Initial Environmental Examination – Main Report

Project No. 41155-013
April 2016

NEP: Electricity Transmission Expansion and Supply Improvement Project

Main Report – Chapter 3-4

Prepared by Nepal Electricity Authority for the Asian Development Bank.

3 STUDY METHODOLOGY

The IEE process follows the Environment Protection Rules 1997, and its amendments 2009 (2065/11/26) and National EIA Guidelines 1993. This IEE report is prepared in accordance with the legal requirements of GoN, based on approved ToR (Appendix-H), field study, consultation with local people/stakeholders and officials.

3.1 Desk Study and Literature Review

Review of IEE reports of similar types of hydropower projects, district level annual reports, and other pertinent literatures was done. Topographical and land use maps of the area including the Google Earth map were studied for field study. The major reports consulted are: Districts profile of Ramechhap, Dolakha, Sindhupalchowk, Kavrepalanchowk, Bhaktapur and Kathmandu districts published by the District Development Committees; National Population and Housing Census 2011, published by Central Bureau of Statistics, GoN; Village Development Committee Profiles; Feasibility Report of Tamakoshi-Kathmandu 400 kV TL and Survey Report. On the basis of the reviewed information regarding the project areas, data gaps were identified and the methodology described in this chapter was developed to collect other relevant information required for the IEE. All the issues highlighted in ToR document were given emphasis during the IEE.

Information on climate, geology and hydrology were taken from the Feasibility Report prepared for this project. Review of topographical map and land use map was done to identify the land use patterns of the area. The details of different topographical maps used during the study period are given in following table.

Table 3-1: Details of Topographic Maps of Project Area

S.No.	Name of Topographic Sheet	Sheet No.	Scale
1	Barhabise	2785-04	1:50,000
2	Dadapakhar	2785-02	1:50,000
3	Dolalghat	2785-06A	1:25,000
4	Banepa	2785-07A	1:25,000
5	Bhaktapur	2785-04A	1:25,000
6	Manthali	2786-09A	1:25,000
7	Melun	2786-05C	1:25,000
8	Charikot	2786-05A	1:25,000

The general information of the forest area, types and community forest of the district was collected by review of publication of District Forest Office of. Socio-economic and cultural data, such as population of project district and VDCs, households size, male-female ratio, infrastructures, ethnicity, religion etc. were derived from Population and Housing Census, 2011. District Profile of Ramechhap, Dolakha, Sindhupalchowk, Kavrepalanchowk, Bhaktapur and Kathmandu district and profiles of the affected VDCs were reviewed for the required socio-economic data.

On the basis of the reviewed information with respect to the project, data gaps were identified and the methodology described in following sections of this chapter was developed to collect other relevant information required for IEE study.

While carrying out the IEE, literature, review on topographic maps, land use maps, CBS publications, project technical reports and other TL project related environmental reports have been extensively carried out.

The following documents which were considered to be relevant for the study were reviewed:

- 1:25,000 scale topographical maps prepared by the Department of Survey, GoN.
- 1:100000 scale district map of Ramechhap, Dolakha, Sindhupalchowk, Kavrepalanchowk, Kathmandu and Bhaktapur Districts
- Detail Survey Report of Khimti-Barhabise 400 kV TL project and Barhabise-Kathmandu 400 kV TL project prepared by Engineering Service Directorate, Project Development Department, NEA
- IEE Report of Koshi Corridor 400 kV TL, Chilime-Trishuli 220 kV TL and Samundratar-Trishuli 132 kV TL projects.
- ToR of Tamakoshi-Kathmandu 400 kV TL project.
- Regional Geological Maps and previous geological reports of the Nepal.
- Population Census, Central Bureau of Statistics, GoN/ Nepal, 2011.
- District Profile of Affected District, District Information Centre.
- Demographic Profile of Nepal 2013/14.
- Profiles of Concerned VDCs and Municipalities.
- Forest Act, 2049, and Forest Regulation, 2051
- Guidelines for Community Forestry Development Program, 2009
- Google Earth, the online software for verifying the TL alignment.

On the basis of the reviewed information with respect to the project, data gaps were identified and the methodology described in following sections of this chapter was developed to collect other relevant information required for IEE study.

3.2 Data Requirement, Collection Methods and Analysis

A team of experts specialized in engineering, forestry, and socioeconomics visited the project area in April and August 2015, to collect baseline information of the area, identify the likely impacts of the proposed project during construction and operation phases and inform stakeholders regarding the project. During this visit, the team visited the project site proposed for structures and facilities as well as settlements of the affected VDCs and collected required data on physical, biological and socioeconomic and cultural environment of the area. Topographical maps were referred for site investigations. The study team observed various assets and took GPS location point references and photographs to establish the baseline. The team also visited relevant government offices of the affected district to interact with concerned officials and collect necessary information and their concerns.

The study team has adopted a participatory approach with maximum involvement of different stakeholders of the project at the local and district levels to generate relevant information for the IEE. The study team has maintained a close contact with the district level government relevant line agencies, VDC level key stakeholders and other stakeholders while conducting fieldwork for the IEE.

has been collected through observation by subject expert during site visit. Geographic and geological data, such as topography, rock type and soil type, stability of the Angle Tower locations, soil erosion and other key environmental features were investigated and obtained from the Regional Geological Maps and previous geological reports of the Nepal and by general observation. Physical settings, land-use pattern and significant crossings were adopted from topographical maps and detail plan and profile of the alignment.

The type of land use and area calculation has been prepared with reference to the topographical maps, survey report provided by the Survey Department with field verifications. The obtained data of land-use pattern, river system and significant crossings along the alignment from the review of the topographical maps and plan and profile of the alignment has further been verified at site. Similarly, the numbers of structures under RoW, at substations area and near angle points were determined with the help of the plan and profile of the Final Survey Report with verifications at site. During the field visit the data on occurrences of slides and other information related to the physical environment were gathered by observation, group discussion and inquiring the local people.

3.2.1.5 Data Analysis

The collected data from the field visit was analyzed using different softwares like ArcGIS 10.2.1, AutoCAD, Google Earth by the study team in coordination with the project engineers and experts. Necessary maps and information thus generated were presented in the report. The beneficial and adverse impacts have been predicted and appropriate mitigation measures proposed to reduce the impacts.

3.2.2 Biological Environment

Following methodology was adopted to collect data on biological environment of the proposed project:

3.2.2.1 Desk Review

Secondary information was reviewed from the Community Forestry Monitoring and Annual Progress Reports of Kathmandu, Bhaktapur, Kavrepalanchowk, Sindhupalchowk and Dolakha DFOs; Management Information System (MIS) data base of Community Forestry Division of Department of Forest (DoF), Forest and Vegetation Types of Nepal published by Tree Improvement and Silviculture Component of DoF, Forest Resource Inventory Guidelines, 2061, Forest Act and Rules, Government Tree Cutting Procedures, 2071. Meeting was also held with concerned officials in the Ministry of Forest and Soil Conservation (MoFSC), DoF, DFO of Bhaktapur, Kathmandu, Kavrepalanchowk, Sindhupalchowk and Dolakha districts.

3.2.2.2 Field Survey

Half day orientation training was organized to brief about the inventory process, necessary formats, use of GPS for identification of angle point (AP) and transmission line (TL) alignment to the concerned DFO staff and CFUG before conducting field survey. AP and TL alignment passing through the forest have been identified with the support of Environment and Social Safeguard Department (ESSD) team of Nepal Electricity Authority (NEA) using GPS, Technical Survey Report, topographical sheets (maps) of 1:25,000 and 1:50,000 scale of Department of Survey. Field survey was organized simultaneously in all Ilaka Forest Offices within the District starting from 12 to 31 August 2015.

Figure 3.1: Measurement of tree under TL in Sindhupalchowk district

Figure 3.2: Tree counting under TL in Kathmandu

Total enumeration in each angle point (15mx15m) and under TL passing from the forest (46 m RoW) was done to assess the number and types of plants likely to be affected by the project. This has been done by the concerned District Forest Office (DFO) staff and community forest users group (CFUG) representative to involve them from the very beginning of the tree counting and cutting process. Field survey was done by forming a team at Ilaka Forest Office comprising of two forest guards (FG), one CFUG representative headed by Assistant Forest Officer (AFO). In addition, the proposed alignment and substation were visited by the Environmental and Forestry Specialist and ESSD team to collect baseline information and for impact prediction.

Forest survey was conducted in each AP and TL alignment to count each tree, pole and regeneration, measure height and diameter at breast height (dbh) for tree and pole and number each tree with enamel painting. Regenerations were counted below 5" dbh and number of each species was recorded. Aspect, slope, forest condition, canopy cover and forest type and name of the forest were also recorded. Non timber forest products (NTFPs) and medicinal plants were also counted and recorded.

Figure 3.3: DBH measurement &tree numbering in Kavrepalanchowk

According to Forest Rules, 1995, trees having more than 11" diameter at breast height (dbh) are referred as tree and species having girth below 11" and above 5" are referred as pole and below 5" are regeneration which were not measured only counted. Trees are also classified in

three classes based on their quality. Class 1 trees are green, dead or dying, standing or fallen with solid stem and without scar or disease, class 2 trees are green, dead or dying, standing or fallen with partly decayed from inside having 6' long two logs or one 10' long log and class 3 trees are those which don't fall in class 1 or 2.

3.2.2.3 Interaction with Community Forest User Group

During tree counting, representative from concerned CFUG has been involved and a letter of consent for the implementation of the proposed project through community forest has been obtained as given in Appendix-G. Similarly, meetings, interviews and discussions were held with the members of CFUG and local peoples to collect information on the availability of flora and fauna, dependency of local people on forest resources, availability of Non-Timber Forest Products etc.

Figure 3.4: Interaction with CFUG of Sindhupalchowk

3.2.2.4 Wildlife, Birds and Fishes

Information on wildlife, birds and fishes was collected through observation and consultation with local resource persons. During the field visit, indirect evidence such as droppings, pug marks, foot prints and scales of the animals were collected for identification purposes.

3.2.2.5 Data Analysis

Timber volume in cubic feet (cft) and fuel wood in chatta (20'x10'x5') was calculated using following formula according to Community Forestry Resource Inventory Guidelines:

Category	Timber (cft)	Fuel wood in chatta (20'x10'x5')
Class 1	$\frac{\pi d^2 \text{x height x form factor x } 2}{4 \text{ x } 3 \text{ x } 144}$	$\frac{\pi d^2 \text{x height x form factor x } 1}{4 \text{ x } 3 \text{ x } 144 \text{ x } 1000}$
Class 2	$\frac{\pi d^2 \text{x height x form factor x } 1}{4 \text{ x } 2 \text{ x } 144}$	$\frac{\pi d^2 \text{x height x form factor x } 1}{4 \text{ x } 2 \text{ x } 144 \text{ x } 1000}$
Class 3		$\frac{\pi d^2 \text{x height x form factor}}{4 \text{ x } 144 \text{ x } 1000}$

Note: Form factor is taken as 0.5

Based on the final data and on its analysis the impacts, both positive and negative, were identified and their magnitude predicted as well as benefit augmentation and mitigation measures were recommended.

3.2.3 Socio-economic and Cultural Environment

3.2.3.1 Data Requirement and Collection Method

The following types of data are acquired for IEE study:

- Socio-economic survey of project affected households whose land and house will be permanently acquired. Information on livelihood and property has also conducted;
- Demographic characteristics: Population distribution, migration pattern, age group distribution, etc.;
- Ethnicity and religion;
- Education and skill level: literacy rates, skills and skilled, manpower, etc.;
- Health and sanitation: information on sub-health post/health post, hospitals, main disease, incidence of water born disease and infectious disease such as HIV/AIDS;
- Gender, children, the elderly, poor and ethnic minorities;
- Land holding size and ownership
- Community infrastructures and service: drinking water, supply, irrigation, foot trails, transportation, electricity, telecommunication, etc.;
- Local institution and activities: government and non-government agencies, cooperatives, community based organizations;
- Other development activities;
- Cropping pattern, practices and production;
- Livestock raising;
- Estimation of loss of standing crops due to project construction, by crop type area and value.
- Local price information: land, agriculture and forest products, etc.;
- Economy: occupation, employment, agriculture and livestock production, non-timber forest products, trade and commerce, etc.;
- Land ownership: list of landowners likely to be affected by land acquisition and resettlement;
- Income and expenditure of the Project Affected Families (PAFs);
- Measurement and valuation of houses, cowsheds and other structures to be acquired by the project;
- Compensation rates for land, agriculture products, forest, houses and other private infrastructures; and
- Places of cultural importance; historic, religious or cultural sites in the project affected area and the special occasions of celebrations/gathering, including the relative importance of these sites (local, regional or national);
- Aesthetic value of the affected landscape;
- Attitude of the local people to the development and to this project;
- Cultural practices of the project area; and
- Religion wise population of the project area.

The socio-economic and cultural environmental survey of the people residing in the project affected area as defined in this section was carried out by using the methodology described in the following chronological order. Secondary data published by District Development Committee of the concerned districts and Central Bureau of Statistics, Kathmandu was intensively used to draw the baseline information of moderate and low impact zones. However, the baseline

information of high impact zone was collected from the field survey by using the appropriate techniques as mentioned in the subsequent sections.

3.2.3.2 Literature Review

Based on previous experiences and the review of relevant literature associated with IEE studies of various TL projects, demographic tables were developed. To fill these tables, a desk study was conducted in the office. All the relevant information associated with socio-economic and cultural environment was reviewed. On the basis of the reviewed information, data gaps were identified and the following techniques were used to generate the remaining data.

3.2.3.3 Identification of PAFs and SPAFs

The land owners of the Angle Towers/substation and the land owners/structure owners of the high impact zone have been identified. These identified families were considered as Project Affected Families (PAFs). In addition, the families losing their residence irrespective of their land holding size and other off farm income and the families losing more than 50% of land were identified as Seriously Project Affected Families (SPAFs).

3.2.3.4 Data Collection Tools

After identification of PAFs, their baseline information was collected by using the following techniques: census of affected households, Key Informant Interview, market survey for agricultural commodity and land price, informal meeting/discussion with district level government officials and local stakeholders and Photographs.

a. Households' Survey

Pre-tested questionnaires were designed and applied by a trained team of enumerators to solicit information from project affected families. Households' survey was conducted only for project affected families belonging to angle towers and structures falling in right of way. Altogether, 197 questionnaires were filled. The land owners belonging to tower points and substation area were identified through walkover survey and survey report and hence socio-economic status of them has been studied using questionnaires. Households' survey of landowners belonging to RoW of Way was not conducted in this stage. It will be finalized during detail design and check survey of the TL route.

The questionnaire has been designed especially to cover the sectors like demographic characteristics, basic health conditions, income and expenditure, availability of infrastructure facilities, water and energy related issues, information about project, attitude towards resettlement and expectations from the project. The list of surveyed HHs is given in Appendix E-IV.

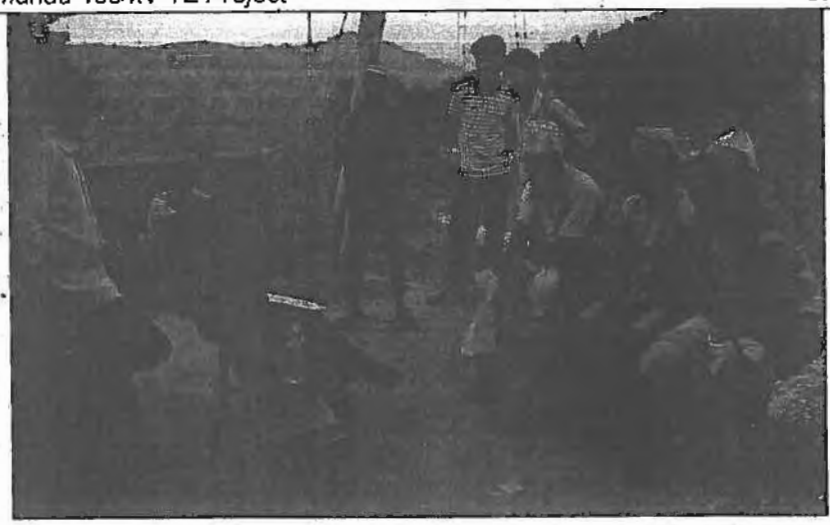

Figure 3.5: Household Survey

b. Key Informant Interview (KII)

Key informant Interview was employed with social workers, businessmen, and teachers, representatives of political parties, former VDC Chairmen and intellectuals of the project area. The main objective of KIIs was to assess their views, concerns and expectation from the project and collect relevant information of the project area. The main objective of KIIs was to assess their views, concerns and expectation from the project and collect relevant information of the project area. Altogether 14 key informant interviews (KIIs) were conducted in project affected VDC/Municipality. The respondents of the KIIs were purposively selected for interviews. The KII was conducted using an in-depth interview guideline (Appendix E-II).

c. Market Survey

Market survey was conducted in the project VDCs to get the prevailing price of agricultural commodity, major construction materials, and wage rate. The market survey was conducted with the help of a checklist (Appendix E-III).

d. Meetings/ Consultations/ Public Participation

Informal meetings/consultations/public participations were conducted with relevant district level government officials at districts headquarters, and at local levels (VDC) with key stakeholders (VDC secretaries, teachers, representative of civil society organization, CFUGs and health workers. The purpose of the meeting/consultation was to inform them about the project, collect their concerns/expectations regarding the project such as project purpose, project type, impact area, likely impacts and potential opportunities due to project implementation and required information for the IEE.

The key issues and concerns raised by the local people are related to compensation, employment, implementation of mitigation and enhancement measures and community participation in the project activities. The key issues/concern raised by the local people during community consultations were summarized.

Figure 3.6: Informal Meeting/ Public Participation

e. Field Observation

Observation of the project site was made to obtain information on different socio-economic and cultural activities of the impact area. Religious and archaeological sites of the impact area were identified to assess the impact on these sites within the high, moderate and low impact zones. At the end of each day notes were written about the observations and a field diary was maintained. Project photographs were also taken during field investigation.

3.2.3.5 Data Analysis

The field data from each project affected VDCs were compiled edited and analyzed in Kathmandu using windows software like WORD and EXCEL. The analyzed data were then interpreted and discussed in appropriate sections of the IEE report.

3.3 Impact Identification, Evaluation and Prediction

A logical, simple and systematic approach has been adopted for impact identification, evaluation and prediction. The impact has been identified for physical, biological, socio-economic, and cultural environment of the project area. The following tools have been used for impact identification:

- VDC Checklist, Key Informant Interview
- Households Questionnaire
- Table format for loss of land, crop production and property of the project affected families
- Expert's judgment

Topographic map of the route alignment has been used in predicting the impacts of the proposed T/L by analyzing the effect of project activities on the resources like existing infrastructures, rivers/rivulets, settlements, private land, forest, etc. present in the location. The expert's judgment using past experiences of similar type of projects have been used to predict impacts. Wherever possible, impact predictions have been done quantitatively.

Field inventories before project implementation provide the baseline condition of resources. The assessment of impacts is based on the baseline environmental conditions of the affected area with the project activities in relation to spatial and temporal aspects in terms of magnitude, extent and duration using various environmental prediction methods. The impact has been predicted over a specified period and within defined area. Consequences of environmental impacts were interpreted in terms of local, regional and national contexts. The significant positive and adverse environmental impacts associated with the project components have been identified considering the impact zone. The magnitude, extent and duration of the impacts which were categorized according to the National EIA Guidelines, 1993 are given below:

Magnitude of Impacts

- Low Impact (L): If the value of the resources could be used with no or minimum inconvenience to the public
- Medium/Moderate Impact (M): If the value of the resources could be used with inconvenience to the public
- High Impact(H): If the value of the resources reduced far below publicly acceptable level

Extent Impacts

- Site Specific (S): The impact is limited within RoW then it is site specific one.
- Local (L): If the impact of the work extends to the adjoining wards and or within 100m up 300m from the TL or angle tower 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 regional.

Duration of the Impacts

- Short Term (ST): If the impacts last for 3 years after project initiation it is classified as short term. Construction phase impacts are mostly categorized under this category.
- Medium Term (MT): An impact that continues for more than 3 years but less than 20 years is considered as medium-term. The construction phase impacts which carry over for few years of operation falls under this category.
- Long Term (LT): An impact that lasts beyond 20 years is considered to be long term. The operation phase impacts are mostly categorized under this category.

3.4 Public Involvement

3.4.1 Public Consultation

Public consultation process was carried out by conducting group discussion, interaction meetings, and household survey among the local people/stakeholders, concerned VDCs and related officials/agenesis of the project areas.

3.4.2 Recommendation Letters

As per EPR 1997, a 15 days public notice was published in Gorkhapatra National Daily on 2072/04/08 (Appendix B). The notice will consist of a statement regarding brief project information and request to provide comments and suggestions within 15 days to the project office or ESSD.

A team was mobilized in the field with copy of public notice along with cover letters to the concerned VDCs/Municipalities, CFUGs, district level line agencies and other local stakeholders. Copy of the notice displayed in the project sites and proof of deed (*Muchulkas*) collected (Appendix G). Similarly, recommendation letters collected from the affected VDCs. In addition, consent letter were collected from the affected CFUGs. Summary of the draft IEE report distributed to the concerned VDCs and CFUGs and a copy of IEE report provided to DDCs and District Forest Offices.

3.5 The Study Team

The following personnel were involved during the IEE study of the proposed TL:

Table 3-2: List of persons involved in IEE study

S.N.	Name	Designation	Address	Phone No.
1	Rajan Rishi Kadel	Deputy Director, (Sociologist) Team Leader	NEA-ESSD	01-6611580
2	Poonam Pokharel	Asst. Director (Socio-economist)	NEA-ESSD	
3	Krishna Pd. Joshi	Asst. Director (Data Base Expert)	NEA-ESSD	
4	Prakash Gaudel	GIS Expert, Environmentalist	NEA-ESSD	
5	Shailaza Gyawali	Sociologist	NEA-ESSD	
6	Sulav Shrestha	Civil Engineer	NEA-ESSD	
7	Nagendra Mulmi	Civil Engineer	NEA-ESSD	
8.	Padam B. Chand	Environmental Assessment/Forestry Expert	Consultant	

Beside the aforementioned study team, the experts from the project were also involved in providing the project's technical data/facts and figures and suggestions for the preparation of this IEE Report. Forester, Biodiversity and wildlife experts were hired on studies phase. As well as Enumerators and field helpers were hired at the local level to assist the study team in collecting baseline on each environmental domain and other necessary field data.

4 REVIEW OF POLICY AND LEGAL PROVISIONS

4.1 Introduction

Nepal integrated environment aspects in all its development activities and projects only from early 1980s. Environment conservation was included in the policies since the Fifth Plan (1975-1980). The second milestone was taken during the Sixth Plan. The Sixth Plan under the environment and land use policy emphasized the integration of environmental aspects into the construction of large-scale development projects. Then finally, in the Seventh Plan it was stated that developmental programs would be implemented only after an approved EIA/ IEE report. The Eighth, Ninth and Tenth Five Year Plans have further emphasized the making of more effective EIA systems. The formulation of Sectorial Guidelines, promotion of participatory EIA/IEE system and inclusion of mitigation cost into the total project cost were some of the activities included in these three five year plans.

The prevailing Acts, Policies, Regulations and Guidelines, which are required for the construction and operation of TL projects in Nepal, have been reviewed as per the followings while preparing the present IEE report. The proponent will abide by any other laws besides those already mentioned in the documents that are attracted due to different activities that will be undertaken during project implementation.

4.2 The Constitution of Nepal, 2072 (2015)

The Article 30 states about the Right regarding clean environment which includes three parts. According to this article part 1, each person shall have the right to live in a healthy and clean environment. According to this article part 2, the victim of environmental pollution and degradation shall have the right to be compensated by the pollutant as provided for by law. According to this article part 3, provided that this Article shall not be deemed to obstruct the making of required legal provisions to strike a balance between environment and development for the use of national development works. The proposed project is a component of hydropower development project and it attracts the provisions made in Constitution of Nepal. Hence, it is mandatory to follow the Constitution of Nepal, 2072 (2015) in regards with environment conservation while implementing the project.

The Article 51 states about policy regarding the conservation, management and use of natural resources as follows:

- The State shall pursue a policy of making a sustainable use of biodiversity through the conservation and management of forests, fauna and flora, and by minimizing the negative impacts of industrialization and physical development by promoting public awareness on environmental cleanliness and protection.
- The State shall pursue a policy of keeping an environmental balance.
- The State shall pursue a policy of adopting appropriate ways of minimizing or stopping negative impacts on environment if it is there, or if there is a possibility of such an impact nature, environment, or biodiversity.
- The State shall formulate policies and enact laws on the basis of the principle of sustainable environment development based on pre-warning and pre-informed agreements regarding environmental protection. Those people who pollute the environment shall have to be responsible for their action.

4.3 Plan and Policy

4.3.1 Nepal Environmental Policy and Action Plan, 2050 (1993) and 2055 (1998)

Nepal Environmental Policy and Action Plan (NEPAP) were endorsed to further institutionalize environmental protection in the development processes. The NEPAP recognize that a growing number of people are exposed to pollute from industrial enterprises. The NEPAP identifies the following factors as contributing to this process:

- Industrial plan inappropriately cited close to population centers
- Insufficient emphasis on fuel efficiency.
- Little, if any pollution abatement equipment used for reducing emission, and
- A total lack of industry pollution standards.

Hence, the NEPAP emphasizes the need for mitigating adverse environmental impacts to address urban and industrial development, air and water pollution and infrastructures development.

4.3.2 Forestry Sector Policy, 2057 (2000)

The Forest Sector Policy of Nepal such as the National Forestry Plan, 1976, Master Plan for the Forestry Sector, 1988, Periodic Five Year Plan and Forestry Sector Policy, 2057 (2000) have emphasized people's participation in the forestry management. Nepal's main forest management is based on people's participation and various management models are underway. Similarly, Forestry Sector Policy, 2057 (2000) stresses on conservation of biodiversity, ecosystem and protection of land degradation by soil erosion, landslide, floods desertification and other ecological disturbances. The Public participation in forest management is sought through community forestry, collaborative forest management, leasehold forestry etc. The mitigation measures such as plantation, NTFP program and other social and community support program proposed by the project will be implemented by mobilizing the local people which is in line with the Forest Sector Policy.

The *procedural guidelines for the use of forest land* for other purpose stated that feasibility study will be carried out with no use of forest land to the extent possible. If it is not possible, the alternate will be considered with minimum use of forest land. This guideline also stated that the project proponent will be responsible for the plantation of 2 tree species for the loss of one tree and their management for 5 years and handing over to the concerned forest office of the district.

4.3.3 Hydropower Development Policy, 2058 (2001)

The Hydropower Development Policy was promulgated in 2001. The main objectives of the policy include producing clean energy through the development of hydroelectric projects and to help conserve the environment. It is stipulated that one of the policies is to extend the use of electricity for achieving a reduction in the utilization of fuel wood and to render necessary assistance in the conservation of forest and environment.

4.4 Acts

4.4.1 Aquatic Animals Protection Acts, 2071 (1961)

This Act provided legislative protection of the habitats of aquatic species. Under this Act, it is offence to introduce poisonous, noxious or explosive material in to a water source or destroy

any dam, bridge, fish ladder or water system the intent of catching or killing aquatic life. The Act was amended in 1988 to prohibit the use of unsafe pesticides.

4.4.2 Land Acquisition Act, 2034 (1977)

One of the important acts that have a bearing on the implementation mechanisms and mitigation adverse impacts of power projects is the Land Acquisition Act, 2034. This Act covers all aspects of land acquisition and compensation of land and other assets. It authorizes the government to acquire land for public purposes by providing compensation to the private landowners.

Land acquisition and compensation has not been a major issue in the rural electrification in the past because the area required for erection of a pole is so small that it has not been an issue. However, this study recommends providing appropriate cash compensation for the land acquired by the erection of the towers. The compensation paid under this Act will be given in cash. To decide the amount of the compensation, the Land Acquisition Act (1977) has made provisions for the constitution of a Compensation Fixation Committee (CFC). That committee consists of the CDO, Chief District Land Administration and Revenue Office, Project Chief or an officer designated by the CDO and the Representative of the DDC.

As per the land Acquisition Act, 2034 (1977), it is mandatory to acquire the land prior to the implementation of the project. The provisions made here will be applied while acquisition of land. Cultivated land requires for the project will be acquired by direct negotiation with the land owners while the forest land will be acquired by taking approval from the government.

4.4.3 Soil and Watershed Conservation Act, 2039 (1982)

In order to manage watersheds of Nepal, the Soil and Watershed Conservation Act (SWCA), 1982 was enacted. The act is devoted to the protection of watersheds. Under Section 10 of SWCA, power is extended to the Watershed Conservation Officer to grant permission to construct dams, drainage ditches and canals, cut privately owned trees, excavate sand, boulders and soil, discharge solid waste and establish industry or residential areas within any protected watersheds. The Act outlines the essential parameters necessary for proper watershed management.

The Act is relevant to the proposed project as the project will utilize the soil for tower foundation in different location. There is likely to impact on soil and watershed condition of the project area. Hence, the project is obliged to follow the Soil and Watershed Conservation Act, 2039 (1982) during project implementation.

4.4.4 Water Resources Act, 2049 (1992)

The objectives of the Water Resources Act, 2049 is to make legal arrangements for determining beneficial uses of water resources, preventing environmental and other hazardous effects thereof and also for keeping water resources free from pollution. The Act strives to minimize environmental damage to water bodies, especially lakes and rivers through environmental impact assessment studies and the proponents who wish to use water resources for various purposes should prepare IEE report before a license can be granted. The Act stipulates that soil erosion, flooding, landslides or any significant impact on the environment should be avoided in

all uses of a water resource. The provisions made in Water Resources Act, 2049 (1992) is mandatory in case of the implementation of the proposed project. As per the provision, the environmental impact mitigation and enhancement measures have been proposed in view of environment conservation.

4.4.5 Electricity Act, 2049 (1992)

Electricity Act, 2049 is related to survey, generation, transmission and distribution of electricity. Electricity includes electric power generated from water, mineral oil, coal, gas, solar energy, wind energy etc. Under Section 3 of the Act it is stated that survey, generation, transmission or distribution of electricity without obtaining a license is prohibited. The Electricity Act, 2049 also contain provisions to minimize soil erosion, flood, air pollution and damage on environment while producing electricity and transmission of the power (Article 24). This Act is not relevant in case of transmission and distribution of generated electricity. The present study is only for hydropower generation excluding transmission component. NEA is responsible for electricity transmission and distribution.

4.4.6 Forest Act, 2049 (1993)

The Forest Act, 2049 (Amendment 2055) recognizes the importance of forests in maintaining a healthy environment. One of the major objectives of the enhancement and enforcement of the Forest Act is the promotion of a healthy environment.

The Act requires decision-makers to take account of all forest values, including environmental services and bio-diversity. It emphasizes the development and implementation of an approved work plan for different categories of forest, i.e. Community Forests, Leasehold Forests, Private Forests and religious forests.

This Act is relevant in case of the project will acquire forest land belonging to community, and national. It is mandatory to follow the Forest Act, 2049 (1992) while proposing the mitigation measures and also in implementation phase.

4.4.7 Labor Act, 2049 (1993)

This act is enforced by GoN in 2049/2/2. This Act classified below 15 years as child and 'anabolic' for the age group of above 14 years and below 18 years. The Act has also made provision of labor court and department of labor. The Act clearly mentions that the appointment letter should be issued for all the employees which include their working hours, working time, wages and other benefits. The Act allows for the time bond contract for the manpower required for development work. The Act specifies that working hours for the Anabolic and women must be within 6 AM to 6 PM which clearly restrict to deploy women in night works. The Act also state that equal opportunity shall be given to women as men. Similarly working period for the other employees must not exceed 8 hours a day and 48 hours in a week. If some people work beyond that period, over-time allowances must be paid which is 150% of the normal per hour wages and such over-time must not exceed 4 hours in a day. According to this act the wage rate of the employees shall not be less than the rate fixed by the concerned offices of GoN.

4.4.8 Environment Protection Act, 2053 (1997)

Nepal has enacted a comprehensive and umbrella type Act, the Environment Protection Act, 1997 (EPA, 97) which is now enforced through appropriate regulatory measures. The EPA provides a legal basis for the concerned authorities for regulation an initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA). Section 3 of the Act requires the proponent to conduct an IEE or EIA in relation to the prescribed proposals. The Act uses the word proposal instead of Projects which makes the scope of the Act much broader in relation to environmental studies. Proponent includes any government, semi government or non-government agency or organization submitting an application for the approval of a proposal and possessing the responsibility to work according to such a proposal or implementing the proposal.

According to the provision in Section 6 (1) of the Act, the relevant agency is empowered to grant approval for the IEE and EIA report, only if it finds that no significant adverse effects will be caused to the environment by the implementation of the proposal. Implementation of any proposal without the approval of the relevant agency is prohibited by the Act. As per EPA, 1997, the proposed project has obligation to carry out IEE study prior its implementation.

4.4.9 Local Self-Governance Act, 2055 (1998)

The Local Self-Governance Act, 2055 contains several provisions for the conservation of soil, forest and other natural resources and implementation of environmental conservation activities. Section 28 and 19 of the Act provide that the Village and the District Development Committees are responsible for the formulation and implementation of the programs related to the protection of the environmental bio-diversity. Section 96 stipulates that it is the duty of the municipality to protect the environment through the control of air, water and sound pollution. It also obligates the Municipality to maintain environmental cleanliness through the implementation of solid waste management, flood and landslide control programs.

This Act is relevant as the proposed project will utilize natural resources and carry out development activities in the project affected VDCs. Hence, it is mandatory to the project for proposing mitigation measures.

4.4.10 Child Labor (Prohibition and Regulation) Act, 2056 (2000)

The Child Labor (Prohibition and Regulation) Act, 2056 is enacted and enforced adopting ILO Convention concerning Elimination of Worst Forms of Child Labor and Minimum Age Convention. This Act has defined the 'Child' as a person who has not achieved the age of 16 year. Article 3 bans the employing a child below the age of 14 to work as a laborer and engaging a child in the hazardous and risky works listed in the Schedule of the Act.

The proponent is mandatory to follow the Child Labor (Prohibition and Regulation) Act, 2056 (2000) during the project implementation phase. The contractor may use child labor during construction period. Hence, the contractor will be instructed to follow the Child Labor (Prohibition and Regulation) Act, 2056 (2000).

4.5 Rules and Regulations

4.5.1 Electricity Rules, 2050 (1993)

Regulations on electricity sectors have been formulated for the implementation of the provisions made in the Electricity Act, 2049. The Electricity Rules, 2050 emphasize environmental analysis, which should include environmental mitigation measures to minimize adverse impacts likely to occur while developing hydro-electricity (Rule 12 and 13).

Rule 12 (f) and Rule (g) are related to the EIA/ IEE process which emphasize that the IEE report should include measures to be taken to minimize the adverse effects of the project on social, biological and physical environments and should also elaborate utilization of local labor, source of materials, benefits to the local people after the completion of the project, training to local people in relation to construction, maintenance and operation, facilities required for construction site and safety arrangements.

4.5.2 Water Resources Rules, 2050 (1993)

It is mandatory under Rule 17(e) of the regulation that any person or corporate body, who desires to obtain a license for utilization of water resources must state in his application that appropriate measures will be taken to lessen the adverse effects due to the project on the overall environment. Rule 19 stipulates that the water resources committee shall publish a notice giving detail information about the project to the people.

4.5.3 Environment Protection Rules, 2054 (1997)

The Environment Protection Rules (EPR) was endorsed in June 1997 and was made under the provisions of the Environment Protection Act. The EPR has been amended several times and the recent was done in 2010/01/27. The recent amendment states that TL projects of capacity above 132 kV voltage level requires only IEE unless it traverses through protected area, buffer zone or national parks. The EPR adopts the environmental assessment criteria mentioned in the EIA guidelines. However, the EPR establishes the administrative framework for assessing, exhibition and determination of the EIA/IEE, in terms of issues needing to be addressed and the format/layout of the EIA/IEE document.

Under section (18) of EPA, any person who contravenes any of the provisions of the Act, or the Regulations or the guidelines issued under the Act, shall be punishable with a fine up to NRs 50,000. If a proposal is implemented without the approval of the Ministry of Environment (in case of IEE, Ministry of Energy) or relevant government agency, or the person implementing the proposal is not complying with the conditions of the approval or license, the authorized official is empowered to close down that activity and may impose fine of up to NRs. 100,000 on such person or organization. This Act is relevant to the proposed project.

Under this Rules, the IEE study of the proposed project has to be carried out by the proponent and get approval from the Ministry of Energy prior to the project implementation.

4.5.4 Local Self Governance Rules, 2056 (1999)

Local Self Governance Rules, 2056 empower the local bodies to coordinate and implement development program and for rationale utilization of local natural resources. Article -7 (69) empowers the VDCs for monitoring and supervision of development work implemented in the VDC. The Article - 4 of DDC has provision of 3 members (Agriculture, Forest and Environment)

committee to look after the concerned issues. Article-6 (206) specifies that the need of social, economic, environmental and public facilities should be consider while planning the project. Article-7 (210) focuses on environmental studies and stresses due consideration while implementing the project like sand quarry, stone quarry, coal mines and others.

4.6 Guidelines and Conventions

4.6.1 Biodiversity Convention, 1992

The convention contains a series of far reaching obligations related to the conservation of biological diversity and sustainable uses of its components. One of these obligations is the requirement for environmental study. The purpose of an environmental study in relation to biodiversity conservation is to identify in advance:

- The aspects of the project which is likely to have significant adverse effects on biological diversity at genetic, species and ecosystem level, and
- The steps to be taken to avoid or minimize significant adverse effects to ensure that the proposed project comply with existing environmental legislation.
- The GoN has included 17 species of plants and 39 species of wild animals in the protection list.

If the project area is in the core habitat of these species and project activity will likely to affect them, mitigation measures shall be proposed and be implemented to avoid and/ or mitigate the adverse impacts. Nepal is a party to the convention of Biological diversity and in accordance to the article 14, adequate attention should be given to minimize and or avoid the impacts.

4.6.2 National Environmental Impact Assessment Guidelines, 1993

The National EIA Guidelines, 1993 developed by the National Planning Commission in conjunction with IUCN, set out the process for the environmental review and management of infrastructure projects in all sectors and the respective roles of certain GoN agencies and project proponents. The guideline was part of a comprehensive program to develop the national and sectorial guidelines for establishing a national system for Environmental Impact Assessment which was part of GoN's National Conservation Strategy. The EIA Guideline was endorsed by GoN on 27 September 1992 and gazette on 19 July 1993. The schedules attached to the Guidelines include:

Schedule 1	:	Projects requiring an IEE Report
Schedule 2	:	Projects requiring an EIA
Schedule 3	:	EIA based on project sites
Schedule 4	:	Projects requiring an IEE Report
Schedule 5	:	Format for Terms of Reference
Schedule 6	:	Environmental Impact Report Format

It is mandatory to follow the National Environmental Impact Assessment Guidelines, 2050 (1993) during the IEE study. Following the guidelines the environmental impact prediction and evaluation of the proposed project has been done on physical, biological and socio-economic and cultural environment of the project area. The guideline is used for analysis of significant issues.

4.6.3 EIA Guidelines for Forestry Sector, 1995

The GoN in keeping with the spirit of the National Environmental Impact Assessment Guidelines, 1993 framed EIA guidelines for the forestry sector in 1995. The Guideline aim to facilitate the sustainable use of forest resources for socio-economic development and meeting basic need to the community regarding the forest products, to make proposals socio culturally acceptable, economically feasible, and environmental friendly to conserve genetic resources and biodiversity and minimize environmental damage in forest areas and facilitate in identification of positive and negative impacts of programs to be implemented by other agencies in forest areas. The guideline emphasized the need of carrying out an EIA/IEE study of development projects and programs proposed for implementation in forest areas.

4.6.4 Forest, Production, Collection and Sales Distribution Guidelines, 2057 (1998)

The Clauses 3 to 10 of the Guidelines have specified various procedure and formats for getting approval for vegetation clearance, delineation of lands for vegetation clearance, evaluation of wood volume etc. and government offices and officials responsible for the approval, delineation and evaluation. These provisions have a direct relevance to the development of the project and need compliance to these provisions. These provisions have a direct relevance to the development of the project and need compliance to these provisions. It is obligation to the project for getting approval in view of vegetation clearance and evaluation of wood volume from district forest office prior to the construction phase.

4.6.5 Community Forest Guidelines, 2058 (2001)

This guideline has been prepared by including amendments of acts, rules by officials of GoN and related experts. Through these guidelines persons involved in the development and management of community forest like facilitators, User Groups, forester and managers etc. will get help to understand about the process and stages of development of community forest. Forest Users Group, forest officials, NGOs and INGOs are getting benefit by this guideline. Till date, more than 15000 Community Forests have been handed over to the Community Forest Users Groups.

4.6.6 Community Forest Inventory Guidelines, 2005

The guideline for inventory of community forests advice to classify the forest into timber trees, pole size trees and regeneration on the basis of diameter. It has recommended using 20m x 20m size of quadrant for timber trees, 10m x10m for shrub and 5m x 5m for regeneration plots in the community forest. Plants having DBH (Diameter at breast height, i.e. 1.3m above ground) greater than 30 cm are considered as trees. Trees having DBH between 10 to 30 cm are categorized as pole and plants having less than 10 cm DBH belong to regeneration species.

4.6.7 शासकीय तथा आर्थिक सुधारको तत्कालीन कार्ययोजना, २०६९

This working plan was devised to speed up the hydropower development process. So, the plan states that until the installed capacity of the country reaches 5,000 MW, instead of doing compensatory plantation at the ratio of 1:25, it is said to do such plantation at the ratio of 1:2.

4.7 Convention on International Trade in Endangered Species of Wild Fauna & Flora

Nepal became a contracting party to the convention on June 18, 1975.That aims to control the trade of certain wildlife species to prevent further endangered of their survival. CITES classified species according to the following criteria:

- Species threatened with extinction
- Species which could become endangered.
- Species that are protected

As Nepal is party to the convention related to species conservation, attention should be given to evaluate the impacts of the project activities on meeting their obligation. It is relevant to IEE study that species protection list could also be used to evaluate the significant of the identified and predicted impacts. Plant and wild animal species under legal protection provides a basis to purpose EMPs for their conservation and for least damaging them during project implementation.

Nepal is signatory to this agreement, which classified species according to criteria where access or control is important (eg. I-species threatened with extinction; II-species which could become endangered; III-species that are protected).

4.8 International Labor Organization (ILO) Convention of Indigenous and Tribal Peoples (No. 169)

Nepal ratified ILO Convention No. 169 on September 14, 2007. In 2007 the UN Declaration on the Rights of Indigenous Peoples was adopted by the General Assembly. The declaration reaffirms the importance of the principle and approaches provided for under Convention No. 169 and its adoption therefore provide a fresh impetus for promoting the ratification and implementation of 169. ILO Convention No. 169 highlights the need to recognize indigenous and tribal people's specific knowledge, skills and technologies as the basis for their traditional economies and self-determined development process. Article-1 of the convention provides definition of the tribal indigenous people. Article-6 deals the consultation of the people concerned through appropriate procedure in particular through their representative institutions. Whenever, consideration is being given to legislative or administrative measures which may affect them directly.

In Article 15, the rights of the people concerned to the natural resources pertaining to their lands shall be covers the total environments of the areas which the peoples concerned occupy or other use. The peoples concerned shall wherever possible participate in the benefit of such activities and shall receive fair compensation for any damage which they may sustain as a result of such activities. Article 16 (2) clearly mention that where the relocation of these peoples is considered necessary as an exceptional measures such as relocation shall take place only with their free and inform consent.

Where their consent cannot obtained, such relocation shall take place only following appropriate procedures established by national laws and regulations, including public inquiries where appropriate, which provide the opportunity for effective representation of the peoples concerned. Article 16 (3) mention that whenever possible these peoples shall have the right to return their

traditional land as soon as the grounds for relocation cease to exist. Article 16 (5) elaborated the persons thus relocated shall be fully compensated for any resulting loss or injury.

Article-15 states that the rights of the people concerned to the natural resources pertaining to their lands shall be specifically safeguarded. Provision includes the people to participate in the use, management and conservation of these resources. This provision creates some confusion and ultimately brings conflict between the project proponent and resources owners. Project share distribution and employment priority to these people will somehow reduce the possible conflict.