CHAPTER-I

INTRODUCTION

1.0 Introduction

Nepal is one of the poorest countries of this world. Approximately 32 percent of the total population is leaving below the poverty line (NPC Report, 2005). Most of the poor in Nepal are the peasant farmers and have been living in the rural part of the country. Thus, poverty is a rural phenomenon in Nepal. To reduce this poverty and to strengthen the living standard of these poor, hydropower projects can play the significant role, which can supply the reliable and sustainable energy to them.

In spite of the high potential for hydropower development in Nepal, only a small fraction of this enormous potential has been harnessed so far. The total installed capacity of Nepal is approximately 611.5 MW. However, energy demand in Nepal has been increased by the rate of 8% per annum from the past 10 years period but the supply has not increased significantly after the addition of 144 MW Kaligandaki 'A' hydropower project in the system which has led to power shortage in the country. Under these circumstances, the development of small and medium hydropower projects seems to be the only immediate solution.

In this context, Government of Nepal has given utmost importance to hydropower development with the main objective of providing electricity facility to the rural people. The current Tenth Plan (2002-07) and the Water Resources Development Policy have also accorded priority to hydropower development and rural electrification. Accordingly, Nepal

Electricity Authority (NEA) and some other Individual Power Producers (IPPs) have proposed to implement a number of hydropower projects in the country. Among them Devighat Cascade Hydroelectric Project (DCHP) is one which is proposed to develop in Nuwakot District by Devighat Hydro Pvt. Ltd (DHPL).

In Nepal, the hydropower developers have to comply the Environment Protection Act, 1997 and Environment Protection Rule, 1997 for the development of hydropower and transmission line projects. According to these legal provisions, the developers are not compelled to conduct the separate SIA study for hydropower and transmission line (T/L) projects. Thus, the concept of SIA is quite new and it is a rare practice in Nepal. However, as per the World Bank (WB) guidelines, the WB funded projects are compelled to do SIA study. Even though, there are no such hydropower projects funded by WB, some transmission line projects such as Khimti-Dhalkabar 220 kV transmission line project, Chandraneghapur 33 kV transmission line project and Dhading-Nuwakot 33 kV transmission line project are WB funded projects. All of these projects conducted the SIA study.

The aim of SIA study is to ensure that development maximizes its benefits and minimizes its costs, especially those costs borne by people (including those in other places and in the future). Costs and benefits may not be measurable or quantifiable and are often not adequately taken into account by decision-makers, regulatory authorities and developers. By identifying impacts in advance: (1) better decisions can be made about which interventions should proceed and how they should proceed; and (2) mitigation measures can be implemented to minimize the harm and maximize the benefits from a specific planned intervention or related

activity. At this background, SIA study is better to conduct at pre-project phase.

1.1 Project Description

The Devighat Casced Hydroelectric Project (DCHEP) is located in Nuwakot District of Central Development Region (Figure-1). The project is located in the South West part of the Nuwakot District near Bidur Municipality. The tailrace of the Devighat hydropower station will be used as the intake of the proposed project. The weir site is located at Charghare VDC and the Powerhouse site is located at the Khadgabhanjyang VDC of Nuwakot District. The discharge from the tailrace of the existing Devighat project will be taken by an open canal up to the forebay located at Sirkhali village of Khadgabhanjyang VDC and brought to powerhouse through 200 m penstock pipe for the generation of power. Detail of the project components are shown in the layout map given in Figure-2.

The intake and the powerhouse site are accessible from the existing fair earthen road but the canal will be through the flat agricultural land which is not accessible.

No part of the proposed project falls in to the environmentally sensitive areas such as National Parks, conservation areas, any historical, archaeological or religious areas, Wildlife Sanctuary Area, Buffer Zones, etc.

Project Features

The project is designed as a cascade run-of-river plant with an installed capacity of 10.2 MW without any provision for seasonal flood storage for power generation. The design flow is 45.3 m3/s and gross head is 28.16

meter. The project component includes an open canal, forebay, water conveyance, penstock, powerhouse and tailrace canal.

Salient Features

1. General

Name of the Project	:	Devight Hydropower Project
Type of the Project	:	Cascade run of river project
Location of Intake	:	Charghare VDC
Location of Powerhouse	:	Khadkabhanjyang VDC
Catchments Area at Intake Site	:	4964 m^2
Installed Capacity	:	10.2 MW
Annual Energy Generation	:	56.3 GWh

2. Hydrology

Design Discharge	:	45.3 m^3 /s

3. Headworks

Bell Mouth Entrance	:	23.10 m
Pool	:	LXBXD (17.50m, 7.50m and 3.30m)
Intake	:	2 openings 3.0 m (width) and 2.50m (height)

4. Open Canal

Total Length	:	4948.75 m
Type 1	:	Reinforced Concrete Closed Conduit (5.0m (w) x 4.80m (h) x 17.45m)
Type 2	:	Trapezoidal RCC closed conduit

		(3.20m (bed width) x 2.60m (water depth) and side slope of 1:1.25)
Type 3	:	Steel Pipe Conduit (5.0 m diameter)

4. Surge Tank

Type	:	Cylindrical Shape
Diameter	:	20 m
Height	:	21m

5. Forebay	:	L=32.5 m, B =12.0 m, H=4.9 m

6. Penstock

Type	:	Steel type
Length	:	200 m
Diameter	:	4.25 m

7. Powerhouse

Type	:	Surface
Size of the Powerhouse	:	13m (w) X 30m (l) x 22m (h).
Plinth Area	:	300 m^2
Type of Turbine	:	Kaplan
Number of Turbines	:	2 Nos.
Installed capacity	:	10.2 MW
Gross Head	:	28.16 m
Net head	:	25 m

8. Tailrace Canal

Length	:	400m
Tail water level	:	77.14m

9. Transmission Line

Type	:	3.3/66 kV, 3 Phase
Type of Conductor	:	WOLF conductor
Length	:	5 km (Power house to Existing Devighat HEP Substation)

Headwork's

As the project is a cascade type, no provision of separate headwork is required. The water coming out from the tailrace channel of existing Devighat Hydropower station is directly fed to open canal of the cascade project by constructing a diversion weir at the tailrace outlet of Devighat Hydropower.

Water Conveyance

An open canal/ headrace canal of 4000 m long will be used to convey the discharge coming out from the tailrace channel of existing Devighat power station. The optimum length and dimensions of the canal will be finalized during the detailed study.

Forebay

At the end of the headrace canal, a forebay will be constructed .The size and the capacity of the forebay is: L=32.5 m, B =12.0 m, H=4.9 m

Penstock

The steel penstock pipe of length of about 200 m and 4.25 m diameter has been proposed. As the cascaded project is of low head type, a separate penstock is recommended for each of the turbine generator units. The penstock pipe will be supported by anchor blocks and saddle supports.

Powerhouse

A surface type power house will house three units of Kaplan turbines. The powerhouse will be located at an elevation of 460 masl approximately 300 m downstream of the confluence of the Trishuli River and Tadi Khola.

Tailrace Canal

The length of the tailrace canal will be 400 m with a gradient of 1:3000 open rectangular canal. Energy dissipater at the end of tailrace canal will be provided and bank protection works will be provided wherever necessary.

Transmission Line

The power generated from the proposed project will be evacuated by 66 kV T/L to the substation of existing Devighat HEP located at Charghare VDC. Approximate length of the line is 3.5 km. There will be three nos. of 3 phase 3.3/66 kV step-up transformers in the switchyard so that the generated power can be transmitted upto the existing Devighat substation.

Figure 1: Project Location Map

Figure 2: Project Layout Map

1.2 Statement of Problem

SIA is much more than the prediction step within an environmental assessment framework. Social impacts are much broader than the limited issues often considered in EIAs (such as demographic changes, job issues, financial security, and impacts on family life). A limited view of SIA creates demarcation problems about what are the social impacts to be identified by SIA, versus what is considered by related fields such as health impact assessment, cultural impact assessment, heritage impact assessment, aesthetic impact assessment, or gender impact assessment. The SIA community of practitioners considers that all issues that affect people, directly or indirectly, are pertinent to social impact assessment.

A convenient way of conceptualizing social impacts is as changes to one or more of the following:

1. People's way of life – that is, how they live, works, play and interact with one another on a day-to-day basis;

2. Their culture– that is, their shared beliefs, customs, values and language or dialect;

3. Their community– its cohesion, stability, character, services and facilities;

4. Their political systems– the extent to which people are able to participate in decisions that affect their lives, the level of democratization that is taking place, and the resources provided for this purpose;

5. Their environment– the quality of the air and water people use; the availability and quality of the food they eat; the level of hazard or risk, dust and noise they are exposed to; the adequacy of sanitation, their physical safety, and their access to and control over resources;

6. Their health and wellbeing – health is a state of complete physical, mental, social and spiritual wellbeing and not merely the absence of disease or infirmity;

7. Their personal and property rights – particularly whether people are economically affected, or experience personal disadvantage which may include a violation of their civil liberties;

8. Their fears and aspirations – their perceptions about their safety, their fears about the future of their community, and their aspirations for their future and the future of their children.

In addition to the identification of impacts in the above stated field there is the problem of designing of appropriate mitigation and enhance measures, development of monitoring mechanisms and management plan. Thus, the major questions needs to be answered by SIA studies are:

1. *What are the potential beneficial and adverse impacts created by development projects?*

2. *What are the potential enhancement and mitigation measures?*

3. *What are the monitoring mechanisms and parameters?*

4. *What should be the appropriate management plan?*

1.3 Objectives of the Study

The main objective of the SIA is to examine the most suitable and cost effective configuration of the development project that would be sensitive to the region's socio-economic and cultural environment, and to recommend further investigations that might be needed to minimize the adverse impacts while enhancing the beneficial impacts.

In essence, the specific objectives of this SIA study are as follows:

1. Document the major socio-economic and cultural baseline data variable;

2. Identify potential beneficial and adverse impacts;

3. Analyze the most critical adverse impacts;

4. Propose mitigation measures for adverse impacts, and enhancement measures for beneficial impacts;

5. Incorporate the input of public opinions in the decision making process related to the identification of beneficial impacts, and mitigation measures;

6. Outline the elements of mitigation, management, and monitoring into the Social Management Plan (SMP);

1.4 Significance of Study

In Nepal, all the hydropower projects which have the installed capacity greater than 1 MW and less then 5 MW needs to do Initial Environmental Examination (IEE) study and the projects which have an installed capacity greater than 5 MW need to do Environmental Impact Assessment (EIA) study. These studies are not sufficient to identify all of the adverse and beneficial social impacts associated with development projects. For the sustainable development of any development project it is essential to consider all of the social factors from the conceptual stage of the project. In order to maximize the social enhancement opportunities and minimize the adverse impacts Social Impact Assessment (SIA) of any development project is essential.

An important feature of SIA is the professional value system held by its practitioners. In addition to a commitment to sustainability and to scientific integrity, such a value system includes an ethic that advocates openness and accountability, fairness and equity, and defends human rights. The role of SIA goes far beyond the ex-ante (in advance) prediction of adverse impacts and the determination of who wins and who loses. SIA also encompasses: empowerment of local people; enhancement of the position of women, minority groups and other disadvantaged or marginalized members of society; development of capacity building; alleviation of all forms of dependency; increase in equity; and a focus on poverty reduction. SIA complements the economic

and technical models that characterize the thinking of many development professionals and agencies.

SIA can be undertaken in different contexts and for different purposes. This creates difficulties in defining or evaluating it. The nature of an SIA done on behalf of a multinational corporation as part of that company's internal procedures may be very different to an SIA undertaken by a consultant in compliance with regulatory or funding agency requirements, or an SIA undertaken by a development agency interested in ensuring best value for their country's development assistance. These, in turn, may be very different to an SIA undertaken by staff or students at a local university on behalf of the local community, or an SIA undertaken by the local community itself. Each of these applications of SIA is worthwhile, and none should pretend to be the definitive statement. Evaluation of an SIA needs to consider its intended purpose.

Some conceptualizations of SIA are related to protecting individual property rights, with clear statements of adverse impacts required to ensure that individual rights are not transgressed. Where these rights are violated, SIA could be seen as contributing to mitigation and compensation mechanisms. In these situations, SIA tends to concentrate on the negative impacts. In other contexts, however, particularly in developing countries, there should be less emphasis on the negative impacts on small groups of individuals or on individual property rights. Rather, there should be greater concern with maximizing social utility and development potential, while ensuring that such development is generally acceptable to the community, equitable and sustainable. SIA should also focus on reconstruction of livelihoods. The improvement of social wellbeing of the wider community should be explicitly recognized

as an objective of planned interventions, and as such should be an indicator considered by any form of assessment. However, awareness of the differential distribution of impacts among different groups in society, and particularly the impact burden experienced by vulnerable groups in the community should always be of prime concern.

Thus, SIA study is very important for any development project to protect the society and the affected communities from the potential adverse impact of development activities such as hydropower development. This study is therefore important for policy makers, project proponent, researchers of this field, academicians, and the affected communities as a whole.

1.5 Limitations of Study

Fundamental limitations of this study are:

1. Because of the limited time the study may not cover the analysis of long term issues and impacts in detail,

2. Because of financial constraints the study might be limited to the review of some literatures and based on limited field visits,

3. Because of the lack of sufficient know how of affected people, the data from social survey may not provide the exact picture of the society but shows the average only.

CHAPTER-II

STUDY METHODOLOGY

2.0 Introduction

This SIA was prepared in accordance with the National EIA Guidelines 1993 and World Bank Guidelines and it was based on field studies and consultation with local people and officials. Thus, this SIA report was structured to meet well-accepted World Bank's principles. To meet this requirement, the most current World Bank guidelines for social impact assessment were used. The details of methodology applied to conduct SIA study of the proposed project is presented below.

2.1 Sources of Data

Both Primary & Secondary data has been used in this study.

2.1.1 Secondary Data

The secondary data has been collected from various sources. (Central Bureau of statistics (CBS), District Profiles, VDC Profiles and Publications of local NGOs was collected and reviewed for baseline information. Review of topographical maps and district map was also been done. The feasibility study reports and EIA report of the project was reviewed. The National EIA Guidelines 1993 and the World Bank Guideline for SIA study was also be reviewed.

2.1.2 Primary Data

2.1.2.1 Field Study

The field investigation was carried out after the acceptance of proposal and review of literatures. The fieldwork was conducted in the second week of Jestha 2064 and was lasted in 10 days. To collect information on socio-economic and cultural aspects of the project area walk over survey was done. The following methodology was applied to collect baseline information and impact prediction in socio-economic and cultural aspects of the society.

I. Identification of Project Affected Families (PAFs)

All of the families who loose land or any assets due to the construction of proposed DCHP are classified project-affected families (PAFs) and those who lost their houses are classified as Seriously Project Affected Families (SPAFs).

To identify all the land owners of all the parcel numbers affected by cannel, foreway, powerhouse and other components of the proposed project, the project layout map prepared by the project proponent and the cadastral maps prepared by the District Survey Office, Nuwakot was extensively used. The cadastral surveyor from the district survey office was hired by the project proponent for exact quantification of the land area belonging to each of the landowner and tenants whose land and house are in the project components. The cadastral maps show all the details associated with land parcels, houses, trails, river, forest, etc. Then the proponent mobilized the surveyor and staff of District Survey Office to collect the list of landowners affected by the project. This list was further verified by Land Revenue Office to cross check and update the information. The information generated by above mentioned process by the project proponent has been used for the analysis in this thesis.

After finalizing the list of PAFs and SPAFs, following methods was implemented to collect the baseline information.

II. Questionnaire Survey

Pre-tested questionnaires was designed and applied to solicit information from project affected families. All of the affected households were surveyed. The responses of the questionnaires were edited for consistency.

The questionnaire were designed especially to cover the demographic characteristics, basic health conditions, income and expenditure, availability of infrastructure facilities, water and energy related issues, information about project, attitude towards and expectations from the project. A second questionnaire for gender issue were used in the field survey to analyze the status of woman, their attitude towards the project, the possible impacts on woman due to the implementation of the project and other gender issues.

III. Checklist Survey

Key informant survey was also used as a major survey instrument, which was employed during the field visit to gather information on socio-economic and cultural activities of the project area. Two sets of checklists were designed. The VDC level checklist were designed to collect information on basic demographic and migration patterns, food sufficiency and cropping patterns, existence of user's group/committees, public facilities and infrastructure, labour force availability, existence of archaeological and religious sites and the existence of disadvantaged

groups and ethnic minorities. The agricultural checklist was also designed to collect the price rate of various agricultural products in the project affected VDCs.

IV. Focused Group Discussion

Group discussions were organized in each VDC and Municipality to give special attention to issues concerning specific target groups such as women, children and farmers. Local elites, leaders, teachers and other intellectuals will also be included in the discussion. Other occupational caste groups, women and ethnic minorities were included in the discussion, which gave opportunity for the people in the project area to voice their questions and concerns regarding the project and to provide an in-depth information associated with their religion, culture, festivals, etc. Similarly, a meeting was also conducted with local CBOs such as Women Development Forum of Nuwakot district and issues raised by them were noted.

2.3 Data Analysis

Data analysis was carried out by using the Microsoft Access Computer Program and required output tables were developed. The main output data are presented in various chapters of the thesis. Both positive and negative impacts were identified and their severities were predicted. The appropriate mitigation measures were suggested as per the severity (i.e. magnitude, extent and duration) of the corresponding impacts.

2.4 Impact Assessment

Matrix method has been used to assess the impact on socio-economic and cultural environment. The magnitude, extent and duration of the impacts have been categorized according to the National Environmental Impact Assessment Guidelines, 1993. The impacts have been further categorized as high, medium and low in terms of magnitude; short term, medium term

and long term in terms of duration and local, site specific and regional in terms of extent.

I. Magnitude of Impacts

Low Impact (L): If the impact is significant but limited to small magnitude

Medium Impact (M): If the impact is of considerable magnitude

High Impact (H): If the impact is of severe nature

II. Extent of Impacts

Site Specific (S): If the impact is limited to the site itself then it is a site specific one.

Local (L): If the impact of the work extends to the adjoining wards and or VDCs then it is termed as local

Regional (R): If the impact of the work extends to the entire district or further then it is termed as regional.

III. Duration of Impacts

Short Term (ST): If the duration of the impact is limited to the particular construction site then it is termed as a short-term impact.

Medium Term (MT): If the impact of the work extends throughout construction period then it is termed as medium-term Impact.

Long Term (LT): If the span of the impact expands beyond the construction phase of the project then it is termed as a long-term impact.

IV. Quantification of Impacts

For the quantification of impacts, the method prescribed in National Environmental Impact Assessment Guidelines, 1993 was used. As per this guideline following points were allotted for different types of impacts as per their natures as mentioned in the following sections.

Magnitude: High: 60; Medium: 20; Low: 10;

Extent: Regional: 60; Local: 20; Site specific: 10;

Duration: Long Term: 60; Medium Term: 20; Short Term: 10.

Impact metrics was developed with its numerical value to identify the significance of impact. Each impact will be considered as high or medium or low on the basis of the significance value calculated in Table 7 of Chapter 5.

CHAPTER-III

REVIEW OF LITERATURE

3.0 Introduction

In this section, I reviewed the various literatures associated with Social Impact Assessment (SIA). Basically, the literature associated with definition and concepts, history, principles, guidelines and some processes were reviewed. Details of the review are presented in the following sections.

3.1 Defining and Describing Social Impact Assessment

As per the wikipedia, SIA first emerged in the 1970s in the U.S, as a way to assess the impacts on society of certain development schemes and projects before they go ahead - for example, new roads, industrial facilities, mines, dams, ports, airports, and other infrastructure projects. It has been incorporated since into the formal planning and approval processes in several countries, in order to categorise and assess how major developments may affect populations, groups, and settlements. SIA is often carried out as part of, or in addition to, Environmental Impact Assessment, but it has not yet been as widely adopted as EIA in formal planning systems, often playing a minor role in combined environmental and social assessments.

As to standard definition "Social impact assessment includes the processes of analyzing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programs, plans, projects) and any social change

processes invoked by those interventions. Its primary purpose is to bring about a more sustainable and equitable biophysical and human environment." (International Principles of SIA)

A substantial academic literature has developed around the techniques and the application of SIA, and it is widely taught and practiced. Major consultancy firms offer SIA expertise (which could be offered to 'developers', governments, or campaign organizations). They, and individual skilled practitioners and academics are often called upon to produce SIA reports, particularly in advance of proposed new infrastructure projects. The academic backgrounds of SIA practitioners are diverse, but may include applied sociology, anthropology, geography, development studies, and planning.

SIA overlaps substantially with the current interest in monitoring and evaluation (M&E). M&E is carried out after a project or development has gone ahead, to assess impacts and to see how well its goals were met. Evaluation is particularly important in the areas of:

- Public policy,
- Health and education initiatives, and
- International development projects more generally, whether conducted by governments, international donors, or NGOs.

In all these sectors, there is a case for conducting SIA and evaluations at different stages. There is a growing concern that projects of all types (from large dams to the work of small rural development NGOs), are efficiently conducted, do not disadvantage local people, and do not generate negative social and environmental impacts.

Increasingly, there is also a concern that non-experts and local people participate in the design and implementation of proposed developments or programmes. This can be achieved in the process of doing an SIA, through adopting a participatory and democratic research process. Some SIAs go further than this, to adopt an advocacy role. For example, several SIAs carried out in Queensland, Australia, have been conducted by consultants working for local Aboriginal communities who oppose new mining projects on ancestral land. A rigorous SIA report, showing real consequences of the projects and suggesting ways to mitigate these impacts, gives credibility and provides evidence to take these campaigns to the planning officers or to the courts.

Likewise, International Institute for Environment and Development defines SIA as: Social Impact Assessment is a field of applied social research and practice that developed originally (1970s) in response to the requirements of environmental regulations. SIA introduces knowledge about the social implications of an activity, into the planning, decision-making and management process associated with that activity. As a research field, SIA has been primarily within the discipline of Sociology, and related sub-fields (Rural Sociology, Environmental Sociology, Human Geography, etc.) but in practice, professionals from many disciplines have developed expertise and experience in the field. A simple definition of SIA is: The process of assessing or estimating, in advance, the social consequences that are likely to follow from specific policy actions or project developments (ICGP 1995, cited by MacFarlane).

As an activity required by environmental regulations, SIA has most frequently been conducted when it was deemed necessary for project permitting, which coincides with not only a company decision to develop

a project but also, in the mining industry generally, with perceptions of when the real impacts begin to occur. As a component of project permitting, SIA has tended to be conducted as a once-off study and planning process, seldom accompanied by thoughtful and carefully designed monitoring of predicted social impacts. The broader usefulness of SIA as a management tool, rather than a permitting hurdle, is a relatively new concept for the mining industry, but being successfully applied at a number of operations.

In general terms, SIA is analyzing, monitoring and managing the social consequences of development. However, there are different levels by which to understand the term ‘SIA’. SIA is a field of research and practice, or a paradigm consisting of a body of knowledge, techniques, and values. Various individuals identify themselves as SIA professionals, or list SIA as one of their disciplines or specialty areas. There is a community of individuals engaged in research and practice of SIA. These people practice the methodology of SIA and undertake associated social and environmental research to inform the practice of SIA. As a methodology or instrument, SIA is the process that SIA professionals follow in order to assess the social impacts of planned interventions or events, and to develop strategies for the ongoing monitoring and management of those impacts. SIA should not be understood only as the task of predicting social impacts in an impact assessment process.

Social impact assessment includes the processes of analyzing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions.

Its primary purpose is to bring about a more sustainable and equitable biophysical and human environment.

The important features of this understanding of SIA are that:

1. The goal of impact assessment is to bring about a more ecologically, socio-culturally and economically sustainable and equitable environment. Impact assessment, therefore, promotes community development and empowerment, builds capacity, and develops social capital (social networks and trust).

2. The focus of concern of SIA is a proactive stance to development and better development outcomes, not just the identification or amelioration of negative or unintended outcomes. Assisting communities and other stakeholders to identify development goals, and ensuring that positive outcomes are maximized, can be more important than minimizing harm from negative impacts.

3. The methodology of SIA can be applied to a wide range of planned interventions, and can be undertaken on behalf of a wide range of actors, and not just within a regulatory framework.

4. SIA contributes to the process of adaptive management of policies, programs, plans and projects, and therefore needs to inform the design and operation of the planned intervention.

5. SIA builds on local knowledge and utilizes participatory processes to analyze the concerns of interested and affected parties. It involves stakeholders in the assessment of social impacts, the analysis of alternatives, and monitoring of the planned intervention.

6. The good practice of SIA accepts that social, economic and biophysical impacts are inherently and inextricably interconnected. Change in any of these domains will lead to changes in the other domains. SIA must, therefore, develop an understanding of the impact pathways that are created when change in one domain triggers impacts across other domains, as well as the iterative or flow-on consequences within each domain. In other words, there must be consideration of the second and higher order impacts and of cumulative impacts.

7. In order for the discipline of SIA to learn and grow, there must be analysis of the impacts that occurred as a result of past activities. SIA must be reflexive and evaluative of its theoretical bases and of its practice.

8. While SIA is typically applied to planned interventions, the techniques of SIA can also be used to consider the social impacts that derive from other types of events, such as disasters, demographic change and epidemics.

SIA is best understood as an umbrella or overarching framework that embodies the evaluation of all impacts on humans and on all the ways in which people and communities interact with their socio-cultural, economic and biophysical surroundings. SIA thus has strong links with a wide range of specialist sub-fields involved in the assessment of areas such as: aesthetic impacts (landscape analysis), archaeological and cultural heritage impacts (both tangible and non-tangible), community impacts, cultural impacts, demographic impacts, development impacts, economic and fiscal impacts, gender impacts, health and mental health

impacts, impacts on indigenous rights, infrastructural impacts, institutional impacts, leisure and tourism impacts, political impacts (human rights, governance, democratization etc.), poverty, psychological impacts, resource issues (access and ownership of resources), impacts on social and human capital, and other impacts on societies. As such, comprehensive SIA cannot formally be undertaken by a single person, but requires a team approach.

3.2 A Brief History of SIA

The origins of SIA as a distinct field are usually traced to the United States, becoming formalized with the passage of the US National Environmental Policy Act (NEPA) of 1969 (Petts 1999). EPA required that 'major federal actions significantly affecting the quality of the human environment,' must first prepare a balanced, and publicly available assessment of the actions likely impacts - now known as an Environmental Impact Assessment (EIA). There existed considerable ambiguity, however, as to what NEPA required with regard to social impacts.

A landmark event in the establishment of SIA was the inquiry by Chief Justice Thomas Berger into the proposed Mackenzie Valley gas pipeline, from the Beaufort Sea, Yukon Territory to Edmonton, Alberta, 1974-8. This was the first time that social impacts had been formally considered in project decision-making (Berger 1983, Gamble 1978), and led to the recommendation that the project be postponed for at least ten years to allow sufficient time for land claims to be settled, and for new programs and new institutions to be established to support the native population. The findings were, at the time, unprecedented and marked the start of a

huge growth in SIA. Prior to the inquiry a study identified just 12 Canadian SIAs. Three years later a study identified over 3,000 Canadian SIAs (D'amore 1981).

Following the Berger Inquiry, the field continued to develop, with the founding in 1980 of the International Association for Impact Assessment (IAIA), the first international conference on SIA, held in Vancouver, British Columbia, in 1982 and the publication of important state-of-the-art SIA papers in the mid-1980s (see MacFarlane, Appendix A). In 1985 the first major EIA case was overturned on social grounds in the U.S. on the grounds that it failed to consider the social impacts on residents, especially in this case the Northern Cheyenne Tribe (Freudenburg 1986:56).

In 1985 the EEC established a directive requiring EIAs from their members (although Europe continues to lack specifically accorded SIA legislation). By the early 1990's, many of the US federal agencies and the US Council on Environmental Quality (CEQ) had incorporated SIA into their EIA reviews or regulations. By the mid-1990's, the World Bank had social safeguard policies, and established a Social Development Department at the World Bank and a social review unit at the IFC, promoting the adoption of SIA principles for both public and private sector projects (Francis & Jacobs 1999). Other Development Banks, some private sector corporations, regional donor organizations and Non-Government Organizations (NGOs) have incorporated SIA-like procedures into their project appraisal procedures, and many national governments have made SIA a mandatory activity for project proposals (MacFarlane, 2001).

3.3 Activities Comprising Social Impact Assessment

SIA comprises most of the following activities. It:

1. Participates in the environmental design of the planned intervention;
2. Identifies interested and affected peoples;
3. Facilitates and coordinates the participation of stakeholders;
4. Documents and analyses the local historical setting of the planned intervention so as to be able to interpret responses to the intervention, and to assess cumulative impacts;
5. Collects baseline data (social profiling) to allow evaluation and audit of the impact assessment process and the planned intervention itself;
6. Gives a rich picture of the local cultural context, and develops an understanding of local community values, particularly how they relate to the planned intervention;
7. Identifies and describes the activities which are likely to cause impacts (scoping);
8. Predicts (or analyses) likely impacts and how different stakeholders are likely to respond;
9. Assists evaluating and selecting alternatives (including a no development option);
10. Assists in site selection;
11. Recommends mitigation measures;
12. Assists in the valuation process and provides suggestions about compensation (non-financial as well as financial);
13. Describes potential conflicts between stakeholders and advises on resolution processes;

14. Develops coping strategies for dealing with residual or non-mitigatable impacts;
15. Contributes to skill development and capacity building in the community;
16. Advises on appropriate institutional and coordination arrangements for all parties;
17. Assists in devising and implementing monitoring and management programs.

3.4 Guidelines, Principles and Core Values

Guidelines can be described as statements which provide advice or direction by which to plan a specific course of action. They are written as specific statements of instruction about what to do and/or how to do it. Typically they are “action-statements”. A principle is a macro statement that provides a general guide to a course of action about what ought to be done. They are written as “ought-statements”. Core values are statements about fundamental beliefs that are deeply held. They are typically “is-statements”. Values determine principles, from which guidelines can be written.

I. The Core Values of SIA

The SIA community of practice believes that:

1. There are fundamental human rights that are shared equally across cultures, and by males and females alike.

2. There is a right to have those fundamental human rights protected by the rule of law, with justice applied equally and fairly to all, and available to all.

3. People have a right to live and work in an environment which is conducive to good health and to a good quality of life and which enables the development of human and social potential.

4. Social dimensions of the environment – specifically but not exclusively peace, the quality of social relationships, freedom from fear, and belongingness – are important aspects of people’s health and quality of life.

5. People have a right to be involved in the decision making about the planned interventions that will affect their lives.

6. Local knowledge and experience are valuable and can be used to enhance planned interventions.

II. Principles

A. Fundamental Principles for Development

The SIA community of practice considers that:

1. Respect for human rights should underpin all actions.

2. Promoting equity and democratization should be the major driver of development planning, and impacts on the worst-off members of society should be a major consideration in all assessment.

3. The existence of diversity between cultures, within cultures, and the diversity of stakeholder interests need to be recognized and valued.

4. Decision making should be just, fair and transparent, and decision makers should be accountable for their decisions.

5. Development projects should be broadly acceptable to the members of those communities likely to benefit from, or be affected by, the planned intervention.

6. The opinions and views of experts should not be the sole consideration in decisions about planned interventions.

7. The primary focus of all development should be positive outcomes, such as capacity building, empowerment, and the realization of human and social potential.

8. The term, 'the environment', should be defined broadly to include social and human dimensions, and in such inclusion, care must be taken to ensure that adequate attention is given to the realm of the social.

B. Principles Specific to SIA Practice

1. Equity considerations should be a fundamental element of impact assessment and of development planning.

2. Many of the social impacts of planned interventions can be predicted.

3. Planned interventions can be modified to reduce their negative social impacts and enhance their positive impacts.

4. SIA should be an integral part of the development process, involved in all stages from inception to follow-up audit.

5. There should be a focus on socially sustainable development, with SIA contributing to the determination of best development alternative(s) – SIA (and EIA) have more to offer than just being an arbiter between economic benefit and social cost.

6. In all planned interventions and their assessments, avenues should be developed to build the social and human capital of local communities and to strengthen democratic processes.

7. In all planned interventions, but especially where there are unavoidable impacts, ways to turn impacted peoples into beneficiaries should be investigated.

8. The SIA must give due consideration to the alternatives of any planned intervention, but especially in cases when there are likely to be unavoidable impacts.

9. Full consideration should be given to the potential mitigation measures of social and environmental impacts, even where impacted communities may approve the planned intervention and where they may be regarded as beneficiaries.

10. Local knowledge and experience and acknowledgment of different local cultural values should be incorporated in any assessment.

11. There should be no use of violence, harassment, intimidation or undue force in connection with the assessment or implementation of a planned intervention.

12. Developmental processes that infringe the human rights of any section of society should not be accepted.

C. Other Guiding Principles

There are many International Agreements and Declarations that contain notable statements. Principle 1 of the 1992 Rio Declaration on Environment and Development, for example, states that "*Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature*."

Principle 17 calls for impact assessment to be undertaken. Article 1 of the 1986 Declaration on the Right to Development states that:

"*The right to development is an inalienable human right by virtue of which every human person and all peoples are entitled to participate in, contribute to, and enjoy economic, social, cultural and political development, in which all human rights and fundamental freedoms can be fully realized. The human right to development also implies the full realization of the right of peoples to self-determination, which includes, subject to the relevant provisions of both International Covenants on Human Rights, the exercise of their inalienable right to full sovereignty over all their natural wealth and resources."*

In International Agreements and Declarations social issues are often implied but rarely given adequate emphasis. Nevertheless, the statements that are given in those Declarations can be rewritten to refer to social issues more specifically. The following is a list of international principles in common usage rewritten to apply more directly to social issues.

Precautionary Principle: In order to protect the environment, a concept which includes peoples' ways of life and the integrity of their communities, the precautionary approach shall be applied. Where there are threats or potential threats of serious social impact, lack of full certainty about those threats should not be used as a reason for approving the planned intervention or not requiring the implementation of mitigation measures and stringent monitoring.

Uncertainty Principle: It must be recognized that our knowledge of the social world and of social processes is incomplete and that social knowledge can never be fully complete because the social environment

and the processes affecting it are changing constantly, and vary from place to place and over time.

Intergenerational Equity: The benefits from the range of planned interventions should address the needs of all, and the social impacts should not fall disproportionately on certain groups of the population, in particular children and women, the disabled and the socially excluded, certain generations or certain regions.

Intergenerational Equity: Development activities or planned interventions should be managed so that the needs of the present generation are met without compromising the ability of future generations to meet their own needs.

Recognition and Preservation of Diversity: Communities and societies are not homogenous. They are demographically structured (age and gender), and they comprise different groups with various value systems and different skills. Special attention is needed to appreciate the existence of the social diversity that exists within communities and to understand what the unique requirements of special groups may be. Care must be taken to ensure that planned interventions do not lead to a loss of social diversity in a community or a diminishing of social cohesion.

Internalization of Costs: The full social and ecological costs of a planned intervention should be internalized through the use of economic and other instruments, that is, these costs should be considered as part of the costs of the intervention, and no intervention should be approved or regarded as cost-effective if it achieves this by the creation of hidden costs to current or future generations or the environment.

The Polluter Pays Principle: The full costs of avoiding or compensating for social impacts should be borne by the proponent of the planned intervention.

The Prevention Principle: It is generally preferable and cheaper in the long run to prevent negative social impacts and ecological damage from happening than having to restore or rectify damage after the event.

The Protection and Promotion of Health and Safety: Health and safety are paramount. All planned interventions should be assessed for their health impacts and their accident risks, especially in terms of assessing and managing the risks from hazardous substances, technologies or processes, so that their harmful effects are minimized, including not bringing them into use or phasing them out as soon as possible. Health impacts cover the physical, mental and social wellbeing and safety of all people, paying particular attention to those groups of the population who are more vulnerable and more likely to be harmed, such as the economically deprived, indigenous groups, children and women, the elderly, the disabled, as well as to the population most exposed to risks arising from the planned intervention.

The Principle of Multicultural Integration: Social development requirements and the need to consider social issues should be properly integrated into all projects, policies, infrastructure programs and other planning activities.

The Principle of Subsidiary: Decision making power should be decentralized, with accountable decisions being made as close to an individual citizen as possible. In the context of SIA, this means decisions about the approval of planned interventions, or conditions under which

they might operate, should be taken as close to the affected people as possible, with local people having an input into the approval and management processes.

3.5 Social Impacts and Social Processes

One confusion in the SIA literature relates to the lack of distinction between social changes processes that are caused by projects such as dams, and social impacts that are actually experienced. In this conceptualization, an impact must be an experience (either real or perceived) of an individual, family or household, or a community or society. Resettlement (relocation of a community), for example, is not a social impact, but causes social impacts such as anxiety and stress, uncertainty, disruption to daily living, potential change to family structure, as well as impacts such as homeliness. Similarly, an (even rapidly) increasing (or decreasing) population, the presence of seasonal workers, and/or weekend residents, are not impacts in themselves, but they cause other impacts, such as breakdown of the social fabric of the community, cause existing residents to experience changed perceptions about their community, and may stress the community physical infrastructure. Alcohol or other drug use are not social impacts, but are processes, which, depending on the context of their use, may cause social impacts such as family violence and economic hardship. All of the variables must be understood in their sociological context, and, of course, in their local cultural context. Homeliness, for example, does not mean the physical quality of the house, but the social relationships among the occupants of the building, and between them and the building. It is a subjective concept relating to the meaning and experience people attach to the place where they live and build their home (Vanclay, 1999a).

Because many of the SIA writers have confused issues of social change processes and social impacts, partly because demographic processes such

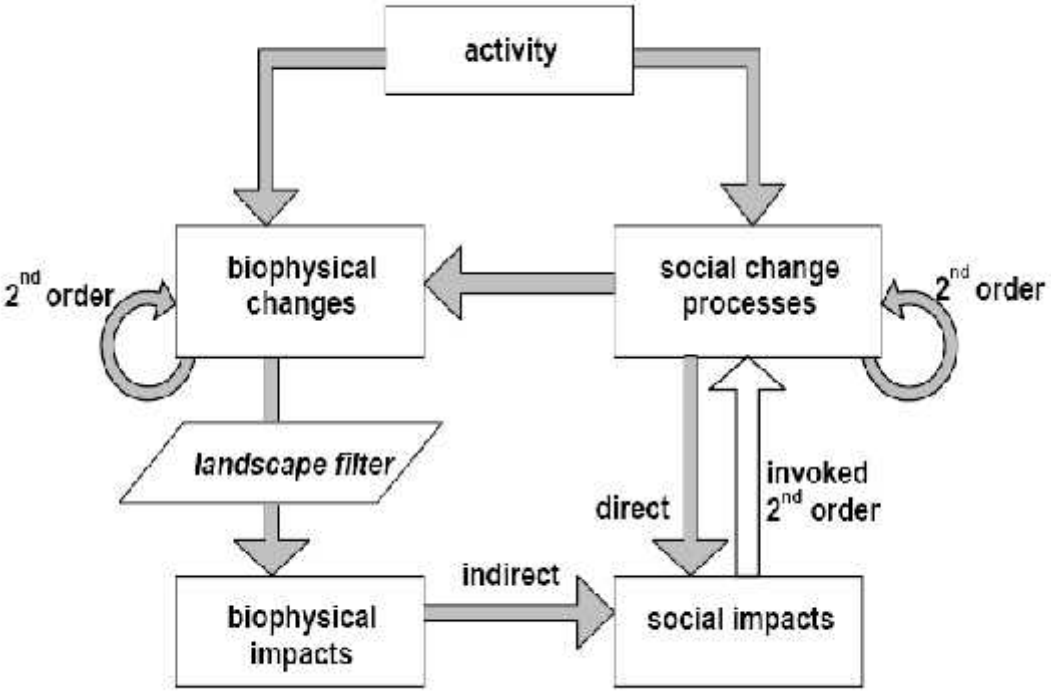
as changes in the size and/or composition of the population are more easily measured than the experienced impact, it is worthwhile presenting here a list of potential social change processes, and a full list of social impacts.

The list of social change processes is incomplete, because the potential number of social change processes is potentially infinite, and the processes vary widely according to the activity being planned. The list of impacts, however, is arguably definitive, although some disagreement may exist about the precise wording and categorization of impacts. In this scheme, impacts are classified according to the level of experience of impact – that is, whether they are experience at an individual or household level, or whether they are experienced by the community or society as a whole. Of course, impacts on society as whole may translate into impacts that affect individuals as individuals.

The list is not intended to be used as a checklist, but is provided to display the full range of potential social impacts, and to assist people not familiar with SIA to become aware of the full extent of SIA.

It is important to appreciate that some impacts make be caused directly by an activity, while other impacts may be caused indirectly. And the experience of an impact can then cause other processes to take places which then cause second order impacts. Because of people's dependency on the biophysical environment, changes to the biophysical environment can create social impacts, and social processes which are the direct result of a project, or the result of the experience of a social impact, can also cause changes to the biophysical environment Figure 3.

Figure 3: Interconnection of Biophysical and Social Impact



Source: - Slootweg, van Schooten and Vanclay (1999).

CHAPTER-IV

EXISTING BIO-PHYSICAL AND SOCIO-ECONOMIC CONDITION OF THE PROJECT AREA

4.0 Introduction

This chapter briefly explains the bio-physical condition of the project area VDCs in compendium form and explains the socio-economic condition of the project area VDC and Project Affected Families (PAFs) in detail. Section 4.1 deals about the bio-physical condition of the project area VDCs and Municipality and section 4.2 explain the socio-economic condition of project area VDCs/Municipality and that of PAFs.

4.1 Bio-Physical Environmental Condition

Sub-tropical to Mild-temperate type of climate prevails in the project area. The annual average minimum and maximum temperatures of the district recorded are 16.3^0C and 26.6^0C respectively. Nearly 80 percent of the annual rainfall in this drainage area occurs between the months of July and September caused by monsoon. The average rainfall recorded in 24 hours is 1431.0 ml.

The project area is located in flat topography. The headwork area is located in the flat topography. The major portion of the open canal runs through flat topography consisting of agricultural land. Approximately 1 km of the section runs through fragile slope along the right bank of the Trishuli River. The powerhouse is located at the slope on the right bank of Trishuli River.

Agricultural land, patches of forest and bushes, settlement are the main land uses pattern of the project area. The land use around the vicinity of the headwork site consists of flat terraced grazing land and agricultural land. However, the land use pattern along the open cannel alignment consists of bush land and forest land. Power house is located on the sloppy barren land at the right bank of Trishuli River. The landuse in the forebay area mainly consists of sparse trees patches owned by a private owner.

The proposed project is located in the tropical vegetation zone. Headwork and power plant sites, both are located on the eastern aspect in the private lands with not much forest cover around them. The adjoining lands, near the dam and the power plant, are also the private agricultural lands and have very limited flora for any significant disturbance. In addition, the open cannel traverse along agricultural land with very limited trees owned by private owners. Fodder and other trees are available along the cannel alignment but very limited number of these trees needs to be falled for the construction of various project components.

There is no declared community forest in the dam and the powerhouse site. Moreover, no part of the project falls inside the protected areas category (National Park, Wildlife Reserve and Conservation Area).

The project area is characterized by the tropical mixed hard wood forest plant species with Sal (*Shorea robusta*) being the dominant species. Other species found along the open cannel alignment are Bel (*Aegle marmelos*), Jamun (*Syzium cuminii*), Chilaune, Katus and Bot dhaero (*Largestromia parviflora*). The agricultural lands adjoining the headwork and the powerhouse sites consist of traditional hill agro-forestry fodder species of

Tanki *(Bauhinia purpuria),* Kutmero *(Litsea monopelata),* Pipal (*Piper longum*), Pakhuri (*Ficus glaberrima*), Kabhro (*Ficus lacor*), Dumri (*Ficus racemosa*), Badahar *(Artocarpus lakocha),* etc. Details of the common plant species found in the project area are given in the Table 1.

The natural vegetation plays an influential role in the socio-economic condition and life style of the local residents. Diverse ethnic group inhibit the project area. They utilized the local plant resources for different purposes including timber, firewood, medicine and food. The major timber yielding plants of the project area Sal, Chilaune, Katus and Lankuri. Common fodders are Khanio, Kabhro, Dabdabe, Kutmero, Badahar and Bamboo. Almost all the trees are used as firewood depending upon their availability with Chilaune the major firewood species.

Citrus species (Suntala, Mausam, Nibuwa, Bhogate etc.), Aanp (*Mangifera indica*) and Katahar (Artocarpus spp.) are the common fruits of the project area. Similarly Khaniyo, Amala, Titepati, Bojho, Timur and Kurilo are the commonly used medicinal plants of the project area.

In Nepal, wildlife has been regarded as a resource belonging to the public. The ideal management concept is “preservation through wise use” and the basic objectives of wildlife management are to prevent disappearance of species native to the country by employing biological principle (*Amatya et al, 2002*).

4.2 Socio-Economic and Cultural Environmental Condition

The baseline conditions of the socio-economic and cultural environment have been described in two categories namely: Project Affected Area

(PAA) and Project Affected Families (PAF). The baseline data of all these VDCs and a municipality have been presented under the heading 'Project Affected Area' in section I while the baseline data of the PAFs have been discussed under the heading 'Project Affected Families' in Section II.

The project affected area covers 2 VDCs and 1 Municipality namely: Charghare and Khadgabhanjyung VDCs and Bidur Municipality. The baseline information of project affected area is compiled from secondary data sources and that of PAF from questionnaire survey.

Table 1: Plant Species of the Project Area

S. N.	Botanical Name	Local Name	Protected Status
1	*Litsea monoplata*	Kutmero	Common
2	*Artocarpus lakocha*	Badahar	Common
3	*Bauhinia purpuria*	Tanki	Common
4	*Bombax ceiba*	Simal	Protected
5	*Bambusa arundinacea*	Bamboo	Common
6	*Aesandra butyracea*	Chyuri	Common
7	*Ficus semicordata*	Khaniyo	Common
8	*Quercus semicarpifolia*	Khasre	Common
9	*Artemisia indica*	Titepati	Common
10	*Rubus elipticus*	Ainsalu	Common
11	*Acacia pinnata*	Arari	Common
12	*Justica adhatoda*	Asuro	Common
13	*Sapium insigne (Royle)*	Khirro	Common
14	*Solanum verbascifolium*	Dhueshul	Common
15	*Microsorium sp.*	Unue	Common

16	*Emblica officinalis*	Amala	Common
17	*Shorea robusta*	Sal	Common
18	*Aegle marmelos*	Bel	Common
19	*Garuga pinnata*	Dabdade	Common

Source: Field Survey, 2007.

I. Project Affected Area (Affected VDCs / Municipality)

A. Population Distribution, Religion and Cast

The total population of the district is 307667 with population density of 257 person per sq. km. Out of the total population, 150984 are male and 156683 are female. The average household size of the district is 5.43.

The total population of 2 VDCs and one municipality of project area is 34467. Bidur Municipality has the highest population and Charghare VDC has smallest. The male female ratio is 48.5% and 51.5 % respectively. The total number of households in the project area is 5309. Average household size of the project area is 6.5 which is greater than the district average. VDC/Municipality wise population distribution with number of households is shown in the Table 2.

Hinduism is the main religion in the project area followed Buddhism and Christian. Brahmin, Chhetry, Gurung, Magar, Tamang, Newar, etc are the major caste in the project area followed by Dalit including Kami and Damai.

B. Language

Nepali is the official language of all the people of project affected area. However, ethnic caste such as Newar uses their own languages inside their community. Other caste use Nepali as their daily communication language.

Table 2: Male/Female Composition of Population in Project Area

S. No.	Name of VDC/Municipality	Total Population	Male	Female	Total HH	Average HH Size
1	Bidur Municipality	22277	10795	11482	3998	5.6
2	Khadgabhyanjyang	6963	3297	3670	712	9.8
3	Charghare	5227	2622	2604	599	8.7
Total		**34467**	**16714**	**17756**	**5309**	6.5

Source: Department of Statistics, Nuwakot, 2007.

C. Education

The literacy rate of the district is 51.4% out of which female literacy rate is 40.7%. The level of education is poor in project area. In each VDC, more than 6 schools are located within 5 minutes to one-hour walk from the settlements. However, number of schools in Bidur municipality is sufficient. In Bidur municipality, there are two colleges with the enrolment of 900 students and 12 teachers.

School dropout rate is not much high, but the rate increase at the higher classes. Girl's dropout rate is higher than that of boys. This may be due to the higher burden of household works and other income generating activities.

D. Settlement Pattern

People of the area live in separate clusters based on their ethnicity and status. Housing patterns are more or less the same throughout the area, irrespective of ethnicity and economic status of the people.

Almost all houses are constructed by brick masonry with mud mortar. Wood is used for windows and slate, corrugated sheets and cement tiles for roofing. Most of the houses are two storied. The ground floor is used for cooking and storage and first floor for bedrooms. A courtyard is found in the front side of most of the houses. The yard is used for various activities such as resting, meeting people, cottage industry work, and for dining. Most households own a smaller house or hut (shed) for cattle, goat and other purposes such as storing dry fodder, firewood or straw.

E. Occupation and Sources of Income

Agriculture is predominant occupation in project area flowed by livestock farming, poultry, trade and business, manufacturing industries, transport and business. Nonagricultural economic activity in affected VDCs and Municipality indicates that 58% of households are not engaged in such activities and distribution of households engaged in various types of activities is provided in Table 3, which is self explanatory.

According to available data, out of the economically active population 2% are involved in manufacturing sector and 6% are in trade and business. The other areas are 7.5% are wage labour, 12% service and 8%in foreign employment. The daily wage rate of the skill and unskilled labour is NRs. 250/- and NRs. 150/- respectively. According to available information professional fishermen were not found in project area.

Table 3: Occupational Distribution of Economically Active Population in Project Affected VDCs.

Occupation	Percentage
Agriculture and Livestock	58
Service	12
Wage Labour	7.5
Pension	2.5
Business	6
Cottage Industry	2
Foreign Employment	8
Others	3

Source: Field Survey, 2007.

F. Health and Sanitation

Sub-health posts and medicals have been providing the health service in the project affected VDCs. However, there are some medicals in Bidur Municipality with health workers. Because of the unavailability of the sufficient health workers and medicine the available health service is not reliable. Heart disease, tuberculosis and respiratory problems are the major diseases reported from the district. The common diseases prevalent are dysentery, diarrhea, worm infection, gastro intestinal disorders, fever, etc.

The sanitation situation in the project area is quite satisfactory. People use pipe water, river and stone tap. Most of the population in affected VDCs and Municipality has access to pipe water facilities. Open defecation along the river or in the open field is a rare practice. Similarly, most of the population has access to the toilet facility in the aforementioned VDCs. However public health situation is not much satisfactory.

G. Migration Pattern

From the field survey, it was found that more than 95% of the households have lived in the same vicinity for three or more generations. The population is therefore generally stable, growing with a local birth rate, and the area has not been subjected to significant migration. However, factors leading to migration of the population from the project affected area are the construction of the Road, and the lack of social services and other facilities in project area.

Permanent migration from the area is very rare but temporary migration for work is quite common. There are some precise statistics on labour migration. Outward migration is generally seasonal for the search of jobs

in nearby towns like Kathmandu with the aim of supplementing household income. Some households reported that members of their family migrate for educational purposes and service. In general male members of Brahmin and Chhetry families go to nearby towns or Kathmandu to work as government employees, and the young men of Tamang, Gurung, Magar, and Chhetri families go abroad to join military and other services.

H. Archeological, Historical and Religious Sites

In the project affected district and VDCs, there are many historical, archaeological and religious sites. There are many significant historical, religious and tourist attraction centers. The religious and archaeologically important places in the area are Nuwakot Seven Story Durbar, Bhairabi Tample, Ganesh Than, Mahadev Temple, Devighat, etc.

I. Religious, Social and Cultural Practices

The main religious activities in the project affected area are *Pasni* (rice feeding ceremony for newly born babies), *bratabanda* (thread wearing ceremony of teenage boys), marriage and *sharaadha* (worship of soul of the dead mother and father). Other social and cultural practices of the project area are outlined in the following paragraphs.

The major festivals of the area are *Vijaya Dashami, Tihar, Maghe Sankranti, Holi, Ram Nawami, Buddha Jayanti and Teej* for the Hindu and Buddist communities. *Lhosar* is the major festival of Sherpa, Tamang, Gurung and Magar communities. *Christmas* is the major festival celebrates by the Christian people.

The widely performed cultural activities in the area are *Teej mela* (fair), *Bhailo* and *Deushi* (singing and dancing activities) in *Tihar*, *holi* (color festival), *Bhajan - Kirtan* in Ram Nawami (praying by singing), cultural programs in *Shripanchami* and *Dhami* and *Jhankri Naach* (dance performed during various religions activities and festivals).

J. Land Types, Holding Size and Land Transaction

In the hills, farmers have more upland (Bari and Pakho) than the low lands (Khet), where rice is grown in monsoon. In the project area, only about 5 to 10% of the total agricultural land is irrigable, which are mostly in river valleys or lower terraces.

The average land holding size is small in the project area. Approximately 80% of the households possess 20 Ropani of land or less. Only 15% of the households possess about 20 – 50 Ropani of land and 4% of the households has more than 50 Ropanies of land. In the project are, 1% of households are landless.

Land transaction in terms of land purchase and sale is limited in the project area. Therefore, land holdings appear to be stable. However, the price of land depends upon the location, quality of land, etc.

K. Cropping Pattern

In the low land, rice is the main croup followed by wheat and other legume crops in areas where irrigation is available. In the upland area coarse grain like cereals and millet are grown. Upland has maize, millet and some legumes grown during monsoon season and they remain followed during dry season.

L. Infrastructure

At present the project area is completely accessible by motorable road. Electricity, telecommunication, post office and cooperatives offices are available in project area. Sub health post, local club, veterinary office and some NGO are also found in project area.

M. Electricity

Project area is partially electrified from the central grid connected line. The Bidur Municipality is fully electrified. Kerosene is mostly used for lighting purpose in other parts of project area. Main source of energy is firewood and in average a household spends 5 hours daily for the collection of firewood.

N. Communal Resources

The major communal resources of the project area are forest, social infrastructures, drinking water, telecommunication facilities, etc. Sufficient access trail to different wards of Khadgabhyanjyang and Charghare VDCs and neighboring VDCs were also found.

O. Existing Water Use Right

Direct consumptive and non-consumptive use of the Trishuli River water by local inhabitants is very limited. From the field, it was observed that people in the project impact area use either spring water or piped water for drinking purposes. The local people do not use river water for any purposes in the downstream. People use the spring water for everyday use and for irrigation of very small piece of land. There are no hydro schemes in the Trishuli River at the downstream of the proposed project.

P. Gender

In general, the status and role of women in the project sites among the PAFs is primarily the bearing, rearing and caring of children and taking care of sick, elderly and other adult members of the family. Simultaneously, they are also engaged in household works such as

cooking, washing, food processing, household maintenance, hygiene and sanitation activities. Approximately they will spend eight hours a day in household chores. Gurung, Magar and Tamang women has found more right in the property than the women of other communities.

Normally, the girls get married at 16 – 22 years of age. The average age of women at first delivery is 20 years. About 90% of deliveries are done through the traditional method with the help of Sudeni.

Most of the women in the project area are engaged in household level work, cottage industry, business, animal husbandry, porter and other sectors. Most of the surveyed women said that they do not participate in income generating activities. They work as house wives and spend their time in household chores.

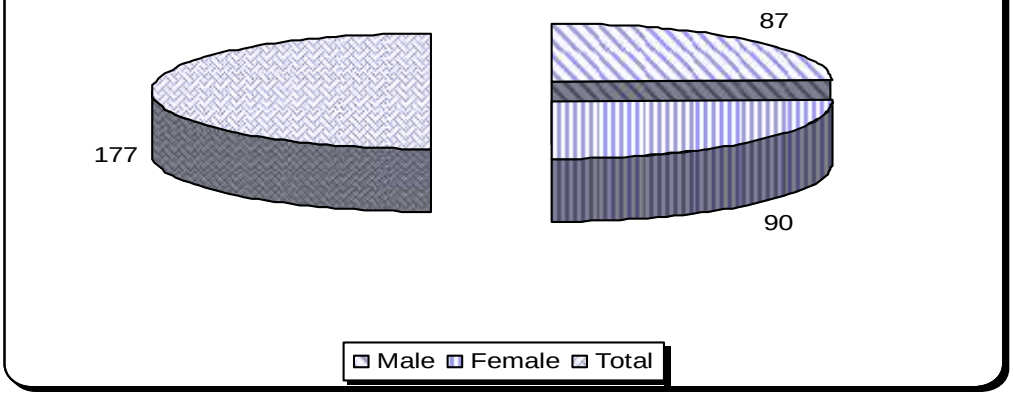
From the survey it was found that the advice of women were considered in matters like agriculture, childcare, health and cleanliness; advice of women is sought after. However, for decision making in other activities, women's advice is less considered.

II. Project Affected Families (PAFs)

The second category 'Project Affected Families' (PAFs) has been analysed through field surveys. From the Cadastral Survey, 34 households (HHs) were identified as directly Project Affected Families (PAFs). Thus, in the field survey, an attempt was made to collect information from all of the PAFs. The text given below is the outcome from the analysis of the questionnaire survey of 34 HHs. The list of participants of the meeting is given in Annex 3 . 34 households (HHs)

will be directly affected by the project due to acquisition of land only for the construction of open cannel and foreway.

Figure 4: Male Female Composition of Project Affected Families (PAFs)



A. Population Distribution, Religion and Cast

The total population of the PAFs is 177 with average household size of 5.2. Out of the total population, 87 are male and 90 are female. Male female composition is shown in the pie chart shown in the Figure 4 below. The average household size (5.2) of the PAFs is slightly less than that of district average (5.43) (*Field Survey, 2007*).

As per the field survey conducted in 2007, Hinduism (95%) is the main religion of the PAFs followed Buddhism (3%) and Christian (2%). Among the PAFs, 65 percent are Brahmin, 20 percent are Chhetry, 5 percent are Gurung and Magar, and remaining 10 percent are Newar.

B. Language

Nepali is the official language of all the people of project affected area. However, ethnic caste such as Newar uses their own languages inside their community. Other caste use Nepali as their daily communication language.

C. Education

The literacy rate of the PAFs is 78% which is far greater than the district average which is 51.4%. Thus, the level of education is quite good among the PAFs. In each VDC, more than 6 schools are located within 5 minutes to one-hour walk from the settlements. However, number of schools in Bidur municipality is sufficient. In Bidur municipality, there are two colleges with the enrolment of 900 students and 12 teachers.

School dropout rate is not much high, but the rate increase at the higher classes. Girl's dropout rate is higher than that of boys. This may be due to the higher burden of household works and other income generating activities.

D. Settlement Pattern

People of the area live in separate clusters based on their ethnicity and status. Housing patterns are more or less the same throughout the area, irrespective of ethnicity and economic status of the people.

Almost all houses are constructed by brick masonry with mud mortar. Wood is used for windows and slate, corrugated sheets and cement tiles for roofing. Most of the houses are two storied. The ground floor is used for cooking and storage and first floor for bedrooms. A courtyard is found in the front side of most of the houses. The yard is used for various activities such as resting, meeting people, cottage industry work, and for dining. Most households own a smaller house or hut (shed) for cattle, goat and other purposes such as storing dry fodder, firewood or straw.

E. Occupation and Sources of Income

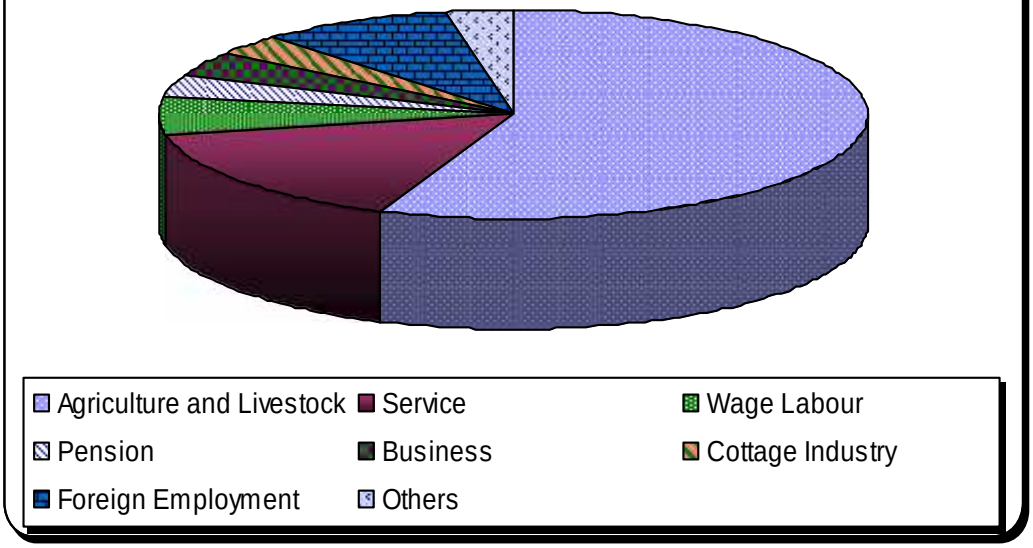
Agriculture is predominant occupation of PAFs flowed by livestock farming, poultry, trade and business, manufacturing industries, transport and business. Nonagricultural economic activity of PAFs indicates that 56% of households are not engaged in such activities and distribution of households engaged in various types of activities is provided in Table 4. and Figure 5. According to field survey 2007, out of the economically active population 3% are involved in manufacturing sector and 4% are in trade and business. The other areas are 5.5% are wage labour, 16% service and 9 % in foreign employment. The daily wage rate of the skill and unskilled labour is NRs. 250/- and NRs. 150/- respectively. According to available information professional fishermen were not found in project area.

Table 4: Occupational Distribution of Economically Active Population of Project Affected Families.

Occupation	Percentage
Agriculture and Livestock	56
Service	16
Wage Labour	5.5
Pension	3.5
Business	4
Cottage Industry	3
Foreign Employment	9
Others	3

Source: Field Survey, 2007.

Figure 5: Employment Status of PAFs



F. Health and Sanitation

Sub-health posts and medicals have been providing the health service in the project affected VDCs. However, there are some medicals in Bidur Municipality with health workers. Because of the unavailability of the sufficient health workers and medicine the available health service is not reliable. Heart disease, tuberculosis and respiratory problems are the major diseases of PAFs reported from the field survey, 2007. The common diseases prevalent are dysentery, diarrhea, worm infection, gastro intestinal disorders, fever, etc.

The sanitation situation in the settlements of the PAFs is quite satisfactory. People use pipe water, river and stone tap. Most of the PAFs have access to pipe water facilities. Open defecation along the river or in the open field is a rare practice. Similarly, most of the PAFs have access to the toilet facility. However public health situation of the PAFs is not much satisfactory.

G. Migration Pattern

From the field survey, it was found that more than 93% of the PAFs households have lived in the same vicinity for three or more generations. The population is therefore generally stable, growing with a local birth rate, and the area has not been subjected to significant migration. However, factors leading to migration of the population from the project affected area are the education facilities and development of various infrastructures in Bidur Municipality.

Permanent migration from the area is very rare but temporary migration for work is quite common. There are some precise statistics on labour migration. Outward migration is generally seasonal for the search of jobs in nearby towns like Kathmandu with the aim of supplementing household income. Some households reported that members of their family migrate for educational purposes and service. In general male members of Brahmin and Chhetry families go to nearby towns or Kathmandu to work as government employees, and the young men of Gurung, Magar, and Chhetri families go abroad to join military and other services.

H. Archeological, Historical and Religious Sites

In the project affected district and VDCs, there are many historical, archaeological and religious sites. There are many significant historical, religious and tourist attraction centers. The religious and archaeologically important places in the area are Nuwakot Seven Story Durbar, Bhairabi Tample, Ganesh Than, Mahadev Temple, Devighat, etc.

I. Religious, Social and Cultural Practices

The main religious activities in the project affected families are *Pasni* (rice feeding ceremony for newly born babies), *bratabanda* (thread wearing ceremony of teenage boys), marriage and *sharaadha* (worship of soul of the dead mother and father). Other social and cultural practices of the project affected families are outlined in the following paragraphs.

The major festivals of these families are *Vijaya Dashami, Tihar, Maghe Sankranti, Holi, Ram Nawami, Buddha Jayanti and Teej* for the Hindu and Buddist communities. *Lhosar* is the major festival of Sherpa, Tamang, Gurung and Magar communities. *Christmas* is the major festival celebrates by the Christian people.

The widely performed cultural activities of the PAFs are *Teej mela* (fair), *Bhailo* and *Deushi* (singing and dancing activities) in *Tihar*, *holi* (color festival), *Bhajan - Kirtan* in Ram Nawami (praying by singing), cultural programs in *Shripanchami* and *Dhami* and *Jhankri Naach* (dance performed during various religions activities and festivals).

J. Land Types, Holding Size and Land Transaction

In the hills, farmers have more upland (*Bari* and *Pakho*) than the low lands (*Khet*), where rice is grown in monsoon. Most of the land owned by PAFs is irrigable land. Only about 10 to 15% of the total agricultural land is non-irrigable, which are mostly in the upper terraces.

The average land holding size of the PAFs is small. Approximately 85% of the households possess 20 Ropani of land or less. Only 10% of the households possess about 20 – 50 Ropani of land and 5% of the households has more than 50 Ropanies of land.

Land transaction in terms of land purchase and sale is limited among the PAFs. Therefore, land holdings appear to be stable. However, the price of land depends upon the location, quality of land, etc.

K. Cropping Pattern

In the low land, rice is the main croup followed by wheat and other legume crops in areas where irrigation is available. In the upland area coarse grain like cereals and millet are grown. Upland has maize, millet and some legumes grown during monsoon season and they remain followed during dry season.

L. Infrastructure

At present the project area is completely accessible by motorable road. Electricity, telecommunication, post office and cooperatives offices are available in project area. Sub health post, local club, veterinary office and some NGO are also found in project area.

M. Electricity

All of the PAFs are electrified from the central grid connected line. The Bidur Municipality is fully electrified. Electricity is used for lighting purpose whereas firewood is the main source of energy cooking. In an average a household spends 4 hours daily for the collection of firewood.

N. Communal Resources

The major communal resources of the project area are forest, social infrastructures, drinking water, telecommunication facilities, etc. Sufficient access trail to different wards of Khadgabhyanjyang and Charghare VDCs and neighboring VDCs were also found.

O. Existing Water Use Right

Direct consumptive and non-consumptive use of the Trishuli River water by local inhabitants is very limited. From the field, it was observed that people in the project impact area use either spring water or piped water for drinking purposes. The local people do not use river water for any purposes in the downstream. People use the spring water for everyday use and for irrigation of very small piece of land. There are no hydro schemes in the Trishuli River at the downstream of the proposed project.

P. Gender

In general, the status and role of women in the project sites among the PAFs is primarily the bearing, rearing and caring of children and taking care of sick, elderly and other adult members of the family. Simultaneously, they are also engaged in household works such as cooking, washing, food processing, household maintenance, hygiene and sanitation activities. Approximately they will spend eight hours a day in household chores. Gurung, Magar and Tamang women has found more right in the property than the women of other communities.

Normally, the girls get married at 16 – 22 years of age. The average age of women at first delivery is 20 years. About 90% of deliveries are done through the traditional method with the help of Sudeni.

Most of the women in the project area are engaged in household level work, cottage industry, business, animal husbandry, porter and other sectors. Most of the surveyed women said that they do not participate in income generating activities. They work as house wives and spend their time in household chores.

From the survey it was found that the advice of women were considered in matters like agriculture, childcare, health and cleanliness; advice of women is sought after. However, for decision making in other activities, women's advice is less considered.

CHAPTER-V
IMPACT AND MITIGATION MEASURES

5.0 Introduction

This study identifies the potentially significant impacts during construction and operation phase of the proposed project on existing socio-economic & cultural resources. The study, distinguish between potentially significant positive and adverse impacts, direct, indirect and cumulative impacts. The adverse impact on existing socio-economic environment due to construction and operation of the project is described in the sub-chapters 5.1 and positive impacts is described in sub-chapter 5.2. The impacts shall be characterized as low, high and medium in terms of magnitude and long term, short term and medium term in terms of duration. The impact shall further be categorized as site specific, local and regional in terms of extent. Each of the impacts is quantified by using the method explains in section 2.4 – IV. Impact matrix is developed at the end of the chapter with quantitative value.

Mitigation measures for all identified significant impacts were taken into consideration during the study period. Each of the identified adverse impacts is evaluated in detail and cost effective mitigation measures are suggested to minimize the adverse impacts. The mitigation measures are specific and developed by applying pragmatic approach, technically and economically feasible, socially acceptable and preferably of proven effectiveness. However, the prime responsibility for implementation of the proposed mitigation measures rest with the proponent. The cost required for each and every mitigation measure is identified in detail. In

general, the following areas are covered while preparing mitigation plan/program.

1. Protective Measures
2. Design Measures
3. Compensatory Measures
4. Rehabilitation Measures

5.1 Socioeconomic and Cultural Environment

Natural as it is, the construction of this project will have both positive as well as adverse impacts in social, economic and cultural conditions of the people. The potential impacts will be identified in this section.

5.1.1 Pre-Construction Phase

A. Impacts

1. Land Acquisition

The construction activities will require approximately 5.2 ha. of permanently acquired land and 1 ha. of temporarily acquired land for the various project structures which includes, construction camps, power house, surge tank, penstock and open cannel alignment, etc. During construction period, this land has to be acquired from the 34 families. Distributing the permanent loss in 34 families, each family loses an average amount of 0.15 ha of land. Therefore, this impact can be considered as long term, moderate and local. Total impact value is: 90 which is less than 100 (Table 7). Thus, the impact is low.

2. Affected Households

Due to the construction of this project, a total of 34 HHs will be affected. These HHs are defined as Project Affected Families (PAFs). None of the

house and structures would be relocated and demolished. Each of these HHs will loss a small portion of their forest land or agricultural land. This reduced the level of income and the agricultural productivity of the concerned HHs. Therefore this is an impact. This impact is long term, site specific and low in magnitude. Total impact value is: 80 which is less than 100 (Table 7). This, this impact is also low.

B. Mitigation

This stage will include the mitigation actions and procedures related to the acquisition of land on lease or permanently for construction and operation activities of the proposed project. The mitigation measures concerning the main impacts are as follows:

1. Permanent Land Acquisition

The project will not require the relocation of houses and cow sheds. However, 5.2 ha. of the land will be required to acquire permanently and 1 Ha. of land will be required to acquire temporarily. Due to the acquisition of land 34 houses will be affected directly. However, relocation of households is not necessary in this project.

The possible mitigation measures for these impacts are:

1. Ensure reasonable and fair compensation for affected families for their loss of property, existing livelihood and other temporarily construction related disturbances for other affected families.

2. The adversely affected households in the project area have required for reasonable compensation for their property to be forgone. The compensation cost is estimated in Table 5.

3. Avoid the construction activities in the cultivated land during cultivation. If construction will start during the cultivation, fair compensation for the lost croup shall be provided.

4. Information regarding the compensation scheme shall be disseminated to the person affected by the project. The compensation scheme should clearly spell out the rights and obligations.

Table 5: Compensation Cost Estimated by Community Consensus Valuation Method

S. No.	Items	Area (Ha.)	Rate (NRs.)	Total
1	Khet	4.0	1,000,000	4,000,000
2	Bari	0.8	800,000	640,000
3	Kharbari	0.3	600,000	180,000
Total		3.15	-	4,820,000

Source:- Field Survey, 2007.

5.1.2 Construction Phase

A. Impacts

1. Loss of Land and Agricultural Production

The proposed project requires permanent land for the project structures and facilities (Approx. 5.2 ha land). Besides permanent structures, approximately 1 ha. of land will also be required for temporary facilities such as contractor's camp area, concrete batching plant area and storage area etc. Acquisition of 5.2 ha of land permanently, agricultural productivity will reduce.

Paddy, wheat, and maize are the main crops grown in these lands. Maize is cultivated in some plots after harvesting wheat. Based on the current yield rate, the total crop production in this land was estimated as paddy 6.0 mt./ha, wheat 2.0 mt/ha. and maize 1 mt./ha. At this productivity rate, approximately 35 mt. of food grain would be lose from the acquisition of land. However, it will lead to the nominal food deficit in this area because land will take from 34 households and this loss will be distributed in the same number of households. Thus, the impact can be considered as low, long term and local. Calculated total impact value in this case is: 90 which is less than 100 (Table 7). So, this impact is considered as low.

2. Health and Sanitation

A project of this nature brings outside labours may induce some impacts relating to health and sanitation of the local people. In the project area open defecation in the field and river areas are rare practice. However, the project area lacks proper health care facilities. The likely increase in population of the area during construction may add further pressure on local health and sanitation situation. The influx of a large population during peak construction period and local people can result in a spread of water borne diseases.

If no effective measures are taken from the beginning, it is usual that the local people are at risk for transmission of the diseases that are easily contagious by influx of labours if they are any. There is the chance of transferring the communicable diseases such as HIV/AIDS also. This impact is expected to be local, low and for the medium term in terms of duration. Thus, the total impact value of this impact is: 50 (Table 7)

which is far less than 100. Hense, this impact is considered as less severe impact.

3. Occupational and Safety Hazards

The construction of hydropower projects is machine based and a large number of equipments and vehicle such as dump truck, bulldozer, excavator, shotcrete machine, batching plant, welding machine and air compressor are required. The construction shall also continue in night hours for the timely completion of the project. Furthermore there will be frequent movement of vehicle for the supervision of works. The likely increase in construction related accidents, which would be an impact. This impact is expected to be site specific, moderate and for the short duration. Hence the total significance impact value is: 80 which is less than 100 (Table 7). Thus, the impact is not severe or low.

4. Conflict of Interest and Law and Order Situation

Due to the influx of large number of workforce from different places and different ethnic group there will be possibilities of conflict of interest between the workers and project management and among the workers and local community. Incidents have been reported from else where in Nepal where angry local people have attempted to block the progress of a project and even destroyed project structures and attacked project personnel. The likely impacts associated with the conflicts and management of law and order situation will be an impact. This impact is expected to be local, low and for the short duration. Impact value is: 40 only. Thus, the impact is less severe.

5. Encroachment on Historical and Cultural Site

The preliminary study indicates that there are some cultural and religious sites found in project area. The likely increase in the work force in the project area will increase pressure in the local historical and cultural sites, in Devighat area, and other cultural sites of project area. Thus it will be an impact. This impact is expected to be local, low and for the short duration. Impact value is: 30 only (Table 7). Thus, the impact is less severe.

6. Disturbance in Socio – Cultural Order

The communities living in the project area and its surroundings are predominantly traditional and are thus far little influenced by outside interventions. With the implementation of the project, the local communities will slowly interact with the outsider work force of different ethnic group and culture such that they undergo a process of change in terms of local values and norms. Although there will be some negative impacts in cultural fronts, the changes are also anticipate to be gradual with positive consequences in the long run. The interaction with the outsiders will lead to increase knowledge, confidence and capability of the people in many respects and local people might slowly adopt the cultural mix up. Overall this impact is expected to be site specific, low and for the short duration. Impact value is: 30 only (Table 7). Thus, the impact is less severe.

7. Gender and Vulnerable Group

Like in other parts of Nepal the women in the project area do all the housework including cooking, rearing children and looking after cattle etc. They are mostly engaged in agriculture. The acquisition of land for the construction of project will create an impact in the women population of project affected families. In addition, local labor will be hired during the construction and operation & maintenance of the project. The contractor especially the sub contractor may deploy child labor for different type of work. The use of child labor for the project construction activities will be an impact. However, this impact will be short term, site specific and low. Impact value is: 30 only (Table 7). Thus, the impact is less severe or low.

8. Pressure on Social Resources and Infrastructures

The migration of about 500 workers from out side at a time may affect on the local social resources such as forest, drinking water, school, health post, telephone facilities, etc of the project affected area. Mobilization of outside workers will increase the pressure on the forest, particularly in meeting the demand for the firewood for cooking purposes. The possible increase in pressure on these resources will be an impact. These impacts are expected to be site specific, low and for the short duration. Impact value is: 30 only (Table 7). Thus, the impact is low.

B. Mitigation

To minimize the impacts incurred during the construction period the following mitigation measures are recommended.

1. Loss of Agricultural Product

- Adequate compensation for loss and disturbance of land and other properties,
- Compensation for the injured livestock, loss of crops, loss of trees, etc.,
- Scheduling of construction operation to minimize the potential loss of agricultural product and livestock.
- Training for agricultural extension programme such as modern vegetable farming, etc.

2. Health and Sanitation

Implementation of health related programmes, both through the existing health agencies like health post as well as the contractor's side. These programmes could come largely in the form of health related extension

and education measures. People shall be educated about basic aspects of health such as drinking water, toilets, immunizations of the infants and children, nutrition, etc. Such programs and support would be important during construction period when changes are high for the outbreak of diseases from workers coming from outside.

3. Safety and Occupational Impacts

- From safety consideration, boots and helmet shall be distributed to the workers,
- Providing security and community awareness programmes for the work force,
- Providing alarm technology, sign boards etc. in different construction sites.
- Delivery of safety and health related instructions, safety awareness programmes will be implemented, erection of warning sign boards at dangerous sites,

4. Disturbances in Socio-cultural Order Due to Influx of Workers

- Local culture, values and norms will be preserved and promoted if they appear to have traditional values and norms. Local people will be made aware to conserve their culture, custom and values,
- Control of adverse social interactions between local communities and construction work force,
- Strong code of conduct shall be maintained to preserve the local culture and to avoid the disturbance from construction workers.
- Social Infrastructures
- Labour camp should not be closed to forest area,
- Using of the kerosene, as an alternative for the cooking fuel,

- Provision must be maid by the contractor for the supply of the own drinking water facilities, latrines, telephone, etc,
- Proponent should provide certain facilities to enhance the capacity of school.

6. Gender

- Promoting role of women in the new income generating activities,
- Job provision for women during the project construction activities,
- Awareness programme associated with health, sanitation and transferable diseases,
- Awareness programme for the development of micro and small enterprises.

5.1.3 Operation Phase

A. Impacts

1. Loss of Agricultural Production

Some of the highly fertile areas (approx. 5.2.0 ha), currently used for the cultivation and the production of cash croups and paddy, maize & wheat, will be lost forever due to the construction and operation of the project. The land acquisition will affect 34 households. Based on the current yield rate, the total crop production in this land was estimated at paddy 6.0 mt./ha, wheat 2.0 mt/ha. and maize 1 mt./ha. Thus due to the permanent acquisition of 5.2 ha. of land 35 mt. of food production will reduce in the project affected area. The likely reduction in agricultural production will be an impact. This impact is expected to be medium term, local and low and continued to exist for the long time. Hence the total impact value is:

50 (Table 7) which is less than 100. Thus, this impact is considered as low.

2. Downstream Water Release

The proposed project will divert 45.3 m3/s water from the Trishuli River for power generation and downstream water release will be minimum in dry period. If the operation of the project will be shut down for certain reason and or sudden increase in river discharge the water will be released from weir gate. There will be possibilities of accidents if the water will be suddenly released and this impact is more significant in dry period. This impact is expected to be long term, local and low. Hence the total impact value is: 90 (Table 7) which is less than 100. Thus, this impact is considered as low.

3. Water Uses

The diversion of 45.3 m3/s water from headrace pipe will significantly reduce the river flow during the dry period. The reduction in river flow has no impact on downstream water users because no significant downstream water uses are noted in between the wire site and tailrace outlet. The downstream water uses study was considered for irrigation canal, religious uses, water mills (Ghatta) and drinking and other water uses. Thus, this impact is considered as site specific, long term and low. Hence the total impact value is: 80 (Table 7) which is less than 100. Thus, this impact is considered as low.

4. Impact on Local Economic and Behaviour

The project generates local employment opportunity during construction phase. In addition, it will increase the possibilities of cottage and small-scale industries and development of small market centers in the project area. During the operation phase, the reduction of employment

opportunities in the construction works will also reduce the possibilities of small market centers and hence the employment opportunities will be reduced. That leads to reduce the expenditure pattern and the consumption behaviour of the local people. This is another important impact of the proposed project. This impact is expected to be regional, short term and low. Hence the total impact value is: 80 (Table 7) which is less than 100. Thus, this impact is considered as low.

B. Mitigation

During this stage following mitigation measure shall be considered:

- Strengthening local organizations to involve people in various income generating and productive activities,
- Providing support from outside in the initial stage,
- Awareness programmes to local people about the prospects and opportunities that they can exploit,
- Job opportunities to the local people shall be provided as far as possible and practicable.
- Provision of compensation for the loss of agricultural production due to the operation and maintenance activities,
- Provision of the compensation for the lost and injury of livestock,

5.2 Positive Impacts

As a part of the SIA, an assessment will be made about the likely positive impacts of the Devighat Cascade HEP. The key positive impacts identified during the SIA study are explained in the following sections. However, these impacts are not quantified because these are positive in nature and create positive affects in the society.

I. Impact on Local Economy

The employment opportunity, income from shops, house rental, increases demand for fresh vegetable, meat and rental/lease of land are the areas of income during construction period. In the vicinity of the project area there will be sudden flow of cash. The employment opportunities for the local people will increase which lead to increase the income of local people. This will further lead to the establishment of various trade centers, and the purchase of house and land. This impact is expected to be regional, low and for the short duration.

II. National Economy

The Devighat Cascade HEP is expected to have a significant positive impact on national economy. Although the country is rich in water resources but only small fraction of this enormous potential has been harnessed to date. The lack of dependable energy is having a adverse impact on the industrial as well as other sector of Nepal. The 10.2 MW supplied by Devighat Cascade HEP upon its completion will be a significant input in the country's energy starved economy. Thus, this impact is significant. This impact is high in magnitude, national and long term.

III. Rural Electrification

The project affected VDCs are not fully electrified. The availability of electricity will enhance the possibility of expansion of rural electrification, which improves the quality of life and provides better services to the area. Thus, it will be an impact. This impact is high in

magnitude, local and long term. Estimated cost for mitigation measures is given in the following Table 6.

Table 6: Total Cost for Social Impact Mitigation & Enhancement

S. N.	Items	Unit Rate	Cost (NRs.)
1	Land Acquisition Cost	Table 5	4,820,000.0
2	Job and Other Relevant Training	LS	400,000.0
3	Cost for Awareness Training	LS	200,000.0
4	Assist to Maintain Social Infrastructures	LS	500,000.0
Total			5,920,000.0

Table 7: Socio-economic and Cultural Environment Impact Matrix

Pre-Construction Phase			Magnitude			Extent			Duration			Total Prioritized Value	Importance of Impacts			Significance of Impact
			H	M	L	R	L	S	LT	MT	ST		H	M	L	
S. No.	**Impacts**															
1	Land Acquisition	Acquisition of 5.2 ha private land			10		20		60			90			1	90
2	Effect on Households	Effect due to acquisition			10			10	60			80			1	80
Construction Phase																
1	Lose of Land and Agricultural Production	Acquisition of 5.2 ha private land and loss of productivity from that land.			10		20		60			90			1	90
2	Health and Sanitation	Possibility of transferrable diseases			10		20			20		50			1	50
3	Occupational and	Likely increase in		20				10			10	40		2		80

	Safety Hazard	construction related accidents														
4	Conflict of Interest and Law and Order Situation	Likely impact due to conflicts of interest between project and workers			10		20				10	40			1	40
5	Enchroment	Possibility of enchroment in culturally important areas			10		20				10	40			1	40
6	Disturbanc in Social Cultural Order	Likely disturbance in traditional cultural ways			10			10			10	30			1	30
7	Gender	Likely discrimination of the women and vulnerable group while hiring the workers			10			10			10	30			1	30
8	Pressure on Social Infrastructures	Likely increase pressure on local water sources,			10			10			10	30			1	30

		schools, healthposts, etc.														
Operation Phase																
1	Agriculture production	Loss of 35 Mt food grain annually			10		20			20		50			1	50
2	Wdownstream Water Use	Likely increase in accidents due to variation in flow			10		20		60			90			1	90
3	Water Uses	Impact on religious days due to reduction in flow			10			10	60			80			1	80
4	Changes in peoples behaviour	People will face difficult to manage lifestyle once the economic activities will reduce and earning drastically declined			10	60					10	80			1	80

Note: Magnitude (Weightage) Extent (Weightage) Duration (Weight) Priorization of Impacts

H = High (60) R =Regional (60) LT = Long Term (contd. to operation H = Significance value above 200

		phase) = 60	
M = Medium (20)	L = Local (20)	MT = Medium term (contd. to construction phase) = 20	M = Significance value 100-200
L = Low (10)	S = Site specific (10)	ST = Short Term (operative in pre-construction phase) = 10	L = Significance value below 100

CHAPTER -VI

SOCIAL IMPACT MANAGEMENT AND MONITORING PLAN

6.0 Introduction

In SIA studies, it is common to consider a project's mitigation plan to comprise all actions necessary to eliminate, offset or reduce potentially adverse social impacts to acceptable levels. Likewise the monitoring plan defines all actions required to ensure proper follow-up and acknowledgment of future responsibilities and costs in connection with the implementation of the mitigation measures. Present practice is that these types of plans plus environmental enhancement measures are incorporated in the Social Impact Management Plan (SIMP).

SIMP outline the mitigation, monitoring, and institutional measures to be taken during project implementation and operation to avoid or control adverse environmental impacts, and the actions needed to implement these measures. They provide a crucial link between alternative mitigation measures evaluated and described within the report, and ensuring that such measures are implemented.

A project’s SIMP has until recently been considered the final planning step in the SIA process. But the most powerful tool is to present this plan at a very early stage as they outline management actions required to effectively meet social requirements and contain technical mitigation measures, institutional arrangements, monitoring and reporting procedures and other issues of relevance. Now day it is being claimed that the SIMP is the single most important part of the SIA, and the establishment of this plan with design of mitigatory measures is being moved forward in time and priority.

6.1 SIMP For Devighat Cascade HEP

The principle objective of the Social Impact Management Plan for Devighat Cascade HEP is to formulate a framework for ensuring that all mitigation measures identified in Chapter 5 are implemented and to provide a basis for examining whether the mitigation measures are effective after implementation. In this context the SIMP refers to the project management and monitoring actions required to ensure compliance with environmental laws and to reduce or eliminate adverse impacts and enhance environmental opportunities. The SIMP should define a technical work programme, including detail of the required tasks and reports and necessary staff skills, supplies and equipment. It should furthermore include a detailed account of the estimated costs of implementing the plan, proposed staffing, schedules of participation and inputs of different agencies.

As there is uncertainty in predicting impacts and effectiveness of mitigation measures, SIMP is proposed as a plan that will be revised periodically during pre-construction, construction, operation and maintenance phases. Thus, SIMP is an "Adaptive Management" concept. The main objectives of SIMP is to implement mitigation program, monitoring plan, public concern issues and other relevant issues for smooth and environment friendly implementation of the project. The SIMP acts as a guideline for the project proponent, DOED, MOWR, MOEST and other concerned agencies. The plan specifies the agency responsible for mitigation and how it will co-ordinate with various line agencies.

The SIMP shall be developed for the following phases:

- Pre-construction Phase,
- Construction Phase, and

- Operation and Maintenance Phase

The details of the agencies to be consulted for the implementation of mitigation measures and monitoring plan shall be identified in detail in this study. However, the followings are the few relevant agencies that shall be consulted during the implementation of SIMP.

- Ministry of Water Resources, Kathmandu
- Ministry of Forest, Kathmandu
- Department of Forest, Kathmandu
- Department of Agriculture, Kathmandu
- Agriculture Development Bank, Nuwakot & Kathmandu
- Land Revenue Office, Nuwakot
- District Administration Office, Nuwakot
- District Development Committee, Nuwakot
- Affected Village Development Committees and Municipality of Nuwakot Other Concerned Agencies.

6.2 Social Environment Management Approach

During the planning and pre-construction phase the prime responsibility for the environment management is with Devighat Hydro Pvt. Ltd. (DHPL) as the proponent of the Project. DHPL may delegate the authority to the required manpower and other concerned agencies for effective and smooth implementation of SIMP. The following approach for environmental management will be adopted during different phases of the project.

I. Pre-construction Phase

A. Activities

The SIMP for pre-construction phase will include land acquisition and compensation, public concern issues and co-ordination with line agencies. The allocation of adequate budget for the implementation of preconstruction measures, follow up for contract clauses that needs to be incorporated in tender documents are the other activities to be managed or conducted during the pre construction phase. The appointed environmental experts by DHPL will have the prime responsibility for dealing with pre-construction issues.

B. Management

During this phase a price fixation committee will be formed to deal with all the compensation matters. This committee will be formed under the chairmanship of Chief District Officer. Other members are: Chief District Land Administration and Revenue Officer, Project Chief, Representative of District Development Committee as legal member, Socio-economist of the project and Representative of the affected households.

II. Construction Phase

A. Activities

This phase is the most critical as it requires expertise and resources to manage the construction phase impacts. It includes implementation of the suggested mitigation measures outlined in chapter 5 with the SIMP as a vital tool and is dependent on liaison with local people, VDCs, DDC, and other line agencies. The other programme includes baseline monitoring, compliance and impact monitoring and adequate reporting on specified schedule. The Project Company will be responsible for carrying out the requirements for mitigation and

implementing the SIMP. At his stage it is merely the control functions that can be described under the management approach.

B. Management

1. Devighat Cascade Environmental Management Unit (DCEMU)

A unit will be required to implement the day to day environment management plan or to implement the proposed mitigation measure and monitoring plan. For this purpose, Devighat Cascade Environment Unit will be formed which will consists of experts (qualified personnel) from the local market. The unit will be located under the project Director/Manager office and all the logistic facilities will be provided by the project. The cost required to setup the office will be born by the project and included in the project cost. The unit basically consists of the short-term consultant of the required field with one public relation officer on full time basis.

- This unit should consists of
- Environmental Engineer
- Ecologist/Botanist
- Socio-economist/Community Liasion Officer/Sociologist
- Field Technicians
- Public Relation Officer

The full time public relation officer of DCEMU will be in close co-ordination with VDC, DDC, local people and contractors. He is responsible to inform the mitigation measures and management programme to the local and the line agencies and will handle the day-to-day official work related with the environmental concerns of the project under the supervision of Project Manager.

The short-term consultant will be hired through the construction period especially for monitoring. They will be work under the DCEMU and report to the Project Manager.

2. Project Manager/Director

Project Manager will have the prime responsibility for the implementation of the mitigation measures and monitoring plan of the project. The project manager may delegate this responsibility to the experts of the concerned fields but ultimate authority must rest in Project Manager's hand as construction activities and logistic will closely linked to mitigation efforts.

3. Construction Contractor

The construction contractor will be responsible for implementation of mitigation measures specified in the part of contractor and compliance with the tender clauses. The contractor will also responsible for developing Environment Protection Plan, Moke Disposal Plan, Waste Management Plan and Health and Safety Plan. The contractor will also responsible for compliance and impact monitoring and for preparing contractors quarterly environmental report and submit to Project Manager via environmental unit of the project.

4. Line Agencies

The line agencies will work in close co-ordination and supervision of the project Environment Unit and Project Manager. Beside this central level line agency such as MOWR, and DOED have responsibility for monitoring of project activities.

5. Local VDC

Devighat Cascade Environment Management Unit of the project company will work on close co-ordination with local VDCs, municipality for the implementation of community based program like agriculture, training and monitoring of community issues. The local VDCs may assign for monitoring of some impacts such as alcohol gambling, price inflation and effectiveness of mitigation measures.

III. Operation Phase

A. Activities

The operation and maintenance phase activities include operation of the power plant, regular maintenance, safety issues, and issues of compensation release, water quality, forest cover, etc.

B. Management

The environment unit will be worked in association with the Project Manager for monitoring during the operation phase. This unit will have required experts from local market. Regular monitoring will be done for parameter like compensation release, water quality and forest cover etc.

6.3 Reporting Requirements

The Devighat Cascade Environmental Management Unit will prepare and disseminate a report containing information on the implementation status of the environmental protection measures and monitoring results quarterly during the construction period and annually during the operation phase. The Unit will also prepare and disseminate the environmental compliance report annually and

make it public in order to provide the people and concerned organizations, an opportunity to evaluate the environmental soundness of the project.

6.4 Social Environment Management Cost

The total social impact management cost for the proposed project is NRs. 6,188,000.0. This cost is estimated for the 4 years (pre-construction, construction and operation phase) period and include the mitigation and monitoring cost. The cost breakdown is shown in the Table 8.

Table 8: Environment Management Cost

S. N.	Items	Reference	Cost (NRs.)
1	Mitigation Cost	From Table 6	5,920,000.0
2	Monitoring Cost	From Table 9	968,000.0
Total			6,188,000.0

6.5 Monitoring

This section discusses and outlines the social environmental monitoring programs likely to be associated with the implementation of the environment management program for the Devighat Cascade Hydroelectric Project. It also assists to ensure compliance with environmental laws and in ameliorating and eliminating the adverse impacts. A monitoring plan will be required to ensure the follow up of the mitigation plan.

This section describes briefly the monitoring programmes likely to be associated with implementation of the social impact management program for the Devighat Cascade Hydropower Project.

I. Requirements for Monitoring

Monitoring is needed to assess the actual effects and ensure compliance of the implementation measures during project construction and operation. Identification or quantification of the degree of impacts on the existing social environment by developmental activities enables to adapt appropriate mitigation measures whereby it would be possible to reduce or minimize such detrimental effects on the social environment and human life. Social Environmental Monitoring Plan will be required which defines the responsibilities for the monitoring, the parameters that will be monitored, where the monitoring will take place and its frequency. The monitoring plans are prepared directly by, or on behalf of the licensee, during the detailed design phase.

II. Social Environment Monitoring Priorities

A monitoring programme is therefore required for the project to evaluate the application and effectiveness of mitigation measures in three phases.

A. Baseline Monitoring

The primary concern during this phase will be to implement field data collection programs needed to enhance the knowledge of baseline conditions; such as the gathering of scientific and sociological information needed to finalize the design and cost of the mitigation measures.

- Priorities in regard to baseline monitoring include:
- Survey and documentation of existing agriculture practices,
- Land Development,
- Land compensation,
- Socio-economic parameters.

B. Compliance Monitoring

1. Construction Phase

In this monitoring the GoN licensing entity oversees and ensures the implementation of the required mitigation measures, according to GoN guidelines and approved mitigation plan.

In this monitoring, it will be necessary to confirm that all procedures regarding land acquisition and compensation have been properly set out and followed, and that the construction mitigation plan is in place. For the purpose of compliance monitoring, bi-monthly monitoring reports will be required and incorporated in an annual monitoring report. The report will provide the basis for assessing the compliance with both GoN regulations, and the mitigation management plans by all parties.

Priorities in this regard for physical, biological and socio-economic and cultural environment will include:

Verification that land, property and crop and livestock disturbance compensation valuations have been completed prior to construction,

- Environment Protection Plans (EPP),
- Health and Safety Plans (HSP),
- Restoration and Renegotiation Plan (RRP),

Verification that all necessary activities regarding the job opportunities, giving priority to the PAFs, have been completed prior to construction and hiring.

2. Operation Phase

Similar to the construction phase monitoring there will be physical, biological and socio-economic and cultural environment impact monitoring. The

compliance monitoring will focus on determining that the prescribed mitigation and enhancement measures are being carried out.

C. Impact Monitoring

1. Construction Phase

The impact monitoring will focus on key indicators to assess whether the impacts have been accurately predicted, and whether the mitigation measures are sufficient and effective. The monitoring of the Upper Devighat Cascade Hydropower Project will include:

- Employment monitoring,
- The economic status of the affected people and relocated people,
- Adaptation of resettlement households to their new homes and communities,
- Public safety and security monitoring,
- Health and sanitation monitoring,
- Compensation.

The impact monitoring will again focus on the key indicators to assess whether the impacts have been accurately predicted and whether the mitigation measures are sufficient and effective. The full environmental management program will be elaborated during the detailed design phase of the project, reflecting the final design and alignment considerations.

2. Operation Phase

The impact monitoring like that in construction phase focus on key indicators to assess whether the impacts have been accurately predicted and whether the mitigation measures are sufficient and effective. The main parameters for measurement will likely include:

- Minimum release of the river flow,

- Economic status of the affected people,
- Quality of potable water supply to worker colony and affected villages,
- Reconnaissance forest and land use change monitoring,
- Illegal hunting, trapping and tree felling monitoring,
- Public safety and security monitoring,
- Health and sanitation monitoring.

The full environmental management program will be elaborated during the detailed design phase of the project, reflecting the final design and alignment consideration.

III. Agencies Responsible for Environmental Monitoring

The project proponent will be responsible for the monitoring activities. However, agencies like the Ministry of Environment, Science and Technology (MoEST), Ministry of Water Resources (MoWR), Department of Electricity Development (DoED), Ministry of Forest and Soil Conservation (MFSC) and other relevant agencies will be consulted during the monitoring.

IV. Monitoring Location, Method and Schedule

Social environmental monitoring will be carried out at the project headwork's, powerhouse, open cannel etc. Monitoring will be carried out regularly or intermittently. Compliance monitoring will be done regularly whereas the impact monitoring will be done at the middle and at the end of construction phase. In general methods such as observation, inspection, review of official records, interview, counting and or measurement will be used for monitoring.

V. Manpower Requirement and Cost for Monitoring

To conduct the above mentioned monitoring activities, an institutional set-up will be required. The concerned ministry will be responsible for the monitoring task as prescribed by the national EIA guidelines. The following professionals will be required for the monitoring task.

- Socio-economist
- Surveyers.

The lump sum monitoring cost for the monitoring activities has been estimated as NRs. 968,000. The break down of the cost is given in the Table 9.

Table 9: Social Environment Monitoring Cost

Manpower requirement	Duration (Man months)	Rate (NRs)	Amount (NRs)
Socio-Economist/ Team Leader	5	40,000	200,000
Field Assistance	2	15,000	30,000
Monitoring Cost - Baseline Monitoring - Compliance Monitoring - Impact Monitoring	Lump Sum	 100,000 200,000 200,000	 100,000 200,000 200,000
Transportation	Lump Sum	100,000	100,000
Report Preparation	Lump Sum	50,000	50,000
Total			880,000
10% Contingency			88,000
Grand Total			968,000

CHAPTER–VII

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.0 Introduction

This chapter sums up the findings and conclusions of the Environmental Team responsible for the Environmental Impact Assessment Study of the Devighat Cascade Hydroelectric Project. An overall assessment is provided first, followed by sections giving specific conclusions and recommendations.

7.1 Summary

For a project of 10.2 MW capacities the environmental issues identified during the EIA Study are exceptionally unproblematic. The impacts are not much significant, and can generally be mitigated. There are enhancement and risk reduction opportunities to be reaped on behalf of the local communities, which will experience strong rural development activities.

Wherever possible, efforts have been made by the project planning team to limit negative impacts on the environment by selecting environmentally benign design options and otherwise suggesting appropriate mitigation measures. Apart from the considerable economic benefits that would arise from power generation by the anticipated project, it will also generate direct economic benefits to GoN and the District from royalties and revenues. Other direct benefits of the project will be regional development, employment of local people, rural electrification and general improvement of infrastructures and services in the project impact area.

From a purely environmental perspective, none of the identified impacts have been classified as serious enough to prevent the implementation of this Devighat Cascade HEP. From a socio-economic point of view, the project may

be seen as a unique regional development opportunity. On this general basis the EIA team can, from its perspective, recommend that the Devighat Cascade HEP be implemented provided the identified mitigation measures and Environmental Management Plan are implemented.

7.2 Conclusions

In terms of the loss of land and assets, 34 households will be affected due to the implementation of the project. None of the families are seriously project affected and relocates.

About 5.2 ha of agricultural land will be affected by the project, suggesting that there will be a loss of some yield from permanently acquired land.

The total cost for implementing the Environmental Management Plan is estimated to be NRs 6,188,000.0 This cost includes mitigation and enhancement cost, and monitoring cost.

7.3 Recommendations

1. Permanent Land Acquisition: Project proponent should acquire the land before the construction of project with reasonable and fair compensation for affected families for their loss of property, existing livelihood and other.
2. Loss of Land and Agriculture Production: Project proponent should provide adequate compensation for loss and disturbance of land and other properties, compensation for the injured livestock, loss of crops, loss of trees, etc.
3. Occupational and Safety Hazards: Project proponent and construction contractors should implement health related programmes, both through the existing health agencies like health post as well as the health camp or project managed health centre.

These programmes could come largely in the form of health related extension and education measures.

4. Conflicts of Interest/ Law and Order Situation: Strong code of conduct should be developed and maintained by the project proponent and contractors to maintain the law and order situation and to avoid the conflict between the local people and construction workers.
5. Encroachment on Historical and Cultural Sites: To avoid the undue encroachment by the construction workers at the historically and culturally important places, the construction contractors and the project proponent should give sufficient training for their workers and maintain the required legal system.
6. Disturbance in Socio-cultural Order: Strong code of conduct should be maintained to preserve the socio-culture and to avoid the disturbance from construction workers.
7. Acquisition, Compensation and Rehabilitation Plan (ACRP): A detailed ACRP is required at the Detailed Design stage for a number of reasons, but primarily because the project configuration and engineering parameters may be changed or adjusted during Detailed Design, such as the selection of construction techniques and construction schedules.

8. Tender Document: The mitigation measures recommended should be incorporated in the Tender Documents for civil works thus providing the Environment and Social Mitigation/Enhancement requirements for the Contractors to consider in his bid and follow during construction and operation.

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ANNEXES

Annex 1: List of Contacted Persons during Field Survey

1. Khadga Bahadur Bogate LDO,	District Development Committee
2. Madhab Bhattrai	Engineer, District Technical Office
3. Ram Prasad Nepal	Overseer, District Technical Office
4. Krishna Kumar NirulaOfficer,	Bidur Municipality
5. Sita Ram Adhikari	DEO, District Education Office
6. Suk Dev Ram	Senior Amin, District Survey Office
7. Buddhi Shrestha	Amin, District Survey Office
8. Tuna Bahadur Shrestha	Head Assistant, District Land Revenue Office

ANNEX-II

Questionnaire for Social Impact Assessment (SIA) Study

All the family information in this questionnaire is confidential and cumulative information is published according to stastistics act 2015.

1. Project area related general information

a. Zone
b. District
c. V.D.C / Municipality
d. Ward no.
e. Village/total
f. Project area

2. Family related information

2.1 a. Owner name

b. Sex [1] [2]

c. Religion [1] [2] [3] [4] [5]

d. Caste …….

2.2 Since how long your family has been residing here

a. Local inhabitants
b. Migrated
(within one year):
five year:
five year and above.

2.3 Types of family

a. Single family (Separated from joint family)
b. Joint family:

2.4 Information about non separated family members (house owner)

S.N	Male2	age	Education3	Profession4	Skill/ Training5	If more than 6 months away from the home			Remarks
1						time	Reason6	place	
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

Note: Fill the chart according to code.

3. Agriculture and livestock

3.1 Agriculture

3.1.1 Do you have any upland or grass land?

Yes	No

3.1.2 If you have land mentioned in ropani

Ownership	Low land	Upland	Kharbari	*Remarks(fifty fifty, kuth, Contract, others)*
Owned				
Rented in				
Rented out				
Total				

3.1.3 What are your main crops in your lowland / upland and what is your income?

Crops 1	Cultivated land (Ropani)		Production (Muri/ Quintal) 4	Price -Rs/Unit 5	Total income -Rs_ 6
	Upland 2	Lowland 3			

Cereal crops	Paddy					
	Wheat					
	Maize					
	Millet					
	Pulses legumes					
	Others					
	Total					
Cash crops Rs	Potato					
	Mustard					
	Sugarcane					
	Vegetables					
	Others					
	Total					

3.1.4 If your own production in the previous year sufficient for your family. Yes NO

3.1.5 If not sufficient then how many months it is insufficient. ……..months.

3.1.6 If your own production is defecit then how will you feed to your family ?

1. credit
2.Daily wages
3. selling house goods
4. eating wild substances
5. Carrrying others goods
6.others----------

3.1.7 Do your have any fruit tree in your house

1. Yes
2. No

3.1.8 If you have any give details

S.N	Fruit tree		Previous year production		
	Name	Number	Amount (Number)	Price (Rs/Piece)	Total Rupes (Rs)
1.	Mandarin (orange)				

2.	Lime				
3.	Mango				
4.	Guava				
5.	Banana				
6.	Others 1...				
	2..				
Total					

3.2 Animal_Husbandary

3.2.1 Do you have any cattle?

1. Yes 2. No

If yes give the following description

S.N	Types of animal	No.	Milk/Egg production			Animal/birds sale *			Yearly income Animal/birds Rs. (a +b)
			Amount Mana /piece /year	Price (Rs + /unit)	Total price Rs (+a)	Amount piece /year	Price (Rs./unit)	Total price RS (+b)	
1. Cattle	a. Cow								
	b. Milking cow								
	c. Ox								
2.Buffalow	a. Buffalow								
	b. Buffalow (milking)								
	c. He-buffalow								
3	Ram, Female goat, goat, Castrated goat								

4	Pig								
5	Poultry/duck								

4. Income and expenditure description

4.1 Expenditure

Please give the expenditure of your house on following food items

S.N	Description	Unit	Amount	Price Rs	Price
1	Rice				
2	Pulses				
3	Maize				
4	Vegetables				
5	Milk/Curd				
6	Fish/Meat				
7	Oil/ghee				
8	Species				
9	Salt				
10	Sugar				
11	Tea				
12	Firewood				
13	Electricity				
14	Kerosene				
15	Medicine (year round)				
16	Education (year round)				
17	Clothes (year round)				
18	Others 1…..				
	2……				
	Total				

4.2 Income

Enlisted your previous year income and income sources

S.N	**Description**	Annual income (Rs)	Remarks
1	Agriculture		
1.1	Cereals		Taken from 3.1.3
1.2	Sash crops		Taken from 3.1.3
1.3	Fruits		Taken from 3.1.8
2	Livestock		Taken from 3.2.2
3.	Other sourses		
A	service		
B	Labour, daily wage		
C	Pension		
D	Foreign employment		
E	Business/ enterprise		
F	Cottage industry		
G	Professional service		
H	Fish killing		
I	others		
	Total		

5. Energy and supply of water

5.1 Where is the source of the drinking water?

a. river/ stream
b. well
c. supply water from pipe
d. others

5.2 What is the light source at night in your home?
a. kerosene
b. mustard oil
c. electricity
d. others

5.3 What is the material used for cooking food.
a. firewood
b. kerosene
c. dried cow dung
d. straw, maize stalk etc
e. electricity
f. others

5.4 What is the source of your firewood for burning in house?
a. Government forest
b. Private forest
c. Bazzar
e. Community forestry
f. others.

5.5 Is electricity available in your village? Yes No

If not available do you want electricity in your home?

Yes No

5.6 If electricity is available in your home in what purpose you will use..
a. Light
b.cooking
c. Industry
e. others

5.7 How much do you want to pay for electricity on monthly basis?
a. Rs 80.00
b. Rs 300.00
c. Rs 600.00
d. >600.00

6.0 Health

6.1 Any member of your family becomes ill in previous year ?

Yes No

6.2 if you became ill what type of curing methods did you employ ? Give descriptions

S.N	Types of diseases	Curing methods
1		

2		
3		
4		
5		

7. what is the affect from the project ?

7.1 land /plot

7.1.1 Give the descripton of your affected land due to the implementation of the project?.

S.N	Plot No.	Project place	Name of the place	V.D.C (Ward No.)	Area ropani and price Rs thousand					
					Upland	Price	upland	Price	Grass land	Price
1										
2										
3										
4										
5										

(Note. Price of land should be of current rate)

8. Compensation of the land

8.1 what do you want in place of land compensation

a. Cash b. Land for land

c. house for house d. others

9.

About project

9.1 Do you have any information about the proje Yes No

9.2 If yes what do you want from this project ?

a. Receiving of good Land compensation b. employment opportunity

c. achieving of electricity facility d. development of local area

e. others ……..

10. Generally who will be the decision maker of the activities mentioned below?

S.N	Activities	Male/female
1	Agriculture	
2	Education	
3	Buying	
4	Child care	
5	Community development activities	
6	Income generating activities	
7	Health, sanitation	
8	Lending borrowing	
9	Social activities	
10	Others……..	

11. Do you have any involvement in government, NGO's and other institution in the ward, V.D.C level? If yes

Name of institution establishment Work /objective implementation methodology Implementation No.

_____ ____ _____ _____ _____

_____ ____ _____ _____ _____

_____ ____ _____ _____ _____

_____ ____ _____ _____ _____

12. What are the effects by the external people on the implementation of projects?

1. Positive side
2. Negative side

13. What are the popular price system, interest rate, labour wage and other systems in this area?

Receiver of interview:

Place:

Date:

Name of interviewer:

Position:

Date:

Annex- III

Participants of the Meeting

S. No.	Name	Address	Occupation
1	Netra Prasad Rimal	Khadgabhanjyang VDC Ward No. 4.	Farmer
2	Rishi Prasad Rimal	Khadgabhanjyang VDC Ward No. 4.	Farmer
3	Bhim Kumari Rimal	Khadgabhanjyang VDC Ward No. 4.	Farmer
4	Bishnu Kumari Rimal	Khadgabhanjyang VDC Ward No. 4.	Farmer
5	Ram Babu Rimal	Khadgabhanjyang VDC Ward No. 4.	Farmer
6	Bishnu Hari Rimal	Khadgabhanjyang VDC Ward No. 4.	Farmer
7	Krishna Prasad Rimal	Khadgabhanjyang VDC Ward No. 4.	Farmer
8	Somanth Rimal	Khadgabhanjyang VDC Ward No. 4.	Student
9	Radhika Rimal	Khadgabhanjyang VDC Ward No. 4.	Student
10	Ganga Rimal	Khadgabhanjyang VDC Ward No. 4.	Student
11	Laxmi Rimal	Khadgabhanjyang VDC Ward No. 4.	Student
12	Sarashwoti Rimal	Khadgabhanjyang VDC Ward No. 4.	Farmer
13	Krishna Kumari Rimal	Khadgabhanjyang VDC Ward No. 4.	Farmer
14	Ganga Devi Rimal	Khadgabhanjyang VDC Ward No. 4.	Farmer

Annex IV
Checklist for Social Impact Assessment (SIA) Study

1. Description of place
District: _____ V.D.C:_____

Municipality_____ Ward No._____

Name of village/place_____ Date._____

2. Description of population
a. Total household number
b. Polpulation
3 Education details:

Level of school	school No.	Teacher No.			Student No.		
		Total	Male	Female	Total	Boys	Girl
Primary (1-5)							
Secondary (6-8)							
High school (9-10)							
10+2							
College							
Total							

4. Health related description
a Major diseases of this V.D.C
1. _____ 2._____

3._____ 4._____

b. Treatment technique
1. _____ 2._____

3._____ 4._____

5. Drinking water and energy supply

a. Source of drinking water

1. _____ 2._____

3._____ 4._____

b. Source of energy

1. _____ 2._____

3._____ 4._____

6. Economic description

General one family have how many land

Irrigated low land	_____
Non irrigated low land	_____
Grass land	_____
Upland/Bari	_____
Lalpurza	_____
No lalpurza	_____

Productivity

Crop	Production/Ropani
Paddy	_____
Maize	_____
Wheat	_____
Millet	_____
Potato	_____
Pulses/Legumes	_____

Annual income of the family

Level	No. of family	Percentage
12,000	_____	_____
12,000 to 50,000	_____	_____
50,000 or above	_____	_____

a. Availability of the produced food House family (percentage)

upto 12 months ……
6-9 months availability ……...
3-6 month availability ……
less than 3 month availability ……

b. name of Village level bazzar

1. _____ 2._____

3._____ 4._____

c. Major income source of local people.
1. Agriculture and live stock
2. service,
3. Daily wage
4. Pension
5. Business
6. Cottage industry
7. Professional service
8. Fish killing
9. Others

7. Describe the temples, archaeological sites etc in this V.D.C.

Name	Name	Name
==========	==========	==========
==========	==========	==========
==========	==========	==========

8. Describtion of the implemented projects in your V.D.C 's

Project Name	Implemented agency
_____	_____
_____	_____

9. Give the details of the Non Governmental Organization in your V.D.C

Name of institution **Work of the institution** **Staff**

_____ _____ ____
_____ _____ ____

_____ _____ ____

_____ _____ ____

_____ _____ ____

_____ _____ ____

Give the description of the public offices, institution of your V.D.C

S.N	Types	Total Number	Place	Ward No.
1	Hospital, Health post			
2	Post office			
3	Police office			
4	Telephone office			
5	Forestry office			
6	Irrigation office			
7	Agriculture service center			
8	Veterinary Hospital			
9	Drinking water office			
10	Bank			
11	Others (specify)			

11. Other details :

Price of Agricultural and Other Commodities

1. Land — Price /per ropani/ Beegha

Irrigated upland	_____
Non Irrigated upland	_____
Grass land	_____
Upland/ upland non terraced	_____

2. Cereals	Kg/Dozen	Price (per Kg)	3.Fruits	Price	(per Kg/dozen)
Rice		_____	Mandarin		_____
Wheat		_____	Lime /Lemon		_____
Maize		_____	Peach		_____
Millet		_____	Pear		_____
Barley		_____	Guava		_____
Pulses		_____	Jack frit		_____
Potato		_____	Banana		_____
Moong		_____	Papaya		_____
Black		_____	Mango		_____
Gahat		_____	Others		_____
Mustard		_____			
Others		_____			

4. Other products	Price (per liter/mana)	5. Meat	Price (per Kg)
		Fowl	_____
Curd	_____	Castrated goat	_____
Ghee'	_____	He-buffalow	_____
Oil	_____	Pig	_____
		Fish	_____

6. Construction material cost used in house construction

Wood	_____
Brick	_____
Cement	_____
Bamboo	_____
Iron rod	_____
Stone	_____

7. Daily wage labour (per day) — Wages — Food — Total

Agricultural Labour (Male)	_____	_____	_____
Agricultural Labour (Female)	_____	_____	_____
Child Labour	_____	_____	_____
Carpenter	_____	_____	_____
Manson	_____	_____	_____
Other	_____	_____	_____