

CHAPTER - ONE

1. INTRODUCTION

1.1 Background

Traveling to relatively undisturbed areas or uncontaminated natural areas with the specific objective of studying admiring and enjoying the scenery and its wildlife as well as any existing cultural manifestation found in those areas are called eco-tourism (Ceballos Lascurain, 1996). It is also a model of development in which natural areas are planned as part by the tourism base and biological resources are clearly linked to social economic sectors which is environmentally safe minimizes impact on nature and wildlife and contribute to environment protection and dynamic conservations. It is generally considered to be environmental understanding and appreciation, facilities conservation and sustains ecology culture and well being of local communities and contiguous lands. Thus eco-tourism is a new form of non-consumptive educational and romantic tourism relatively undisturbed and under-visited areas of immense natural beauty and cultural and historical importance for the purpose of understanding and appreciating the natural and socio cultural history of the host destination.

The international eco-tourism society (1991) defined eco-tourism as “responsible travel to relatively natural areas that conserves the environment and improves the welfare and local people”

IUCN defines eco-tourism as environmentally responsible travel and visitation to relatively undisturbed natural areas, in order to enjoy and appreciate nature to promote conservation, has low negative visitors

impacts and provides for beneficially active socio-economic involvement of local population.

A large variety of nature-based activities are undertaken on eco-tourism. The most popular are trekking, bird watching, observing wild animals and plants which are often undertaken concurrently. Birds are the main focus for those who are primarily observing fauna. Photographic tours and participating scientific studies are also popular. The following activities are eco-tourism activities like nature walk, wildlife safari, elephant ride, nature photography, camping, scientific study, art tours, jungle drive, mountaineering, river rafting /kayaking, sight seeing, canoe rides on the jungle river and observing wild-flowers and other plants. These activities are highly dependent upon protected areas as these areas provide the majority of eco-tour destinations and attractions.

Eco-tourism is carefully planned tourist activity (whether natural, historical, botanical, ornithological or archaeological tours) that is compatible with sound ecological principles. Eco-tourism results in no ecological damage from group impact on national parks and/or natural history resources. It is philosophy of travel companies to support/use the destination's local resources, operators, lodging, guides and other tourist facilities or services and of showing evidence of continued support for the destination's conservation/preservation programme and long term planning.

Nepal has less than four decades of experience with tourism development. At the beginning tourism activities were concentrated only inside the Kathmandu valley. As the year passed, many regions and places became a popular tourist destination such as Annapurna, Everest,

Langtang, Sauraha, Karnali etc. Nowadays these region have become popular for the new tourism concept i.e. eco-tourism.

The concept of eco-tourism is new to Nepal. Now, the popularity of this concept is increasing day by day, so national tourism board (NTB) has put forward national eco-tourism strategy. NTB has emphasized certain areas to promote eco-tourism in the country. Annapurna, Chitwan, Manang, Jomsom, Sagarmatha, Langtang are the prime sites for eco-tourism in Nepal (NTB, 2001).

Nepal is a mountainous country presents a unique conglomerate scenic grandeur and vitreous beauty with rich cultural heritage of diverse ethnic groups and presents an alluring picture from gorges, planes and valleys to magnificent himalayas including some of the highest peaks in the world enriched by a wide range of flora and fauna. This has put Nepal in an important in the world tourist destination map. For this reason, Nepal has become a magnet, which attracts tourist to explore the diversity of the country. Subsequently, tourism has become a main source of foreign exchange for the government since 1951, when the door was first open to foreigners. So properly managed eco-tourism practices may change the status of society. The ninth fifth year plan (1997-2002) has given emphasis to promote eco-tourism by the Government of Nepal. So for the development of eco-tourism different strategies are implemented in Nepal, which has emphasis on expanding the existing spectrum of eco-tourism products and services aiming for a wide range of high quality products from village tourism to world class wildlife and premier adventure products (NTB, 2001).

Tourism in Nepal has brought both positive and negative changes in the mountain areas where it is practiced. These changes are manifested

in nature and environment, in the economy and in the social, cultural patterns of mountain people. Although negative impacts have also occurred, by the large evidence indicates the positive changes outweigh negative ones. Moreover, the potential for developing tourism in mountain areas is enormous.

Trekking is one of the most prominent tourism activities in Nepal. Most trekking takes place in one of the several mountain protected area. Langtang national park (LNP) is strategically very important from the point of view of tourism compared to other national parks and protected areas in Nepal. LNP is accessible by motor vehicle and lies directly north of Kathmandu. Many visitors to Nepal who do not have many days their disposal can quickly make a trip to LNP and enjoy the grandeur of the Himalayas as well as other natural features found in other mountain areas.

Visitors to LNP include both free independent trekkers (FITS) and group trekkers(GTs), unlike those going to Mustang and Manasalu where only group trekkers are permitted. The park headquarters is in Dhunche the capital of Rasuwa district. The park is spread out across the three districts Rasuwa, Sindhupalchok and Nuwakot. Rasuwa district contains the largest portion of the park in terms of land areas.

1.1.1 Scope of eco-tourism

Eco-tourism that produces economic (monetary profits and job opportunities) and social benefits to local people. It is based on the sustained conservation of resources in a non-consumptive manner involving non-intrusive exploitation of natural resources through the controlled use and management of cultural and environmental resources for the future. It incorporates the co-existence and interaction between the

natural environment and people and encourage the active involvement of tourists and the local population in preservation efforts.

-) Development of greater understanding and appreciation of the environment.
-) Motivation of tourists/locals to become more environmentally responsible.
-) Increase public environmental awareness.
-) The opportunity of financial independence is perceived by eco-tourism operators.
-) Provision of funding for scientific research.
-) The application of environmentally friendly skills acquired during the tour facets of everyday living.
-) It is primarily nature based tourism, thus it is eco-friendly.

1.1.2 Impact of eco-tourism

Tourism is one of the world's fastest growing industries as well as the major source of foreign exchange earning and employment for many developing countries. Tourism is a double-edged activity. It contributes a positive impact if proper management is done but at the same time uncontrolled growth and improper management can be the major cause of degradation of the environment and loss of local identity and traditional culture (Biological Diversity and Tourism, 2003).

Negative impacts from tourism occur when the level of visitors use is greater than the environment's ability to cope with this use within the

acceptable limits of change (Sharma, 1995). Overcrowding, misuse of natural resources, the construction of buildings and infrastructures activities associated with tourism produce impacts on the environment. The impacts of tourism depend on the number and nature of tourist and the characteristics of the sites. Problem arises if the number of tourist is larger or the resource over used.

Direct use of natural resources, in the provision of tourist facilities is one of the most significant impact of tourism in a given area. Deforestation, soil erosion, depletion of wildlife and alternation of wildlife behaviour and habitat is caused due to construction activities and incorrect and unregulated activities of tourist.

In spite of negative environmental impacts, it also has some positive impacts on natural resources. Direct revenues generated from the tourism can be used for the protection, conservation and restoration of biological diversity of the area. Tourism activities also generates employment opportunities for the local people, which helps to increase the status of local people.

Tourism has a highly complex impact on cultural values. Tourism activities may lead to intergenerational conflicts and may effect gender relationship. Traditional practices and events also influenced by the tourist performances. Tourism development can lead to the loss of access by indigenous and local communities to their land and resources as well as sacred sites.

The negative impact of tourism can be broadly classified into two categories

a. Direct Impact: Direct impact is caused by the presence of tourist.

b. Indirect Impact: Indirect impact is caused by the infrastructure created in connection with tourism activities.

Table No. 1. Impacts of Tourism: An Extensive list

Major Component	Negative Impact	Positive Impact
(a) Environmental	<p>a. Increased deforestation and degradation by increased firewood and trampling of vegetation.</p> <p>b. Wildlife disturbance and habitat loss due to increased tourist activities.</p> <p>Increased land and water pollution by litter and other solid waste.</p>	<p>a. Wildlife management new ideas and inputs, resources availability.</p> <p>b. Forest management new ideas and input, resources availability.</p> <p>c. Improved park management capacity (increased funding for PAS and local communities).</p> <p>D. Pollution- new ideas and inputs.</p> <p>e. Increased conservation awareness education.</p>
(b) Economical	<p>a. Employment opportunity is low but the inflation rate is high in local level.</p> <p>b. Direct and indirect impacts increased dependency.</p>	<p>a. Employment opportunities and better economy by increased revenues.</p>
(c) Socio-Cultural	<p>a. Rapid cultural change and degradation in moral values.</p> <p>b. Shift in family roles and values.</p>	<p>a. Opportunity to learn cross culture, appreciate our traditional culture and moral values, built confidence.</p>
Other	<p>-Misuse of Community properly</p> <p>-Hazards to trekking staff</p> <p>-Uncontrolled Construction.</p>	<p>Cooperation</p>

1.2 Objective of the Study

The main objectives of the present study are:

- i) To study the impact of tourism mostly trekkers on natural environment.
- ii) To analyze the socio-economic and cultural impact of tourism.
- iii) To quantify fuel wood consumption by hotels/ lodges, villages and tourist.

1.3 Justification

Langtang national park being one of the nearest national park from the capital city Kathmandu yet unaffected by the mass tourism could be developed the prominent hotspot for eco-tourism. The study of eco-tourism in Langtang national park (Dhunche-Kyangjin route) is helpful to explore the natural and cultural heritage of the area. Tourism in LNP has created both threats and opportunities so this study will also focus on the present status of environmental, social, cultural and economic impacts in the area and also approaches towards the conservation of natural environment. So this study will be helpful for identification of tourism impact on natural environment and socio-cultural condition of this region as well as this study will also beneficial for the resource management in the context of eco-tourism.

1.4 Limitation of the study

The following are the limitation of present study:

- (i) Coverage of certain area LNP due to financial limitation.
- (ii) Literature on socio-economic aspects of eco-tourism is available however, literature on eco-tourism focusing its impacts on natural environment is lacking.
- (iii) The increasing concern of tourism towards security condition and declining no. of tourist.

CHAPTER - TWO

2. LITERATURE REVIEW

Now a days, Mountain tourism has become prominent due to its increasing significance through out the world. Mountains have a mystic aura, not only for explores, scholars and mountain climbers but also for the public. One of the prime interests of a tourist is to expose himself/herself to a different environments and culture. This interest passion, which is largely driven by curiosity, is generally satisfied by mountain tourism (Shrestha, 1995). It is strongly agreed that mountains are corridors of migration for plants, animals and for cultures. Thus, tourist objectives of experiencing nature in terms of wild life and wild plants are easily meet in the mountain environment.

Tourism in the Himalayas can be seen as in the early stage of tourism development in the Alps. However, tourism induced environmental and Social problems in the Himalayas are severe and without any compensatory economic as realized in the Alps (Nepal, 1999).

The growth of tourism related activities have many advantages such as improvement of facilities to the visitors and also to maintain qualities to the visitors and also to maintain quality tourists. However, the local residents are also almost equally benefited due to improved infrastructures and general living conditions (Shrestha, 2002).

Mountain eco-tourism in Nepal can be a key factor in the focal concern for improvement of people quality of life through sustainable development initiatives in economic development and environmental conservation (Nepal, 2002).

Mountain eco-tourism promotes responsible tourist behavior, conservation of important wild life habitats and ecosystems and appreciation of the tourist toward local cultures and traditional life styles

in provision to increase the livelihood status of people living in such communities (Nepal, 2002).

The success of tourism not always brings the positive impact but may lead to the degradation of the natural environment by depleting the natural resources thus reduces the site attraction. The Sagarmatha national park in Nepal vividly illustrate the local environmental condition have deteriorated as a result of tourism (Nepal, 1997).

Bhattarai (1985) mentioned that a related solid waste problem is the litter often left behind by tourists. He further mentioned that the mount Everest track route so littered that people started calling it the garbage trail and the base camp is derogatorily referred to as the highest garbage dump in the world.

The relationship between nature tourism and conservation may be mutually beneficial. However, unless the requirement of safeguarding the environment is met, eco-tourism is in danger of being self destructive process destroying the resources upon which it is based (Cater and Lowmen, 1994).

The efforts in eco-tourism no always bring the beneficial for local people and environment. At its worst activity, eco-tourism is environmentally destructive, economically, exploitive and culturally insensitive. There is increase in demand of local resources with the arrival of the tourism in the natural areas. To provide the required demands, there is the need of modern infrastructures, which in turn produce large waste and pollution and enhance further degradation of fragile ecosystem (Lindsay, 2003).

Trail impact by tourism includes a variety of problems including loss of vegetation cover, soil loss compaction. The type and the used area indeed is the main important factor that influence trail degradation (Marion, 1994).

The Increase in the Tourist related activities have many advantages such as improvement of facilities to the visitors and also to mountain qualities to the visitors and also to mountain quality tourists. However, the local residents are also almost equally benefited due to improved infrastructure and general living conduction (Shrestha, 2002)

Cultural diversity is the main identity of the local community. The influx of people from different country and religion may affect the local culture and may lead to social degradation. The nature tourism is concentrated to the remote areas, so its impact on local culture is unavoidable. Gurung (1997) elaborates that many local traditions and habits come under the influence of western tourists as such generation old tradition and cultures have been impacted in many areas.

Wall (1997) emphasis four major destructive environmental characteristics of eco-tourism. First eco-tourism locations are very special and have limited resistance to use pressure. Second, the timing of visitation to the eco-tourism area is often at critical times such as mating and breeding seasons. Third, the relationship between numbers of visitors and associated impacts is unlikely to be linear rather it is more likely to be curvilinear or cumulative. Finally, eco-tourism may have less impacts one-site but off-site impacts may be substantial such as air pollution and climate change through aircraft emission, while they travel long distance to the eco-tourism destination.

Banskota and Upadhya, 1989 studied on trekking tourism in LNP. This study was based on visitors survey of some 104 trekking tourist in LNP during 1988-89 winter reason. The authors provided information on the perception of the trekking regarding the state of natural environment, accommodation, food expenditure pattern of trekkers and issues important to park management. They found lack of information about

places and signboard along the trails are major constituent for the development of trekking tourism in that region.

The lack of sustainable grazing management in park such as the deterioration of the existing natural resources. Soil-erosion, landslides and cessation of plants has resulted due to over grazing in the Langtang area (Shrestha, 1998).

Tourism can bring both positive and negative socio-cultural changes. The Sherpa's in the well known tourism destination of Khumbu are involved with the cash economy as a result of tourism and have become more westernize. But they have apparently not lost the essence of their cultural identity and have even developed an enhanced scene of ethnic pride because of the value place on their services and culture by tourist (MOPE, 2004).

Koirala (2001) has study the impacts of tourism on plant, and animals environment of Modikola valley of Annapurna conservation area of showed the multidimensional effect of tourism like greater consumption of fuel wood, environmental degradation, Waste problem, cultural depletion, economic impact of tourism.

Ecotourism has both positive and negative impact on mountain environment if the adverse environmental activities are done lack of proper management, it bring negative impact. Mountain environment is fragile hence unchecked tourist activities degrades the environment and loss of plant and animal life (Cruz, 1999).

Carefully planned ecotourism practices contribute to cultural preservation. The Sherpa cultural in high Himalayan region and Gurung cultures in middle and high hills was found to be preserved due to ecotourism (Weaver, 2001).

Koirala (2002) studied about the tourism potentiality and impact on the livelihood of the local people TMJ trekking route. He raised some

critical issue need to strengthen to increase the carrying capacity of the TMJ taking route such as critical areas, critical resources, critical infrastructure, critical institution and critical behavior. He also suggested a number of step should be taken by Government to promote environmental friendly tourism and mandatory to bring kerosene for cooking and avoid presser avoid natural resources.

CHAPTER - THREE

3. METHODS AND METHODOLOGY

Following methods were employed in study to obtain information.

3.1 Preliminary Field Survey

A preliminary field survey was carried out during the first week of Kartik 059 (October 2002). During this period general survey of Langtang and Gosaikunda route was made. Discussion and Consultation with official of Langtang national park and other concerned personals was also conducted during this period.

3.2 Literatures Review

Relevant literature were thoroughly review in order to collect secondary information regarding impact of eco-tourism including other relevant information of the study area.

3.3 Data collection:

In order to collect necessary data for the purposed study, the following method will be selected.

3.3.1 Field Survey and Observation

Field survey was made at Dhunche, Syaphru, Lama Hotel, Ghoda Tabela, Langtang and Kyangjin Oct. 2002 to March 2004 to identify major location and issue of impacts of eco-tourism in LNP. During field survey various information on impacts of tourism such as damage to forest for fuel wood and timber, disturbances to wildlife and their habitat,

deposition of waste and liters, sanitation and water quality were also collected.

3.3.2 Questionnaire Survey

The quantitative information was gathered from the random questionnaire survey from tourist, lodge owners, locals and porters. Altogether 60 household, 25 hotels/lodge owners, 25 tourist and 5 porters were selected for questionnaire survey. The questionnaires were designed to receive information about fuel wood consumption by local people, trekkers and lodge owners, litter and waste deposition and management, socio-economic and cultural status of the people. During questionnaire survey the researcher often observed the energy uses waste and litter management etc in Langtang route.

3.3.3 Interview and Discussion

The qualitative information was gathered by interviews and discussion with Key informants including farmers, lodge owners, tourist, porters, guides and LNP staffs.

3.3.4 Nature and Source of Data

This study includes both primary and secondary data. The primary data were collected directly from the field observation within study period. The sources of these primary data were tourist, lodge owners, park staffs, village people and porters. Secondary data included the records and reports on different aspects of the study, maps and diagrams etc. Other secondary source of information was articles, books and dissertations on related topics.

3.3.5 Data Analysis

i) Correlation coefficient

Response from 12 statements was analyzed by Rating scale (Kothari 1990). Correlation coefficient between the view of local trekkers and local residents were calculated by the formula.

$$r(x, y) = \frac{\text{Cov}(x, y)}{s_x s_y}$$

where, $\text{Cov}(x, y) = \text{Covariance between } x \text{ and } y = \frac{1}{n} \sum (x - \bar{x})(y - \bar{y})$

$s_x = \text{Standard deviation of } x = \sqrt{\frac{1}{n} \sum (x - \bar{x})^2}$

$s_y = \text{Standard deviation of } y = \sqrt{\frac{1}{n} \sum (y - \bar{y})^2}$

ii) Testing of hypothesis

Hypothesis was tested by using t-test to show the significance of the view between local trekkers and local residents at 95% limit of confidence, where the value of t was calculated by

$$t = \frac{r \sqrt{n-2}}{\sqrt{1-r^2}} \quad \text{With } (n-2) \text{df}$$

CHAPTER - FOUR

4. DESCRIPTION OF THE STUDY AREA

Of the many potential areas LNP holds a strategic importance of tourism development. A number of places like Langtang, Gosaikunda, Rasuwagadi, Tatopani and beautiful Himalayan peaks situated within LNP are important from the tourist point of view.

4.1 Location and Boundary

Langtang National park is located in the central Himalayas of Nepal. It was established in 1976 by the government of Nepal to conserve the unique flora and fauna of this region. The park covers an area of 1710 sq. km and extends over parts of Nuwakot (6%), Rasuwa (56%) and Sindhupalchock (38%) in the southern mountainous terrains of the Nepal-Tibet border. The park has 420 sq.km of buffer zone.

It is the second nearest national park to the capital city Kathmandu. It is accessible by road from Kathmandu and lies a distance of 120 km. It lies at a distance of 32 km by air from Kathmandu. The park is located between the latitude 28.00° - 28° , 20° N to longitude 85.15° - 86.00° E.

4.2 Climate

The climatic condition of Langtang region ranges from subtropical to arctic-river valley below 1000m is characterized by wind and dry winter and hot summer. Mean annual temperature is around 20° c. Meso-thermal climatic condition prevails between 1000-2000m. Mean annual temperature lies between 15 - 20° c and annual precipitation lies between 700mm-2000mm. The wet micro-thermal climate is characteristic of altitude between 2000-3000m. Here the mean annual precipitation of

altitude of 2000m. Only 40 to 50 days in a year is frost free above the altitude of 2500m. Here, there is snowy period around 200 days.

Alpine humid climate occurs between 3000-4500m. Mean annual temperature lies between 3⁰ c-10⁰ c. Mean annual precipitation ranges from 100-1500mm. This zones characterized by cool summer and severe winter. At the altitude of 400m frost free days are very short. (CDG, 1997).

4.3 Biodiversity

4.3.1 Vegetation

The description and classification of the vegetation in the park has been described in detail in the Management plan (DNPWC/DUHE, 1977). Different vegetation zones are described.

Upper Tropical Zone (Below 1,000m)

A very small area in the lower Bhote Kosi is covered by hill Sal (*Shorea robusta*) forest. However, the vegetation composition of this zone is completely different from that of Sal forests of southern plain of the Country. This zone is under heavy pressure from man. This zone corresponds to the Wet Hill Sal forest.

Subtropical Zone (1,000-2,000m)

In Nepal, this zone is under the greatest pressure from man. Small pockets remain relatively untouched on steep slopes. Hydrophyllic forest (*Schima wallichii*, *Lagerstroemia parviflora*) occur in the wettest areas of the park, e.g. the lower elevations of the Larke. Panch Pokhari and Nasem Khola an the east bank of the Melamchi Khola. This appears to be the only vegetation type of this zone is which small areas have remained

reasonably unspoilt in Nepal. Mesohydrophyllic forest (*Schima wallichii*, *Castanopsis indica*) occurs in the damper areas of the lower Trisuli, Melamchi, Larke, Panch Pokhari and Balephi khola and the Bhote Kosi.

Xerophyllic forest and health (*Pinus roxburghii*) occurs on drier slopes, mainly in the upper Bhote Kosi Valley, due to the rocky terrain and reduced rainfall. *P. roxburghii* is often the only tree species present. This vegetation type is frequently exposed to fires and the dense herb layer is poor in species. *Euphorbia royleana* occurs in the dry, rocked habitats along the Bhote Kosi and lower Langtang Valleys, in association with other strictly xerophyllic plants such as *Agave mexicana*.

Often, the mesophyllic types have been replaced through the actions of local people and livestock. Heaths, characterized by shrubs and small trees (*Berberis aristata*, *Rubus ellipticus*) predominate. Pastures represent the ultimate stage of degradation. A small number of species favored by overgrazing, always dominate the heath and include *Eupatorium adenophorum*, *Artemisia vulgaris* and *B. asiatica*. This corresponds to Bengal subtropical Hill forest. Himalayan Subtropical pine forest.

Hill Zone 2000-2600m

Within the Park, agricultural expansion has greatly affected the forest. Grazing throughout, each year has impoverished the forest.

Hydrophyllic *Quercus lamellosa* forest occurs on south side of the Park, although it is also present in the wetter parts of the Bhote Kosi and Trisuli Khola. Mesophyllic *Quercus lanata* forest on south facing slopes together with *Rhododendron arboreum* and *Lyonia ovalifolia* occur. Mesoxerophyllic *Pinus excelsa* and *Rhododendron arboreum* forest lies

in the upper Bhote Kosi, lower Langtang. Due to human interference, *P. excelsa* is now often the dominant or only species represented in this types. An interesting species, *Picea smithiana*, is scattered throughout the upper of this forest.

Degraded forest means intensive collection of fuel wood and fodder. The resulting heath are, therefore, plagioclimax communities where the stunted, sparse tree species present are associated with shrubs such as *Berberis sp.*, *Rubus sp.*, and *Lonicera sp.*, Grazing-resistant species are *Anaphalis sp.*, *Anemona sp.*, *Potentilla sp.* and *Gentiana sp.*

Montane zone (2600-3,000m)

Montane and Hill Zone are sometimes considered as Temperate zone. Vegetation vary from the damp, shaded *Q. senecarpifolia* and *Tsuga dumosa* type, to the mesohydrophyllic stands which are almost pure *Q. semecarpifolia*. Other types of forest include those which have been burnt and now consist mainly of *Q. semecarpifolia*. The further degeneration of natural forest, due to the presence of livestock in spring and autumn, has resulted in heaths community where *Rhododendron arboreum* is at a selective advantage and ultimately, heath communities, where trees have been removed. This zone corresponds to the Himalayan wet Temperate forest.

Lower Subalpine Zone (3,000-3,600m)

This zone is mainly characterized by the dominance of conifers and rich variety associate species. It occupies an almost continuous belt throughout the park, broken in places by burnt areas where dense bamboo (*Arundinaria sp.*, *Thamnocalamus aristatus* and *Himalayacalamus falconeri*) stands thrive.

On damper, steep, north-facing slopes *Rhododendron barbatum* is often present in pure stands. At the lower altitudes in this zone, *Acer spp.* are important associates on the north-facing slopes. These often extend down into gulleys of the upper Montane Zone. In slightly drier conditions, *T. dumosa* is an important constituent of the zone together with *Abies spectabilis*. The mesophyllic habitats are characterized by *A. spectabilis* and *Larix nepalensis* in the area of less rainfall to the north of the Gosainkund Lake- Dorje Lhakpa range. The latter species is peculiar because of its localized distribution in the Eastern Himalayas.

Abies spectabilis, the high altitude fir, is common in the upper forest. It is not usually found below 3,000m, but where occasional trees occur rather below that altitude they retain the appearance characteristic of the tree at higher altitudes. *A. spectabilis* does not usually exceed 24m in height, its branches are widely spreading, and its leaves are much more stiff. Above 3,500m the *Abies* often is superseded by *Betula utilis*, but in some places it ascends to the treeline. Below 3,000m it usually gives way to *Tsuga dumosa* forest or to *Acer*, *Osmanthus*, and *Magnolia* of the upper temperate mixed broad-leaved forest. This forest normally has a dense under story of rhododendrons and when seen in the spring it is one of the most beautiful sights in Nepal. The upper canopy of the forest is composed almost exclusively of the fir, and the straight-stemmed trees attain a height of 25-30m.

The *Rhododendron* occurring in *Abies* forest are limited to *Rhododendron barbatum*, *R. campanulatum*, *R. arboreum* and in a few places the Nepalese endemic *R. cowanianum* occur. Broad-leaved trees are not common in this *Abies-Rhododendron* forest and mostly confined to clearings. The one most frequently found are *Betula utilis* and species of *Sorbus* and *Acer* where the *Abies* is burnt or the area near Sing Gompa

and Thada have dead stand and fire blackened trunks of conifers. This zone corresponds to Alpine Fir- Birch forest. Birch- Rhododendron forest, Moist Temperate Deciduous forest and Eastern Oak-Hemlock forest.

Upper Sub Alpine Zone (3,6000-4,000m)

Betula utilis is the characteristic tree species of this zone. Pastures often extend down to areas covered previously by forest. This is largely attributed by overgrazing. On north- facing slopes. *B. utilis* is associated with *Rhododendron campanulate*, the latter scattered and stunted above the tree-line. In drier habitats, *B. utilis* is absent and *R. campanulatum* is associated with *J. indica* and *J. recurva*.. These juniper species are common. *A. spectabilis* is still present, in small numbers, in the damp areas.

Wherever forest is absent, clumps of *R. lepidotum*, and *R. anthopogon* develop and are dominant in and around the pasture (DNPWC/DUHE, 1977). This zone corresponds to the Alpine Fir Birch forest and Birch-Rhododendron forest.

Lower Alpine Zone (4,000-4,500m)

Above the tree line scrub species such as *Rhododendron sp.* *Lonicera spp*, *Juniperus sp.*, *Cotoneaster sp.* are found. Depending on climate and humidity, the heaths are dominated by *Rhododendron sp.* (damp) or *Juniperus sp.* (dry). Occurrence of *Rhododendron anthopogon* is characteristic of the moist areas. *Salix sp.* occurs in the Langtang Valley, often down into the Sub alpine zone, but are seldom seen in the south of the Park. This zone corresponds to the Dry Alpine Scrub.

Upper Alpine Zone (4,500-5,500m)

Species vary depending on the soil, aspect and degree of shelter. Grasses, herbs and cushion plants occur in the most favorable microhabitats (DNPWC/DUHE, 1977).

4.3.2 Fauna

The Langtang National Park has an abundant of found species due to its physiographic diversity. There are recorded more than 46 mammalian species, 345 Bird species, 11 species of herpetofauna, 30 species of pisces, 11 species of spider and 58 species of butterflies (DNDWC, 2003). Some of the endangered species found in the park are: snow leopard (*Uncia uncia*), Clouded Lepoard (*Neofelis nubulosa*), Musk deer (*Moschus chrysongaster*), Red Panda (*Ailurus fulgens*). The prey species such as the Himalayan thar (*Hemitragus jemlahicus*), Himalayan Marmot (*Marmota himalayan*), Pika (*Ochotana sp.*), Ghoral (*Nemorhaedas goral*). Other major fauna found in the park are Wild Dog (*Canis alpinus*), Red Fox (*Vulpes vulpes*) common Leopard (*Panthera pardus*), Wolf (*Canis lupus*), Himalayan Yellow Throated Marten (*Martes flavigula*), Himalayan Balck Bear (*Selenarctos thibetanus*), Large India Civet (*Viverra zibetha*), Assamese Macaque (*Macaca assamensis*), Barking deer (*Muntiacus muntijac*).

Some of the important bird species in the Park are: Impeyan Pheasant (*Lophohorus impejanus*), Blood Pheasant (*Ithaginis cruentus*), Monal Pheasant (*Tragopan styra*), Tibetan Snow Cock (*Tetraogallus tibetanus*), Snow Partridge (*Lerwa lerwa*), Long-gailed Minivets (*Pericrocotus ethologus*), Black-capped Sibilias (*Heterophasia capistrata*), River Chat (*Chimarrornis leucocephalus*), Yellow-billed Blue Magpie (*Cissa flavirostris*), Ibisbill (*Ibidorhyncha struthersii*) etc. Eagles and

vultures are often seen soaring above cliffs and high pastures in search of carion or prey. White-collared black bird, Himalayan Honey guide, Scaly-bellied woodpecker, Redstarts. Tits are other birds that can be seen. The Gloden Eagle (*Aquila chrysetus*) is also present, although less common. The most commonly seen reptile is the Himalayan rock lizard, Green Pit Viper, Himalayan Matrix. Mountain Pit Viper, Large Toad Viper are found in the park.

Table No. 2: Sharing of Biodiversity by LNP

Taxa	Number of Species		
	In the world	In Nepal	LNP
1. Mammals	4,327	185	46
2. Birds	9881	857	345
3. Amphibians	4000	43	11
4. Reptiles	6500	100	10
5. Pisces	85000	158	30
6. Butterflies	112,000	635	58

Source: DNPWC, 2001

4.3.3 Land use Pattern of LNP

The park lies in mountainous region characterized by steep and rugged terrain coupled with harsh climate. Consequently only 1.7 percent of it's area is under cultivation. Forest, grassland and shrub land constitute 29.87, 4.94 and 2.276 percent respectively. While rocks and ice put together cover 60.73 percent which is shown in table.

Table No. 3: Land use Pattern of LNP

Land use type	Area (km²)	Percentage (%)
Cultivation	30.82	1.70
Forest	539.9	29.87
Grassland	89.28	4.94
Shrubland	50.00	2.76
Others (Rock/ice)	1098	60.73
Total	1710	100

Table No. 4: Land use pattern in Buffer zone.

Land use type	Area (in sq.km)	Percentage
Cultivation	118.35	28.29
Forest	129.8	31.04
Grassland	58.45	13.97
Shrub land	106.12	25.36
Others (Rock/Ice)	5.59	1.34
Total	418.31	100

CHAPTER - FIVE

5.THE RESULTS

5.1 Tourism in Dhunche-Kyangjin Route

Dhunche-Kyangjin route is the most busy and popular trekking route of LNP. Natural beauty and socio-cultural lifestyle with untouched the modern onslaughts, high level of biodiversity, himalayan valley of Langtang with its fusion of Tamang and Tibetan culture, multitude of glaciers and Buddhist monasters such as Kyangjin make this route high potential for tourist destination.

LNP is the third and most popular trekking destination in the mountain area after ACAP and SNP and this National park was opened for tourism since 1972. It attracts approximately 8.9 percent of total trekkers visiting Nepal in the year 2002 and 9.17% in 2003. The potential to increase the number of visitors to LNP is favorable for several reasons, first the park is relatively the most accessible from KTM, second, other popular trekking destination have already experienced over crowding compared to LNP. Third this park is an ideal destination for trekkers who have limited time in Nepal as it can be reached in a relatively a short period of time. Fourth LNP presents a fairly comparative Himalayan environment like other national mountain parks.

LNP is the must accessible of the mountain national parks in Nepal. It is accessible all year round by combination of motor transport and trekking. But (October-November) and March –April is the major tourist flow season in this area. Where as June-July is the off season in this area. Average length of stay is 11 days for both individual trekkers and group trekkers. Approximately 40% of the tourist visited LNP for the purpose of holiday pleasure and 60% come for trekking and mountaineering.

Fig No. 1: Number of trekkers in LNP.

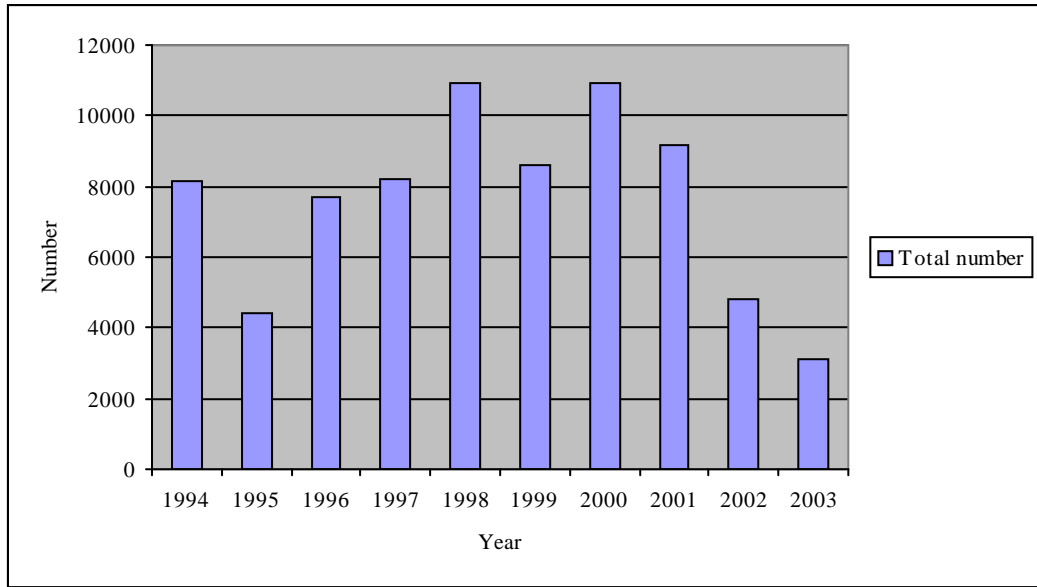
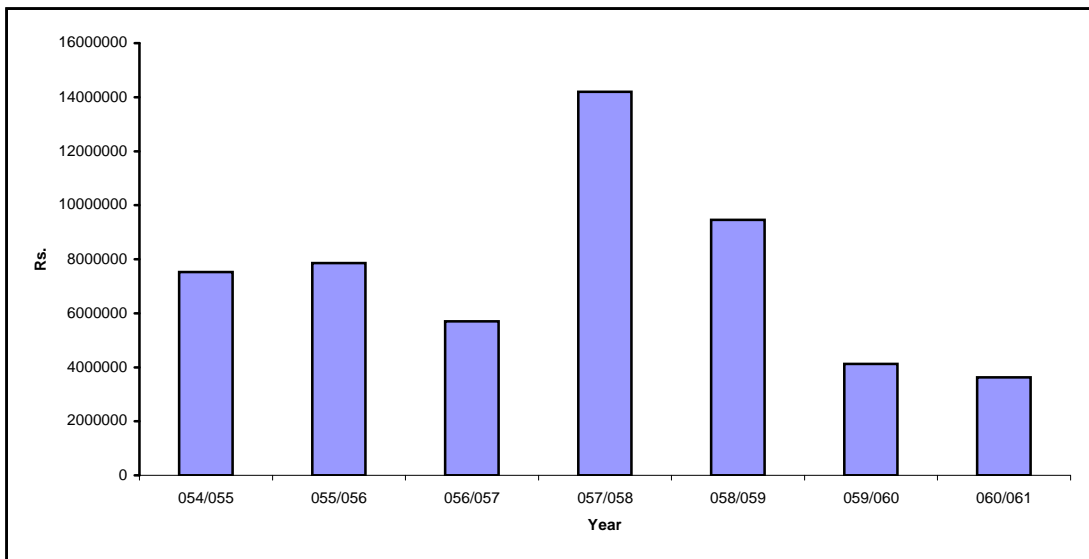


Figure No. 2: Total Revenue generation in LNIP



5.2 Tourist Experience

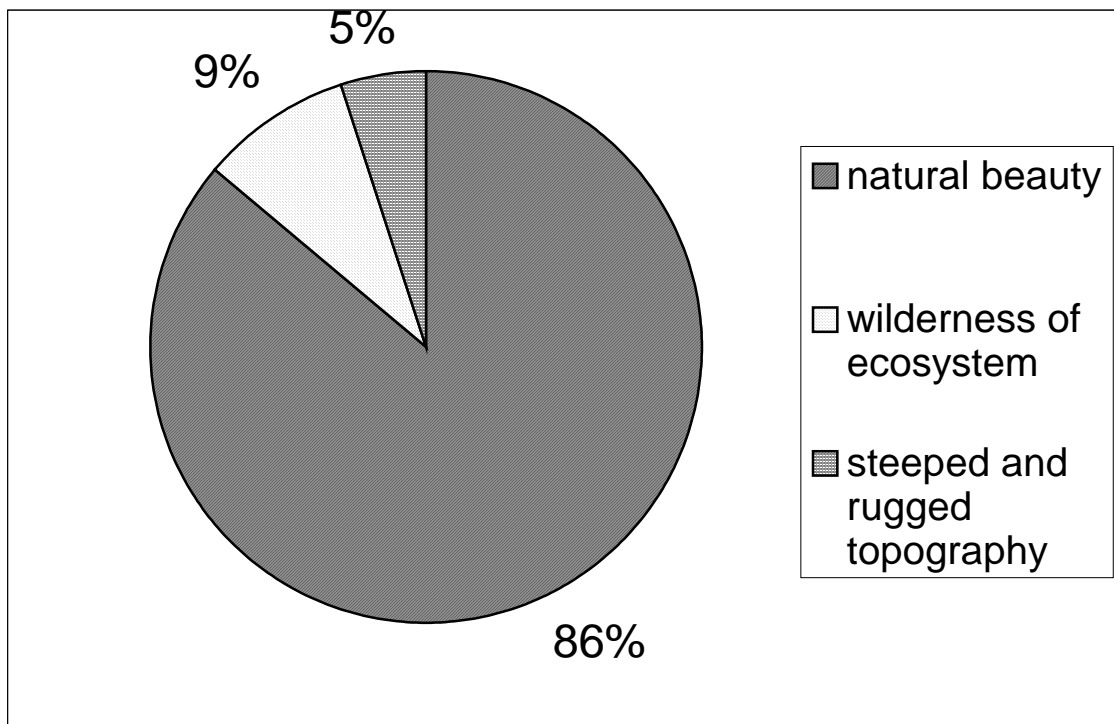
Most of the tourist come here are magnetized by the natural beauty of the landscape. A total of 25 individuals were asked questionnaire during the survey, 8 French, 6 Israeli, 5 German, 4 Netherlands, and 2 American had participated in the questionnaire survey. All of them were found visiting LNP for trekking and mountaineering.

Among the respondents (n=25) 60% were male and 40% were female. 36% of tourists were group trekkers while 64% were individual trekkers in the site.

From the tourist questionnaire survey it was found that the factors that attracts tourist to LNP was natural beauty for (n=25) 86% followed by 9% for wilderness of ecosystem and 5% for steeped and rugged topography and ethnicity and culture.

Out of the total tourist visited this area, 90% having higher education. Of the total visitors 85% were new for that area while 15% had second visit.

Fig No. 3: Tourist Experience of study area



5.3 Tourism infrastructure

5.3.1 Major trails of LNP

There are three major trekking routes, which lead to Kyangjin and Gosainkunda. These trek routes are classified as Dhunche – Kyanjin, Dhunche-Gosaindakunda, Dhunche- Kyangjin in route in Gosainkunda or vice-versa.

Among these three routes, this study was focused on Dhunche-Kyangjin route. This is the most busy and popular route for trekkers in LNP. This route passes through important places like Dhunche, Barkhu, Brabal, Syaphru, Changdom, Ghoda Tabela, Langtang and Kyangjin.

The total length of route is about 50km. In the whole the trails is moderate, only in a few places there are landsides. Along this route there is one suspended bridge on the Langtang khola near bamboo cottage lodge and four other wooden log bridges. All these bridges are in good condition.

5.3.2 Accommodation

All trekking routes have the facilities of locally operated hotel/ lodge, tea house and camp ground for group trekkers. Lodge operate year round except during the peak winter when the trails are blocked.

Table No. 5: shows the profile of accommodation of Langtang route:

S.N	Settlement/place	Hotel/lodge	No.of beds	Tea shop	Campsite
1	Dhunche	24	296	20	-
2	Sanobharkhu	-	-	1	-
3	Thulo bharkhu	3	37	2	-
4	Brabal	-	-	3	-
5	Thulo syaphru	20	264	-	4
6	Syaphru besi	10	124	16	1
7	Pairo	4	20	-	-
8	Pul	1	4	-	-
9	Bamboo	3	36	-	3
10	Rimiche	3	44	-	-
11	Lama hotel	7	162	-	3
12	Riverside	2	20	-	-
13	Ghoda tebala	2	28	-	2
14	Thyangsyaphu	5	32	-	-
15	Langtang	15	232	-	3
16	Mundu	1	8	-	-
17	Kyangjin	13	242	-	7
Total		113	1549	42	23

Source TRPAP/VAT Office Dhunche, 2003

5.3.3 Information and communications

In spite a nearly 25 years of tourism development provision of information for the tourist remains a critical problem in the LNP. Relatively good trekking maps and guide Books are available for the Langtang region, but there are no visitor centers located in the region. Dhunche, the district headquarter where must tourist arrive, is woefully deficient in information that a trekkers needs. The entrance to the LNP in Dhunche where tourists normally pay Rs. 1000/ park entrance fee provides an information brochure introducing the park but nothing beyond that. A Trekkers is pretty much left to his/her own devices or the knowledge of the poster or the guide. No authoritative fact sheet is available on conditions of the trails, the accommodation available, prices,

the safety condition of the trails information in case of emergency, not to mention information about the general social and cultural features of the areas, the trekker's/visitor's. Communication facilities are also not available properly.

5.3.4 Transportation

Dhunche is the starting point of the Trek. It is accessible by modern means of transport always throughout the year except for a few weeks during the monsoon season when segments of the road are washed out by the torrential rain Regular Bus service is available between Kathmandu via Trishuli, Dhunche.

5.4 Major tourist sites

From the tourist point of view LNP holds an important place as it is wild and rugged. Its scenery natural beauty and socio-cultural life style still untouched by modern onslaughts. The whole trekking route are equally attractive due to varied topography although some sites have given especial priority from tourism point of view.

Dhunche is an old and compact settlement inhabited by the Tamangs and it is the district headquarter of Rasuwa as well as Park headquarter. It is situated at the Confluence of Bhote Koshi and Trishulikhola at an altitude of 1950 masl. From here a wide range of mountain can be viewed.

Syaphru is situated at an altitude of 2228 masl. It is the cross-way between Kyangjin and Gosain Kunda, a major Tamang village with linear pattern of settlement. It is the upper limit of agricultural domination activity on the way to Kyangjin. One can enjoy the view of Ganesh Himal range in the west and Gosainkunda mountain in the south east.

Lama hotel is about 5 hours walk from Syaphru, situated on the right of Langtang khola and clad within dense forest. It is the trekkers halting place. The trail to Helambu or Gosainkunda via Chadang bifurcates from this place, across the Langtang khola.

Ghora tabala which is three hours walk from Lama hotel. From here begins the alpine region. Langtang village is seen from this place and lies at 3000 masl.

Langtang, from scenic view point as well as cultural view point the Langtang village is the most important place in the whole of Langtang valley. It is situated on the foot of Langtang Lirung Himal and the village height is 3375 meters. All are Tamangs and their cultures, language and costumes are taking to the Tibetan region of china in the north.

Kyangjin, which is situated in the Langtang valley, just two hours walk from the Langtang village located at 3750 masl. From here tourist can enjoy mountain views and glaciers in close range and it the last destination point of trekkers.

Table No. 6: Major tourist sites

S.N	Sites	Altitude	Importance
1.	Dhunche	1960 masl	Mountain view
2.	Syaphru	2120 masl	Mountain view
3.	Lama hotel	2840 masl	Scenic view
4.	Ghora tabala	3000 masl	Scenic view
5.	Langtang	3420 masl	Scenic view point and cultural view point
6.	Kyanjin	3900 masl	Mountain view and glacier

5.4.1 Tourism products, resources and major attraction

5.4.1.1. Biodiversity Experiences

- a. Floral species:** Endemic Larix species, Blooming Primula, more than 9 species of Rhododendron and Orchids are the best floral attraction of the site.
- b. Faunal Species:** Asamese Monkey/Langur, Red Panda, Musk Deer, Himalayan Thar, Snow Leopard, Butterfly, Wren Babbler and Danphe are best faunal observation of the site.

5.4.1.2. Landscape Experiences

- a. Mountain Peaks:** A wide range of eye catching mountain peaks Langtang Luring (7225m), Langtang I and II, Ganesh Himal (6905m), Langshisha Ri (6310m), Dorje Lakhpa (6983m) are the heart of every trekkers visiting the site. The mountains are ever covered with snow and the reflection of sunlight during sunrise and sunset offers a magnificent view of the area.
- b. Grassland and Meadow:** The grassland and meadow of Langtang and Kyangjin increases the beauty of this area.
- c. Rock and Cliffs:** Langtang village and Kyangjin along the trail is the best site for rock climbing.

5.4.1.3. Cultural Experiences

Tulku Chholing Gomba (Dhunge), Thulo Syabru, Gomba, Kyangjin Gomba, Syabru Nach, Mane Nach, Syamba Nach, Shamans Nach, Chhyalu Nach, Sau Nach, Tabu Nach, Ghoda Nach, several local festivals like Loshar, Mane Chhokpa, Buddha Purnima and major dances like Soldo, Bakkhu, Syama, Waist Bands, Rembo Syade, Mirgi, Syade, Globes and Anki provide the lots of entertainment to the trekkers during their treks.

5.5 Cultural Resources

Culturally the area is heterogeneous, as it is the home of several ethnic groups. The main three ethnic groups living in LNP are Tamang, Yolmo and Bhotia each thought to have originated from Tibet. The cultures are discernible by language, house styles dress, ornaments and customs. The Tamang are traditional farmers and cattle herders. Their religion is related to the Bon and pre Buddhist doctrines of Tibet. The Yolmo people of Helambu region are often referred as Sherpa. Other hill tribes and castes such as Brahmin, Chhetri, Newar and Gurung inhabit the lower elevation along the edge of park.

The people of Dhunche, Thulosyaphru and Langtang worship deities and spirits associated with nature. Nhhara, Dhukpacheju, Hyulba cheji, chombul and Torpe are some of the important Buddhist festival celebrated in the area. Loshar (Tibetan New Year day), Maghe Sakranti (festival of eating), Mane Chhokpa (Effigies made up of wheat powder is thrown performing the naked dance by male), Buddha Purnima (on the auspicious occasion of the birth day of Buddha) and Baishakh Purnima are the other festival celebrated in this region.

Major dresses which is used by the people in this region are Soldo (woolen cloths of male just like overcoat), Bakkhu (woolen half cap), Syam (women's black cloth with colorful striped wool), Waist Bands, Rembo Syade (black woolen cap for man), Mrigi Syade (colored woolen cap for women), Gloves, Anki (smooth cloth just like apron).

Major festivals are celebrated in all Tamang and Tibetan settlements with major dances. Some major dances of this region are Syabru Nach, Mane Nach, Shamans Nach, Lama Nach, Chhyalu Nach, Sau Nach, Tabu Nach, Ghoda Nach and Khamba Nach etc.

Table No. 7: Ethnic Representation in study area

SN.	Cast	Language	Religion
1	Tamang	Tamang	Buddhism
2	Sherpa	Sherpa	Buddhism
3	Bhote	Bhote	Buddhism
4	Yolmo	Sherpa	Buddhism
5	Gurung	Gurung	Buddhism/Hindu
6	Brahmin	Nepali	Hindu
7	Chhetri	Nepali	Hindu
8	Newari	Nepali	Buddhism/Hindu

5.6 Socio-Economic Condition

5.6.1 Population settlements

There's no consistent record of population residing within or depending on the park resources. The 1977 LNP management Plan estimated that there were 846 households in some 45 villages located within the park. Yonzon (1993) estimated a total population of some 19,000 people residing within or using park resources. There are all together 28 village development committee (VDCs) that are partially or wholly included in LNP (DDC, 2003). A population of around 50,000 was found inhabited within LNP.

Table No. 8: Population of Various VDCs of Study Area

Name of VDC	Household	Total Population	Male	Female
Dhunche	574	2530	1515	1015
Syaphru	484	4108	2025	2083
Bridham	163	577	292	286
Langtang	143	521	252	269

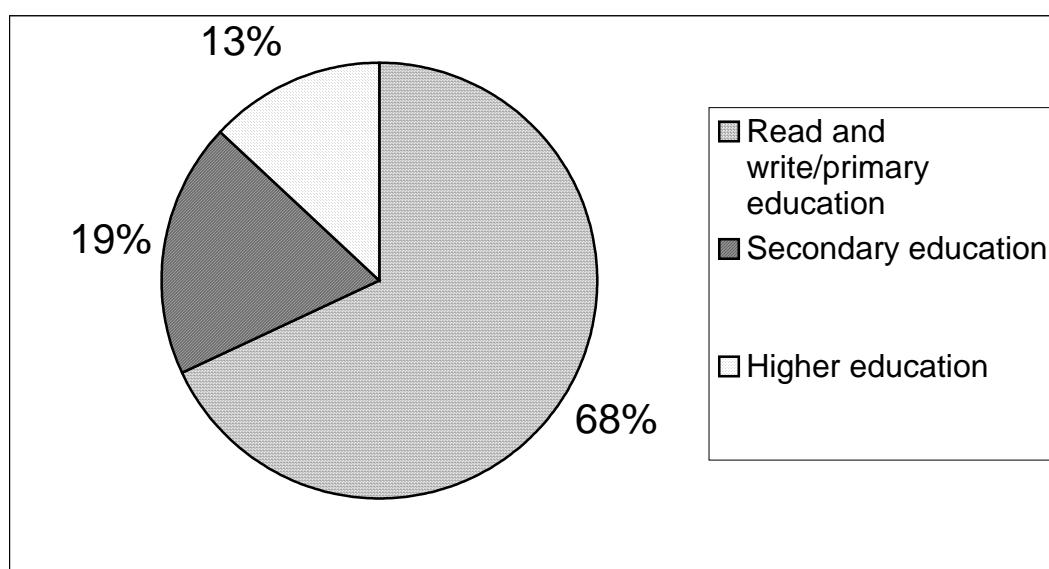
Source : CBS, 2001.

The family size of the VDCs along the trail ranges from 3.53 to 8.48 (CBS, 2001) i.e. average family size is 5.67 which is slightly higher than the family size of district i.e. 5.45 (DDC).

5.6.2 Educational Status

Among the 60 respondents 25 i.e. 42% were found to be literate and remaining 35 i.e. 58% were illiterate. Among the educated respondents 68% could read and write or had completed primary education. Only 19% had studied secondary level and those who got the higher education is less i.e. 13%.

Fig No. 4: Educational Status of the Study Area



5.6.3 Livelihood status

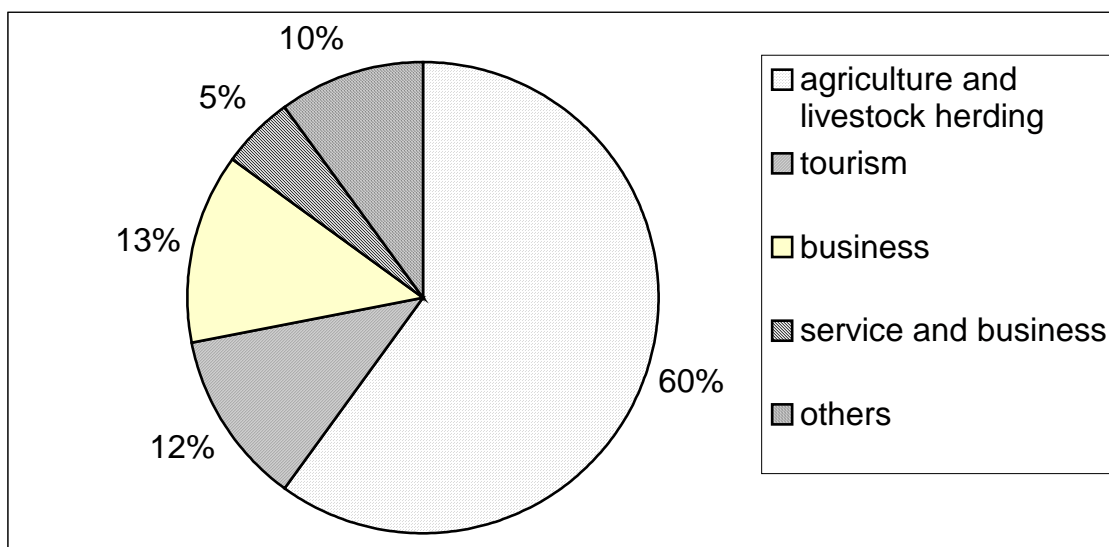
Agriculture, animal husbandry and tourism are the main source of livelihood for the people residing in LNP. Some people also earn supplement income through commerce and trade by producing handicrafts or household items such as baskets and mats from forest resources. The major crops cultivated in the region are potatoes, buckwheat, barley at high altitude and maize, millet, wheat and paddy in

the middle hills and lower areas. Lodge operators generally return to their village during off season to work on their farms. Yaks, Sheep, Cow, Chauri and Goats are the most common livestock owned and an important source of cash income the upper Langtang valley. In the Thulo Syaphru, Sing Gombha and Kyangjin area households can sell milk from yak, cows, Chauri to the government run cheese factories. The estimated livestock population of the area is about 29,557. The live stock number have been increasing in the area. Although the DNPWC restricts the livestock population inside the park, enforcement has not been effective alternatives has not been provided.

Tourism has become an important source of income to the park and buffer Zone residents. Almost every household in the LNP valley is directly and indirectly involved in the tourism, although tourism is a seasonal business (approximately six months in a year). Income generating activities, particularly for those living in the remote region such as upper Langtang valley, where limited to collection of non timber forest products for the production of medicines, baskets and so on are the main source of income.

From the field survey it was found that 60% of the total respondents were involved in agriculture and livestock herding, 12% were involved in tourism i.e. hotel, lodge and tea shop, 13% were involved in business and rest 10% were involved in other occupation.

Fig. No. 5: Livelihood status in study area



5.6.4 Livestock herding

People used this area as pastureland before the establishment of park. Yaks, Chauris, Sheep, Goat, Cow, Buffalo, Pig etc are the main livestock of this region. The estimated livestock population of this area is about 29,575. Average livestock per household was found to be four. The livestock number has been increasing in the area although the DNPWC restricts the livestock population inside the park.

From the survey 81% of household were found to be rearing at least one kind of livestock and 15% of the respondents were not rearing single livestock. From the data collected during survey 25% of the household rearing Buffalo, 35% of the household rearing sheep and goat. Yak and Chauris were being reared by 30% of the household 10% of the household was found rearing poultry.

5.6.5 Local Products

The cheese factory located at Kyangjin produce cheese and chhurpy made from milk of Yak and Chauri which is famous for this region. Woolen cap, woolen bag, woolen phuru, woolen mofler, woolen waist belt, friendship belt are some crafts are the local products of this region.

5.7 Impacts of Tourism

5.7.1 Environmental Impacts of Tourism

Environmental problem is the major issue of today's world. Developmental work and overpopulation are the main cause of environmental degradation. On the other hand tourism has also caused some impacts on environment due to tourism infrastructure development and different tourist's activities like recreation, lodging, fooding and entertainment.

A set of 12 statements were asked to the local residents and local trekkers, using a rating scale (Kothari 1990) ranging from strongly agree to strongly disagree. A summary of data from the questionnaire survey is presented in table no. 14 and 15.

Both the negative and positive impacts of tourism on natural environment are discussed and analyzed by using response provided by the local residents and local trekkers.

A total of 35 respondents from local residents were asked the prepared 12 structured statements and that of 25 respondents were taken from local trekkers.

5.7.2 Solid waste disposal problem

High concentration of tourist activities and appealing natural attractions, waste disposal is a serious problem and improper disposal can be a major despoiler of the natural environment like rivers, scenic areas etc. This is mainly due to increased amount of non-biodegradable waste like bottle/can, plastics/papers/wrapper, human waste/excreta etc. campsites along the trail are not well designed with respect to proper sanitation, drainage and waste disposal. These lead to environmental pollution. Several non-biodegradable wastes like bottles of mineral water, noodles, chocolate wrappers can be seen along the trail, which reduces the aesthetic value of the area.

As in other mountain areas, improper management of garbage and litter has been the environmental problem of tourists in LNP. Biodegradable waste remains for a short term so it is not a problem. Non-biodegradable waste remains for a longer period of time without decaying so, it is harmful for the environment. Respondents were asked their opinion for the statement "tourism adds solid waste disposal problems in this area." Out of the total respondents 51% of local residents and 43% of local trekkers agreed to the statement. Similarly 28% of local residents and 33% of local trekkers were disagreeing to the statement.

The correlation coefficient was ($r=0.50$) that the view of local residents and local trekkers towards solid waste disposal was correlated and there was no significant difference between the perception of local residents and local trekkers ($t=1, p>0.5$ at 8 df)

Another survey which was conducted during field visit among the tourists showed that 85% of the tourists managed solid waste locally

with special device while 5% carry together while going back where as 10% leave as such.

Table No. 11: Trekkers (Tourist) opinion on sanitation and garbage Disposal facilities in LNP (in percentage)

Place	Sanitation facilities		Garbage facilities	
	Adequate	Inadequate	Adequate	Inadequate
Lodge	33	67	59	41
Campsites	35	65	65	35
Private homes	24	76	39	61
Trekking routes	34	66	66	34

5.7.3 Impacts on water quality and sanitation

Water is one of the critical natural resources. The demand of fresh water increase with the increase number of tourist arrival Trishuli and Bhotekoshi is the major source of drinking water in this region. Sitting toilets too close to or over streams or drinking water resources and use of chemical soaps for bathing or washing dishes and clothes in streams or too close too water sources and dumping waste in rivers and streams have been seen during study period which causes water pollution.

Poor health and bad hygiene are common problem in LNP as in other mountain trekking areas. From field survey it was found that dumping waste in rivers and streams and disposal of human waste into rivers and cause water pollution. The local residents as well as local trekkers perceived somewhat similar ($r=0.67$). Out of the total respondents, 53% of local residents and 33% of local trekkers were agreed to the point that the Sanitation and water quality has degraded due to tourist achieving while 34% of local residents and 49% of local trekkers were against to the statement ($t=0.68, P>0.05$ at 8df).

Another survey which was conducted along with trekkers showed that 34% of the tourist agreed that sanitation facilities were adequate along the trail while 66% were against the opinion.

5.7.4 Impacts on animals

Impacts of tourism on animal are for reaching both spatially and temporally than the impacts to vegetation and soil. The most extreme effect of tourism on wild life arise from hunting, shooting and fishing, all of which may severely deplete local population of certain species. It is also well established that the presence of people is sufficient to disturbed the activities of animals particularly birds and large mammals and enforce them to change their habitat. Breeding failure of the species apparently caused by presence of human beings.

5.7.4.1 Habitat destruction

Forest and vegetation are the natural habitat of wildlife is being destroyed due to over consumption of fuel wood. In Kyangjin, there is a government run cheese factory which has given authority to collect about 2500 cft of dry wood per annum but the actual consumption is more than that. And 113 hotel and lodge which is established along the trail had given services to the trekkers had destroyed the habitat of wild animal has observed. As a result of which wild animal like musk deer, Red panda, Snow leopard etc are decreasing sharply.

5.7.4.2 Poaching activities

Illegal hunting and poaching of wild animals is strictly prohibited. But study showed that people may illegally hunted some animal like Musk Deer, Barking deer, Wild-bore, Jharal and Ghoral. People hunted these animals inside the forest or when the animals came to graze their farms, only for two different purposes. Firstly, people hunted these

animals because of the agricultural destruction; secondly these activities are highly influenced by tourism. The high cost of meat and high demand of it is created by tourism to higher extinct. Musk deer which produces musk is a valuable raw material for aromatic preparation thus some being killed for it. In these days their number has decline sharply.

5.7.4.3 Disturbance of Animals by the presence of human being

Animals are naturally threatened because of the presence of human beings. A type of disturbance that is often called harassment, even though it is often unintentional. In this region such a problem had seen much more from local residents than that of trekkers. Local residents had shifted their herd from place to place. The animal like Himalayan Thar is greatly affected from such a process of shifting herd and their number is decreasing. High mortality rate of Himalayan Thar i.e. about 85% due to herd (according to park warden) and several other animal and their behavior has changed due to mass movement of trekkers had been also observed during study period. Animals had suffered from the effects of pollutants particularly food and litter left by trekkers.

Tourist activities and their impacts on wildlife had not been adequately monitored during study period. But during study it was found uncontrolled construction, garbage dumping, grazing, lodge establishment and herd in sensitive place slightly affect the wildlife population and their behaviour. Trapping and poaching of wildlife by local people due to encroachment on their crops and domestic animals was also found.

The perception of local people local trekkers was mostly similar ($r=0.706$) for wildlife behavior change and $r=0.79$ for wildlife population. 48% of the local residents and 60% of local trekkers were agreed to the point that wildlife behavior has changed due to tourist activity while 22%

of local residents and 20% of local trekkers were against to the point $t=1.721, P>0.05$ at 8df). Similarly 54% of local residents and 44% of the local trekkers were agreed to the statement that Wildlife population has decreased due to tourist activity while 23% of the local residents and 31% of the local trekkers were against to the statement. ($t= 2.23, P>0.05$ at 8df)

5.8 Soil erosion

Tourist using the same trail over and over again trample the vegetation and soil, eventually causing damage that can lead to loss of biodiversity and other impacts. Such damage can be even more extensive when visitors frequently stray off established trails. In the study area there can be seen the use of other trails than existing one. This has caused the depletion of the ground vegetation of the area.

The fragile mountain ecosystem is sensitive towards tourism, Pressures due to large number of tourist along the weak hill side cause the soil erosion. Similarly the development of tourism infrastructure such as road construction, hydroelectricity project, raw material (sand, rock, soil, timber) collection for hotel/lodge etc are the main cause of soil erosion along the trail.

Along the study area soil erosion is not the major problem, from the questionnaire survey 4% of the local residents 10% of the local trekkers were agreed to the statement that “the tourism are the cause of soil erosion while 77% of local residents and 74% of the local trekkers were against the statement.

5.9 Deforestation

5.9.1 Fuel wood consumption

Forest degradation and deforestation resulting from the increased demand for fuel wood and timber to cater to tourist need is common throughout the tourist destination.

For fuel wood and to build hotel/lodge and tea shop people used forest and forest products, which caused the problem of deforestation. Although the green wood collection from the forest in the park is prohibited.

Hotels/lodges inside the study area use the alternative energy resources as sunlight for electricity in recent years. Although the firewood is main source of fuel along the trail. Different woody species are used for fuel wood purpose to which their burning characteristics are suited. Although the plant species most frequently used are hardwood Oak, Rhododendron, Birch, Juniper and Bamboo. An average of 20 to 40 kg per household per day was found depending upon the elevation and species of tree used. Where as an average of 60.81 kg of dry wood was found to be used by local hotels and lodge while 18.6 kg fire wood was found to be used by group trekkers and 5.5 kg by that of individual trackers.

Table No. 12: The average fuel wood consumed in hotel and lodge of the trekking route.

S. No.	Sample Place	Daily requirement of fuel wood per hotel per day (k.g)
1	Dhunche	960
2	Thulo Syaphru	1000
3	Bamboo	180
4	Lama Hotel	490
5	Ghoratabala	160
6	Langtang	1350
7	Kyangjin	360
Total		4500

Source: Field Survey, 2004.

1 Bhari β 40 kg Dry wood

Table indicates that the average fuel wood consumption in adjacent part was found to be 60.81 kg per hotel per day. Maximum consumption recorded at Kyangjin (120 kg), followed by Langtang (90 kg), Ghora Tabala (80 kg), Bamboo (70 Kg), Thulo Syaphru (60 kg), and Dhunche (40 kg) respectively.

People in and around the study area depended on park resources for wood and fuel wood. Average fuel wood consumption per household per month ranges from 20-40 bhari. Of the total surveyed households, 23% of the households were found to be consuming 10-20 bhari of fuel wood, 59% of the household were found to be consuming 20-40 bhari and 18% of the households were consuming more then 40 bhari fuel wood per month.

Table No. 13: Utilization of fuel wood by local people

Fuel wood consumption per month	No. of household	%
10-20	9	24.19
20-40	36	58.06
Above 40	15	17.74

There is a restriction on the use of fuel wood by trekkers within the park area although the free individual trekkers and some of the group trekkers used fuel wood for cooking and space heating. The fuel wood consumption by each trekkers per day is more then the requirements of one household in the area.

Table No. 14: Fuel wood consumption by type of tourist in LNP

Year	Tourist No.	Daily fuel wood consumption (Kg)	Average duration of stay	Estimated total fuel wood consumption (kg/year)
2002	GTs. (1727)	18.6	11	353344.2
	FITs.(3071)	5.5	11	185795.5
Total				=539139.7
2003	GTs. (1123)	18.6	11	229765.8
	FITs.(1996)	5.5	11	120758
Total				=350523.8

Fuel wood consumption by trekking groups is shown in table. The fuel wood consumption by both group and free individual trekkers were found to be 539139.7kg in the year 2002 and 350523.8 kg in the year 2003.

Perception of local residents and local trekkers about the deforestation caused by tourism was found strongly correlated ($r=0.74$) 48% of local residents and 62% of local trekkers said that deforestation has caused by tourism while 17% of the local residents and 23% of local trekkers were against the statement ($t=1.90$, $P>0.05$ at 8df)

5.9.2 Timber

As a result of tourism development more hotel/lodge, restaurant and tea shop has been established which increase demand for timber that cause deforestation in this region. The local inhabitants get the timber from the near by area of national park or the buffer zone: the consumption of the timber in 2003 is about 55.78 cft which is increased by than 2002 i.e 41.37 cft. The increase in the amount of timber use indicate the increase in new infrastructure in the area.

5.9.3 Fodder collection

Livestock herding is also one of the major occupation of this region. Most of the people in and around the study area collects the fodder from the forest. These people living outside the park also used to collect the required fodder from the forest. The average fodder collection ranges from 1-2 bhari per day, per households.

Among the respondents 74% of the house hold collect 1-2 Bhari of fodder to feed livestock and bedding purpose and 26% were found collecting 2-3 bhari of fodder.

Park animals have been substituted for much animals as they bring in higher cash returns to households by carrying farms load. These many have added fodder demand and also lodge owners have purchased buffaloes for milk, which has also increased pressure on surrounding forest for fodder supply.

5.9.4 Grazing

Overgrazing is another severe problem in this region. Along with the increase in population the number of people rearing animal is also increasing. The estimated livestock population of the area is about 29,575. Study showed that near about 90% of the respondents let their livestock near by jungle for grazing. Although the local authorities have banned grazing inside the park boundary, but the local people let free their cattle inside the park for grazing. There are over 200 Yaks that graze in LNP area daily.

5.10 Support For Conservation

Wildlife and forest are the main things of tourist attraction and to promote tourism in this area, need to protect such valuable things.

During field survey it was found that 11% of local residents and 17% of local trekkers agreed for the statement that tourism supports the wildlife conservation while 56% of the local residents the and 53% of the local trekkers were against the view ($r=0.97$, $t=6.97$, $p>at$ 8df) and 40% of the local residents and 43% of local trekkers agreed that tourist activities supports the conservation of forest while 42% of local residents and 43% of local trekkers were disagreed to the statement ($r=0.97$, $t=6.09$, $p> 0.05at$ 8df)

5.11 Environmental awareness

Environment becomes healthy only when the every people of society become conscious as to make the environment pollution free. Commonly solid-waste pollution, water pollution, air pollution and noise pollution should be created by the tourist in mountain area. It was seen that not only the tourists but also the host populations who are providing the tourist facilities are equally responsible for environmental degradation along the tourist area.

Tourism can significantly contribute to environment protection, conservation and restoration of biological diversity and sustainable use of natural resources, use of alternative energy, sanitation and solid waste management were the major subjects of concern for those statement the local residents of LNP were found to be positive 70% of the local residents and 47% of the local trekkers were agreed with the statement that tourism increase the environmental awareness to the local people while 25% of local residents and 46% of local trekkers were disagreed to the statements. ($r=0.49$, $t=0.97$, $P> 0.05$ at 8 df)

5.12 Perception of local people about conservation and tourism

During the field survey, most of the local people were found in favour of protection of forest. The forest in and around the park was supervised by the government but the collection of livelihood is strictly banned but people collected the firewood, fodder and timber from the forest. Perception of the local people for the protection of forest was positive 95% of the respondents were in favour of the protection of forest and only 5% were against to it.

Another survey was about the involvement of the conservation activity to this area. For this question, 50% were in favour of the

participation of local people 45% were in the favour of government and 5% were answered for the co-ordinary participation between local people and government including NGOS and INGOS.

5.13 Tourism infrastructure development

Tourism infrastructure development is the prime factor for tourism development in the area. Construction of roads and trails, buildings of hotels/lodges, view tower and tourist information center and providing tourist facilities like communication, security and services creates environmental change by extracting natural resources or by disturbing the natural environment.

Tourism infrastructure as well as other developmental work degrades the quality of ecosystem in different ways. Destruction of forest, habitat loss of wild animal has been observed in this trekking route.

5.14 Economic impact of tourism

Tourism has become a main employment as well as foreign exchange generator of Nepal. Tourism has been a boon to the local economy of this region. Tourism has generate jobs directly through hotels, restaurants, souvenir sales, local guides and indirectly through the supply of goods and services needed by tourism needed business

Farming of in and around the region have greatly been benefited with the development of tourism industry. They got opportunity to sell their farm products like vegetables, milk, ghee, hen, egg, etc for the hotels and restaurants. Farmers are also getting a reasonable price from the hotels owners

The jobless young people had got a job of guiding tourists and helping them to transport their luggage. Thus local people have been benefitted from the development of tourism in this region.

The majority of village respondents agreed that the development of tourism would promote village and hotel industry as well as agriculture and livestock farming also flourish due to the development of tourism. People along the trails are highly benefitted from poultry farming.

Due to the development of tourism 113 hotel/lodge, 42 tea shop are servicing tourist and generating foreign exchange. The hotel are providing jobs for 567 person and indirectly more than 1500 people.

5.15 Socio-cultural impact of tourism

Tourism has its impact on social condition of Langtang people. The development of tourism industry in these remote areas has brought a number of changes on the lives of local peoples. People got many job to do, land become expensive, modification occurred in traditional lifestyle, people got wide horizons and so on.

The Villagers have got opportunity to learn many good things from the tourists as well as bad things also. The villagers learn quickly the life style of tourists some language something about electronic and mechanical goods the tourist generally carry with them such as camera, walkman, binocular etc.

Tourism also helped in the development of infrastructure of trekking routes, water supply, telephone etc. people in this trekking route involve with the cash economy as a result of tourism and have there become westernized. But they are also equally protecting their Tamang culture which is taken as the one major tourist attraction of the site.

The villagers respondents feel that there is some negative effect associated with tourism development. The majority of them believe that villagers especially young ones are impressed from the electronic goods such as camera, walkman, binocular which is used by tourist.

Consequently, local people imitate the western fashion and behavior, which may break up of their previous social structure and in change of value system.

The open display of wealth by tourist and excessive consumption of luxurious food and drink in front of hungry people cause the desire for better life. Illegal ways lead faster to the aim of getting rich quickly. Some respondents viewed that the development of tourism make their village on safe and also believed that the crime rate for robbery is high in the trail.

CHAPTER - SIX

6. DISCUSSION, CONCLUSION AND RECOMMENDATION

Natural beauty and Socio – cultural life style with untouched by modern onslaughts, high level of biodiversity, Himalayan valley of Langtang with its fusion of Tamang and Tibetan culture and multitude of glaciers including Langtang glacier, Langshisa glacier, Salbachum glacier and Lirung glacier, Buddhist monasteries such as kyangjin make this area high potential for tourist destination.

A considerable number of tourist has visited this area since 1972. A total of 3119 tourist has visited the area during 2003 which is 0.97% of tourist visited in Nepal. 19.43% of tourist coming to Nepal in the year 2003 were for trekking and mountaineering and the number rapidly declined then the previous year 2002 (MOCTCA, 2004), world tourism has declined after 2001 by internal conflict of the nation. As like the whole country Langtang is also not free from such constraints. A total of 3119 tourists visited this area which is 34.99% less than previous year 2002 (DNPWC Dhunche). Of the total arrival in this region 42% were west European basically British, German, French and Dutch. 12% are American and rest from other countries.

The natural beauty of the Himalayan landscape and the Langtang national park are really the major attraction for foreign tourists in Langtang. The Himalayan peaks of the Langtang and Ganesh Himal range. Langtang lirung (7254m), Ganesh Himal (7408m), Langtang (6905m), Dorje Lhakpa (6983m) can be seen from here. The Kyangjin valley in Langtang provides the trekkers with a unforgettable experience of a hidden valley in the Himalayas and wilderness were reported as the reasons for coming to Langtang by over 53% tourist in year 2003.

High level of biodiversity with over 3000 species of flowering plants, 345 species of birds, 58 species of butterflies, 11 species of

amphibians and 46 species of mammals are also the major source of tourist attraction of this site. Variety of faunal species including musk deer (*Moschus Chrysogaster*), Himalayan Thar (*Hemitragus jemtahreus*), Himalayan black bear (*Selenarctos thibetanus*), Snow leopard (*Panthera unica*) and Red Panda (*Ailurus fulgens*) can be observed during trail in their natural (wild) state, which is also provide entertainment to the visitors.

The distinctive life style, festivals and the Tamang culture in its pristine form added the additional experience to the tourist. Many local festivals, mela and cultural programs make excited to the visitors. Loshar is the main festival of Tamang in this region.

All the trekking routes have the facility of locally operated hotel/lodge and teashop. The concentration of hotels and lodge has also increase in Dhunche, Thulo Syaphru and Langtang valley along with tourism development. In the Langtang area there has been a steady growth of lodges, (Wtanable, 1997) noted that the first hotel in Langtang was built in 1975, by 1984 there were five more and by 2001 the number of hotels was around 15. Of the total trekkers of LNP, 64% of the trekkers were FITs and 36% were group trekkers. FITs stay at the locally operated hotel/lodge but group trekkers used the campsite for there settlements. October-November and March-April is the major tourist flow season in this area where as June-July is the off season in this area and average length of stay was 11 days for both FITS and group trekkers. The average length of stay was 13.7 days for GTs and 16.2 days for FITs (Watanable, 1997).

People living in the surrounding of LNP are depend on it for their daily needs like fodder, fire wood, building material and wild edibles etc. on the other hand forest resources especially fuel wood were use more to meet the demand of tourist. People are also hunting and felling trees, due

to extensive and illegal extraction of these materials has caused serious problems like deforestation, pressure on consumption of natural resources and threaten to existence of wild animals and plants.

At first forest resources were used only for construction, cooking and heating. After the influence of tourists these resources have become a cash crop worth considerable amount of money. The foreign currency earned from tourism has been used to build larger houses and hotels, both of which depend on increased use of firewood for heating and cooking and thus accelerate the exploitation of forest resources.

LNP lies at high altitude, so people experienced cold climate throughout the year. Firewood is the main source of fuel in this area. More fuel wood is utilized during the winter season than summer. Due to cold environment space heating is equally necessary as cooking. Of the total surveyed household 65% of the household were consuming average 20-40 bhari fuel wood per month, 13% of the households were found to be consuming 10-20 bhari per month and 22% of the households were found consuming more than 40 bhari of fuel wood per month. Pine, hemlock, fir, birch, rhododendron and juniper was found mostly used as fuel by people along the trail.

Several hotel and lodge which provides services to the tourist found to consume more fuel wood than the households. An average of 60.81 kg of firewood was found to be used by per hotel and lodge per day while 18.6 kg firewood was found to be used by group trekkers and 5.5kg by that of individual trekkers.

Use of alternative energy is still impracticable though certain hotel/lodge use solar energy in recent years. Due to extremely cold environment, remoteness and less public awareness towards the alternative energy utilization. So Deforestation has become prominent in LNP. Most of the energy required is fulfilled by firewood. People in this

remote area had no any option beside this because kerosene, LPG and electricity being expensive so much and people can not afford it.

Environmental problem has also increased along with the increase in tourism along the trails. Illegal use of fuel wood, use of timber in lodge construction, intensive use of environmentally sensitive areas, improper disposal of waste litter and garbage, improper campsite location/management are the major type of environmental impacts found in LNP. Cause of such problems in LNP is due to local pressure and tourist activity. The decay of fallen wood, illegal felling of trees for fuel wood is also common. Although there is a restriction on the use of fuel wood by trekkers within the park area, this regulation cannot be strictly monitored or enforced in lodges. Because of the lack of affordable alternative energy porters accompanying trekkers tend to use fuel wood. Locally operated cheese factory at Kyangjin also exacerbate the deforestation which is the prime habitat of endangered species such as Red panda, Musk deer and Snow leopard.

Timber is used for the construction, repair and maintenance of lodge and tea shops and for poles prayer flags constitute other source of pressure on the forest. Increase in the number of lodges increases the demand for timber which has contributed for deforestation along the trail.

Livestock herding is also one of the side occupation for the residents of this area. Along with the increase in population the number of livestock is also found to be increased. The estimated livestock is about 29557 i.e. each household tamed an average of 4 livestock. 81% of the residents were found rearing at least one livestock and 35% of the livestock were found non-captivated i.e free for 24 hours. There are over 200 Yaks that graze in the LNP area. The fine grazers like Yak, Chauri, sheep are mainly responsible for destruction of pastureland. Once they

graze, it takes long time to become regrazable grass which are also destroying pasture land by introducing non regrazable grass and exotic plants.

Environmental condition has studied under positive and negative impacts. All 12 statements (Of chapter 6 table no. 14 and 15) have showed correlation between the view of local trekkers and local residents. For the t-test at 95% of level of confidence at 5 statements have showed no significant difference between the view of local trekkers and local residents i.e for negative impacts (solid waste disposal problem, change of wild life behavior, decrease of wild life population and deforestation problem) and for positive impacts (support for conservation of local people, increased awareness to use alternative energy and increased environmental awareness in the area). Other four statements have showed significance difference between the view i.e 1 negative impacts (soil erosion) and 3 positive impacts support for forest conservation, support for wild life conservation and improved the sanitation and solid waste disposal problem)

Environmental impacts found around LNP is also enhance by tourist. Incase of solid waste disposal problem, majority of the respondents were agreed to the statement that tourist were responsible for disposal problem. This is mainly due to the increased amount of non-biodegradable waste left by the tourist like bottle can plastics, papers, wrapper and human waste/excreta etc. Deforestation has found caused by tourist, 48% of local residents and 52% of the local trekkers were agreed to the statement that tourist create deforestation problem. Yet deforestation resulting from the increased demand for fuel wood and timber to cater tourist need is common throughout the tourist destination. Sanitation and water quality has found to be degraded due to tourist activity. Forest is being destroyed in this area, mostly due to over

consumption of timber for different purpose. More land is used for construction, for agriculture and for grazing land for animals. Due to which habitat of animals is lost, that loss of habitat decline the certain animal species like Red Panda, musk deer, snow leopard etc.

Illegal hunting and poaching of wild animal is strictly prohibited but this area is not free from such process. People in and around the park illegally hunted some animals like Musk deer, Barking deer, wild bor Jharal and Ghoral for two different purposes. Firstly, people hunted these animals because of the agricultural destruction by these animals and secondly the high cost demand of meat and cost created by tourism.

Mass movement of trekkers and shifting of hard from place to place directly and indirectly affected the wild life behaviour of this region. Animal like Red Panda, Himalayan Thar is found to be affected from such process. Animals had also suffer from the effect of pollutants particularly food and litter left by trekkers.

The trekkers, lodge owners, tea shop along the trail generate waste, rubbish and excreta. Dumping waste in rivers and streams and defacating close by cause water pollution (Lama et al, 1996, Banskote). Of the total surveyed households 65% having no toilet facilities and defecate in open places. But indirectly tourism development cause deforestation that leads to the soil erosion in the fragile mountain region. 53% of the local residents and 33% of the local trekkers agreed the statement that tourist creates sanitation and water quality problem. Wild life population and behavior has found to be changed due to tourist activity. Soil erosion has not caused due to touristic activity but the movement of locally used means of transport like Yak and Chauri and grazing of sheep caused soil erosion along the trails. 77% of the local residents and 74% of the local trekkers were against the statement that soil erosion is caused by trekking tourist.

For the positive impacts, the respondents were found more positive towards the statements than the negative impacts, yet majority of the respondents were against the statements. From the study the environmental condition of this area has degraded due to the activity of the local people as well as the touristic activities. They believe environmental awareness has increased due to tourist, they learned about health and sanitation from the tourist but all over effect on the environment is not affected by tourism. Tourism has become an important source of income to the park and buffer zone residents. Almost every household in the LNP valley is directly or indirectly involve to the tourism, although tourism is a seasonal business. So 60% of the total respondents on the study area were involved in agriculture and livestock herding, 12% were involved in tourism i.e. hotel, lodge and tea shop, 13% were involved in business and 5% were doing services and business and rest 10% were involved in other occupation.

Households along the trekking routes benefited from tourism mainly through the sale of local products like vegetables, livestock and poultry products to lodges/hotels. The jobless young people had got a job of guiding tourists and helping them to transport to their luggage due to development of tourism. 113 hotels/lodge, 42 tea shops were servicing tourist and generating foreign exchange. 567 personal directly got job in hotel/lodge and indirectly 1500 people. So sustainable tourism development can be a boon for raising the living standard of local people.

Along with its positive impacts some negative impacts has also been monitored during study period. High dependence on tourism and has high seasonality brought fall in income during the slack tourist season. Unhealthy competition among lodges and declining of traditional agriculture system were the some common negative economic impact in the area. Tourism has its impacts on social condition of Langtang people.

The development of tourism in these remote areas has brought demonstration effect of tourist on the host population, commercialization of culture, change in traditional agriculture and livestock dependent life styles, change in vernacular architectural styles and used of imported rather than indigenous building material along the trails were the major impacts in this region. The seasonality of tourism and the dependence on outside also destabilize the traditional systems and skills of social adaptation acquired through the centuries. On the other hand tourism supports for education and help to know about foreign culture. It is also helpful for the conservation of local culture and tradition which is the one major source of tourist attraction on the site. The habit of listening Hindi and English song and clothing pattern has found to be affected by tourism along the trail.

Conclusion

Based on the findings, there is no doubt this Dhunche-kyangjin route is the best and popular trekking route in LNP. It attracts 4798 tourist in the year 2002 and 3119 in the year 2003.

The rapid increase in mountaineering and trekking tourism in this region has lead to environmental degradation. A set of 12 statements were asked to the local residents and local trekkers to know about negative and positive impact of tourism on natural environmental. Both local residents and local trekkers were agreed that deforestation, solid waste disposal problem, decrease of wildlife population and change of their behaviour. As well as they were also agreed to the statement that tourism support for conservation of local people and the use of alternative energy source. But they were disagreed to the statement that tourism cause soil erosion, support for forest conservation, support for wildlife conservation and improved the sanitation and solid waste disposal problem.

Due to lack of alternative energy source and cold climatic condition the rate of use of firewood was found to be high in this area. Average fuel wood consumption was found to 20-40 kg per household per day, while that of 60.81 kg by local hotels and lodge, 18.6 kg by group trekkers and 5.5 kg by that of individual trekkers.

Development of tourism in this area has brought some positive change. The jobless young people got a job of guiding to the tourism and helping them to carry their luggage and farmer had got opportunity to sale their farm products for the hotels and restaurants. So, tourism has been a boon to the local people.

The villagers has got opportunity to learn many good things as well as bad things from tourist. Tourism development helped in the development of infrastructure, water supply, telephone etc. people learn quickly the life style of tourist and some language as well as some about electronic and mechanical goods.

Change in people's behaviour, dress and life style, family and social structure, values and expectation, the decline in local support for local tradition and institutions, people preference for tourism related jobs, over education, pollution of sacred places and change in traditional architecture are generally as a instances of tourism negative impacts on culture.

Recommendations

Based on the findings of the study the following recommendations are proposed for mitigating the negative impacts of tourism in Langtang National park.

-) Arrangements of alternative energy sources should be developed to reduce reliance on wood.

-) Group tourist should not be allowed to use firewood and must be made to use only kerosene or gas by specific direction or regulations.
-) A forestation programmed should be launched both within and outside the park area.
-) Mountaineers, trekking groups as well as individual trekkers must be made to bring back waste residue and dispose at pre-specified locations only.
-) New hotels/lodges should not be permitted.
-) A very little or no information is provided to the tourist coming here for mitigating their effect on the nature. A very few notice about what to do and what not to do are found. So, such notice should published and kept in all the entrance of LNP.
-) Garbage should be managed in proper way. Instead of throwing garbage on the bank of river, composting and recycling should be encouraged.
-) A clear policy plan and strategy should be formulated regarding number of tourist and number of hotels and their location and activities.
-) Infrastructures for the health and safety of visitors need to be developed.
-) Organized efforts should be taken to maintain and monitor standards of sanitation in lodges and restaurants as well as the management of human wasted energy.
-) Sanitation awareness education should be given to the hotel/lodge owners, staffs and potters.
-) Continuous education and dissemination should be made about energy conservation and its proper use.

-) A national park could be restricted during certain time of the year for animals and plant to breed and grow.
-) Joint effort of government, park authority and local people are also suggested for the proper management and reduction of the impact found around LNP.
-) The national park must clean the trail area at least once a year. Such cleaning operations should be conducted from the national park entrance fee. If need be, the national park entrance fee may be raised to be utilized specifically for this purpose.

REFERENCES

Banskota, K and Sharma, B. 1998. Mountain tourism for Local Development. Training Manual for local Community Groups and Organizations. ICIMOD. Kathmandu, Nepal.

Banskota, K. and Upadhya, M, 1989. A survey of trekking Tourists in Langtang National Park, Kathmandu, Nepal.

Banskota, K., Sharma Bikash, 1998. Mountain Tourism for Local Community Development in Nepal. A case study of Syaphrubesi, Langtang National Park, MEI series no 98/3 ICIMOD, Ktm, Nepal.

Bhatt, D. 2006. Ecotourism in Nepal with Theoretical Concepts and Principles. Kathmandu.

Bhattarai, S. 1989. Environment Impact of Tourism on Mountain Ecosystems. People and Protected Areas in the Hindu Kush-Himalayas. 49-52p.

Budowski, G. 1976, Tourism and Environmental Conservation: Conflict: Coexistence or symbiosis? In Environmental Conservation 3(1) 27-31.

CBS, 2001. Statistical Year Book of Nepal. Central Bureu of Statistics, Kathmandu.

CDG, 1997. Socio Economic Survey of Langtang Region Contributed to UNDP/ Partnership for Quality Tourism, Central Department of Geography, Kirtipur Kathmandu, Nepal.

Ceballos-Lascurin, H. 1996. Tourism, Ecotourism and Protected Areas. The state or nature based tourism and the world guidelines for its development IUCN. Gland, Switzerland and Cambridge UK.

Chaudhary, R.P. 1998. Biodiversity in Nepal: Status and Conservation. (Know Nepal series no. 17). Saharanpur (U.P.), S.Devi/Bangkok, Tec press Books.

Cruz, R. 1999. The Impact of Ecotourism in the Annapurna Region: The Baragaon, The Annapurna Sanctuary and Sikles Sector. Kathmandu, Cornell-Nepal Study Programme.

DDC, 2003. Rasuwa District Profile. Dhunche DDC Office.

DNPWC. 2001. Langtang National Park, Buffer Zone Management Plan. Department of National park and wildlife Conservation Nepal, Kathmandu.

DNPWC. 2003. Langtang National Park (Booklet) Department of National Park and Wildlife Conservation, Kathmandu.

DNPWC/DUHE. 1977. Langtang National Park Management Plan. 1977-82 Department of National Parks and Wildlife Conservation, Kathmandu, Nepal.

Ecotourism Society. 1991. Ecotourism Guidelines of Nature Based Tour Operators. Vermont, USA.

Government of Nepal, Ministry of Tourism and Civil Aviation. Annual Tourist Statistical Report 2002.

Government of Nepal, Ministry of Tourism and Civil Aviation. Annual Tourist Statistical Report 2003.

Gurung, B. 1998. Socio-economic Development and Conservation in Sabru and Langtang, Langtang National Park, Central Nepal. Thesis Submitted to Central Department of Sociology, Tribhuvan University, Kirtipur.

Gurung, C. 1997. Ecosystem: Nepal's Experience. In Jackson, R. Ahmed, A. eds. Proceedings of Eight International snow leopard symposium, 12-16 Nov. 1995, Islamabad, Pakistan. Seattle, WA, International Snow leopard Trust/Islamabad, WWF for nature Pakistan 170-177p

Guruwacharya, Gehendra Gopal, 2002. The Impacts of Tourism on the wildlife and wild lands of the Chitwan National Park, A dissertation submitted to the central department of Zoology, Tribhuvan University, Kirtipur, Kathmandu, Nepal.

Jha, P.K. 1999. Ecosystem: In Majapurua, T.C. Majapurua, R.K. eds. Nepal nature's Paradise: insight into diverse facts of topography flora and ecology. Gwalior, M.Devi. 480-495p.

Kharel, F.R. 1993. Park People Conflict: Langtang National Park. Master Thesis, Lincoln University Canterbury, New Zealand.

Koirala, M. 2002. Environmental Departments of the Livelihood Related Food Production system in A Mid-Himalayan Landscape, (Tinjuri-Milke Region), East Nepal. PHD thesis, submitted to the Jawaharlala Nehru University, school of Environmental Sciences. New Delhi India.

Koirala, Nabin Bandhu 2001. Impacts of Tourism on Plants, Animals and Environment of Modikhola Valley Annapurna Conservation Area, A Dissertation submitted to the Central Department of Zoology Tribhuvan University, Kirtipur Kathmandu, Nepal.

Kothari, C.R. 1990. Research Methodology. Method and Techniques, Wishwa Prakashan, New Delhi, P. 468.

Lama, W, Lama, G, Poudel. D, C, Yonzon, P. 1996 Recommended Tax Structure and Ecotourism Guidelines for Lodges and Tea shops in Langtang National Park, Kathmandu, The mountain Institute.

Lindsay, H.E. 2003. Eco-Tourism: The Promise and Perils of Environmentally-Oriented Travel. www.ectourism.org

Marion, 1994. An assessment of Trail conditions in great smoky mountains National Park, Department of Interior national Parks service, southeast region, Atlanta, Georgia.

MOPE, 2004. State of the Environment Nepal (Ecotourism). Kathmandu, Nepal.

MOT, 1989. Master Plan for Tourism In Rasuwa District. Department of Ministry of Tourism. Government of Nepal, Kathmandu.

MOTCA. 2005. Tourism Resource Mapping Profile Rasuwa District. Tourism for Rural Poverty Alleviation Programme, Kathmandu, Nepal.

Mulleler-Boeker, U. 2000. Ecotourism in Nepal: The example of Royal Chitwan National Park. In: Thapa, R.P.: Baaden J. eds. Nepal: Myats and Realities. Delhi, Book Faith India. 100-118p.

Nepal S.K., 1999. Tourism-Induced Environmental Changes in the Nepalese Himalaya, A Comparative Analysis of the Everest, Annapurna and Mustang Regions, PhD Dissertation, submitted to the faculty of Natural Science University of Berne, Switzerland.

Nepal, S. K. 1997. Tourism Induced Environmental Change in the Everest Region: Some Recent Evidence. Unpublished Research Report.

Nepal, S. K. 1999. Tourism-Induced Environmental Change in the Nepalese Himalayas: A Comparative Analysis of the Everest, Annapurna, Mustang Region. PhD Dissertation submitted to the Faculty of Natural Science University of Berne.

Nepal, S. K. 2002. Mountain Ecotourism and Sustainable Development, Ecology, Economic, and Ethics. Mountain Research and Development, 22 (2). 104-109p

Nepal, S. K. 2002. Tourism as a key to sustainable Mountain Development: The Nepalese Himalayas in Retrospect. Unasyala, 208(53) 38-45p

Nyaupane, G. P. 1999. A Comparative Evaluation of Ecotourism: A Case Study of the Annapurna Conservation area, Nepal. Thesis Submitted for Master's Degree, Master of Parks, Recreation and Tourism Management, Lincoln University, New Zealand.

Sapkota, B. 2002. Tourism in Nepal: A case Study of Helambu Region, Nepal. Thesis Submitted for Master's Degree Department of Economics, Tribhuvan University, Kathmandu, Nepal.

Sharma, P. 1995. A Framework for Tourism Carrying Capacity Analysis. International Center for Integrated Mountain Development, MEI Series No. 95/1, Kathmandu, Nepal.

Shrestha, R.K. 2002. The Impact of Tourism on the Environment of Royal Chitwan national Park, Nepal. Thesis submitted to University of Rajasthan for the Degree of PhD (Zoology), Environmental Biology Department of Zoology, University of Rajasthan, Jaipur, India.

Shrestha, T.B. 1995, Mountain Tourism and Environment in Nepal, Published by ICIMOD, Kathmandu, Nepal.

Singh, T.V. 1989. The Kulu Valley. Impact of Tourism Development in the Mountain Areas. Himalayan Books : New Delhi.

Subas, D. 2003. Can Ecotourism Bring about Conservation and Development in the Mid Hill? A Case Study of Siraichuli Trekking Route. *The Wildlife*, **8**. 34-41p.

Wall, G. 1997. Forum: Is Ecotourism Sustainable? Department of Geography University of Waterloo, Waterloo, Canada, Environmental management 21(4): 483-491p.

Watanabe, T. 1997. Estimates of the Number of Visitors Impacting Forest Resources in the National Park of the Nepal Himalaya. Quarterly Journal of Geography, Tohoku Geogr, Association, **49**, 15-29.

Weaver, D.B. 2001. The Encyclopedia of Ecotourism Oxon, CAB International.

Yonzon, P.B. 1993. Traditional Resource use and problem in National Park Nepal. Park peak and people. A collection of papers Arising from an international consultation on protected areas in mountain Environments, Held in Hawaii Volcanoes National Park, 1991.

Annex - One

Dear visitor/s

Welcome to the mountain environment of central Nepal. Here are some questions for you; the answer will be used for an academic research. I hope you will cooperate by filling it up. You might be feeling tired a bit by trekking up to here. But your valuable answers may be useful in making the tourism of this sector sustainable and environmental friendly in future. Thank You.

1. Name: of respondents:-

- | | |
|------------------|----------------------|
| 1.1 Nationality: | 1.2 Sex: Male/Female |
| 1.3 Age: | 1.4 Education |

2. Purpose of Visit:

- | | |
|-----------------------|---------------------------------|
| 2.1 Holidays/pleasure | 2.2 Pilgrimage |
| 2.3 Official | 2.4 Trekking and Mountaineering |
| 2.5 Others, specify | |

3. Is it your first visit?

Yes/No:

If no, how many times?

4. Number of visitor/s in your team?

- | | |
|-----------------|------------|
| 4.1 Individual | 4.2 Couple |
| 4.3 Two members | 4.4 Group |

5. Your present accommodation

- | | |
|-----------------------|----------|
| 5.1 Local hotel/lodge | 5.2 Camp |
| 5.3 Others, specify | |

6. How long is your trekking/tourism duration in this region?

- | | |
|---------------------|---------------|
| 6.1 One day | 6.2 One week |
| 6.3 Two week | 6.4 One month |
| 6.5 Others, specify | |

7. How do you manage your food items during trekking?

Buy locally prepared food	Buy raw materials and cook locally	Bring raw material from outer market and prepare in the camp	Others, specify

8. If buy raw materials locally or from outer market what is the energy source for cooking?

8.1 Bring kerosene with the team.

8.2 Collect/buy firewood locally

8.3 Only the partners and/camp managers cook their food in local firewood

8.4. Others, specify

9. What factors attracted you to visit this site?

9.1 Wilderness of the ecosystem

9.2 Natural beauty

9.3 Steeped and rugged topography

9.4 Ethnicity and culture

9.5 Archeological sites

9.6 Others, specify

10. Do you feel this site is of any importance?

10.1 Least explored

10.2 site of scenic beauty

10.3 site of scientific importance

10.4 Others, specify

11. Do you feel the site has adequate facilities to stay?

Yes/No/

12. If no, what is the lacking?

12.1 Toilet

12.2 Bathroom

12.3 Telephone booth

12.4 Health facility

12.5 Security post

12.6 Tourist information Centre

12.7 Viewing tower

12.8 Others, specify

13. How do you manage your solid waste during trekking?

13.a Biodegradable	13.b Bio-nondegradable
13.1 Leave as such	13.1 Leave as such
13.2 Manage in a pit	13.2 Carry together while going back
13.3 Burn it out	13.3 Manage locally with special device
13.4 Throw in the river flow/water body	13.4 Others, specify

14. Do you see any change in the landscape, flora and fauna in the specific site compared to your previous visit? (Please specify the year of the previous visit)

	Increased	Decreased	No change
Landscape			
Flora			
Fauna			

15. Your individual comments on your impression about the site.

16. Your brief comments on making the site environmentally sustainable from tourism point of view.

Annex-Two

Household survey questionnaire

A. General

1. Respondents Name: Sex: Male/Female
 Age: Occupation:
2. Village Development Committee: Ward No:
 Settlement/Cluster:
3. Sources of livelihood
 3.1 Agriculture 3.2 Business 3.3 Wage earning
 3.4 Others 3.5 Services
4. Livestock

Numbers	Cattle	Buffalo	Sheep/goat	Swine	Poultry
Stall fed/ Captive					
Free					
Grazing in forest or meadows					

B. Forest related

Forest in use	Government	Community	Lease-hold	Religious	Private
Area (ha)					
Users No.					
Household No					
Management objective					
Establishment year					
Major species					

C. Use of forest product

Type	Quantity (bundle/kg)	Collection interval	Remarks
Fuel wood			
Fodder			
Timber			
Bedding material			
Wild edibles			
Animal Feed			
Fibers and others			

D. Wild life

Mammals

Forest	Status			Whether hunted		If harmful/depredator?		
	Common	Occasional	Scarce	Month	Number	Crop	Livestock	Season

Birds

Forest	Status			Whether hunted		If harmful/depredator?		
	Common	Occasional	Scarce	Month	Number	Crop	Livestock	Season

In case of crop loss,

Area:

Extent of loss in percentage: Maize Potato Others

E. Agriculture

Major crop: Total land area owned:

Area under major crop Other land uses (type and area):

Yield of crop this year (kg)

Food import (kg) Export/sale (if any?)

Income from the sale of livestock and/or livestock product:

Income from other land uses

Expenditure in wages, labour etc: Income from other sources;

F. Tourism related

Specific area used by tourist:

Peak season:

Route/destination:

Resources used by tourists:

Water: Fuel wood: Others/if any?

Tourist flow (in numbers):

Average days spent in the site:

Available facilities:

Food: Lodging: Communication: Others:

Objective of visit:

Sight seeing: Others:

Activities undertaken:

Solid waste management:

Impact on local life:

Positive:

Negative:

G. Institutional arrangements

Codified institutions:

1. Community forests
2. Non Governmental Organizations
3. Community Based Organizations