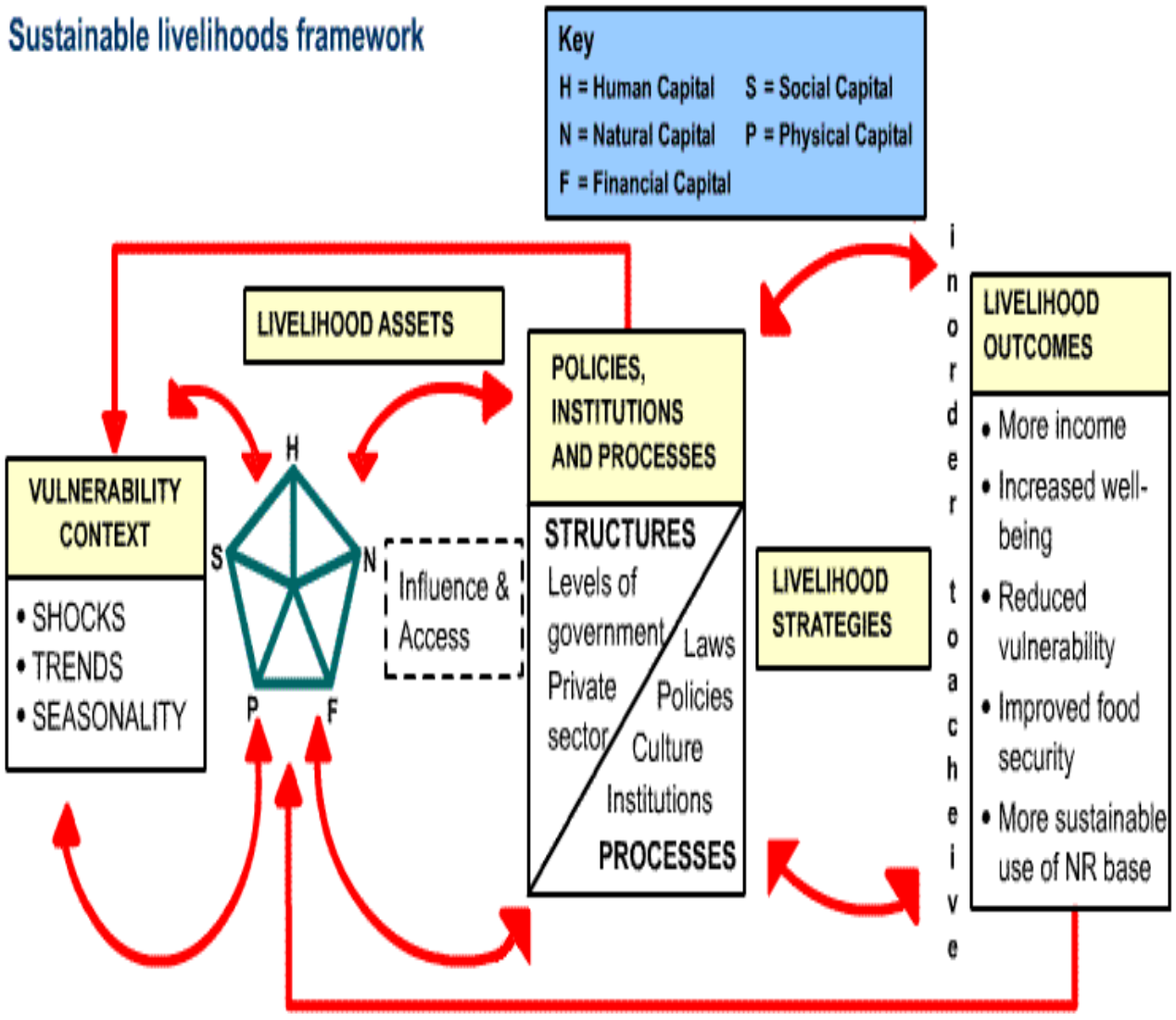


Figure 4: Sustainable livelihood framework (Sources, DFID, 1999)

Chapter 3

Study Area

3.1 The National Park

3.1.1 Location and boundary of the park

The Royal Bardia National Park ($81^0$20' E and $28^0$35' N) is located in the mid-western region of Nepal. RBNP is the largest (968 sq. km.) protected area in the Terai region. The northern boundary of the park is formed by the crest of the Churia range. The eastern boundary extends up to the Surkhet- Kohalpur road. The eastern branch of the Karnali river, is the western boundary of the park. The southern boundary adjoins agricultural settlements and part of the east-west highway of the country.

3.1.2 History of the establishment of the National Park

In 1969, a part of the area was established as Royal Hunting Park. After about seven years, in 1976, it was gazetted as Royal Karnali Wildlife Reserve with an area of 386 sq. km. Later in 1984, the area was enlarged to include Babai valley in the north east, and 1572 families comprising about 9500 people residing in the Babai valley were resettled in the Taratal area near the Indian border. In 1988, the whole area was declared as Royal Bardia National Park.

3.1.3 Vegetation

A vegetation study conducted by Dinerstein (1979) classified six major vegetation types. This was later modified by Jnawali and Wegge (1993) to seven major vegetation types. These are:

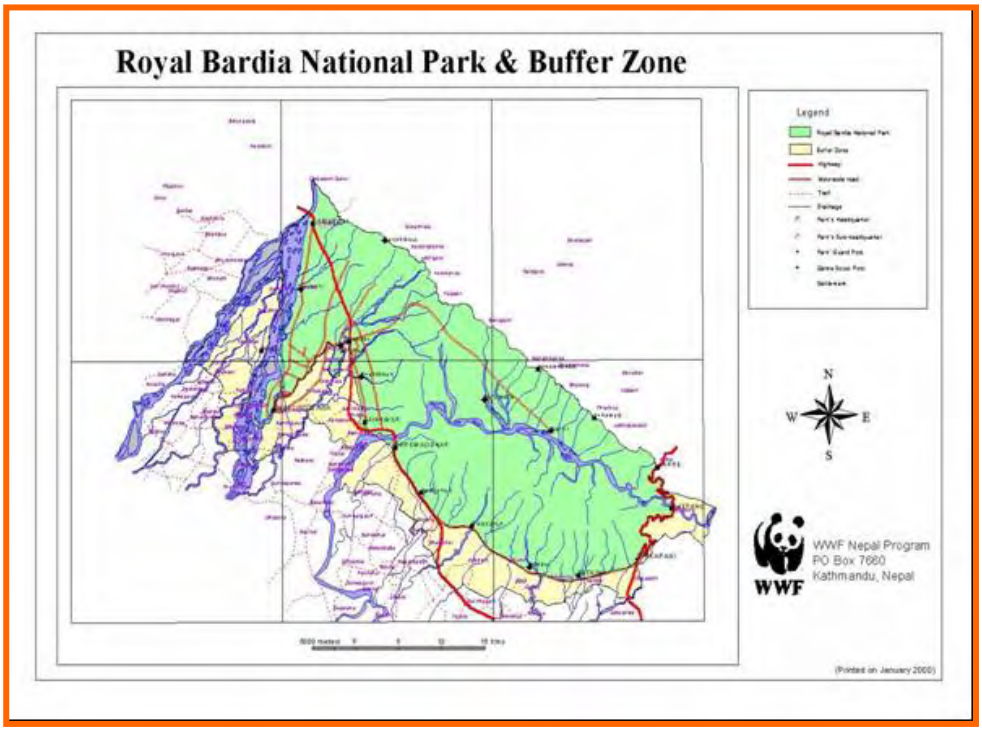
1. *Sal forest* is dominated by *Shorea robusta* in association with *Terminalia tomentosa* and *Buchanania latifolia.*
2. *Khair-Sissoo* forest is composed of *Dalbergia sissoo* and *Acacia catechu* and restricted to major water courses and flood plain islands.
3. *Moist riverine forest* comprises *Syzigium cumini, Mallotus phillippensis, Bombax ceiba* together with shrub species like *C. macrophylla* and *M. koenigii*.
4. *Mixed hardwood forest* grows on well drained flat land, *Adina cordifolia, Casearia tomentosa, Mitragyna parviflora* are some species of this type of forest.
5. *Wooded grassland forest* is more or less Savana type in which the area is covered by grass with sparsely distributed trees. The common grasses are *Saccharum spontaneum,*

Imperata cylindrica, Erithrina ravennae, with sparsely distributed tress of *Bombax ceiba, M. phillippencis, A. cordifolia*.

6. *Phantas* are the previously cultivated fields which in due course of time revegetated into open grasslands. *Imperata cylindrica, Saccharum spontanum* and *Narenga perphrocoma* are the dominating grass species of the phantas.
7. *Flood plain grassland* is the tall grasses of the flood plain along the Geruwa river. The dominating species of these grasslands are *Saccharum spontanum, S. bengalensis, Phragmatis karka* and Arundo donax .

3.1.4 Wildlife

The RBNP supports exceptionally diverse wildlife populations. The park harbors a total of 53 species of mammals including five species of deer alone, about 400 species of avifauna, 25 species of reptiles and amphibians and 121 species of fishes (RBNP 2001). Its protected species, according to DNPWC Act, 1973, include tiger (*Panthera tigris*), reintroduced one-horned rhinoceros (*Rhinoceros unicornis*), Asiatic wild elephant (*Elephas maximus*), swamp deer (*Cervus duvauceli*), Gangetic dolphin (*Platanista gangetica*), stripped hyaena (*Hyaena hyaena*), four horned antelope (*Tetracerus quadricornis*), and Indian pangolin (*Manis pantadactyla*), similarly, Giant Hornbill (*Buceros bicornis)*, Black stork (*Ciconia nigra*), Sarus crane (*Grus antigone*), Bengal florican (*Eupodotis bengalensis*), and lesser florican (*Spheotides indica*) are among the protected avifauna found in the park. Gharial (*Gavialis gangeticus*) and Python (*Python molurus*) are reptiles in the similar category. In addition, large populations of spotted deer (*Axis axis*), hog deer (*Axis porcinus*), barking deer (*Muntiacus* muntjak) and wild boar (*Sus scrofa)* together with invertebrates also enrich the biological diversity of the park.



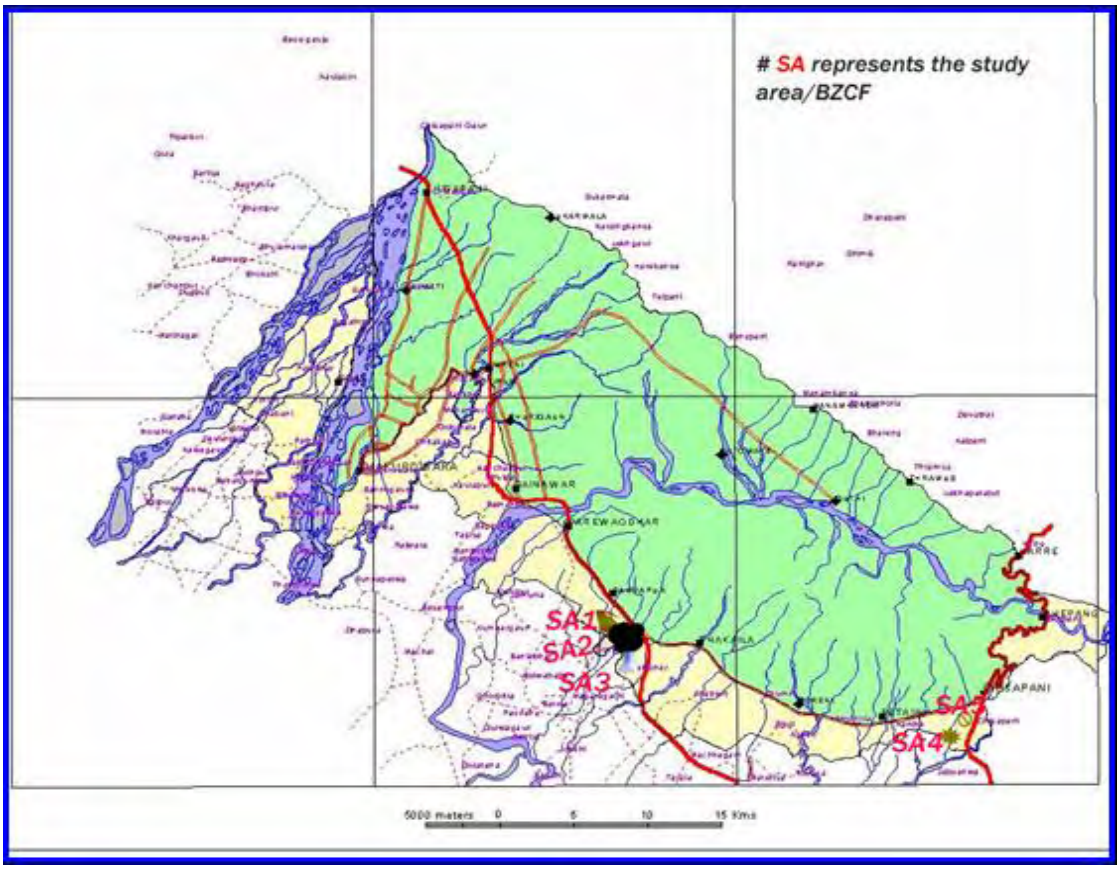
Map plate No: 1 showing the Bardia National Park (BNP) and its buffer zone

For the details information in buffer zone community forest user groups, five BZCF had been taken for the study. Rammapur BZCF, Harnawa BZCF and Janachetana BZCF had been taken and studied from Bardia district where as Shree Krishna BZCF and Santi Batika BZCF was taken form Banke district.

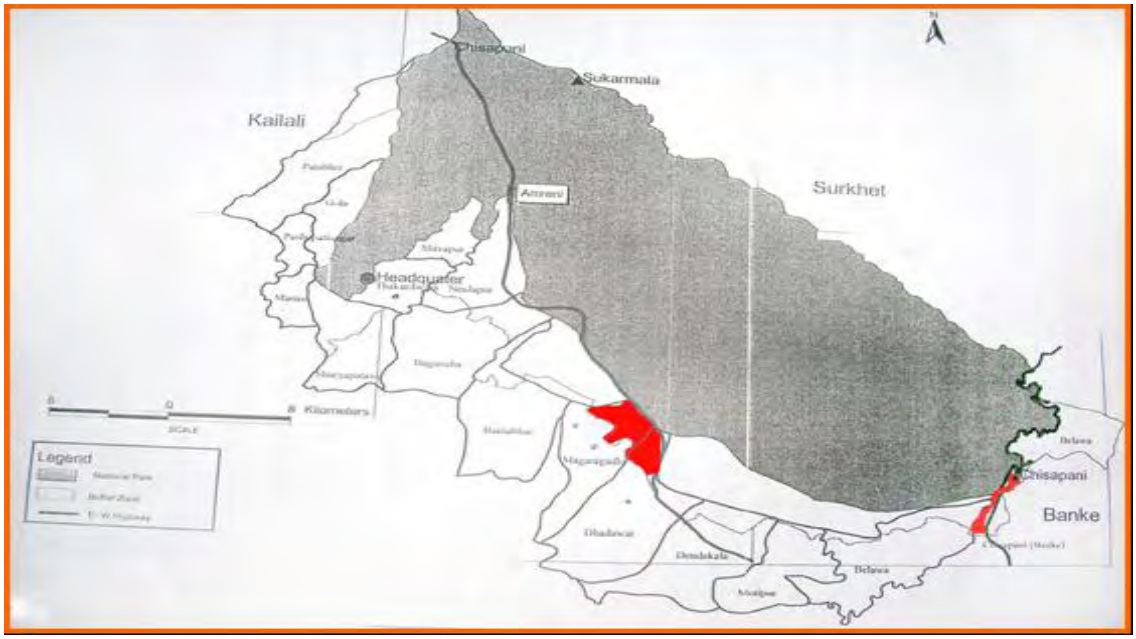
Table 2: Name of BZCF and its brief introduction

S.N.	Name of BZCF	Type of Forests	Major forest species	Major wildlife
1	Rammapur	Natural	*Shorea robusta, Termenelia tomentosa, Acacia catechu, and Adina cardifolia*	*Rhinoceros unicornis, Panthera tigris, Axis Axis, Lepus nigricollis, Hystrix indica and Panthera pardus*
2	Harnawa	Natural	*Shorea robusta, Shorea robusta, Gargua pinnata, Syzium cumini, Adina cardifolia*	*Axis Axis, Bengal florican, lesser florican, Panthera pardus*
3	Janachetana	Natural		
4	Santi Batica	Natural /Plantation	*Terminalia tomentosa, Gargua pinnata, Syzium cumini, Adina cardifolia,*	*Axix Axis, Resheu monkey, Hyana hyana, Panthera pardus, Panthera tigres.*
5	Shree Krishna	Natural	*Shorea robusta, Adina cardifolia, Terminalia tomentosa, Terminalia belarica, Syzium cumini*	Axis Axis, Hispid hare, Panthera tigres, pantera pardus, *Sus scrofa, Hystris indica*

Map plate 2: Map showing the study area (five BZCFs of Bardia NP)



Map plate 3: VDC- wise representation of BZCFs



Map plate No. 4: Protected area of Nepal

Chapter 4 Methods

4.1 Data Collection

Both qualitative and quantitative research techniques were applied for collection of all types of data.

4.1.1 Primary Data collection

In case of primary data collection, Participatory Rural Appraisal/Rural Rapid Appraisal tools can be used which are described briefly below:

4.1.1.2 Participatory Wealth Ranking

It was used to determine the relative economic position of each household in the buffer zone forest user groups. User committee members were mobilized to carry out this exercise. Ranking was done as perceived by local people using card method. The name of each household head was written on card separately and committee members were asked to place card accordingly into three economic strata, which were categorized as Rich, Medium and poor households. After grouping, the participants involved in ranking process were asked the criteria employed for ranking. Criteria were primarily based on landholding size, number of quality livestock, income sources, education status etc. Triangulation to verify this ranking was done separately with some key informants who are familiar with all users.

4.1.1. 2 Discussion with committee members

Researcher faced the very difficult to discuss with the respondent because it was the time for harvesting of paddy. In one hand, park-people conflict situation was there and they were not happy to answer the detail questions. The researcher deeply discussed with the committee chairperson, secretary and treasurer about activities conducted by BZCFUG.

4.1.1.3 Direct observation

It was very useful method for understanding actual condition of field by researcher himself. The activities of people at their home or farms, participation in discussion, decision making processes etc. were observed directly.

4.1.1.4 Questionnaire Survey

The questionnaire survey was used to collect socio-economic information of buffer zone forest UG members, perception of users on CF activities and forest product situation. Total 150 households (11.05%) were selected from five BZCFUGs for questionnaire survey. For this, each household was considered as the unit of observation. First of all, the households of BZCFUG members were divided into different strata considering the social and economic condition.

Photo: Researcher has been filling the questionnaire during the field survey.

Then total of 40 households from Rammapur BZCF, 30 households from Harnawa BZCF, 25 households from Janachetana Women BZCF , 25 households from Santi Batika BZCF and 30 households from Shree Krishna BZCF were selected as sample households purposively considering proper representation of castes, female and poor people .

Table 3: Sampled households with different socioeconomic status

S.N	Name of BZCF	Total households	Sample Households	Sampling percentage (%)
1	Rammapur	462	40	8.6
2	Harnawa	306	30	3.06
3	Janachetana Women	172	25	14.5
4	Santi Batika	109	25	22.9
5	Shree Krishna	309	30	9.7

The questionnaire was pre-tested and some necessary changes were made. The purpose of pre-testing was to identify any ambiguity or errors in questions.

4.1.1.5 Key informant's survey

Key informants like local leaders, local forestry staff, government employers who have been involved in BZCF were interviewed during field time. Using checklist, Open-ended questions were discussed with them about current practices and future strategies of BZCF.

4.1.2 Secondary data collection

Secondary data for the study were collected from different relevant sources like national park office (Thakurdwara, Bardia), buffer zone Council office, Thakurdwara, operational

plan of related BZCFs, CARE-Nepal, office, IOF library and various published & unpublished literature etc.

4.2 Data Analysis

All collected data were analyzed by using qualitative and quantitative data analysis techniques. All the interpretations are based on the categorization of respondents as shown in table 2. Most of the data were fed in to computer software programs i.e. SPSS 11.5 and MS- Excel program. Using different statistics such as Percentage, Mean, and graphics etc, both qualitative and quantitative data were interpreted.

The perception and attitude of different level of respondents were measured in a strongly agree to strongly disagree (1-5) in Likert Scale format. The mean scores obtained on the Likert Scale were compared and used to determine the perception of respondents. Pearson Chi square (γ^2) test was applied to test the difference in the perception of the respondents according to social, economic and gender status of respondents (**Gentle, 2000**).

Table 4: Basis of analysis

Status of respondents	Categorization of respondents		
Social perspective	NDAG	DAG	-
Economic Perspective	Rich	Medium	Poor
Gender	Male	Female	-

Other strong tests viz. Index of Perceived Availability (IPA) and Index of Relative Ranking were used to identify the people perception and priority order of the expected activities. The formulas used in this regard were presented below:

Index of perceived availability (IPA)

In the index of perceived availability (IPA), perceptions of poor, women and disadvantaged groups toward their right can be calculated or analyzed by using following formula.

IPA = SD (0.10) + D (0.30) + N (0.50) + A (0.75) + SA (1.0)/n

Where,

IPA = Index of perceived availability

SD = strongly disagree

D = Disagree

N = Neutral

A = Agree

SA = strongly agree

N = Number of responses

Index of Relative Ranking (IRR)

IRR can be used to determine the ranking value in different heading concerning on poor, women and DAGs. **Miller (1986)** on his book stated that Index of Relative Ranking (IRR) can be calculated by using following formula.

IRR= (R1S1+R2S2+----------+RnSn)/nr

Where, IRR = Index of Relative Ranking

R1=Rank of 1^{st} order

S1= score of 1^{st} order

Rn = Rank of last order

Sn = Score of last order

n = Number of observation

r = Total rank given to particular attribute

Chapter 5 Result and Discussion

5.1 In-depth study of BZCFs

For in-depth study, five BZCFs (*Rammapur, Haranawa, Janachetana Women, Santi Batika and Shree Krishna*) were purposely selected in such a way that three from Bardia district and two from Banke district. Details information regarding BZCF has been presented below:

Assessment of biodiversity

Major seven species of agricultural diversity **(Appendix I)**, Eight species of wildlife mainly causing crop damages **(appendix II)**, Overall biodiversity characteristics of BNP **(Appendix III**), Listing of Vegetation /trees.*79* **(appendix IV)**, Listing of Medicinal and Aromatic Plants (MAPs) *92 species* **(Appendix V)** and Bird diversity **(Appendix VI)** were the outputs while assessing the biodiversity conservation with in study area

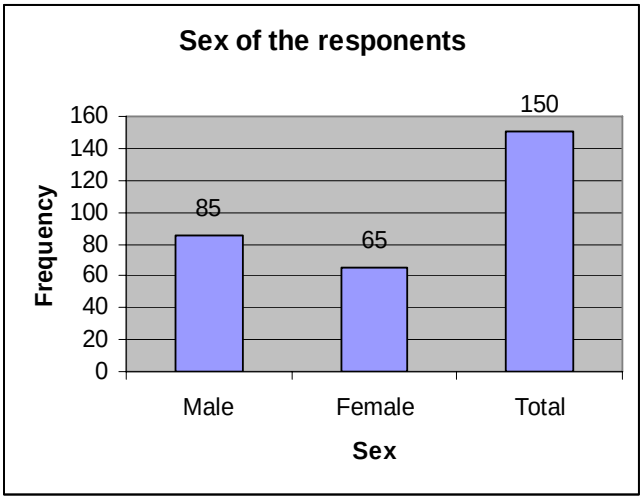
Socio-economic status of the respondents

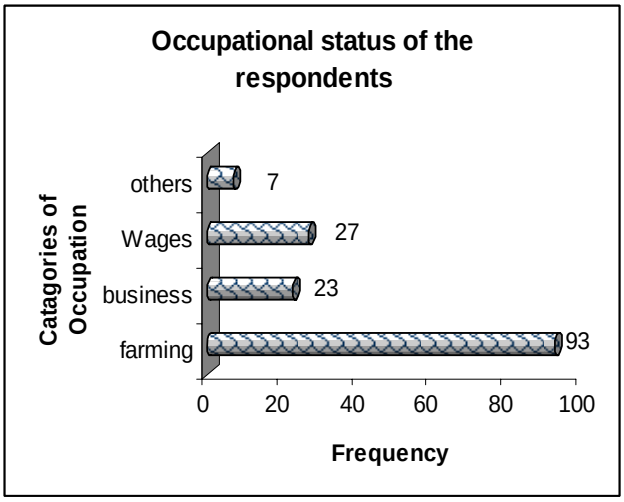
In this heading, study has been focused on activeness of users in development activities and executive committee in BZCF.

5.1.1 Sex and occupational status of the respondent

Out of the 1358 total households, only 150 households were taken which is 11.05% of sampling intensity. Households were selected in such a way that there was a equal proportions of gender, economic and social status. The representative male and female in these BZCFs has been presented above figure and occupational status of the respondents has also been shown.

Figure 5: Sex and occupational status of the respondents





5.1.2 Representative of users in executive committee

Executive committee is a responsible body to organize and effective mobilize toward the community development in BZCFs. Equal proportions of Representation of rich, poor, women and dalit in executive committee seems very effective to run any Program effortlessly for the future course of actions because integration of raised voices comes to fix decision. Participation of women in executives committee was seen in actual fact in figure below:

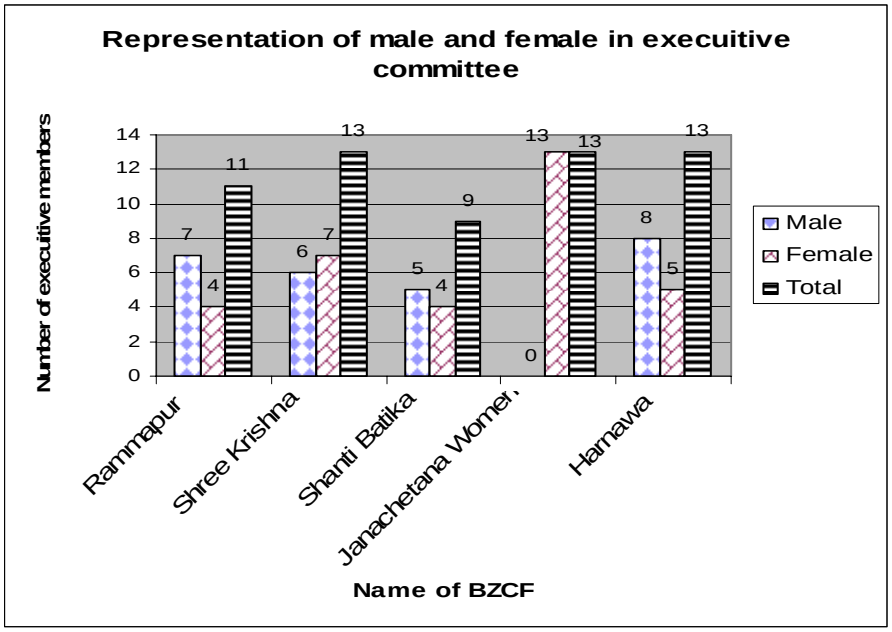


Figure 6: Status of Dalit and Poor in Executive committee of BZCF

5.1.3 Status of dalit and poor in executive committee of BZCF

Altogether, there was a minimal representation of poor and dalit in executive committee. Rich and NDAG prefer to be an executive member where as poor and dalit hesitate. One of the main reasons why are not taking in this opportunities is a big question mark in any EC. People said that they were not able to bear the responsibility and they did not impose to take part from rich and NDAG.

Discussion

Buffer Zone User Committee (CFUC) is a decision making body elected by CFUG. In all UGs, participation of DAG, women and poor members is minimal in committee and never

occupies the key positions. They are only in general positions (members) and only for short time. The same individuals are holding the key posts since handing over. The result is similar to **Poudel (2003)**, who concluded that presence of women and DAGs member in committee is only for attendance not for discussion, suggestion and decision making even if they were called for.

There is no coordination among committee members so committee meeting is very irregular. DAG and women had a concept that only educated and experienced person could contribute on the committee so they hesitated to participate in CFUC. As the representation of poor and DAGs in the executive committee is meager, the sharing mechanism could hardly fulfill the demands of forest products for the poor and DAGs (Kanel and Kandel, 2004).

SAGUN program of CARE/Nepal has been implementing in these areas (study area) since its establishment periods and equal chance of representation has gradually increased and they have got a chance to be a executive member. Different formal and non formal Programs have been conducted in favor of poor and dalit viz decision making process, selection of executive committee and good governance in BZCF, etc.

5.2 Activities undertaken by BZCFUG

Every BZCF has its own constitution and operational plan (OP). Generally constitution describes about rules and regulations of the CFUG as an autonomous organization. In other hand, OP explains the overall technical management of BZCF including forest inventory. Every BZCFUG has to follow its constitution and OP and perform the activities accordingly; however, SAGUN Program of CARE/Nepal has been conducting the different activities in BZCFs viz. good governance, assistantship during operation plan preparation creation of favorable condition to hand over the potential community forests and sharing the technical ideas to the buffer zone committee.

Users have participated in different forest management activities viz. income generation activities, NTFPs cultivation, infrastructure development and group's mobilization after the handing over the buffer zone community forests. This photograph shows the Kurilo (Asparogus racemocus) plantation within BZCF of Rammapur which is one of the activities followed by users.

The major activities are categorized as follow:

5.2.1 Forest management activities

Firewood and timber for house construction are the main forest products provided to all members from BZCF. Representation of poor, women and disadvantaged groups in forest products collection were comparatively high (leaf letter collection, ground grass collection and fodder collection) because they had to depends up on the day to day in BZCF for these minor activities. For major activities in BZCF, One member of each household has to involve voluntarily during collection of firewood and shearing of benefit according to the quantity needed for each household (proportional basis).

5.2.2 Community development activities

Community development includes trail construction, gabion wall construction, drinking water, electricity etc. Rammapur BZCF had already conducted such activities in different toles. Committee decides activities that are to be undertaken for each year. Where as in four other BZCFs (Haranawa, Janachetana, Santi Batika and Shree Krishna), such community development activities has been progressively implemented. In this present situation, committee thought about the protection of forest rather than community benefits.

5.2.3 Income generation activities

Even though almost all the BZCFUGs had different income generation activities such as, NTFP management, Nursery preparation, and special programs for poor, DAGs and women,

mentioned in their OP, they had not conducted any such programs systematically yet. However, Rammapur BZCFUG was found as a model among the BZCFs of Bardia National Park.

Table 5: Activities conducted by BZCF

Activities conducted by BZCF	**Rammapur BZCF**	**Harnawa BZCF**	**Janachetana Women BZCF**	**Santi Batika BZCF**	**Shree Krishna BZCF**
1. Income generation Activities (IGAs)	Yes #	yes	Yes	yes	yes
2. Community development activities	Yes #	yes	Yes	yes	yes
3. Forest protection	Yes	No	Yes	No	No
4. Fire line construction	Yes #	No	No	No	No
5. Fuel wood, Timber distribution	Yes	yes	Yes	yes	yes
6. Silvicultural operations	Yes #	No	No	No	
7. plantation	No	yes	No	yes	yes
8. Equal opportunity to poor and disadvantaged groups	Yes	yes	Yes #	yes	Yes #

*Note: # denotes the more effectiv*e

5.2.4 Participation in Community forest Activities

In the questionnaire survey, almost all the respondents give the positive response and do not want to tell the negative attitude toward the BZCF Program. Researcher had very much claver to capture the actual problems in grass root level and whether this program can contribute the livelihoods of poorest of the poor people or nor. BFCF Program has been effectively running as well as contributing to solve the problems related to forest products to the targeted groups.

5.2.4.1 Participation of CFUG members in Different Meetings

Generally, every member in CFUG has to participate in the meeting organized by BZCFUG. They have equal right to speak and participate in decision making process. The participation of Poor, DAG and women found to less comparing to rich but their participation has progressively increased in meeting since the formation and Implementation of the BZCF Program even If most of the respondents were unaware of the contents of OP and constitution. Chi-square test showed that attendance of respondents was significantly different by social as well as economic condition of respondents.

Table 6: Participation in Meeting when OP and Constitution was finalized

	Status of Respondent		Attendance of respondents (in %)		df	$\chi 2$ value	Sig.
			Yes	No			
Participation in the meetings when OP and Constitution was finalized	Social	DAG	49.2	60.8	1	6.188	*
		NDAG	60.6	39.4			
	Economic	Rich	71.4	28.6	2	2.192	-
		Medium	64.6	35.4			
		Poor	56	44			
	Gender	Male	56.5	43.5	1	0.776	-
		Female	49.2	50.8			
	Total						

* Significant at 95% confidence interval, - not significant

Nightingale (2001) also explained that low participation of women and DAG in decision-making processes was not represented their voices in the decisions. Chi-square value showed that attendance of DAG and NDAG is significantly different to each other i.e. more NDAG respondents were participated than DAG. Chi-square test of economic and gender has been found the insignificantly different to each other because almost all the users have directly concern with their meeting schedule after the BZCF Program.

5.2.4.2 Participation in General Assembly

General assembly of the CFUG is the common forum for all CFUG members to participate in decision making. So every CFUG member has equal right to participate in general assembly. Among five BZCFs, general assembly is called twice a year, mainly at the time of tending operations i.e. firewood collection. Most of the BZCFUG members mainly women are involved in general assembly because it has direct effect on the forest products collection. Although participated in such programs, most of the DAGs and women were not feeling free to express their opinions. Various right based training has been conducted by SAGUN Program of CARE/Nepal and most of the poor, women and dalit can raise their voices in general assembly.

5.2.4.3 Response on Committee decision

Poor and dalit are very innocent to give the positive response toward committee decision. Majority (45.34%) and very few (9.25%) of the respondents stated committee decisions were ok and not so good for them respectively. DAG, poor and female respondents were unknown about the decision made by committee. They explained that however there was no any negative result for them, FUC had not worked in favor of them. Chi-square values showed that response of respondents varied significantly to social, economic and gender status of respondents. That means NDAG, Rich and Male had significantly different perception with DAGs, poor and Female respectively.

5.2.4.4 Participation in training, workshops and study tours

About 42% of the respondents have attended BZCF related training, workshops and study tours. Among them, 55% were rich, followed by medium (44.7%) and poor (29.9%). Most of the respondents were participated in such events once. Similarly 54.8% of the NDAGs and only 19% DAG respondents had attended in such events. However, Chi-square test also showed significant difference between DAGs and NDAGs members attended in training and tours. There was not significance difference among the economic and gender perspective of the society.

SAGUN program of CARE/Nepal, WWF-TAL Program, DNPWC, District Forest Office and FECOFUN organized trainings and workshops. Most of the trainings were concerned with biodiversity conservation, forest management i.e. silvicultural operations and auditing. According to poor and DAG respondents, only executive members are getting benefits from such facilities. They claimed that they were not even aware about the training and workshops. In theory, these programs should be targeted to those who are less educated, less aware and less empowered groups, however, most of the opportunities were captured by rich and NDAGs of executive committee **(Poudel, 2003)**.

5.3 Index of Relative Ranking (IRR)

Index of Relative Ranking (IRR) was used to calculative the relative position of the conducted activities. Typically, activities headings viz. meeting and assemblies, plantation Program, skill development Program, biodiversity conservation, NTFP management/IGAs for pro-poor program, and etc were categorized according to the objectives of the research.

Data were captured separately from each of the BZCF and then summarized in below table. Result seems the positive toward the biodiversity conservation and protected area management because of the near by national park (Bardia Nation park). Most of the respondents were aware about biodiversity conservation, meeting and assemblies and skill development programs. Various NGOs, INGOs, GOs have been implemented in the buffer zone of Bardia National Park so

users have got a chance to participate in meeting of concerned headings. In fact, skill, attitude and knowledge of the users have positively increased after the BZCF Program.

Photographs

Different activities had been carried out in buffer zone of Bardia National park by BZCFUGs which also are a proof of highest value of Index of Relative Ranking (IRR) and calculated (0.9).

Table 7: Activities, calculated IRR, result and ranking value

S.N	Activities	Calculated IRR	Result	Ranking
1	Meetings & assemblies	0.80	Active	Third
2	Plantation Program	0.43	Fair	Four
3	Skill development activities	0.82	Active	Second
4	Biodiversity conservation	0.9	Active	First
5	NTFP management/IGAs, pro poor focus Program	0.53	Good	Four
6	Others	0.42	Fair	Six

Table reveals that score of biodiversity conservation was the highest (0.9) and got the rank of first and beyond the enlisted actions were the smallest value (0.42). One of the main reasons why are they more knowledge on biodiversity is that they have participated in formal or non-formal workshops/trainings organized by WWF/TAL, SAGUN-CARE, DNPWC/NP, etc.

5.4 Index of Perceived Availability (IPA)

Index of perceived Availability was used to check the people perception in different headings. IPA value was compared to the highest (1) and lowest (0). Higher the value higher the perception toward the asked statement. Questionnaire was taken in different economic strata of the users with in purposed BZCFs and summarized the IPA value below:

Table 8: Index of Perceived Availability

S.N.	**Activities**	**IPA value**	**Perception**
1	Participation of Poor, women and dalit in meeting has increased after BZCF program.	0.65	High
2	Poor, women and DAGs can not able to handle the executive body of BZCF	0.21	Low
3	It had better to reduce poverty through income generation activities	0.8	High (Remarkable)

4	Representation of poor, women and DAGs in buffer zone committee is more effective than others	0.51	Medium
5	"Linkage between biodiversity conservation and rural livelihood improvement in the buffer zone of Bardia NP" Is it possible or true?	0.84	High (Remarkable)
6	We must promote the eco-tourism in BZCF	0.7	High
7	Creation of employment specially for targeted groups (Local people)	0.9	High (Remarkable)
8	Skills, knowledge and attitude for smoothly running the BZ committee	0.5	Medium
9	Are you Interested to be a executive committee members?	0.53	Medium

5.5 Livelihood and biodiversity

Rural livelihood strategies are shaped by several factors. In the protected areas like buffer zone the livelihood is diverse than other parts of the settlements. Natural hazards, wildlife damages, political unrest, and government policies are among the many forces causing this. Those individual, households and communities have to negotiate to reduce their vulnerabilities and improver their welfare.

A livelihood encompasses not only the income generating activities pursued by a household and its individual, but the social institutions, intra-household relations and mechanisms of access to resources through the life cycle (Ellis, 2000). The purposed of understanding livelihood strategies is to shed light on how and when individuals, households and communities negotiate among themselves, with their communities. Forests, water, land, livestock, crop and knowledge are essential resources in generating the livelihoods of families in rural areas of the world. Although agriculture may not be the sole sources of their income, it .is a major components (Valdivia and Quiroz) in the buffer zone.

This seems to evolve a positive influence as a result of the buffer zone Program on the indications of various livelihood factors such as vulnerability reduction, improved access and growth of resources/ capitals and better coordination among the actors.

As the household levels, and looking at social capital, it indicates a provision of membership in formal CBOs along with their traditional practices as a consequence of the increase in social inclusion and bargaining power of the poor and women. Another increasing effect on wildlife and their chasing practices is the reduction in hunting practices and increase in protection trend. Adoption of alternate means to control wild animals from entering to the croplands and crop damages. Also it should be noted that the vulnerability context of wildlife damages (expect crop) decreased due to establishment of the relief fund.

5.6 Livelihood strategies

Table 9: Showing the Livelihood strategies evolved during the group discussion, September, 2006

S.N.	Activities	Year 1995 (before formation of Buffer zone Program)	Year 2006 (After buffer zone Program and realization)
1.	Forestry	Over extraction and utilization Govt. managed protection Less effective protection	• Plantation, protection, management and optimum utilization • Community managed protection system • More effective protection.
2.	Sources of fuels	Fuel wood (100 %)	Fuel wood (80%) Alternate energy-biogas, solar heater (20 %)
3.	Relief for wildlife victims	Informal (only for human injuries)	Established endowment fund (compensation for livestock's damage, poverty lose and human injuries)
4.	Wildlife chasing	• Wildlife hunting • Making noise • Traditional tower	• Wildlife conservation • Making noise

		(over the trees)	• Trench construction • Solar fencing • Tower construction
5.	Agriculture	cereal crops (Paddy, wheat, maize) traditional / local cash crops (mustard, lentil)	Cereal crops (Paddy, wheat, maize and also their improved varieties Vegetable farming Menthe cultivation
6.	Social capitals	• Traditional (Kulopani chaudhary, Badhghar) • Meeting as per need • Collective actions for social activities occasionally	• Formal memberships in CBO • Organizational development • Regular meeting • Collective actions for social activities regularly
7.	Health facilities	Local healers District health centre	Local healers Health in the village
8.	Financial capitals	• Loan from landlord • Formal bank • High interest rate (up to 60% from landlord)	• Loan from landlord • Formal bank • CBO managed co-operatives • Low interest rate (max 20% from CBOs)
9.	Livestock	• More cattle • Grazing than stall feeding • Local varieties	• More buffaloes • Stall feeding than grazing • Improved breeds
10.	Awareness/co-ordination	Co-ordination meeting with park	• Co-ordination meeting with park • Net working meeting with other line agencies
11.	Technical support	• Veterinary office • Agriculture office	• Village specialist (Veterinary, agriculture) in the village

(According to the field survey, 2006)

5.7 Assessment of livelihoods pentagon

5.7.1 Natural capital

One of the main objectives of the BZ Program is the conservation of BZ forest in collaboration with local communities and sustainable supply of the forest products (timber, fuel wood and forage), that help to minimize the pressure on park resources. The communities have been directly involved in plantation on barren land and protection of the degraded natural forest. BZCF has able to improve the live standard of poor and dalit as a formation of natural capital. People spent more time to collect firewood, fodder and leaf letter. *Time (65%) has saved to the users after the BZCF Program.*

Water Sources

The Karnali and Babai rivers are the perennial river systems that flow through the park. There are so many seasonal rivers and streams like Orai river, Gumnaha Nala, Ambasa Khola, Khauraha Khola, etc. that are draining through park area between Karnali and Babai rivers (RBNP, 2006). BZCF can contribute to serve the sources of water at the upper Siwalik regions. The construction of Siwalik hills in the park has helped to provide the local people a study source of water for irrigation.

(Photo: Water resources both for human being as well as wildlife species in and around Babai river system, Bardia)

Wildlife species

The community manage forest has become an additional habitat for wild animals. The animals prefer to graze new shoots of grasses in the community forest. The community reported that the trend of sighting wild animals have been gradually changing for last few year. They also reported sighting of some common species during the meeting.

Table 10: Trend of wildlife sightings in the study area (group discussion, Sept, 2006)

S.N	Sighting trends	Rammapur BZCF	Harnawa BZCF	Janachetana Women BZCF	Shree Krishan BZCF	Santi Batika BZCF
1	Abundant before but decreasing now	Blue bull, Vulture, Monkey Rhinoceros	Blue Bull Vulture Rhinoceros	Vulture Monkey Cattle heron	Vulture Eagle Jackle Rhinoceros	Vulture Cattle heron
2	Existing before but has disappeared now		Rat, Bear, Sarus	Eagle, Fox	Sarus Fox	Blue bull, Sarus, Crow
3	Not reported in past but sighted now a days	Common Birds Asian Elephant, leopard	Common Leopard, Elephant	Common Leopard	Leopard, Common Birds	Common Birds

According to the respondents perceived some reasons that caused the change in sighting tendency of the following species:

Vulture: District forest office was cleared a large number of Simal trees (*Bombax ceiba*) around the buffer zone. It might have distributed their habitat. Local communities use **diclofenac** medicine for their livestock's treatment. Vulture die in few days when they eat carcasses used by diclofenac. This condition affected the reduction of the vulture.

Blue Bull: Increase mobility of tiger might be the possible cause of disappearing of the Blue bull.

Cattle heron: There was poising in the Orai River around 1995. The fishes, frogs and other aquatic species died and floated massively. They were eaten by cattle Heron and huge number of Cattle heron died immediately.

Future direction (Future activities of BZCFUG)

They are thinking about tower construction and grassland management to promote tourism activities, which will help create employment opportunities to them. They are collect forages and fuel wood as per needs. They have to pay Rs 4.0 per person per entry in the BZCFs.

5.7.2 Human Capital

The literacy status was analyzed in different BZCF. There is substantial difference in the literacy rates among different group. The overall literacy status was 58%, which was higher than the national the national literacy rate.

Awareness activities, managerial training and income generating activities ware supported by the BZ Program. The awareness activities included workshops, observation visit, and seminars to enhance knowledge and skills on conservation and community development. The managerial training was organized to the office bearers for the better management of the CBOs. They have frequently received more than 10 training on book keeping, leadership, cooperative, forest management, etc. There was zero or minimal presentation of poor, women and disadvantaged groups before BZCF Program. This is a situation at present and we can guess that marginalized poor, women and disadvantaged groups will take part in different awareness raising Program and IGAs.

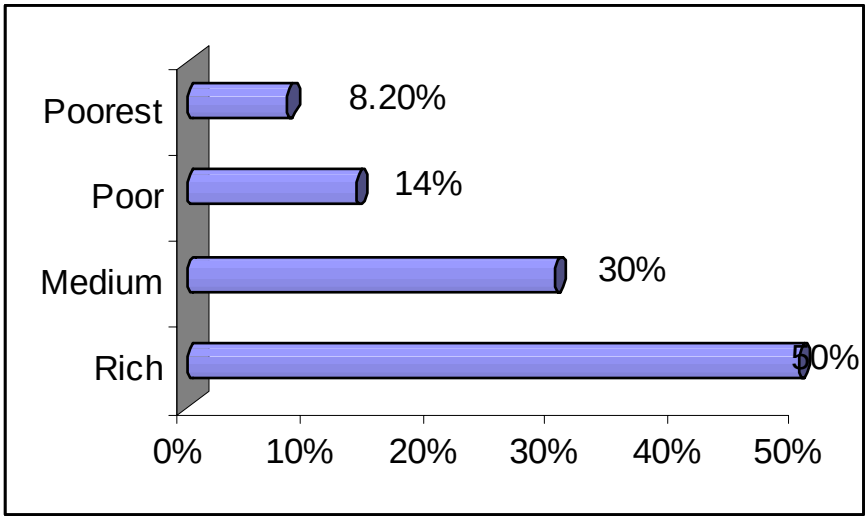


Figure 7: Participation of Rich, medium, poor and poorest on awareness program and IGA training

Community governance and decision making

The decision making process of user groups is usually on consensus basis. About 84% of the households are members of UGs and majority (51%) of the members always attends regular meeting. The degree of participation is highest in rich and lower in the poorest class.

5.7.3 Financial Capital

During group discussion, it was found that there was a positive correlation between reduced income due to crop damage and out migration in search of better employment opportunities. Those incidences of relatively higher crop damage occurred resulting in reduced income but increase in out country (third countries) labor work in 2006.

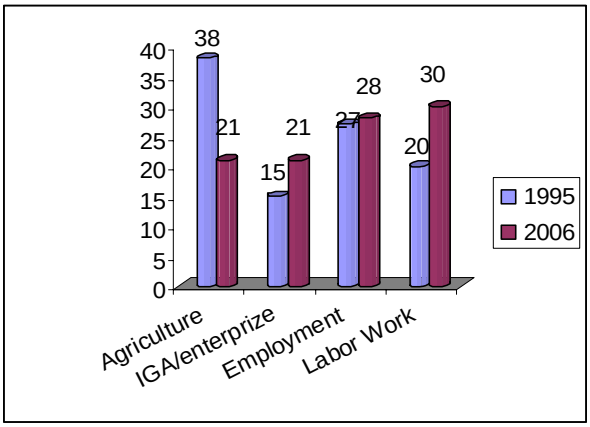


Figure 8: Major income sources of Households in 1995 and 2006 (%)

The number of cattle significantly decreased over the period of 11 years. The number of buffalo has decreased. However, the average number of livestock unit has significantly decreased by 2006. The decrease in number of livestock helps to reduce pressure on park particularly for cattle grazing. The reasons behind decrease in number of livestock are conversion of grazing land into community plantation as well as protection of degraded forest. Besides this the communities were aware and actively involved in conservation. The communities had been encouraged to promote stall feeding for their livestock rather than grazing. The quality of livestock has increased with the decrease in number of livestock. The number of buffalo has increased which are fertilized by genetically improved he-buffalo, thus increasing the total productivity.

In community saving/credit scheme, the members have deposited money at the regular meeting as per their capacity and willingness. The review of documents of CBOs showed that there were big variation on average shaving and fund mobilization. There are two types of soft loan provision to the members without collateral as well as on low interest rate. One is from community generated saving fund and another is from BZ program provided fund. The BZ program has been providing loan on the basis of recommendation of respective user groups. The interest is kept as a grant of respective user groups and the principle amount is paid back to the BZ Program on installment basis.

Table 11: Perception on loan and witness/collateral of other members

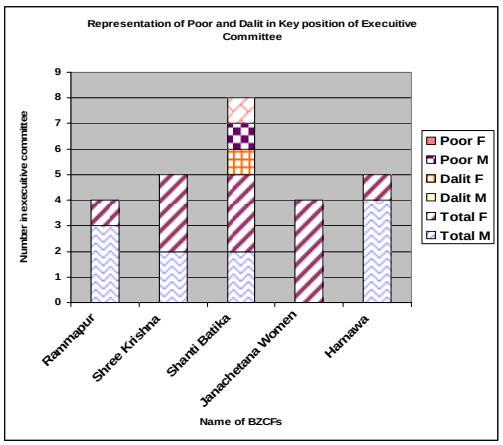
S.N.	Well being class	Index of Relative Ranking IRR		
		Formal Loan	Informal Loan	Witness/collateral
1	Rich	0.6	0.8	0.81
2	Medium	0.51	0.7	0.75
3	Poor	0.46	0.64	0.6
4	Poorest	0.38	0.82	0.58

The table shows that the poor people have low (IRR= 0.38) reliance on formal (Bank etc) loan and higher dependency (IRR = 0.82) on informal (group fund) loan.

Under the BZ provision, 30 to 50 % of the park-generated revenue has been ploughed back to the communities for conservation and community development works. The respective user committees allocated this budget as per their community requirements and the program's norms. After the declaration of the buffer zone, the communities have received fund annually and mobilized it principally for community development activities.

5.7.4 Social capital

Majority of the poor showed their positive interest in CBOs, but, nominal percent represented in user committees. Poor and poorest access to representation is low in the higher levels of CBOs. Though people



perception toward BZCF seems positive, they have not captured any vital key posts yet.

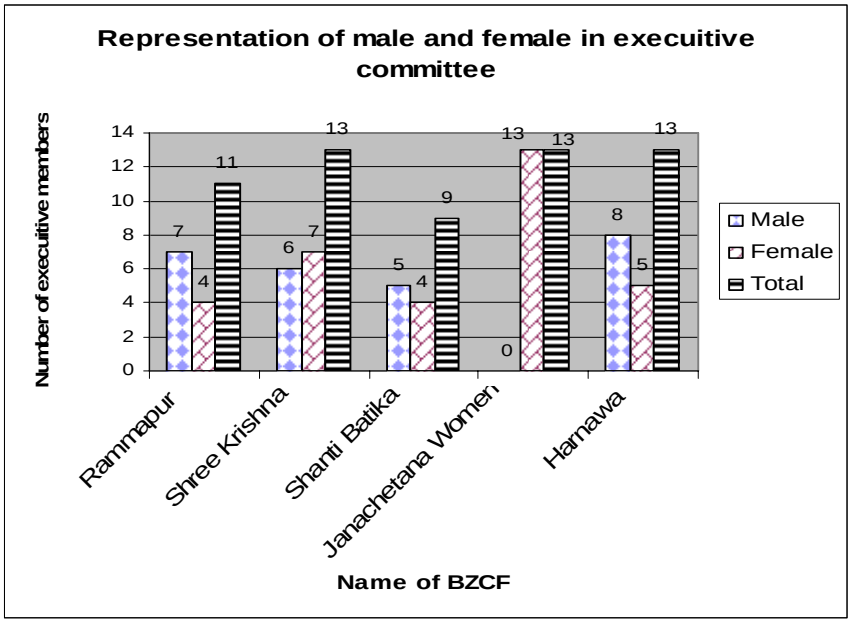


Figure 9: Representation of male and female in executive committee (BZCF)

5.7.5 Physical Capital

One of the main objectives of the BZ program was to generate sustainable supply of timber to all users for house construction and other requirement including agricultural implements. The ownership of house is one if the main properties. All respondents have their own houses.

It was found that 87% of house in the study area was thatched roofed and 13% was with permanent roof including masonry type.

There was decrease in dependency on rain fed irrigation system with increase in pump set boring installation by 2006. The buffer zone program supported 62 pump-set boring as a productive investment in the study area over a period of 11 years.

The canals were improved with the replacement of *Jhalapata* (vegetation construction to divert water to the irrigation land) system by aqueduct and RCC construction. They installed boring in collaborating investment of Agriculture Development Bank (ADB), BZ program and users. After that, several opportunities were opened to the entrepreneurs like vegetable farming.

5.8 Vulnerability context

The vulnerability context frames the external environment in which people exist (DFID, 1999). Low potential for substitution makes livelihoods more vulnerable (Ellis, 2000). Every year people are killed or seriously wounded by Tiger (*Panthera tigris*) and other wild animals. The tiger occasionally turn into man-eaters and create havoc in the near by villages. During questionnaire survey, Rammapur BZCF was a serious problem by wild elephant and tiger.

Table 12: Mobility of wild animals in the croplands in 2006

Wild animals	Index (Mobility index0	Rank
Wild boar	0.95	I
Elephant	0.8	III
Chital	0.83	II
Others (Rhino, Blue bull, Monkey, Peacock, etc)	0.7	IV

The other animals including Rhino, Monkey, Blue bull, Peacock, etc have relatively low mobility in the farmlands. The mobility may not show the extend of damages. However, people used to blame mainly the wild boar for their crop damages. It is discussed in the study area. Human injury, crop damage and wildlife movement were measured or assessed for the vulnerability context and recommend the suitable compensable to the affected community in the near future. People were not satisfy with compensate amount due to higher lost and they were able to receive lower amount from the government

5.9 Analysis of Livelihoods

Nature of livelihoods

The common physical capitals have equal access to all but it was different in the case .of private physical capital. House type (permanent) and ownership, land holding, livestock holding, annual income, literacy status are found to be critical assts distinguishing the poorest and rich class. Poorest have relatively less access than the rich class.

Expect human capital, rich class haws highest access on four assets whereas middle class has highest access on human capital since they have access to literacy level, training and leadership quality.

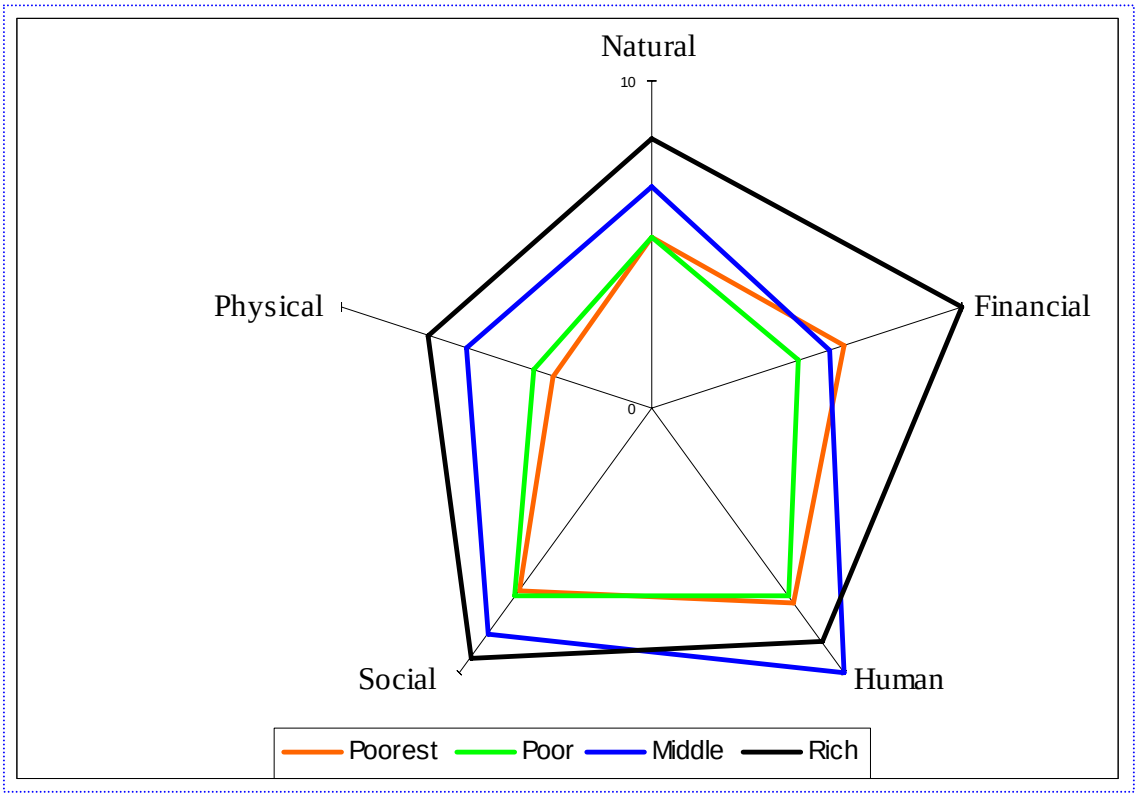
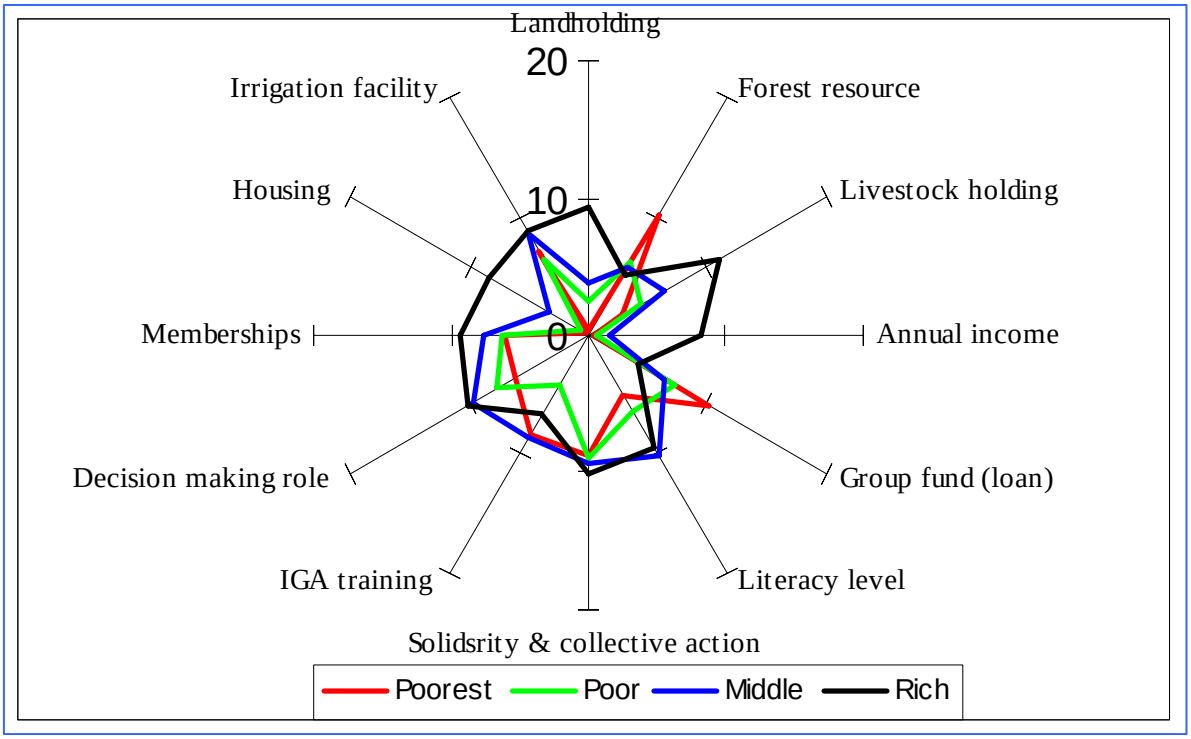


Figure 10: Household assets, by well being class, 2006



In above figure, it reveals that rich has highest access in all assets expect group fund and forest resources. It is because of availability of alternative sources of forest resources to them and they do not depend much upon group fund, which is a small amount. However, the poorest class has greater access to group fund and forest resources since they have more dependency on those activities.

In fact, the poor people have highest access on forest resources and group fund whereas better calls has higher access than the poor on remaining activities which are related to these livelihood assets.

5.10 Policies and Institution

Park Management Plan, BZ Management Plan, NPWC Act, BZ Management Regulation, BZ Management Guidelines, Tourism plan, Community-based Co-operative Working Guidelines, CBO`s Constitutions provided the opportunities to have membership in CBOs, use of fund and resources, provision of Biodiversity Conservation Fund and Buffer zone community forestry were the policy and institution.

Chapter 6

Conclusion and Recommendation

6.1 Conclusions

The study has examined the community-based biodiversity conservation and rural livelihood improvements in the buffer zone of Bardia National Park. Five Buffer zone community forests have been taken for the study as BZCF has been adopted from the model of community-based biodiversity conservation. Almost all the users have aware and consensus on biodiversity conservation. They have received 30 to 50% of park revenue and help to progress willingness to conserve natural habitat from their inner hearts. Out of the five buffer zone community forests, Rammapur BZCF was more effective management than the others (Santi Batika BZCF, Harnawa BZCF, Janachetana Women BZCF and Shree Krishna BZCF). Others BZCFs have followed this success and continuously grew up. Equal opportunity for the poor, women and DAGs in any resources is the vehicle for the change in community development. Though BZCF can increase the biodiversity conservation, vulture population is being at risk due to use medicine (*Diclofenac*) for livestock's treatment and vulture die in few days when they eat carcasses used by that medicine.

The CBO as guardians of the BZ and became an umbrella approach for community development and conservation activities. Community managed BZ forest is more effective conservation approach, whereas delay in handing over community managed forest is creating distrust between communities and park authority. However, majority of the poor, women and Dalit have been neglected due to lack of quota provision for representation at higher level Community Based organizations (CBO).

Most of the adopted attempts by the CBOs are in progress in collaboration with park and other line agencies to reduce the vulnerability factors, which are soft loan provision, community forest management and establishment of endowment funds.

The increasing trend of alternative energy use (25%), stall-feeding practice (increased by 50%) and participatory protection of the BZ forest are helping to meet conservation

strategies adopted by the Program. Establishment of relief fund and biodiversity fund provided opportunities for immediate rescue of wildlife victims and soft loan for poor entrepreneurs respectively.

In terms of capitals

Physical capital*:* Overall the physical capital has effectively increased. Increase in physical capital by construction of village roads, school, health post have equal access to all. Maintenance of irrigation canal, installations of pump set boring and new house construction have help to increase the physical capital.

Natural capital*:* BZCF is serving as an extended habitat to the wild animals and the poorest of the poor people have got highest access to forest resources. Thus natural capital has improved by BZ Program.

Social capital: Local people become more aware regarding community-based organization. They were participated in formal or informal CBOs. Leadership power and well-being has been increased after the BZCF Program. People perception toward buffer zone community forestry Program is strongly positive. People have shown the keen interested under the park rather than district forest office as they receive about 30 to 50 % revenue collected during year to the BZ committee for the community development. The CBOs have evolved as a major umbrella organization to implement community development and conservation activities at the settlement level. Thus, the social capital has improved.

Human Capital: More than 60 % members are always present in user group meeting and 70% of the poorest have got the opportunity to be present in awareness Program and IGA training. Moreover, there is a strong decision making role of the poorest in the meeting. So, the human capital has improved.

Financial capital: Saving/credit scheme has been established through co-operative management Biodiversity Conservation Fund (BCF) and other small scale fund has been initiated through buffer zone forestry Program. Poor and DAGs has got higher access (86% and 80%) to soft loan. Thus, the financial capital has improved after the buffer zone forestry Program.

6.2 Recommendations

On the basis of research the following recommendations have been made:

- Provision on crop insurance mechanism should be implemented in wildlife conflicts area. Barriers will reduce human and livestock entry to the park and wild animal entry to the village. The barbed wire fenced at the boundary of the park along the settlement can be maintained. The boundary of the park and BZCF along the settlement can be fenced with bio fence, electric fence and game proof fence to reduce the damage caused by wild animals to the life and property of the villagers.

- Representation of poor, women and DAGs in any resources is a vehicle for the change in community development. So, quota provisions, pro-poor activities should be designed and implemented to empower them for the streamlining of foremost development Program.

- Biogas can be a good alternative to reduce the local dependency on the BZCF for the collection of the fuel wood. It will help to reduce the use of dung cake and also will help to enhance the health status of people and saving time.

- It was found that the CFUG in the area was very much active and was doing appreciative pieces of initiatives to motivate and mobilize local community towards conservation and management of their natural resources together with the wildlife conservation inside the park. Therefore, the management system of BZCF should be further boosted by providing economic, institutional and moral supports by the park and donor agencies so as to develop the well institutionalized local stewardship in conservation.

- Shaving/credit scheme should be promoted through community managed cooperatives. Soft loan should be provided through co-operatives to the selected potential entrepreneurs for IGA.

- Most of the people in the study area are illiterate and financially poor. They are aware of protecting Park in the sense of forest resources only i.e. tree but they are unaware about the significance of protecting wild animals, and conservation of bio-diversity. So, in such situation conservation education is the only means to make them aware. Such program can be facilitated with the help of the film documentaries, nature conservation talk programs, cultural show and school/informal education that will leave a direct effect on conservation thinking. Conservation of park is not possible only by the effort of park authorities alone; it needs support from the people especially living near the Park. So, keeping in mind conservation through participatory approach, people should be encouraged to participate in the park management program.

- Community awareness Program on biodiversity conservation should be launched among the indigenous local people in the buffer zone of the park, which will be very effective for the proper management of flora and fauna in and around the park.

- Though BZCF can increase the biodiversity conservation, vulture population is being at risk due to use medicine (*Diclofenac*) for livestock's treatment and vulture die in few days when they eat carcasses used by that medicine. Alternate medicine (**Meloxicam**) should be used for their livestocks treatment. Creation of community awareness on biodiversity conservation (focusing on endangered species) among the indigenous local people should be implemented in the near future through conservation related donor agencies and local communities organization.

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Appendixes

Appendix-I

Major crop diversity within the buffer zone of Bardia National Park.

S.N.	English Name	Scientific Name
1	Paddy	*Oryza sativa*
2	Wheat	*Triticum aestivum*
3	Maize	Zea mays
4	Lentils	*Lens culinaris*
5	Peas	*Pisum arvanse*
6	Mustard	*Brassica compestris*
7	Potato	*Solanum tuberosum*

Appendix II

Wildlife Species causing crop damages

S.N.	English Name	Scientific Name
1	One- horned rhinoceros	*Rhinoceros unicornis*
2	Tiger	*Panthera tigris*
3	Chittal	*Axis Axis*
4	Wild boar	*Sus scrofa*
5	Wild Elephant	*Elephus maximus*
6	Rabbit	*Lepus nigricollis*
7	Common Leopard	*Panthera pardus*
8	Porcopine	*Hystrix indica*

Appendix III

Major Biodiversity Characteristics of BNP

- Mammals: > 53, including 10 protected species
- Birds: > 400, including 4 protected species
- Reptiles: > 25, including 3 protected species
- Fishes: > 121
- Major Grassland

- **Bhaghaura, Khauraha, Lamkauli, Dhanushe, Shivapur, Sanoshree, Thuloshree, Guthi, Chittale, Babiyachour and Chepang**
- Sal Foresst : More than 70%
- Bardia National Park is rich in Species diversity, ecosystem diversity and genetic diversity for suitable habitat of various wildlife.
- Scenery Beauty of Babai Valley:
- Translocation of one horned Rhinoceros successfully in area
- Area for protection of Gharial Crocodile(*Gavialis gangeticus)*
- Focus on Black buck (*Antilope cervicapra*) Conservation (approximately 97 numbers at present)
- Increasing numbers of Wild Elephant (Approximately 50-55 numbers at present)
- Area of Dolphin Conservation *(Platanista gangetica)* (Approximately 4-7 numbers in winter season)
- Maximum number of Chittal flocks found in that area of Nepal.
- Area of protection of Swamp deer (*Cervus duvauceli*) (Approximately 100 number in Baghaura area)
- Area of incerasing order in numbers of Tiger

Annex IV

Vegetation status in the buffer zone of Bardia National Park

S.N.	Scientific Name
1.	*A. Dicotyledon*
2.	*Acacia catechu*
3.	*Argustemma verticillatum*
4.	*Blumea sp.*
5.	*Bombax ceiba*
6.	*Callicarpa macrophylla*
7.	*Carthamus tinctorius*
8.	*Crotalaria albida*
9.	*Crotalaria prostrate*
10.	*Dalbergia sissoo*
11.	*Desmodium gangeticum*
12.	*Dillenia pentagyna*
13.	*Dunbaria sp.*
14.	*Flemingia macrophylla*
15.	*Hedyotis ovalifolia*
16.	*Indigofera linifolia*
17.	*Knoxia corymbosa*
18.	*Lagerstroemia parviflora*
19.	*Leucas mollissima*
20.	*Maharanga sp.*
21.	*Mallotus phillippensis*
22.	*Melia azariach*
23.	*Mimosa sp.*
24.	*Murraya koenigii*
25.	*Ophioglossum nudicaule*
26.	*Oxalis sp.*
27.	*Peristylis sp.*
28.	*Phyllanthus simplex*

29.	*Phyllanthus sp.*
30.	*Phyllanthus nurii*
31.	*Prunella sp.*
32.	*Scleris biflora*
33.	*Sporobolus diander*
34.	*Stellaria media*
35.	*Shorea robusta*
36.	*Trifolium repens L.*
37.	*Euphorbia parviflora*
38.	*Senecio densiflora*
39.	***B. Monocotyledons***
40.	*Alysicarpus rugosa*
41.	*Apluda mutica*
42.	*Arisaerna sp.*
43.	*Byophytum sensitivum*
44.	*Bothriochloa ischemum*
45.	*Coix lachryma-jobi*
46.	*Cymbopogon flaxuosus*
47.	*Cynodon dactylon*
48.	*Cynodon sp.*
49.	*Cyperus difformis*
50.	*Cyperus rotundus*
51.	*Desmostachya bipinnata*
52.	*Digitaria sp.*
53.	*Digitaria adsendens*
54.	*Eragrostis gangetica*
55.	*Eugenia jambolana*
56.	*Evolvulus nummularis*
57.	*Fimbristylis dichotomo*
58.	*Heliotropium strigossum*
59.	*Hemigraphis hirta*
60.	*Imperata cylindrica*
61.	*Lidernia ciliata*
62.	*Linium linifolia*
63.	*Narenga porphyrocoma*
64.	*Pauzolzia zeylanica*
65.	*Phragmites karka*
66.	*Rungia pectinata*
67.	*Saccharum bengalensis*
68.	*Saccharum spontaneum*
69.	*Setaria glauca*
70.	*Schizachyum brevifolium*
71.	*Symplicus sp.*
72.	*Themeda arundinacea*
73.	*Themeda villosa*
74.	*Vetiveria zizanoides*
75.	***C. Pteridophytes***
76.	*Diplazium esculentum*
77.	*Discorea bulbifera*
78.	*Equisetum debile Roxb.*
79.	*Selaginella sp.*

Annex V

Listing of the Medicinal and Aromatic plants (MAPs) and their ethno -botanical value in the buffer zone of Bardia National park.

S.N.	Local name	Scientific Name	Ethnobotanical Uses
1	Bojo	*Acorus calamus*	Rhizome is a medicine for throat problem and common cold.
2	Bel	*Aegle marmelos*	Leaf is used as a medicine for fever and cold. Fruit sap is administered in gastric and diarrhea. Leaf has a religious value and used in worship ceremonial. Fruit is edible and

			eaten.
3	Titepati	*Artemisia vulgeris*	Leaf being medicinally important, is used in blood purification and common cold. Root is used to treat tapeworm problem. Leaf has religious value.
4	Kurilo	*Asparagus recemosus*	Root is a medicine administered in gastric and fever. Root is a tonic commonly used by housewives. Root and fruit has veterinary value. Fruit also sometimes used as a substitute of soap. Root is used as vegetables.
9	Ank	*Calotropis gigantea*	Leaf, as a medicine, is used in nozzle problems. Sap is used in bleeding control and toothache, and swelling muscles.
13	Tejpat	*Cinnamomum tamala*	Leaf, due to good flavor, used in tea and spices. Bark also used as spice, oil extracted from leaves is used as medicine.
15	Bans	*Dendrocalamus species.*	Culm is used as food in young stage. It is used to make handicrafts, to make sticks for fencing purpose, instrument for fishing and different agriculture implements. It is used in funeral work.
20	Jamuno	*Eugenia jambolana*	Fruit is edible and eaten. Seeds are used in diabetes. Bark is used to treat diarrhea.
23	Siru	*Imperata cylindrica*	Root is a source of medicine and used in gastric and tapeworm problems. Whole plant is used in thatching.
24	Sajiwan	*Jatropa curcas*	Stem is commonly used as toothbrush. Oil extracted from seed is used as candle.
25	Asuro	*Justica adhatoda*	Bud is considered as a valuable medicine and used in fever, gastric, asthma and headache. Leaves are good source of green manure.
29	Tatalo	*Oroxylum indicum*	Bark is source of medicine and used for asthma. It is also used in veterinary purposes. Flower is used in religious ceremony.
30	Nundhiki	*Osyris wightiana*	Root and bud is used in abortion and pesticides in crops.

31	Amala	*Phyllanthus emblica*	Root is used as dye. Leaf is used in softening dead skin as which is used by shoemaker later. Fruit is used as medicine to make *Triphala churna* for gastric. Fruit is edible and eaten and used to make pickle.
40	Khirro	*Sapium insigne*	Sap is a poison. Leaf and bark is used for fishing by Magar tribe.
43	Sal	*Shorea robusta*	Bark is used to make dye. Sap is adhesive and has medicinal value, used as a substitute of Lac. Leaves are used to make dinner plate. Oil extracted from seed is used as a substitute of soap. Saldhuphas religious value.
45	Kantakari	*Solanum xanthocarpum*	Fruit has a medicinal value and used in dental cure, headache and bodypain. Root is commonly used in abdominal pain, fruit is used as a substitute of soap.
47	Kaliniuro	*Tectaria macrodonta*	Leaf has medicinal value and used in curing gastric and blood dysentery. It is commonly used as vegetables.
48	Harro	*Terminalia chebula*	Fruit is used as a medicine in common coughs. It has laxative value and used in gastric and constipation and lung treatment. It is used to make *Triphala churna*.
53	Simali	*Vitex negundo*	Leaf is used as a medicine for nozzle problems.
55	Dhairo	*Woodfordia fruticosa*	Flower is used as medicine for dysentery and fever.
56	Bayar	*Zizyphus mauritiana*	Bark is used as medicine in common cold. Seed is used to treat measles. Fruit is eaten and used to make pickle.
60	Abijalo	*Drymaria diandra*	Entire plant is used to make juice for cough, headache.
63	Gandejhar	*Houttuynia cordata*	Whole plant is used to make juice and used in wounds.
69	Sajh	*Terminalia tomentosa*	Bark is used to make dye and to make juice which is used against overbleeding and cut wounds.
70	Pandel	*Zizyphus*	Fruit is used to cure menorrhogia.

		incurva	
71	Camuna	*Syzigium cerasoides*	Bark and leaf is used to make juice and used to treat cough and common cold.
72	Ekle bir	*Lobelia pyramidulis*	Stem is used in abdominal pain and wounds.
74	Datiwan	*Achyranthes bidentata*	Whole plant is used as diuretic and astringent.
75	Ghottapre	*Centella asiatica*	Leaves are diuretic and tonic, purify blood and improve appetite. They are considered good for indigestion, asthma, skin diseases, and improving memory. Leaf juice is used in treatment of liver complains and gastric troubles. It is widely used in leprosy.
77	Bhringaraj	*Eclipta prostrata*	Paste of leaves and roots are used in wounds and skin diseases, young parts are used as vegetables. Leaf juice is given to treat fever, urinary and spleen trouble.
79	Pipla	*Piper longum*	Root is pungent, heating, stomachic laxative, abdominal pains, urinary discharge, piles, antidysentery and useful in bronchitis.
82	Khayar	*Acacia catechu*	It is used in chronic diarrhea, dysentery, uterine hemorrhage and leucorrhea, remove the pain of mamallary glands and to make katha and kach.
87	Rajbriksha	*Casia fistula*	Fruit pulp is used as purgative, tonic and febrifuge and also in heart disease. Root is generally given as tonic and purgative and useful in skin diseases. Leaves are laxative and heal ulcer.
90	Mahauwa	*Madhuca indica*	Flowers are eaten raw and fermented for distilling alcohol. The decoction is used for curing cough, fatty oil from seeds lighting lamps, oil cake as fish poison.
91	Sindhure	*Mallatus phyllippinensis*	Powder on the fruits is bitter and anthelmintic heals ulcer and wounds and also used as purgative and in scabies.

92	Barro	*Terminalia blerica*	It is one of the constituents of *Triphala churna* and used for liver and gastrointestinal tracts. Bark is diuretic and cardiotonic. Fruit is astringent, laxative, alterrative, fine powder useful in carious teeth and bleeding germs.

Annex VI

Birds Diversity

English Name	**Latin Name**
Babblers	
Abbott's Babbler	*Turdoides earlei*
Black-Chinnned Babbler	*Stachyris pyrrhops*
Black-Throated Babbler	*Stachyris nigriceps*
Jungle Babbler	*Turdoides striatus*
Nepal Babbler	*Alceppe nepalensis*
Red-Capped Babbler	*Timalia pileata*
Red-Headed Babbler	*Stachyris ruficeps*
Rufous-Bellied Babbler	*Dumetia hyperythra*
Slaty-Headed Scimitar Babbler	*Pamatorhinus schisticeps*
Spotted Babbler	*Pellorneum ruficeps*
Striated Bbbler	*Turdoides nipalensis*
Yellow-Breasted Babbler	*Macronous gularis*
Barbet	
Blue-Throated Barber	*Megalaima asiatica*
Lineated Barbet	*Megalaima lineata*
Great Himalayan Barbet	*Megalaima virens*
Green Barbet	*Megalaima zeylanica*
Crimpson-Breasted Barbet	*Megalaima haemacephala*
Bee Eaters	
Chestnut-Headed Bee-Eater	*Merops leschenulti*
Green Bee-Eater	*Merops orientalis*
Blue-Bearded Bee-Eater	*Nyctyornis athertoni*
Blue-Tailed Bee-Eater	*Merops philippinus*
Blackbird	
Eurasian Black Bird	*Turdus merula*
Gray-Winged Black Bird	*Turdus boulboul*
Bulbul	
Brown-Eared Bulbul	*Hypsipetes flavalus*
Gray Bulbul	*Hypsipetes madagascariensis*
Red-Vented Bulbul	*Pycnonotus cafer*
Red-Whiskered Bulbul	*Pycnonotus jocosus*
White-Cheeked Bulbul	*Pycnonotus leucogenys*
Bunting	
Yellow Breasted Bunting	*Emberiza aureola*
Crested Bunting	*Melophus lathami*
Chat	
Blue Chat	*Erithacus brunneus*
Collared Bush Chat	*Saxicola torquata*
Dark-Gray Bush Chat	*Saxicola ferrea*
Pied Bushchata	*Saxicola caprata*
White-Capped River Chat	*Chaimarrornis leucocephalus*
White-Tailed Bush Chat	*Saxicola leucura*
Cisticola	
Golden-Headed Cisticola	*Cisticola exilis*
Zitting Cisticola	*Cisticola juncidis*
Cormorants And Darters	
Large Cormorant	*Phalacrocorax carbio*
Little Cormorant	*Phalacrocorax niger*
Darter	*Anhinga rufa*
Coucal	
Small Coucal	*Centropus toulou*
Large Coucal	*Centropus sinensis*
Crakes And Gallinule	
Indian Gallinule	*Gallinula chloropus*
Purple Gallinule	*Porphyrio porphyrio*
Banded Crake	*Rallina eurizonoides*

Cranes	
Sarus Crane	*Grus antigone*
Common Crane	*Grus grus*
Demoiselle Crane	*Anthropoides virgo*
Creeper	
Wall Creeper	*Tichodroma muraria*
Northern Tree Creeper	*Certhia himalyana*
Nepal Tree Creeper	*Certhia nipalensis*
Crow	
House Crow	*Corvus splendens*
Jungle Crow	*Corvus macrorhynchos*
Cuckoo	
Common Hawk	*Cuculus varius*
Drongo Cuckoo	*Surniculus lugubris*
Banded Bay Cuckoo	*Cacomantis sonneratii*
Koel Cuckoo	*Endynamys scolopacea*
Indian Cuckoo	*Cuculus micropterus*
Plaintive Cuckoo	*Cacomentis merulinus*
Sirkeer Cuckoo	*Taccocua leschenaultii*
Dipper	
Brown Dipper	*Cinclus pallasii*
Dove	
Emerald Dove	*Chalcophaps indica*
Indian Ring Dove	*Streptopelia decaocto*
Red Turtle Dove	*Streptopelia tranquebarica*
Spotted Dove	*Streptopelia chinensis*
Rufous Turtle Dove	*Streptopelia orientalis*
Drongos	
Ashy Drongo	*Dicrurus leucophaeus*
Black Drongo	*Dicrurus adsimilis*
Crow-Billed Drongo	*Dicrurus annectans*
Hair-Crested Drongo	*Dicrurus hottentottus*
Large Racquet-Tailed Drongo	*Dicrurus paradiseus*
Little Bronzed Drongo	*Dicrurus aeneus*
Small Racquet-Tailed Drongo	*Dicrurus remifer*
White-Bellied Drongo	*Dicrurus caerulescens*
Ducks And	

Geese(Anatidae)	
Bar-Headed Goose	*Anser indicus*
Comb Duck	*Saarkidiornis melanotos*
Common Teal	*Anas creeca*
Cotton Teal	*Nattapus coromandelianus*
Lesser Whistling Teal	*Dendrocygna javanica*
Gadwall	*Anas strepera*
Mallard	*Anas platyrhynchos*
Merganser	*Mergus merganser*
Ruddy Shelduck	*Tadirba ferruginea*
Red-Crested Pochard	*Netta rufina*
Tufted Pochard	*Aythya fuligula*
White Eyed Pochard	*Aythya nyroca*
Egrets, Herons And Bitterns(Ardeidae)	
Cattle Egret	*Bubulcus ibis*
Chestnut Bittern	*Ixobrychus cinnamoneus*
Gray Heron	*Ardea cinerea*
Intermediate Egret	*Egretta intermedia*
Large Egret	*Egretta alba*
Little Egret	*Egretta garzetta*
Little Green Heron	*Butorides striatus*
Night Heron	*Nycticorax nycticorax*
Pond Heron	*Areola grayii*
Purple Heron	*Ardea purpurea*
Yellow Bittern	*Ixobrychus sinensis*
Finch	
Common Rose Finch	*Carpodacus erythrinus*
Blanford's Rose Finch	*Carpodacus rubescens*
Himalayan Gold Finch	*Carduelis spinoides*
Florican	
Bengal Florican	*Eupodotis bengalensis*
Flowerpecker	
Thick-Billed Flowerpecker	*Dicaeum agile*
Plain Colored Flowerpecker	*Dicaeum concolor*
Flycatcher	
Black-Naped Flycatcher	*Monarcha azurea*
Blue-Throated Flycatcher	*Muscicapa rubeculoides*
Brook's Flycatcher	*Muscicapa poliogenys*

Brown Flycatcher	*Muscicapa latirostris*
Gray-Headed Flycatcher	*Culicicapa ceylonensis*
Little Pied Flycatcher	*Muscicapa westermanni*
Orange-Gorgetted Flycatcher	*Muscicapa strophiata*
Pale-Blue Flycatcher	*Muscicapa unicolor*
Pardise Flycatcher	*Terpsiphone paradsi*
Red-Breasted Flycatcher	*Muscicapa parva*
Rufous Breasted Blue Flyucatcher	*Muscicapa hodgesonii*
Slaty Blue Flycatcher	*Muscicapa leucomelanura*
Verditer Flycatcher	*Muscicapa thalassina*
White Breasted Fantail Fluycatcher	*Rhipidura aureola*
White Browed Blue Flycatcher	*Muscicapa superciliaris*
White Throated Fantail Flycatcher	*Rhipidura albicollis*
Large Niltava	*Muscicapa grandis*
Small Niltiva	*Muscicapa macgrigoriae*
Beautiful Niltava	*Muscicapa sundara*
Yellow Bellied Fantail Flycatcher	*Rhipidura hypoxantha*
Forktail	
Black-Backed Forktail	*Enicurus immaculatus*
Slaty-Backed Forktail	*Enicurus schistaceus*
Patridge, Quail And Pheasant	
Black Patridge	*Francolinus francolinus*
Common Quail	*Coturnix coturnix*
Red Jungle Fowl	*Gallus gallus*
Common Peafowl	*Pavo cristatus*
Grebes(Podicipedae)	
Breat Crested Grebe	*Podiceps cristatus*
Littlegrebe	*Podiceps ruficollis*
Griffon	
Eurasian Griffon	*Gyps fulvus*
Indian Griffon	*Gyps indicus*
Gulls And Terns	
Black-Bellied Tern	*Sterna acuticauda*
Black Headed Gull	*Larus ridibundus*
Great Black Headed Gull	*Larus ichthyaetus*
Herring Gull	*Larus argentatus*

Inidan River Tern	*Sterna aurantia*
Little Tern	*Sterna albifrons*
Hoopoe	
Hoopoe	*Upupa epops*
Hornbill	
Giant Hornbill	*Buceros bicornis*
Gray Hornbill	*Tockus birostris*
Pied Hornbill	*Anthracoceros malabaricus*
Ibis And Spoonbill	
Black Ibis	*Ciconia nigra*
Eurasian Spoonbill	*Platalea leucorodia*
Jacana	
Bronze Winged Jacana	*Metopidus indicus*
Kingfisher	
Large Pied Kingfisher	*Ceryle lugubris*
Small Pied Kingfisher	*Ceryle ruids*
Blue Eared Kingfisher	*Alcedo meninting*
Stork Billed Kingfisher	*Pelargopsis capensis*
White Breasted Kingfisher	*Haloon smyrnensis*
Eurasian Kingfisher	*Alcedo atthis*
Kites, Hawks, Eagles And Vultures	
Black Vulture	*Torgos calvus*
Changeable Hawk Eagle	*Spizaetus limnaeetus*
Crested Serpent Eagle	*Spilornis cheela*
Dark Kite	*Milvus migrans*
Egyptian Vulture	*Neophron ercnopterus*
Gray Headed Fishing Eagle	*Icthyophaga ichthyaetus*
Himalayan Gray Headed Fishing Eagle	*Icthyophaga nana*
Honey Kite	*Pernis ptilorhyncus*
Lesser Spotted Eagle	*Aquila pomarina*
Long Legged Buteo	*Buteo rufinus*
Marsh Harrier	*Circus aeruginosus*
Mountain Hawk Eagle	*Spiaetus nepalensis*
Osprey	*Pandion haliaetus*
Rufous Bellied Hawk Eagle	*Lophotriorchis kienerii*
Short Toed Eagle	*Circaetus gallicus*
Sparrow Hawk	*Accipiter nusus*

White Eyed Hawk	*Butastur teesa*
White Backed Vulture	*Gyps bengalensis*
Lapwing	
Red Wattled Lapwing	*Venellus indicus*
Yellow Wattled Lapwing	*Vanellus malabaricus*
Spur Winged Lapwing	*Vanellus spinosus*
Lark	
Bush Lark	*Mirafra assamica*
Ashy Crowned Finch Lark	*Eremopterix grisea*
Sand Lark	*Calandrella raytal*
Little Skylark	*Alauda gulgula*
Crested Lark	*Galerida cristata*
Leaf Bird	
Golden Fronted Leaf Bird	*Chloropsis aurifrons*
Ornge Bellied Leaf Bird	*Chloropsis hardwickii*
Martin	
Sand Martin	*Riparia paludicola*
Eurasian House Martin	*Delichon urbica*
Mayna	
Brahmini Mayna	*Sturnus pagodarum*
Gray Headed Mayna	*Sturnus malabaricus*
Pied Mayna	*Sturnus contra*
Common Myana	*Acridotheres tristis*
Bank Mayna	*Acridotheres ginginianus*
Jungle Mayna	*Acridotheres fuscus*
Talking Mayna	*Gracula religiosa*
Minivet	
Short Billed Minivet	*Pericrocotus brevirostris*
Long Tailed Minivet	*Pericrocotus ethologus*
Scarlet Minivet	*Pericrocotus flammeus*
Yellow Throated Minivet	*Pericrocotus solaris*
Rosy Minivet	*Pericrocotus roseus*
Small Minivet	*Pericrocotus cinnamomeus*
Munia	
Red Munia	*Estrilda amandava*
Sharp Tailed Munia	*Lonchura striata*
Spotted Munia	*Lonchura punctulata*
Black Headed Munia	*Lonchura malacca*
Needletail	

White Rumped Needletail	*Chaetura sylvatica*
White Throated Needletail	*Chaetura caudacuta*
Night Jar	
Jungle Night Jar	
Franklin's Night Jar	*Caprimulgus indicus*
Franklin's Night Jar	*Caprimulgus affinis*
Little Night Jar	*Caprimulgus asiaticus*
Longtailed Nightjar	*Caprimulgus macrurus*
Nuthatch	
Chestnut Bellied Nuthatch	*Sitta castanea*
Valvet Fronted Nuthatch	*Sitta frontalis*
White Tailed Nuthatch	*Sitta himalayensis*
Oriole	
Black Headed Orilole	*Oriolus xanthornus*
Black Napped Oriole	*Oriolus chinensis*
Golden Oriole	*Oriolus oriolus*
Maroon Oriole	*Oriolus traillii*
Owls	
Brown Fish Owl	*Bubo zeylonensis*
Brown Hawk Owl	*Ninox scutulata*
Brown Wood Owl	*Strix leptogrammica*
Collared Scops Owl	*Otus bakkamoena*
Barred Owlet	*Glaucidium cuculoides*
Spotted Owlet	*Athene brama*
Tawny Fish Owl	*Bubo flavipes*
Grass Owl	*Tyto capensis*
Forest Eagle Owl	*Bubo nepalensis*
Great Horned Owl	*Bubo bubo*
Jungle Owlet	*Glaucicium radiatum*
Parakeet	
Blossom Headed Parakeet	*Pisttacula cyanocephala*
Large Parakeet	*Pisttacula euptria*
Rose Breasted Parakeet	*Pisttacula alexandri*
Rose Ringed Parakeet	*Pisttacula krameri*
Partridge	
Black Partridge	*Francolinus francolinus*
Swamp Partridge	*Francolinus gularis*
Gray Partridge	*Francolinus pondicerianus*
Crows And Allies	

Indian Treepie	*Dendrocitta vagabunda*
Redbilled Blue Magpie	*Cissa erythrorhyncha*
Pigeon	
Blue Rock Pigeon	*Columba livia*
Bengal Green Pigeon	*Treron phoenicoptera*
Hill Pigeon	*Columba rupestris*
Gray Fronter Green Pigeon	*Treron pompadora*
Thick Billed Green Pigeon	*Treron curvirostra*
Pintail Green Pigeon	*Treron apicauda*
Pipit	
Hodgson's Tree Pipit	*Anthus hodgsoni*
Paday Field Pipit	*Anthus novaeseelandiae*
Rose Breasted Pipit	*Anthus roseatus*
Pitta	
Green Breasted Pitta	*Pitta sordida*
Indian Pitta	*Pitta brachyuran*
Plover	
Kentish Plover	*Charadrius alexandrinus*
Little Ring Plover	*Charadrius dubius*
Pratincole	
Small Pratincole	*Glareola lacteal*
Prinia	
Ashy Prinia	*Prinia socialis*
Brown Hill Prinia	*Prinia criniger*
Fulvous Streaked Prinia	*Prinia gracilis*
Gray Capped Prinia	*Prinia cinerocapilla*
Hodgson's Prinia	*Priniahodgsonii*
Jungle Prinia	*Prinia sylvatica*
Plain Prinia	*Prinia subflava*
Yellow Bellied Prinia	*Prinia flaviventris*
Quail	
Botton Quail	*Turnix tanki*
Common Quail	*Coturnix conturnix*
Redstart	
White Capped Redstart	*Chaimarrornis leucocephalus*
Plumbeous Redstart	*Thyacornis fuliginosus*
Robin	
Robin Dayal	*Copsychus saularis*

Roller	
Indian Roller	*Coracias benghalensis*
Dark Roller	*Eurystomus orientalis*
Rubythroat	
Eurasian Rubythroat	*Erithacus calliope*
Himalayan Rubythroat	*Erithacus pectoralis*
Shama	
Shama	*Copsychus malabaricus*
Sandpiper	
Wood Sandpiper	*Tringa glareola*
Common Sandpiper	*Tringa hypoleucos*
Green Sandpiper	*Tringa ochropus*
Marsh Sandpiper	*Tringa stagnatilis*
Shank	
Common Redshank	*Tringa totanus*
Green Shank	*Tringa nebularia*
Shrike	
Bay Backed Shrike	*Lanius vittatus*
Black Headed Shrike	*Lanius schach*
Brown Shrike	*Lanius ccristatus*
Gray Shrike	*Lanius tephronotus*
Cuckoo Shrikes	
Dark Cuckoo Shrike	*Coracina melaschistos*
Large Cuckoo Shrike	*Coracina novaehollandiae*
Large Wood Shrike	*Tephrodornis gularis*
Lesser Wood Shrike	*Tephrodornis pondicerianus*
Pied Wood Shrike	*Hemipus picatus*
Snipe	
Painted Snipe	*Rostratula benghalensis*
Pintail Snipe	*Capella stenura*
Fantail Snipe	*Capella gallinago*
Sparrow	
House Sparrow	*Passer domesticus*
Tree Sparrow	*Passer montanus*
Yellow Throated Sparrow	*Petronia xanthocollis*
Spiderhunter	
Little Spiderhunter	*Arachnothera longirostris*
Streaked Spiderhunter	*Arachnothera magna*

Stork(Coconiidae)	
Black Necked Stok	*Xenorhynchus asiaticus*
Black Stork	*Ciconia nigra*
Lesser Adjutant Stork	*Leptoptilos javanicus*
Open-Billed Stork	*Anastomus oscitans*
Painted Stork	*Ibis leucocephalus*
White Necked Stork	*Ciconia episcopus*
Sunbird	
Purple Sunbird	*Nectarinia asiatica*
Rubbycheek Purple Sunbird	*Anthereptes singalensis*
Scarlet Breasted Sunbird	*Aethopyga siparaja*
Swallow	
Barn Swallow	*Hirundo rustica*
Striated Swallow	*Hirundo daurica*
Swift	
Edible Nest Swiftlet	*Collocalia brevirostris*
Palm Swift	*Cypsiurus parvus*
Alpine Swift	*Apus melba*
Thick Knee	
Great Thick Knee	*Esacus magnirostris*
Eurasian Thick Knee	*Burhinus oedcnemus*
Thrush	
Blue Rock Thrush	*Monticola solitarius*
Blue Headed Rock Thrush	*Monticola cindlorhynchus*
Chestnut Bellied Rock Thrush	*Monticola rufiventris*
Mistle Thrush	*Turdus viscivorus*
Whistling Thrush	*Myiophonus caeruleus*
Black Red Throated Thrush	*Turdus ruficollis*
Orange Headed Ground Thrush	*Zoothera citrina*
Speckled Mountain Thrush	*Zoothera dauma*
Tit	
Gray Tit	*Parus major*
Green Backed Tit	*Parus monticolus*
Yellow Cheeked Tit	*Parus zanthogenys*
Wagtail	
Yellow Wagtail	*Motacilla flava*
Gray Wagtail	*Motacilla caspica*
Yellow Headed Wagtail	*Motacilla citreola*
Pied Wagtail	*Motacilla alba*
Large Pied Wagtail	*Motacilla maderaspatensis*
Weaver	
Baya Weaver	*Ploceus philippinus*
Black Throated Weaver	*Ploceus benghalensis*
Warblers	
Aberrant Bush Warbler	*Cettia flavolivaceus*
Blandford's Bush Warbler	*Cettia pallidipes*
Blyth's Reed Warbler	*Acrocephalus dumetorum*
Brown Leaf Warbler	*Phylloscopus collybita*
Chestnut Crowned Warbler	*Seicercus castaniceps*
Crowned Leaf Warbler	*Phylloscopus reguloides*
Dull Green Leaf Warbler	*Phylloscopus trochiloides*
Dusky Leaf Warbler	*Phylloscopus fuscatus*
Gray Cheeked Warbler	*Seicercus poliogenys*
Gray Headed Warbler	*Seicercus xanthoschistos*
Large Bush Warbler	*Cettia major*
Large Billed Leaf Warbler	*Phylloscopus magnirostris*
Orange Barred Leaf Warbler	*Phylloscopus pulcher*
Paddyfield Warbler	*Acrocephalus agricola*
Plain Leaf Warbler	*Phylloscopus inornatus*
Rufous Capped Bush Warbler	*Cettia brunnifrons*
Slaty Bellied Ground Warbler	*Tesia cyaniventer*
Smoky Leaf Warbler	*Phylloscopus fuligiventer*
Striated Marsh Warbler	*Megalurus palustris*
Tailor Bird	*Orthotomus sutortius*
Tickell's Leaf Warbler	*Phylloscopus affinis*
Yellow Eyed Warbler	*Seicercus burkii*
Yellow Rumped Leaf Warbler	*Phylloscopus proregulus*
Yellow Throated Leaf Warbler	*Phylloscopus cantator*
White Eye	
White Eye	*Zosterops palpebrosa*
Woodpecker	
Black Backed Woodpecker	*Chrysocolaptes festivus*
Black Napped Woodpecker	*Picus canus*

Yellow Fronted Pied Woodpecker	*Dendrocopos mahrattensis*
Great Slaty Woodpecker	*Mulleripicus pulverulentus*
Brown Woodpecker	*Micropternus brachyurus*
Brown Crowned Pigmy Woodpecker	*Dendrocopos nanus*
Brown Fronted Pied Woodpecker	*Dendrocopos auriceps*
Gray Crowned Pigmy Woodpecker	*Dendrocopos canicapillus*
Fulvous Breasted Pied Woodpecker	*Dendrocopos macei*
Large Golden Backed Woodpecker	*Chrysocolaptes lucidus*
Large Scaly Bellied Woodpecker	*Picus squamatus*

Large Yellow Napped Woodpecker	*Picus flavinucha*
Lesser Golden Backed Woodpecker	*Dinopium benghalensis*
Small Scaly Bellied Woodpecker	*Picus xanthopygaeus*
Small Yellow Napped Woodpecker	*Picus chlorolophus*
Three Toed Golden Backed Woodpecker	*Dinopium shorii*

SOME PHOTO PLATES

(NTFP processing machine, Rammapur BZCF)

(Researcher observing Kurilo (*Asparagus racemacus*) plantation)

Researcher has been taking questionnaire survey with president of Santi Batika BZCF

Researcher, taking interview with park Personnel

Field Assistant, taking interview with the users of Shree Krishna BZCF

Community building of Shree Krishna BZCF

Community building of Santi Batika BZCF

Research has been pleasing with the users of Santi Batika BZCF after the interview.

User collecting firewood from BZCF

Majorities of the poor and dalit has got a chance to participate in meeting and able to raise their voices (Case study: Santi Batika BZCF)

Bad regeneration condition (Shree Krishna BZCF), during the assessment of buffer zone CF, timber value is high at present but not the long term survival of natural capital. So plantation program should be strongly recommended to carry out in the near future. It helps to the local people for providing regular supply of timber in long run.

Bardia National park is a prime habitat of tiger. Due to increase in poacher within park, they are going to disappear so local community have been managing through formation of eco-club toward tiger conservation

The Rufford Maurice Laing Foundation

The Rufford Small Grants for Nature Conservation
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Rufford Small Grant for Nature Conservation (RSG)

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World wildlife Fund (WWF) / Nepal

WWF

Department of National Parks and Wildlife Conservation (DNPWC)

GOVERNMENT OF NEPAL
MINISTRY OF FORESTS AND SOIL CONSERVATION
DEPARTMENT OF NATIONAL PARKS AND WILDLIFE CONSERVATION

Web: www.dnpwc.gov.np

DNPWC is a legal authority of government of Nepal, who gives the permission to conduct research and other activities within and around the protected areas of Nepal.