CHAPTER ONE
INTRODUCTION

1.1 Background

Nepal is a scenic and beautiful country situated towards the south of the Himalayas. It is located between 26°22' to 30°27' north latitude and 80°4' to 88°12' east longitude. It stretches for 885 km from east to west and for 193 km from north to south. In context of faunal diversity, 3.9 % of mammals, 8.9% of birds and 1.94 % of amphibians found in the world have been found in our country (MEST, 2007).

200 million hectares of tropical forests have been cut down within the last 50 years in the world. Similarly, the forest area of Nepal has reduced from 45% of total land area of the country to 29% in the last 40 years with a deforestation rate of 1.7 % (DoF, 2000). Human livelihood is in need of forest conservation enforced by proper management strategy, and figuring out means to ensure that people and wild animals live in a sustainable way.

After the enactment of national parks and wildlife conservation act 1973, Nepal has, in a period of less than four decades, established nine national parks, three wildlife reserves, three conservation areas, one hunting reserve , eight buffer zones and few strict nature reserves. From a total area of 4584 sq. km. in 1970s, such protected areas today cover 27,387 sq. km. or 18.6 percent of the country's total land area (Pokhrel, 2011). On the other hand, the population of the country has grown to 26.5 million from 11.5 million in the same period. These developments have caused an increase in the number of interactions between human and wildlife animals. These interactions are transforming to conflicts between humans and wildlife, and thus are challenging the sustainable livelihood of people in many rural areas.

Sustainable livelihood is a holistic approach to conservation which enables people and communities to analyze, decide and act to achieve fair and sustainable management

and use of natural resources, and improved individual and community's wellbeing (WWF, 2008).

Considering the current human population growth rate, increasing demand for resources and the growing demand for access to land, it is clear that human-wildlife conflicts will not be eradicated in the near future. For this reason a better understanding of conflict management options is crucial. Forest is a major source of livelihood of people in Nepal. Forest provides firewood, timber, fodder, pastureland, non-timber forest products (herbal medicine) to people. Also forest plays significant role in balancing the environment and hydrological cycle. Further it is source of raw material for different small and large industries. The harvesting of such forest is being unsustainable in recent decade. (Lama, 2006) which increases the chances of human-wildlife conflict more .

Villages not only near to the forest but also near to the conservation areas, national parks, wildlife reserve and buffer zones are in big danger because of various wild animals. The main reason of Park people conflict is also a conflict between human and park animal/wildlife animal.

Conflicts between humans and animals are serious problems in many parts of the world. The damage and destruction caused by a variety of animals to human property and sometimes to human life is a real and significant danger to many human communities. And with the animals often killed, captured, or otherwise harmed in retaliation, these conflicts are one of the main threats to the continued survival of many species. Human-animal conflict is a universal problem. From tigers killing cattle in Malaysia and elephants trampling fields in Kenya to sun bears destroying corn crops in Colombia and wolves attacking sheep in Italy …it happens around the world, affects rich and poor, and is bad news for all concerned.

(WWF)

Humans can be economically affected through destruction and damage to property and infrastructure (e.g. agricultural crops, orchards, grain stores, water installation, fencing, pipes), livestock depredation, transmission of domestic animal diseases, such as foot and mouth. Negative social impacts include missed school and work,

additional labour costs, loss of sleep, fear, restriction of travel or loss of pets (Hoare 1992; Human-Elephant Conflict Working Group, HECWG).

This paper provides insights into HWC, based upon an elaborate study of the same in an area where humans and wildlife frequently interact with each other, often leading to conflicts between them. It also provides a summary of key lessons learned, and highlights common problems and probable sustainable solutions that could aid the development of appropriate strategies for resolving the problem and conserving different ecosystems and their inhabitants.

1.2 Statement of Problem

HWC is more intense in the tropics and in developing countries where livestock holdings and agriculture are an important part of rural people's livelihoods and incomes. In these regions, competition between local communities and wild animals, for the use of natural resources, is particularly intense and direct and resident human populations are very vulnerable. Of course, the relative impact of wildlife damage on farm production and household income varies greatly according to the amount of land (Messmer, 2000).

People in a country like Nepal with a low standard of living are particularly at risk, as are agro-pastoralists who depend exclusively on production and income from their land. Rural lives can't survive without access on agriculture and forest. When both of these sectors get unsecured, people's livelihood can't sustain for long term. There may not be other choice for people to conflict with wildlife animals rather than interaction.

Many environmental crises like climate change, ozone layer deflation, forest degradation, etc. are already the threats for sustainable livelihood of the people. Especially in a third world country like Nepal, socio economic factors are also big challenges in sustaining livelihood. Because of the low level of income, rural people have been used by the hunter and smuggler. Sustainable livelihood of rural people is not only related with human-wildlife conflict management, it is more concerned in wildlife conservation.

Negative impacts on human goals generally result when stakeholders' wildlife acceptance capacity (WAC) defined as the wildlife population level in an area that is acceptable to people has been exceeded. A wildlife population can exceed stakeholders' WAC in 3 possible ways; 1) when wildlife population numbers become too high, 2) when a wildlife population becomes threatened or endangered by low numbers, which increases risk to stakeholders by their presence, or 3) when a population becomes threatened or endangered, increasing the risk of extinction. (Decker,1991)

Safe, healthy and resourceful environment is the main base for sustainable livelihood. The problems arising out of environmental and biological threats cannot be easily solved in developing countries mostly because of the people's dependence on forest for the facility of energy, shelter, animal husbandry, etc.

The fueling factors of the conflict are habitat destruction and fragmentation of corridor of wildlife animals. In case of eastern Terai of Nepal, the migration of people from hill was not properly managed after the malaria eradication in 1950. The construction of east and west highway and the opportunity of trade, education and medical facilities lured the people of hills to Terai region. These socio economic activities resulted in destruction of large proportion of forests in the Terai thereby reducing the habitat for the wild life (Shrestha, 1979).

The research has tried to find out the answers to a number of questions that can be useful for the concerned people and organization. Some of those questions are:

- What kind of effect people are facing from wildlife animals?
- What kind of effect wildlife animals are facing from human beings?
- What could be the solution measures of ongoing accidents related with HWC?
- How can local people improve sustainability of their livelihood?

1.3 Objectives

The goal of this study is to gather, analyze, and evaluate information that provides better understanding about means of sustainable livelihood by managing human-wildlife conflicts and with the intent to develop and implement more cost-effective

and proactive conflict resolution strategies in the future. The major objectives of this study are as follows.

- To reveal the dimensions of human-wildlife conflict.
- To analyze the solution measures to manage the conflict.
- To make relevant recommendations for the sustainable livelihood.

1.4 Significance of the Study

In this supply centered economic system, most of the people are interested to consume more and more resources but don't care where it comes from. People are harming ecosystem in order to fulfill their demand for luxury, causing many types of natural unbalances to rise rapidly. The relationship between human being and environment should be balanced and sustainable.

Many types of natural diversities are getting collapsed day by day. These trends causes ecosystem unbalances and directly harm human being. This study will search the probable solution of a conflict between human being and wildlife animal that directly affects our ecosystem. Human beings have always been the center point of development activities, exploiting resources as they proceed. It is now slowly appreciated that every factor of bio diversity is important for the better future of human being.

In light of the current scenario, this research is focused on the mitigation of local people's problem raised by wildlife animals. The findings of the research would also help in elaborating the knowledge on human and wildlife animal relationship and it will also be helpful to the concerning organization working in the field of environmental conservation. The findings of this study can be useful to promote safe livelihood and healthy environment.

1.5 Limitations of the Study

Though I have given my best to this endeavour, there may be some shortcomings on field study and report writing. Because of the lack of experience, this report may not be perfect in all manners. Some other limitations of this study are enumerated below.

- The finding of the study is representative of the selected sample units.
- This study has been conducted in the VDC of Nepal-India border, so the result may not be exactly applicable for other places.
- Sample size may be small to represent the real situation in the affected area.
- Findings of the study are mainly based on qualitative information, which are taken from random sampling method.
- Limitations of physical resources

1.6 Organization of Study

This dissertation is divided into six chapters. The first chapter deals with introduction of the study including background, statement of the problem, objective of the study, importance of study, limitations and organization of study. Chapter two includes the review of literature including conceptual review of concerning subject matters. Chapter three includes with the methodology and the tools used for collection, handling and analysis of data. Chapter four is concerned with study area. Chapter five includes data presentation, analysis and interpretation and chapter six includes summary, conclusion and recommendations.

CHAPTER TWO
LITERATURE REVIEW

2.1 Conceptual Review

2.1.1What is Human-Wildlife Conflict

Twenty six types of mammals, nine types of birds and three types of reptiles are known as protected wildlife animals in Nepal (NPWCA, 1973) . No one is free to kill or injure these animals illegally. People should be punished under the "National Parks and Wildlife Conservation Act, 1973" if anything done to these animals illegally. However, human-wildlife conflict is posing a big question to this law, and giving rise to issues such as what should be done if wild animals attempt to kill the people. Should people protect the victim even if it means disobeying the law or should they make efforts not to harm the animals even if it means risking a person's life?

As human population expands and the natural habitats of wildlife shrink, people and animals are increasingly coming into conflict over living space and food. The impacts are often huge. People lose their crops, livestock, property, and sometimes their lives. The animals, many of which are already threatened or endangered, are killed in retaliation or to prevent future conflicts. Human-wildlife conflict is one of the main threats to the continued survival of many species in many parts of the world. Many different animals come into conflict with humans in different parts of the world.

Human–wildlife conflict is defined by the World Wide Fund for Nature (WWF) as "any interaction between humans and wildlife that results in negative impacts on human social, economic or cultural life, on the conservation of wildlife populations, or on the environment."

A 2007 review by the United States Geological Survey defines human-wildlife conflict in two contexts; firstly, actions by wildlife conflict with human goals, i.e. life, livelihood and life-style, and, secondly, human activities threaten the safety and survival of wildlife. However, in both cases, outcomes are decided by human responses to the interactions (*Cline, Sexton, & Stewart, 2007)*.

Human-wildlife conflicts can be real or perceived, economic or aesthetic, social or political (Messmer 2000). Conflicts generally fall into 3 major categories; health and safety, economic, and psychological (Decker, 2002). Health and safety conflicts fall into 3 subcategories; disease, motor vehicle collisions, and physical threat (Conover et al. 1997). The negative impacts of psychological conflicts on stakeholders are not well studied and therefore tend to be less recognized than other types of impacts that may arise from human-wildlife conflicts. Economic conflicts occur when damage caused by wildlife species negatively affects a stakeholders' income (Decker, 2002).

Small farmers, often desperately poor and economically vulnerable, and sometimes forced by circumstances to encroach into elephant habitat can lose their entire livelihood overnight to an elephant raid. Big business suffers too: for example, in Riau, Indonesia, the cost of elephant damage to oil palm plantations and timber estates is estimated at around US$105 million per year. There are also deaths and injuries on both sides. In Kenya alone, over 200 people have been killed by elephants in the last seven years, and wildlife authorities shoot between 50 and 120 elephants each year. With elephant populations declining dramatically over the past 100 years, habitat loss, poaching, and conflict with people are now the biggest threats to their continued survival (WWF, 2006).

All wildlife species possess value, yet that value may change when human-wildlife conflicts are discussed. Value is assigned by society, and represents the net sum of positive and negative values given to a species. Wildlife value reflects the species' effect on an individual's economic state, sense of well-being, or quality of life (Conover 1997).

Positive values generally are associated with the species' existence, society's knowledge of their presence, and beneficial economic returns or values gained; negative values derive from various forms of damage (economic and/or physical) inflicted by wildlife on agriculture and society in general. Five factors contributing to this change include: increasing suburban development, overabundance among adaptable species, a shift in public attitudes from utilitarian views of wildlife to those concerned with animal welfare and rights, increased media interest in wildlife issues, and advances in wildlife science and technology that enable recovery of previously low density wildlife populations (Bruggers, 2002).

Case studies across several continents suggest that HWC is greater in tropical areas and developing nations in which livestock and agricultural land are an integral part of people's lives and income (Distefano 2004). Thus, the relative impact of HWC on an individual's economic livelihood is directly correlated to the amount of land owned and the dependence on rural activities (Messmer 2000).

2.1.2 Management

HWC should be recognized as one of the most critical conservation challenges faced by protected areas today. HWC is too often sidelined by other conservation initiatives, perhaps because HWC is such a complex, poorly understood, and difficult issue. Yet, if overall conservation efforts do not directly address HWC in their programs, these efforts will likely fail in the face of unresolved conflict between humans and wildlife (Madden,2004).

In efforts to reduce human-wildlife conflict, World Wide Fund for Nature (WWF) has partnered with a number of organizations to provide solutions around the globe. Their solutions are tailored to the community and species involved. For example, in Mozambique, communities started to grow more chili pepper plants after making the discovery that elephants dislike and avoid plants containing capsaicin. This creative and effective method prevents elephants from trampling community farmers' fields as well as protects the species.

If conflict management is to be at all successful, the many agencies potentially involved must maintain good working relationships to navigate the complex matrix of laws, regulations, and overlapping authorities (Elsner, 2008).

Conflict management strategies earlier comprised lethal control, translocation, regulation of population size and preservation of endangered species. Recent management approaches attempt to use scientific research for better management outcomes which includes behavior modification and reducing interaction. As human-wildlife conflicts inflict direct, indirect and opportunity costs, the mitigation of human-wildlife conflict is an important issue in the management of biodiversity and protected areas.

2.1.3 Impacts

In a paper titled ‘The hidden dimensions of human-wildlife conflict: Health impacts and opportunity costs’ published in *Biological Conservation*, the authors address the hidden impacts of human–animal conflict. When the breadwinner of the family is killed or injured, the burden of the family passes on to women and younger children. When a woman is the victim, the children take over and this affects their education as they are unable to go to school. A study in North-East found that when men were injured or killed, it led to increased debts and poverty. In Tanzania, lion attacks have caused injury or death of over 800 people between 1990 and 2004. In Mozambique and Namibia, over a hundred people are killed by crocodiles every year. In India, the documented loss of human life to elephant attacks averages over 400 people, annually. The people who succumb to these injuries are those who belong to the weaker socio-economic strata of society. In both Asia and Africa, communities could lose about 10–15 per cent of their total agricultural output to elephants. Such losses are huge for the affected people and their families. Failing to address these issues will only lead to more retaliation from people against these animals, thus promoting tension and conflict. It is crucial now to prevent the conflict and improve the distribution of compensation to people, so that coexistence can happen in and around protected areas (Balasubramanian, & Chavan, 2014).

2.1.4 Causes

According to the World Conservation Union, HWC occurs when human populations overlap with wildlife requirements resulting in costs to both native residents and animals (Distefano 2004).

Human-wildlife conflict occurs “when the needs and behavior of wildlife impact negatively on the goals of humans or when the goals of humans negatively impact the needs of wildlife” (Madden, 2004).

Human-wildlife conflict occurs when the needs and behavior of wildlife impact negatively on the goals of humans or when the goals of humans negatively impact the needs of wildlife." Conflicts are not just restricted to larger mammals, though they are always the centre of news in the media. Such conflicts also arise with monkeys, snakes, birds, wild boars, sloth bears, and many other animals as well.

The crucial question that needs to be addressed here is why do animals raid crops or why do leopards attack livestock? According to the World Database on Protected Areas, 2012, only 13 per cent of earth's surface belongs to the global network of protected areas. These areas are, in fact, the last resort for many large and threatened mammals. With the protected areas largely surrounded by human population, the conflict situation has risen in recent times. As fragmentation of land increases, animals come in direct conflict with people. When the conflict occurs, it happens under tough situations. During this time, animals respond in a frightened manner they attack and flee! Studies show that such an attack is also propelled by people's way of trying to chase away the animal (Balasubramanian & Chavan 2014).

2.1.5 Solutions

Potential solutions to these conflicts include electric fencing, land use planning, community-based natural resource management (CBNRM), compensation, payment for environmental services, ecotourism, wildlife friendly products, or other field solutions (*Distefano, 2014).*

In context of human-wildlife conflict, Nepal and Weber (1993) found that there were five different types of park people conflict namely, illegal extraction of resources by the people, livestock grazing, hunting and fishing, crop raiding by wild animals and loss of human life due to wild animals. They started that the crop loss was highest close to the park area. During the cropping season, crop raiding at night was almost a regular phenomenon. They noticed that extend of crop damage mainly depend on size of households, distance to the park and influencing of visit by wild animals and crop raiding by wild life. They concluded the effective fencing could solve the crop loss problem. They recommended launching a buffer zone program to reduce the impact of wild animals.

Shrestha (1994) has suggested that the creation of boundary wall does not necessarily ensure the protection of an area. Despite many established public entry points for public access by the reserve management, several illegal entry points are recorded on the boundary wall. Maintenances of boundary wall may control the crop raiding intensity but the maintenance cost of wall is very high.

The human–wildlife conflict may be resolved if there is a shift in the understanding of stakeholders, including policy-makers, scientists, media, and the local people. Even today, we expect wildlife to be confined to 'only' forests. However, the fact is that this protected area constitutes just five per cent of the area in India (4.87% to be precise) as on November 2014, according to the National Wildlife Database Cell, Wildlife Institute of India. How can we then confine animals within this space? And larger animals are biologically programmed to travel far distances. Villages and households in heavy-risk areas can be educated on preventing and mitigating conflicts. Also, these need to be reported to the authorities in an organized and timely manner. Studies indicate that there is need for a monitoring system which will record and disperse information on such conflicts. Such an approach can build up the development of a risk database and live warning and monitoring systems. Though experiences from Uganda, Kenya, and Sumatra suggest that establishing and long-term maintenance of monitoring systems in local communities is challenging and tough to sustain, with greater stakeholder participation, animosity against animals can certainly be reduced. Large carnivores pose a challenge when it comes to conflict. As top predators, they need healthy prey base for sustaining themselves. When natural prey populations decline, they look at alternatives like livestock or people. If large carnivores such as lions, leopards, and tigers are to survive in the future, then it is critical that every effort should be made to promote co-existence and prevent negative interactions. This is a goal that is tough in the world where humans dominate. So, how do we maintain this balance? (Balasubramanian & Chavan, 2014)

Local people can be the recipients of the benefits that come from wildlife tourism developed. As the National Parks and Wildlife Conservation Act, 1973 states, "Up to thirty to fifty percent of the amounts earned by a national park, reserve or conservation area may be expended, in co-ordination with the local authorities for community development of local people."

2.1.6 Sustainable Livelihood

In 1987 the World Commission on Environment and Development sought to address the problem of conflicts between environment and development goals by formulating a definition of sustainable development: "Sustainable development is development which meets the needs of the present without compromising the ability of future

generations to meet their own needs." – World Commission on Environment and Development, 1987

For the ecologist, sustainability should be defined in terms of the maintenance of ecosystem resilience. This view of sustainability is clearly different from the human-centered conceptions put forward by the World Commission on Environment and Development and the consumption-based principles proposed by economic theorists. Common and Perrings suggest that 'the concepts of Solow-sustainability and Holling-sustainability are largely disjoint. This implies that there may be no close relationship between economic efficiency and ecological sustainability' (1992, p. 7). In order to achieve ecological sustainability, it is likely to be necessary to modify current consumption preferences and production techniques which, while efficient in economic terms, threaten the ecological resilience of planetary systems (Jonathan, 2003).

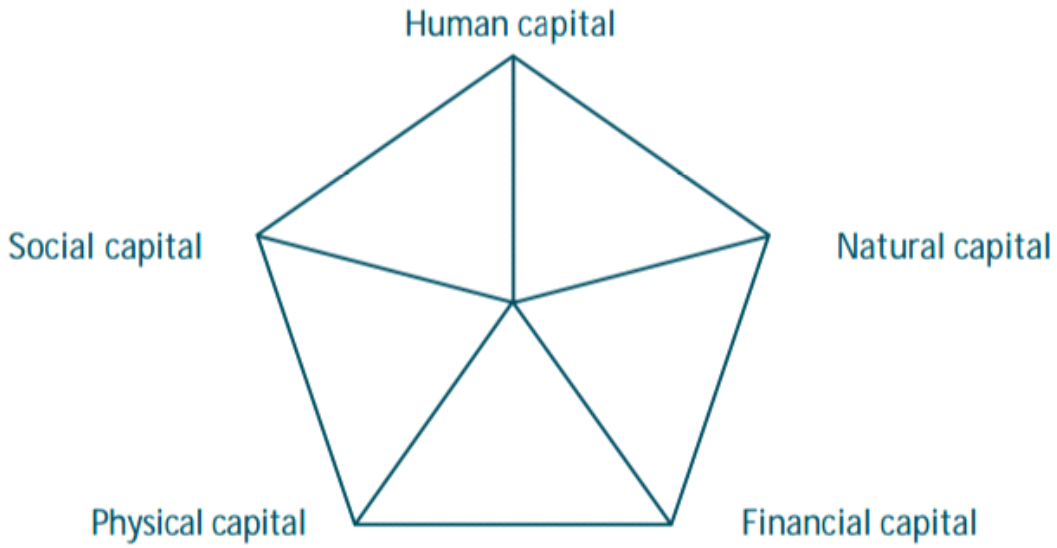
A concept of sustainable livelihood was put forward in the report of an advisory panel of the World Commission on Environment and Development. In calling for a new analysis, it proposed sustainable livelihood security as an integrating concept, and made it central to its report (WCED 1987a:2-5). The definition was as follows: Livelihood is defined as adequate stocks and flows of food and cash to meet basic needs. Security refers to secure ownership of, or access to, resources and income-earning activities, including reserves and assets to offset risk, ease shocks and meet contingencies. Sustainable refers to the maintenance or enhancement of resource productivity on a long term basis. A household may be enabled to gain sustainable livelihood security in many ways – through ownership of land, livestock or trees; right to grazing, fishing, hunting or gathering; through stable employment with adequate remuneration; or through varied repertoires of activities.(Chambers & Conway, 1991)

In order to achieve a sustainable livelihood situation, the target group must receive support that leads to increased income and well-being. Typical examples are just and equitable pay for work, decent housing, higher food security, sustainable use of the natural resources base and a reduction in vulnerability to sudden changes or shocks.(United Kingdom of Great Britain and Northern Ireland, Department for International Development, Sustainable Livelihood Guidance Sheets (Eldis,2001).

The notion of sustainable livelihood as we know it today can be said to have arisen out of the 1992 Earth Summit held in Rio (Perrings 1994) and its promotion of Agenda 21 (Agenda for the 21st Century). A stated aim in Agenda 21 is that everyone must have the "opportunity to earn a sustainable livelihood". Once the concept of a sustainable livelihood had been adopted then it seems like a small step to go from there to SLA. But SLA did not become main stream until the late 1990s (S. Morse and N. McNamara, 2013,).

DFID, 1999 explains Sustainable Livelihood as, SLA is an example of the 'multiple capital' approach where sustainability is considered in terms of available capital (natural, human, social, physical and financial) and an examination of the vulnerability context (trends, shocks and stresses) in which these capitals (or assets) exist. The five principal capitals often suggested as important to livelihood are presented as a pentagon in

Figure 1: Capitals for sustainable livelihoods



Source: DFID

Natural capital

Natural capital is the term used for the natural resource stocks from which resource flows and services useful for livelihoods are derived.

Human capital

Human capital represents the skills, knowledge, ability to labour and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives. Human capital appears in the generic framework as a livelihood asset, that is, as a building block or means of achieving livelihood outcomes**.**

Economic or financial capital

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 as stocks and it can contribute to consumption as well as production. Capital base (cash, credit/debt, savings, and other economic assets)

Social capital

Social resources (networks, social claims, social relations, affiliations, associations)

Physical capital

Physical capital comprises of the basic infrastructure and producer goods needed to support livelihoods. Infrastructure (buildings, roads), production equipment and technologies)

These five capitals have been taken as means of sustainable livelihood of people. But these capitals are not free from threats. Sustainable livelihood exists when these threats don't exist at all. Generally, in a country like Nepal, many kinds of these threats exist and thus the sustainability of livelihood is vulnerable. It is thus imperative that these threats or vulnerability contexts should be minimized to assure the sustainability of livelihood.

A livelihood comprises of the capabilities, assets (including both material and social resources) and activities required for means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, and maintain or enhance its capabilities and assets while not undermining the natural resource base (Chambers & Conway, 1991).

DFID, 1999 further explains- The factors that make up the *Vulnerability Context* are important because they have a direct impact upon people's asset status and the options that are open to them in pursuit of beneficial livelihood outcomes.

Shocks

Shocks can destroy assets directly (in the case of floods, storms, civil conflict, etc.). They can also force people to abandon their home areas and dispose of assets (such as land) prematurely as part of coping strategies. Recent events have highlighted the impacts that international economic shocks, including rapid changes in exchange rates and terms of trade, can have on the very poor. It also includes:

- Human health shocks
- Natural shocks
- Economic shocks
- Conflict
- Crop/livestock health shocks

Trends

May (or may not) be more benign, though they are more predictable. They have a particularly important influence on rates of return (economic or otherwise) to chosen livelihood strategies.

Seasonal shifts

In prices, employment opportunities and food availability are one of the greatest and most enduring sources of hardship for poor people in developing countries. We can understand more about relation of capital, vulnerability context and sustainable livelihood in given framework.

The sustainable livelihoods framework presents the main factors that affect people's livelihoods, and the typical relationships between these factors. By analyzing the given framework, we can conclude that a conflict between human being and wildlife could be a great threat for sustainable human livelihood. We can ensure human livelihood sustainability by ensuring mitigation of vulnerability contexts including human-wildlife conflict.

2.2 Review of Related Studies

Upreti (2001) has concluded that here is no single form and model for handling natural resources related conflict in the community. Rather it is a broad, dynamic and complex process constantly evolving and responding to changing circumstances. So long as the present dominant method of addressing conflict in the country continues, conflict will increase more in the future together with the expansion of development interventions. It becomes clear from both the empirical evidences and theoretical background that conflict is ubiquitous. Conflict, are from being static is evolving under the pressure of growing resources scarcity, faculty execution policies and procedures excessive political interference and political, bureaucratic and administrative corruption.

King Mahendra Trust for Nature Conservation (1999) has concluded that habitat destruction, soil erosion, drying of watersheds, species being endangered and increasing national hazards and losses are some of the major environmentally unsustainable dimensions. Man induced pressure on fragile landscape, mainly these arising out of a rapidly growing population, rampant and large scale poverty and inappropriate development intermentally non-sustainability. In the context of Nepal, problems are increasing faster than capacity to correct to lack of resources or capital (human, natural, financial, physical and social), poor program design and a weak capacity for organizations, management and implementation.

Bajimaya (2005) has written that Nepal has gone through various stage of learning processes in its bid to conserve and manage its biological resources. But its relatively recent experience of participatory bio-diversity conservation perhaps, has been the most educative and constructive of all. Today, some eight years after the buffers zone management in the Royal Chitwan National Park was implemented, it has clearly emerged that protected areas and local people can help each other. N this partnership, local communities gain both natural financial resources and protected areas can benefit by involving local people in their planning and management.

Habitat degradation due to change induced by succession of grassland into shrubland and the degradation of forest into shrubland and agricultural land in the BZ, are considered a serious threat to long term bio-diversity conservation. In the recent years, the Park is also increasingly threatened by infrastructure development projects such as roads, bridges and irrigation and urbanization (Lama, 2006)

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Research Design

This study has been carried out on the basis of exploratory, qualitative and descriptive research design. Some quantitative data have also been used in some contexts. This study is mainly focused on finding the types and character of human-wildlife conflict and its impact on sustainability of livelihood of local people.

3.2 Rationale for the Selection of the Study Area

Environmental threats on human life are increasing in many forms and dimensions. Human-wildlife conflict is also one of them. Villages in rural areas near to the forest are mainly affected from this kind of problem. Bahundagi VDC is also a similar village in Jhapa situated near a forest. Another important thing is that this is the same place from where many elephants from India enter to Nepal every year and go out using the same corridor. People from Bahundagi VDC are going through a long ensuing conflict with wild animals, especially elephants. Livelihood of local people in Bahundagi has been made difficult by this conflict for many decades.

Further, Bahundagi VDC is well known to the researcher, and this familiarity with the VDC was one of the primary reasons why it was selected for the study.

3.3 Population and Sampling

There are 372 household and 1757 total population in Bahundagi VDC ward no 2. A 10 percent households out of total 372 household, has been taken as a sample size. There are nine wards in Bahundagi VDC. Among three hundred and seventy two households of ward no. 2, ten percent of the total households were selected by using simple random sampling method. Additionally, some important respondents were also selected to increase the quality and quantity of information/data.

3.4 Data Collection Tools and Techniques

Data collection is the foundation of every research work. The kind of tools and techniques we use in our study, to some extent, influence the effectiveness of our research and the report. Data collection technique used is supposed to be a framework for accurate result. Here in this study work, maximum applicable techniques have been used to take out the factual data.

- **Focused Group Discussions**

Focused group discussions were carried out among the affected people of the VDC. Focused group discussions were mainly conducted to collect the information about the expectations and experiences of local people. Discussions between affected people brought forth some important ways to solve the problem. Group discussions became very effective in bringing out the different views and opinions of the local people.

- **Interview**

For information collection works to support his research, many people from the concerned VDC were interviewed using a standard set of questionnaires. The researcher consulted another set of questionnaire developed by another researcher for a study in a relevant but different area. The questionnaire used for this research was tested in the study area and also corrected and/or modified whenever deemed necessary.

- **Direct Observation**

Agricultural land, houses and other affected infrastructures were observed by the researcher. A checklist was used to make observations more factual and reliable. Casualties and deaths of both the human and wildlife (elephant) were also observed during the research period.

- **Household Survey**

This technique was applied to get household level information of the study area. The researcher visited each household selected in sampling to collect the factual

information about their facilities, profession, threats, loss of property (house, crops etc.), casualties, death etc.

- **Reliability**

To make the data reliable, the primary data was collected in the study area from all types of respondents like teachers, farmers, businessman, youths, leaders, labors, old man/women, housewives, etc. Contradictory pieces of information were re-tested by asking questions repeatedly.

3.6 Data Processing and Analysis

The qualitative and quantitative data, collected through various instruments and sources are descriptively analyzed here in this report. Processed data has also been interpreted by using simple statistical tools like percentage, average, mean etc. Findings are described in various topics and sub-topics. Table, chart and figures are also used to analyze the collected information.

3.6 Nature and Source of Data

The primary data were collected through household survey, interview and observations. Secondary data were taken from the official records of the VDC, Department of National Parks and Conservation, WWF, Central Bureau of Statistics, and Nature Conservation Society of Bahundagi. Additional information was extracted from published and unpublished literature such as books, journals, reports, articles and research papers etc.

CHAPTER FOUR
INTRODUCTION OF THE STUDY AREA

4.1 Bahundagi VDC

Bahundagi VDC is situated in the north-east part of Jhapa district, 9 kilometers north from Kakarbhitta chowk situated along the Mahendra Highway. The VDC covers an area of 54 square kilometers and is bordered by India in the east, Ilam district in the north, Shantinagar VDC in the west and Mechinagar municipality in the south.

The VDC has a population of 23,822 and comprises of different ethnicities (2012, CBS). Agriculture is the dominant occupation of the people here. The majority of the people are farmers, mostly cultivating rice, tea, areca nut, ginger, wheat, maize etc.

People in the VDC have free access to India, thanks to the open border, and they frequently visit the adjoining Indian market Naxalbari for shopping and medical treatment. Some people also engage in illegal trade of arcea nut, ginger, paddy and timber between the two areas. The village is remote and is served by a graveled road connecting it to Kakarbhitta.

4.2 Economy

Bahundagi is a historical market in the context of Jhapa district. After the construction and development of Mahendra Highway, the market of Bahundagi started to decline as did the district's other old markets such as Sanischare, Jhapa and Bhadrapur. Today, Bahundagi hosts a weekly market every Thursday where vendors from many different places come in to sell their products such as clothes, cosmetics and other items. Thus, people can now buy most of the things they need in their local market.

In addition, many traders from India also come to Bahnundagi to sell or buy products. The trade between people from India and Bahundagi has existed for more than 100 years. The majority of the people are farmers, mostly cultivating rice, tea, areca nuts, ginger, mushroom etc. Because of the open border with India, most of the people have free access to Indian market where they go for trading, shopping and medical facilities. Many families have members working abroad and thus receive remittance

from various countries like Qatar, Malaysia, UAE, USA, Australia, India etc. Thanks to remittance, the consumption capacity and living standard of local people has grown up. Local business shops, co-operatives, NGOs, schools, health clinics are also contributing to expand the economy of Bahundagi VDC. Many people from this VDC are also working in several government sectors and in some private sectors.

4.3 Demography

The total population is 23,822 according to 2011 census and the major ethnicities living here are Brahmins, Chettri, Newar, Magar, Marwari, Rai, and Limbu.

4.4 Transportation

Transportation is an important means for trading goods. Horse and bullock carts that were widely used until few years ago to transport goods to and from India have now been mostly replaced by trucks and tractors. There are several buses that directly run from Bahundagi to Kathmandu, the capital city of Nepal on a daily basis. Also, several buses and cars connect Bahundagi to major cities like, Kakarvitta, Birtamode, Biartnagar, Dharan etc. Private vehicles and motorcycles are becoming the major main means of travel for most of the houses in the VDC.

4.5 Forest Resources

There are five community managed forest around the Bahundagi VDC. Though the household of this study area are not affiliated as a member in this program, many other people from Bahundagi VDC are getting benefits from it. These are the same forest where the wild elephant make their shelter and make access to the village.

4.6 Death and Casualties

Since the period of human wild elephant conflict occurring there are so many accidents have been taken a place. Because of the conflict, 19 people have been killed by wild elephant only within the Bahundagi VDC. More than 11 elephants also have been killed while the conflict. More than 50 people have been injured since the conflict started to happen.

CHAPTER FIVE
PRESENTATION AND ANALYSIS

Thirty six questions were set to find the answers relevant to the objectives and the scope of this thesis. Information derived from various literature and observations has also been analyzed in related headings and sub headings. All the information is categorized into four major sections, with each section based on the objectives of this study.

5.1 Basic Information and Analysis

5.1.1 Population Composition of Household

There are 178 people with 79 males and 99 females in the 37 households that were selected as the sample for questionnaire survey in Bahundagi VDC, Ward No. 2. The size of sampled household is range from 3 to 6 persons per household and an average of 4.81 persons per household.

Table 1: Gender composition of sample population in Bahundagi-2

Population/H.H	Male	Female	Total	Percentage	Household
<4	4	5	9	8.5 %	3
4	26	30	56	37.5 %	14
>4	49	64	113	54 %	20
	79	99	178	100 %	37

Source: field survey, 2016

Table 1 shows that the female population is more than a male population in the sample households. Many young men, however, have moved abroad for foreign employment. Since there are not many young people in the village, facing the elephants is tougher for local people.

5.1.2 Public Health

Condition of public health is not satisfactory in the study area. There is a health post with minimum human resources and poor infrastructure. This health post is supposed

to provide service to people from all over the VDC. There are few small private clinics in the VDC. There is no hospital nearby to treat people in case of dangerous accidents or lethal encounters with elephants. So, the whole of VDC is at risk when it comes to health protection, and treatment of diseases and injuries.

5.1.3 Housing Structure

A different kind of technology can be seen as housing engineering in study area. Some of the wooden structures are made also with the use of Bamboo, sand, cement etc. Local people call this structure as *Center Bera / Taade Ghar*.

Table 2: Housing pattern

Type of house	Number	Percentage
RCC	4	11 %
Wooden *(kachi)*	33	89 %
Total	37	100 %

Source: Household Survey 2016

Table 2 shows that the most people in the study area live in wooden *(kachi)* houses. Among the 37 sampled houses, only four households, or eleven percent of the total household, own RCC building. On the other hand, 89% of the sample households live in wooden buildings that are more likely to be damaged by an elephant. Many respondents say that the poor families having small houses are affected more than families having RCC and big houses. From this, we can conclude that most people in Ward no. 2 of the VDC are vulnerable to damage by elephant attacks.

5.1.4 Livestock

Animal husbandry is the important source of livelihood for some families. Some of the people are not seen interested for animal husbandry, because of the high risk from the wildlife Elephant.

Table: 3 Livestock holding of the household

Livestock	Number of livestock	
	Holding	Not holding
	28	9
Cow only	12	
Buffalo only	2	
Goats only	2	
Chickens only	3	
Mix	18	
Total	28	9

Source: Household Survey, 2016

Table 3 shows that most people from the study area are holding livestocks. Though not the primary source, animal husbandry is an important source of livelihood for local people. Households that are engaged in other occupations and households with small children are not involved in livestock rearing.

Nine out of thirty-seven households are not involved in livestock rearing. Out of twenty eight households rearing cattle, eighteen household are involved in more than one type of livestock rearing. Twelve households out of twenty eight are rearing cows only. Two household are rearing buffalos only and other two are rearing goats only. There are three households who are involved in rearing chicken only.

5.1.5 Agriculture Production

There is no scarcity of water for irrigation, and the fields are fertile and very productive, but the security of the crops is a main threat for the farmer household in study area.

Table: 4 agricultural production pattern

Crop/product	Involved H.H.	Not involved H.H.	Percentage
	35	2	
Paddy and other	28		76 %
Maize and other	22		59 %
Areca nut and other	26		70 %
Tea and other	5		13.5 %
Vegetable / other	2		5.5 %
Mix	35		94.5 %
Total	35	2	

Source : Household Survey,2016

Table 4 shows that the people from study area are involved in production of various products of agriculture. Two households are not involved in agriculture at all. All thirty seven households engaged in agriculture cultivate and harvest many different kinds of crops. 76 % of the total sample population engaged in cultivating paddy is also involved in producing maize and areca nut too. Though many households are involved in agriculture, they have to depend on other sustainable sources of income to secure their livelihood. The harvest itself is not enough for the people who grow the crops, and the wild elephants also frequently harm the produce.

5.1.6 Main source of income

Research found that, the study area has a trend to go to India for the employment. After 2062/63 BS, people also started to go to the Malaysia, Qatar and UAE.

Figure 2: Main Income Sources in Bahundagi VDC

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APPENDIX I

A research on: Human Wildlife Conflict Management For Sustainable Livelihood

A Case Study of Bahundagi VDC

Questionnaire format

a. Household Questionnaire:

VDC name: Ward: Community:

Respondent: Position in family:

Code:

1. Information of family members

   Total: ☐

   Male: ☐

   Female: ☐

2. Type of house.

   RCC ☐

   Wooden ☐

   Muddy ☐

3. Are you satisfy with local health service ?

   Very satisfied ☐

   Satisfied ☐

   Not satisfied ☐

4. Do you have any livestock ?

   Yes ☐

   No ☐

   If yes, what kind of livestock do u have ?

   a.

   b.

   c.

5. Are you involve in agricultural production ?

Yes ☐

No ☐

If yes, what is the most priority for you ?

Paddy ☐

Maize ☐

Areca nut ☐

Ginger ☐

Other ☐

6. What is a source of your livelihood?

Agriculture/ livestock rearing ☐

Business ☐

Service ☐

Labor ☐

Remittance ☐

7. What is a source of cooking ?

Market (LPG Gas) ☐

Forest (firewood) ☐

Home (bio-gas) ☐

8. Do you have any information about “bio diversity conservation” ?

Yes ☐

No ☐

9. Did anyone get punishment for killing wildlife animal ?

Yes ☐

No ☐

10. How many member in your family are educated ?

Total ☐

Educated (from private school) ☐ (from government ☐ school)

Uneducated ☐

11. Do you satisfy from your agricultural income?

Yes ☐

No ☐

12. What kind of land do you have ?

Housing only ☐

Agricultural only ☐

Housing and agricultur ☐

No land ☐

13. Are you affiliated with nearest community forestry ?

Yes ☐

No ☐

14. Are you producing your agricultural products safely?

Yes ☐

No ☐

If no, why ?

……..

…….

15. Did your livestock ever harmed from wildlife animals ?

Yes ☐

No ☐

16. Did HWC ever affected your source of drinking water ?

Yes ☐

No ☐

17. Did you ever loss your agricultural stock by wildlife animal ?

Yes ☐

No ☐

18. Did your property ever harmed by wildlife animal ?

Yes ☐

No ☐

If yes, from which animal ?

……

19. What kind of effect do you see in social relation due to HWC ?

A

B

C

D

20. What kind of effect do you see in local organizations because of HWC?

A

B

C

21. Does wildlife animal destroy any local infrastructure ?

Yes ☐

No ☐

If yes, what ?

…….

22. In which season, mostly HWC occurs?

Chaitra/baisakh/jestha ☐

Asaar/shrawan/bhadau ☐

Ashoj/kartik/mangsir ☐

Push/magh/falgun ☐

23. Do you feel risk or danger of your (family) life due to HWC ?

Yes ☐

No ☐

24. Did you ever harm any wildlife animal to protect yourself and/or your property?

Yes ☐

No ☐

If yes, what has been done ?

……..

25. What kind of group mainly get affected from HWC ?

Poor ☐

Women ☐

Old ☐

Children ☐

Differently able group ☐

26. Are you satisfy with the role of local NGOs and communities in mitigating HWC ?

Yes ☐

No ☐

27. What kind of personal effort you have given to mitigate HWC ?

A

B

C

28. Was there any program conducted to ensure the sustainable livelihood of local people ?

Yes ☐

No ☐

If yes, please tell the name of organization and program

…….

…….

29. Does HWC threats in travel and transportation ?

Yes ☐

No ☐

30. Does HWC threats in schooling ?

Yes ☐

No ☐

31. What was the most effective solution for mitigating HWC ?

a. Electric Fencing

b. Trench corridors

c. Bee farming

d. Watch towers

e. Chasing elephants

32. What can be the permanent solution of HWC ?

a. …….

b. ……

c. ……

33. What do you expect from government ?

…….