

**Annex 15: Environmental Survey Report**  
**Lower Badigad Project (C-02)**

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## Introduction

Federal Democratic Republic of Nepal is rich in water resources, its potential water power is 83,000 MW and economically exploitable water power is 42,000 MW. However, as of 2011, the total generating capacity of the country is only about 718.62 MW. Of the total installed capacity 92% is from the hydroelectric power plants. In addition, since most of hydroelectric power plants are run-of-river type, their output decreases seriously in the dry seasons. Consequently, there is a rolling blackout of as long as 14 hours a day which poses many problems including affects in livelihood and industries which severely impact the national economy.

To cope with these situations, the government of Nepal has worked out “National Electricity Crisis Resolution Action Plan” and “10-Year Hydropower Development Task Force” at the end of 2008. The above action plan and task force recommended need of storage-type hydroelectric power plants able to supply sustainable electricity uninterruptedly even in dry seasons to solve current power shortage at an early date.

However, construction of storage-type hydroelectric power plants should be carried out systematically taking into consideration of various aspects including the overall water resource development policy of Nepal, hydrological and geological characteristics, environmental impact, etc. Therefore, the Government of Nepal has requested the Government of Japan to work out a nationwide master plan for storage-type hydroelectric power development.

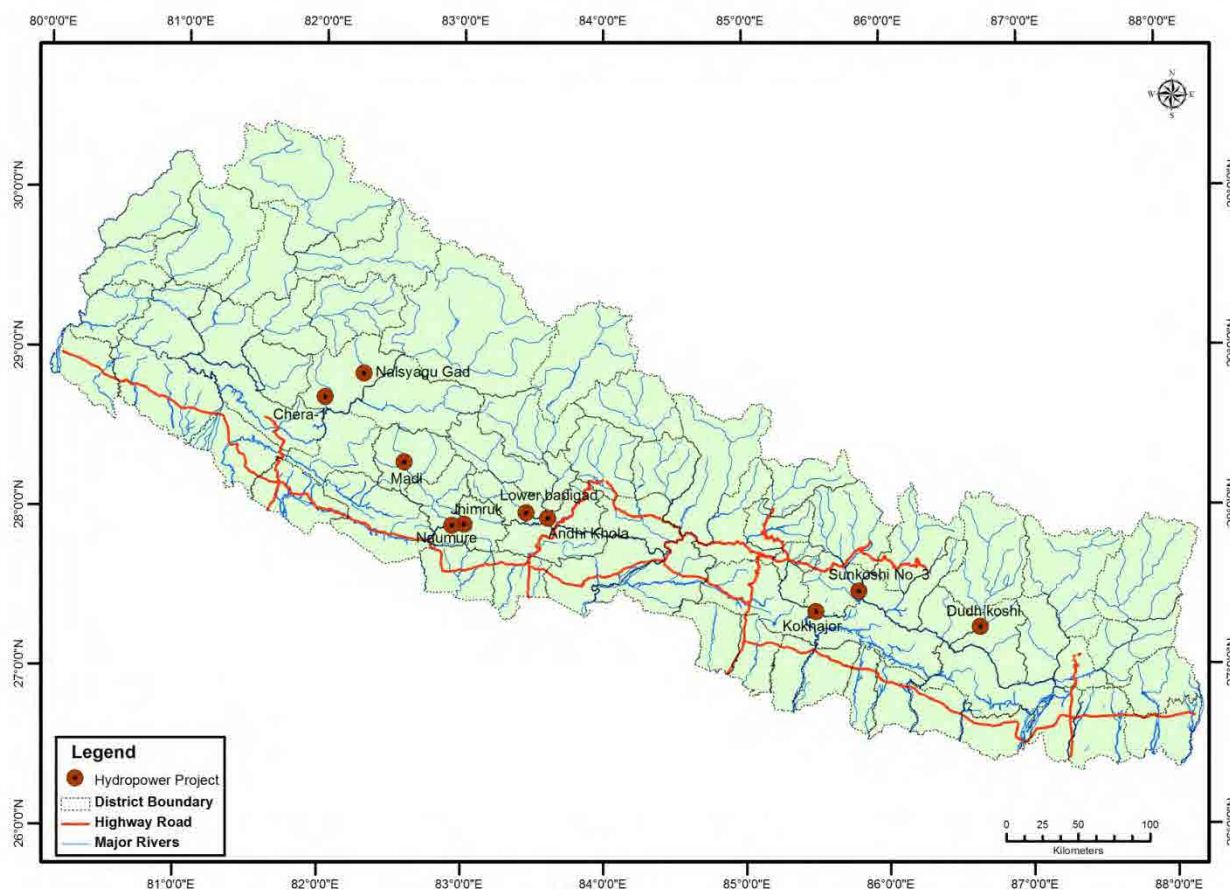
Electric Power Development Company Limited (J-Power) appointed by the JICA for the nationwide master plan study based on the desk level study in close association with NEA screened 10 candidate projects for the master plan study out of the list of 67 promising projects identified by NEA all over Nepal. **Table 1a and 1b** presents the salient features of the 10 promising projects screened for the master plan study, while **Figure 1** presents the location of the projects.

**Table 1a: Salient Features of Potential Projects**

No.	Project Name	Location (District)	Location of Dam Site		River	Installed Capacity (MW)	Catchment Area (km <sup>2</sup> )
			Longitude	Latitude			
E-01	Dudh Koshi	Okhaldhunga/Khotang Dist.	86° 39' 17.3	27° 15' 47.2	Dudh Koshi to Baiku Khola	300.0	4100
E-06	Kokhajor-1	Sinchuli, Sindhupalchok	85° 29' 59.6	27° 22' 21.9	Kokhajor	111.5	281
E-17	Sun Koshi No. 3, Kosi MP	Ramechhap, Kavre and Sindhupalanchok	85° 48' 14.3	27° 29' 50.5	Sun Koshi	536.0	5520
C-02	Lower Badigad	Gulmi	83° 27' 22.2	28° 0' 0.6	Badigad	180.3	2050
C-08	Andhi Khola	Syangja	83° 36' 30.6	27° 58' 2.6	Andhi Khola	180.0	475
W-02	Chera-1	Jajarkot	82° 1' 12.3	28° 42' 56.4	Chera	148.7	809
W-05	Lower Jhimruk	Argakhachi, Pyuthan	83° 1' 1	27° 55' 30.8	Jhimruk	142.5	995
W-06	Madi	Rolpa	82° 35' 15.5	28° 18' 48.5	Madi	199.8	674
W-23	Nalsyau Gad	Jajarkot	82° 17' 42.8	28° 52' 4.7	Nalsyau Gad	410.0	571
W-25	Naumure (W. Rapti)	Argakhanchi, Pyuthan	82° 55' 42.9	27° 55' 6.1	West Rapti	245.0	3430

**Table 1b: Salient Features of Potential Projects**

No.	Project Name	Dam Height (m)	Total Storage Volume (MCM)	Effective Storage Volume (MCM)	Reservoir Area (km <sup>2</sup> )	FSL (m)	MOL (m)	TWL (m)	Rated Gross Head (m)	Rated Power Discharge (m <sup>3</sup> /sec)
E-01	Dudh Koshi	180.0	687.40	442.10	11.05	580.0	530.00	303.35	275.0	136.00
E-06	Kokhajor-1	107.0	218.70	166.10	8.92	437.00	390.00	200.00	226.3	63.90
E-17	Sun Koshi No.3, Kosi MP	140.0	1,220.00	555.00	23.99	700.0	674.00	575.00	116.3	109.34
C-02	Lower Badigad	191.0	995.90	505.50	13.65	688.00	654.00	475.00	196.0	232.60
C-08	Andhi Khola	157.0	336.50	238.70	5.52	675.00	626.70	368.48	307.0	81.40
W-02	Chera-1	186.0	254.90	141.10	4.00	866.0	814.00	640.00	220.0	80.50
W-05	Lower Jhimruk	167.0	386.00	211.60	4.98	597.0	557.0	390.0	194.6	88.10
W-06	Madi	190.0	359.50	235.10	7.66	1,090	1,030.00	800.00	280.8	84.90
W-23	Nalsyau Gad	200.0	419.6	296.3	6.3	1,570.0	1,498.00	872.0	644.0	75.00
W-25	Naumure (W.Rapti)	190.0	1,021.00	580.00	19.76	517.0	474.00	358.00	162.6	185.60



**Figure 1: Ten promising Sites Identified for Survey**

The NESS, a local consulting firm of Nepal was entrusted by J-Power for the required SEA field studies of the 10 candidate projects. As per the ToR of works, there are basically two types of surveys required namely; geological, geotechnical, construction material and seismicity study, and environmental and social study. This report deals with the field survey findings of social and environmental study on **Lower Badigad Project** identified as one of the candidate project in the western Nepal.

## 1 SOCIO-ECONOMIC ENVIRONMENT

The information regarding the social and economic conditions of the people in Nepal is available in the publications of the Central Bureau of Statistics. But such information is limited to administrative units such as VDCs, DDCs, Development Zones and at national level. As the candidate projects cross cut the administrative units, the available data on the social and economic concerns could not be used effectively to characterize the direct impact areas by the projects. To fill this gap field level studies on Socio-economic and Environmental Concerns<sup>1</sup> are conducted through participatory methods. The findings of the field surveys are presented in the section below.

### 1.1 Demographic Concerns

#### 1.1.1 VDCs, Settlements and Population

The proposed Lower Badigad storage type project is located in Gulmi district in the Western Development region of Nepal and covers 13 VDCs, 30 settlements, 35 wards and 1606 households. The total population of the reservoir area is estimated to be 10,116 with the average family size of 6.30 which is slightly higher than the national average family size (4.7) 2011 Census estimate) (Table 1 and **Appendix 1**). The reservoir area occupies about 3.41% of the total population of the project district<sup>2</sup>.

**Table 1: VDCs, Settlements and Population under the Lower Badigad Storage Project, Gulmi**

S.N.	VDC	Settlement	Ward No.	HH	Population
1	Aanpchaaur	Bhukuwa Jhakla, Indregaunda, Tallophant	3,4 , 5,7	145	815
2	Johang	Prabhananda nagar (Chorkate), Arunga (Khaireni), Ulli Khola and Khukura Phant, Dhaba (Khaluru khola), Ritaudi Gaun	1,2,4,5	351	2052
3	Rimuwa	Sidha Thum, Sakhar (Yaadi)	7,8	24	145
4	Balithum	Charkhute, Sivapuri/Tari, Sera Phant/Botegaun, Khaguwa	2, 4,5&6	112	764
5	Rupakot	Sotaphant , Bote Majhi (Chureni gaun)	2,3, 4&9	175	1150
6	Turang	Rampur, Majuwa bazaar, Sota, Kumal Gaun	1,4, 5,7	189	1620
7	Hasara	Chatimpot, Upalo Saghat, Khaireni Bazar Phat, Tallo Saghat	1,2,3,4	206	1193
8	Jubhung	Ghorha	NA	70	400
9	Hunga	Urleni, Chorkat, Tallo Ramaudi	2 and 3	5	33
10	Bamgha	Majha/chamdi aatipata	1,2,5	125	850
11	Limgha	Nadeva	7	44	405
12	Juniya	Chorkot	9	65	239
13	Badagaun	Dovhan	1	95	450
<b>Tota l</b>	<b>13</b>	<b>30</b>	<b>35</b>	<b>1606</b>	<b>10116</b>

Source: NESS Field Survey, 2012

#### 1.1.2 Ethnicity / Caste

The population of the reservoir area is dominated by Brahmin caste figuring 61%. The second largest population is recorded for Chhetri (8%) and Magar (disadvantaged Janjati-8%) More than a quarter of population (26.53%) is represented by different Janjati groups who are categorized from Highly Marginalized (Bode) to Advanced Janjati (e.g Newar and Thakali). *Dalit* represents 5% of the population (Figure 1 and **Appendix 2**).

<sup>1</sup> The findings are based on the NESS Rapid Field Survey Assessment (2012) using Focus Group Discussions (FGD) and Observation tools. Refer **Appendix 16** for the List of FGD participants.

<sup>2</sup> The total population of Gulmi district according to preliminary estimate of CBS Census 2011 is estimated to be 296,654.

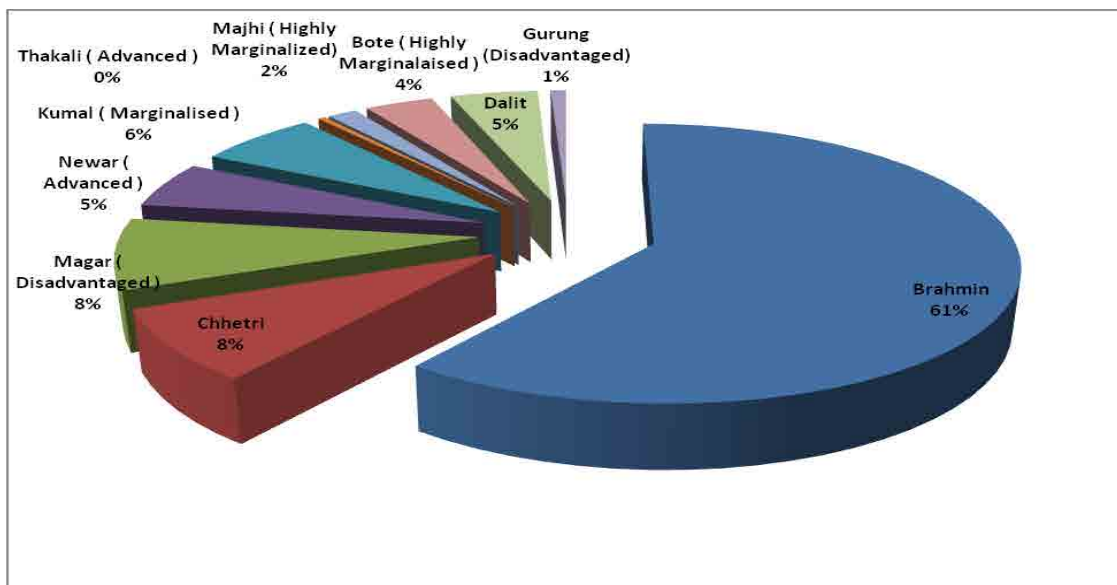


Figure1: Ethnic Composition of Population (%)

## 1.2 Economic Concern

### 1.2.1 Land Use Pattern and Land Holding Size

The total land area in the reservoir area is estimated to be 16,784 ropanies (1 ropani=20 hectare), 75% of which is used for agriculture followed by, forest (11%), other (kharbari-10%), and pasture (4%) (Figure 2). **Appendix 3** presents details on the land use pattern by each cluster of the VDC.

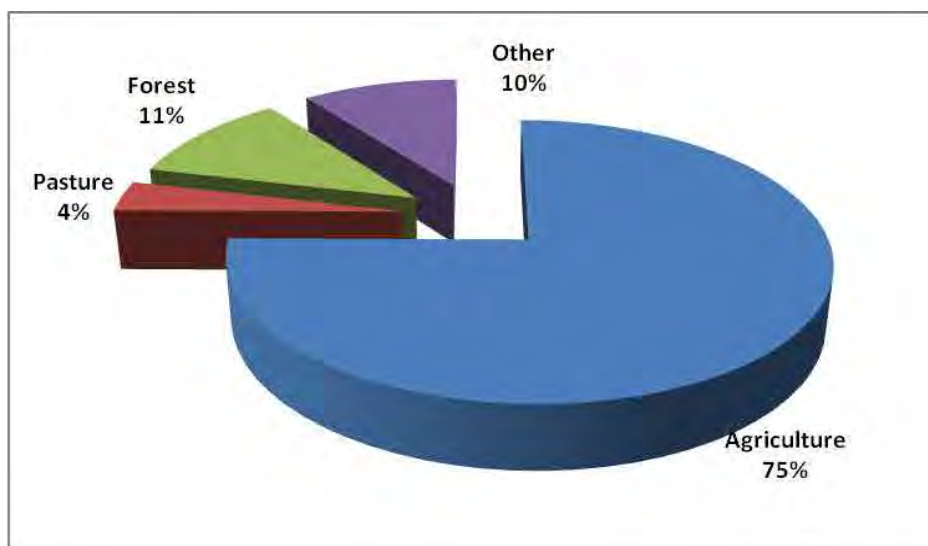


Figure 2: Land Use Pattern of the Reservoir Area

The total agricultural land of the reservoir area is estimated to be 13,772 ropanies including *kharbari* (thatch growing land). Of the total agricultural land 79% is *khet* (irrigated paddy field), 13% *pakho* (un-irrigated up land), and 8% *kharbari*. The average land holding of a household is calculated to be 8.6 ropanies with the minimum and maximum range of holding size of 3-24 ropanies (Table 2 and **Appendix 4**). Based on the Central Bureau of Statistics (CBS) classification<sup>3</sup>, the households fall in the marginal and

<sup>3</sup> According to CBS, a households holding < 15 ropani of land is classified as marginal farmer, holding 15-135 ropanies as small to medium farmers and holding > 135 ropani as large farmers.

small to medium farmers group when examined from the view point average land holding size.

**Table 2: Total and Average Land Holding Size (Ropani)**

Description	Total	%	Average/HH
Khet	10858	78.84	6.76
Pakho	1756	12.75	1.09
Other (Kharbari)	1158	8.41	0.72
<b>Total</b>	<b>13772</b>	<b>100</b>	<b>8.58</b>

The reservoir area is producing cereals such as paddy, maize, millet, wheat and cash crops such as potato, pulses, oilseeds and vegetables. Among the cereals, paddy is grown in largest area (10888 ropanies) followed by maize (7548 ropanies) wheat (5714 ropanies) and millet (500 ropanies). Among the cash crops, potato and oilseeds occupy the largest area.

Source: NESS Field Survey, 2012

Unlike the area, the quantity of production is also highest for paddy followed by maize, wheat and millet. Among the cash crops, the production is recorded to be highest for the vegetables followed by potato and pulses. The cropping intensity of the area is 220% (Table 3 and **Appendix 5**)

**Table 3: Crop Production and Yield**

S.N.	Crop	Area (Ropani)	Production (Kg)	Yield (Kg/Ropani)
1	Paddy	10,888	2,200,300	27.13
2	Maize	7548	1,411,790	187.04
3	Millet	500	94,510	189.02
4	Wheat	5714	1,1299,68	197.75
5	Potato	1286	1,009,200	784.76
6	Pulses	519	234,600	452.02
7	Oilseeds	15	735	49.00
8	Vegetables	1249	1,472,000	1178.54
<b>Cropping Intensity</b>		<b>219.75%</b>		

Source: NESS Field Survey, 2012

According to field study most of the productions are consumed locally. However, large quantity of vegetables produced by seven settlements and paddy and wheat from three settlements are sold in the surrounding villages and Pullakamukho bazaar located in Ranpur of Turang VDC (Table 4 and **Appendix 6**).

**Table 4: Sale of Crops**

Crops sold	Quantity Sold (Kg)	Number of Settlements Selling Crops	Market
Paddy	25350	2	Near village and Pullakamukho bazar
Wheat	441	1	
Vegetables	334000	9	

Source: NESS Field Survey, 2012

## 1.2.2 Occupation

About 67% of the total population of the reservoir area is reported to be involved in economic earning activities. Of the total working population, a majority (60%) are engaged in agriculture. Almost equal number populations are involved in foreign employment (17%) and wage labour (16%). A fewer population is occupied in service sector (Figure 3 and **Appendix 6**).



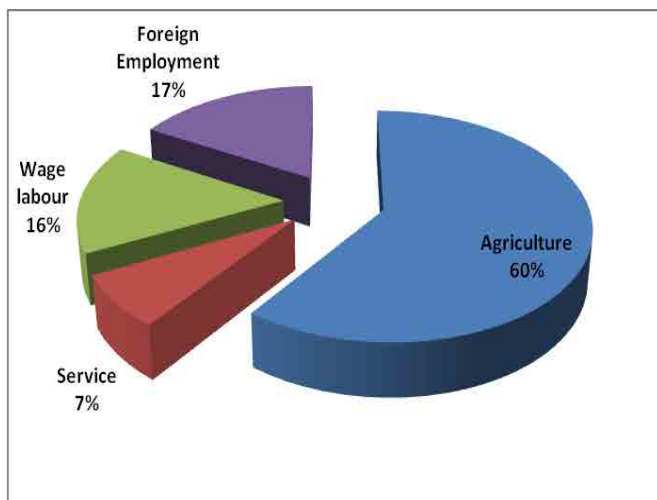


Figure 3: Occupation of Population

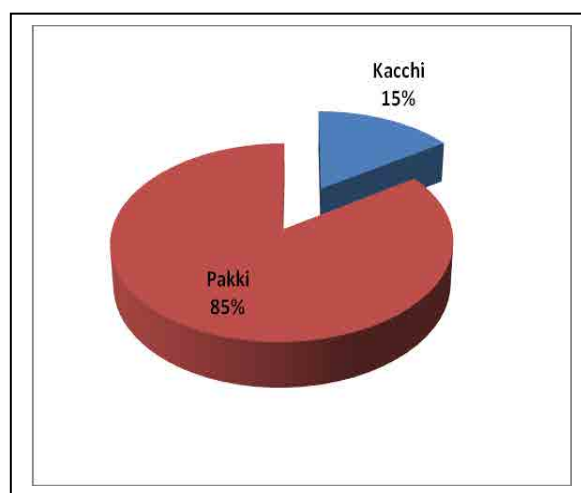


Figure 4: Types of Houses

### 1.2.3 Housing Type

Two types of houses are categorized in the reservoir area: i) Pakki house i.e. permanent types of house built generally using cement and stone and roofed by using galvanized sheet (tin) or cemented and ii) kachhi house i.e. built by using mud and stone and roofed using thatch.

Eighty 5% of the households are residing in pakki (permanent) types of houses and 15% in kachhi (temporary) types of house (Figure 4 and **Appendix 7**).

## 1.3 Service related Infrastructures

### 1.3.1 Road

Out of 30 settlements, 21 have access of motor able road. The total road length within the settlement is estimated to be 26.06 km. The settlements are facilitated with 12 bridges of which one concrete bridge and 11 are suspension type (**Appendix 8**).

### 1.3.2 Schools

Altogether different levels of schools are located in the reservoir area where 3415 students are enrolled (**Appendix 9**).

### 1.3.3 Irrigation Infrastructure

Most of the settlements have irrigation schemes. Total number of irrigation schemes in the reservoir area is estimated to be 58 and more than 11,000 ropanies of land is under irrigation (**Appendix 10**).

### 1.3.4 Drinking Water

Each of the 29 settlements has drinking water schemes under operation. Altogether 436 water taps are reported in the schemes with minimum and maximum number of taps installed between 1 and 40 in each of the schemes (**Appendix 11**).

### 1.3.5 Community Forest

The reservoir area enjoys the facilities and services of three community forests and five wetlands and

recreation centers as shown in Table 5.

**Table 5: Number of Community Forest and Wetland/Recreation Centre in the Reservoir Area**

S.N.	VDC	Settlements	Community Forest	Wetland/Recreation Centers
1	Aanpchaur	Indregaunda		1
2	Johang	Arunga (Khaireni)		1
3	Rupakot	Sotaphant	Rama Sharam CF	0
4		Bote Majhi (Chureni Gaun)	Bhirboto CF	0
5	Turang	Kumal Gaun		1
6	Hasara	Chatimpot		0
7		Tallo Saghat		1
8	Jubhung	Ghorha	Newarya Siladi CF	0
9	Badagaun	Dovhan		1
<b>Total</b>	<b>7</b>	<b>9</b>	<b>3</b>	<b>5</b>

Source: NESS Field Survey, 2012

### 1.3.6 Industries and Services

Altogether 11 small cottage industries are running in four settlements of the reservoir area where 54 persons employed. The annual sales of these industries are estimated to be over Rs 3,100,000 in a year. Similarly, water mills are installed in most of the settlements for grain grindings (Table 7 and **Appendix 12**).

**Table 6: Industries Types in the Reservoir Area**

S.N.	VDC	Settlement	Small & Cottage Industries	
			Number	Employees
1	Aanpchaur	Indregaunda	3	7
2		Tallophant	0	0
3	Johang	Arunga (Khaireni)	3	20
4	Rupakot	Sotaphant	2	7
5	Turang	Majuwa Bazar	3	20
6	Hasara	Chatimpot	0	0
7	Juniya	Chorkot	0	0
<b>Total</b>	<b>13</b>	<b>30</b>	<b>11</b>	<b>54</b>

Source: NESS Field Survey, 2012

There are two hydropower schemes with the capacity of 0.025 MW and 2.7 MW located in two VDCs of the reservoir area (Table 7).

**Table 7: Hydropower Schemes in the Reservoir Area**

S.N.	VDC	Settlement	Name	Capacity
1	Turang	Majuwa Bazar	Turang Hydro	0.025 MW
2	Hasara	Chatimpot	Jumdi Hydropower	2.7 MW

Source: NESS Field Survey, 2012

Five market centers located at four VDCs are popular in the reservoir area where local and imported items are marketed (Table 8).

**Table 8: Major Market centre of the Reservoir Area**

S.N.	VDC	Settlement	Market Name
1	Aanpchaur	Indregaunda	Indreguanda market
2	Johang	Arunga (Khaireni)	Runga
3	Turang	kumal gaun	pulchowk bazar

S.N.	VDC	Settlement	Market Name
4		Tallo saghat	Sahaghat bazar
5	Badagaun	Dovhan	Indragauda
<b>Total</b>	<b>4</b>	<b>5</b>	<b>5</b>

Source: NESS Field Survey, 2012

#### 1.4 Culture and Religious Site

The major festivals celebrated in the reservoir area are: Dasain, Tihar, Tija, Majhe Sankarati, which are based on Hindu tradition and culture. Besides these festivals, the janjati of the area celebrate Ghatu Natch, Lakhe (Krishna Asthami), Bote (Barkhi) and etc. Temples such as Malikeshwor, Radhakrishna mandir, (Walumada) and Ram Mandir, Mukleshwor Kulyan and Sivalaya Siddha Thum Mandir, Bhumi, Tutre Baraha Than and Dabala Devi Mandir are some of the important temples located in the reservoir area. Each of the settlement has their cementation places located near the rivers and streams (**Appendix 13**).

#### 1.5 Ongoing and Proposed Development programmes

Two hydropower and one irrigation projects are under development process in the reservoir area (Table 9).

**Table 9: Ongoing Development Projects in the Reservoir Area**

VDC	Settlement	Ward Number	Ongoing Development Projects	
			Irrigation	Hydropower
Balithum	Sera Phant/Botegaun	6	Dailkhol-sera Irrigation plan	0
Turang	Majuwa bazar	1	0	1
Hasara	Chatimpot	4	0	Jumli hydro power
<b>Total</b>			<b>1</b>	<b>2</b>

Source: NESS Field Survey, 2012

#### 1.6 Past Experience with community and their perception

The reservoir area people have not experience any types of conflict with regards to the development projects in the past. The people have perceived different positive and negative impacts from the storage type hydropower project. Submerge of house and land, difficulties in transportation, translocation of villages etc. are reported to be the major negative impacts perceived by the community. The communities have also expected different development activities from the project such as availability of electricity, infrastructure and industrial development and employment (Table 10 and **Appendix 14**).

**Table 10: Perceived Impacts of the Storage Type Hydropower Project**

Positive impacts	Negative Impact
Electricity	loss of land and property
Industrial development	loss of houses
Infrastructure development	difficulties in transportation
Employment and development activities	submerge of house and land
	translocation of village

Source: NESS Field Survey, 2012

#### 1.7 Disasters

Flood and landslides are reported to be the common natural disasters faced by the reservoir area each year, however severe losses are not recorded yet.

## 2 DISASTER STUDY

There are no records of the disaster at the site specific level of the candidate project at the central level and district level offices of the government of Nepal. It is therefore, the disaster information is collected from the project site based on the key informant survey. The findings of the results are presented in the sections below.

### 2.1 Types of Disaster

Within the influence area of the Dudhkoshi storage type hydroelectric project the flood and landslide disaster have been reported by the key informants. The earthquake as a disaster event is not in the memory of the local people after the great earthquake of 1934.

#### 2.1.1 Flood

In the memory of the local people flood disaster is of common occurrence within the project site. Nine flood events have a widespread damage of life and property. The cause of the floods as reported by the informants is the heavy precipitation in the catchment areas of the Barigad in the monsoon season. The loss of life and property caused by the flood events in the candidate reservoir area are presented below.

**a) Name of respondent: Kala Dhar Aryal** Contact No: 9849033051 **Date:** 26/03/2069 B.S.  
**Age:** 71 **Occupation:** Agriculture **Location:** Ampchaur -7, Indregauda

**i) Year of the occurrence:** 2018 B.S.

**ii) Cause of the flood:** Heavy Precipitation

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~20 Ropani	~10 Ropani	~45 Ropani
Life	X	X	X
Build properties	3 houses	1 house	X
Crops	~Paddy , 60 muri	~Paddy , 35 muri	~Paddy, 140muri
Others	X	X	X

**b) Name of respondent: Padam Pani Bhandari** Contact No: X **Date:** 27/03/2069 B.S.  
**Age:** 61 **Occupation:** Agriculture **Location:** Ampchaur -3,Bhukwa Phant

**i) Year of the occurrence:** 2018 B. S.

**ii) Cause of the flood:** Heavy Precipitation

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~40 Ropani	X	X
Life	X	X	X
Build properties	3 houses	X	X
Crops	~Paddy , 120 muri	X	X
Others	X	X	X

**c) Name of respondent: Rudra Raj Kharel** Contact No: 9747024552 **Date:** 27/03/2069 B.S.  
**Age:** 55 **Occupation:** Agriculture **Location:** Ampchaur -4, Talla Phant Gaun

**i) Year of the occurrence:** 2018 B. S.

**ii) Cause of the flood:** Heavy Precipitation

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~55 Ropanies	~15 Ropanies	~5Ropanies
Life	2	X	X
Build properties	Belly Bridge & School	X	X

Loss or Damages	Local Area	Upstream Area	Downstream Area
Crops	~Paddy , 170 muri	~Paddy , 50 muri	~Paddy , 18 muri
Others	5 Cattles	X	X

**d) Name of respondent: Til Bdr. Rana (Kumal)**      **Contact No: X**      **Date: 26/03/2069 B.S.**  
**Age: 63**      **Occupation: Agriculture**      **Location: Badagaun-1, Dovan.**

**i) Year of the occurrence: 2018 B. S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~5 Ropanies	X	X
Life	X	X	X
Build properties	X	X	X
Crops	~Paddy , 10 muri	X	X
Others	X	X	X

**e) Name of respondent: Bhakta Bdr. Magar**      **Contact No: 9817406912**      **Date: 27/03/2069 B.S.**  
**Age: 50**      **Occupation: Agriculture**      **Location: Balithum-4, Sanolumpe**

**i) Year of the occurrence: 2066 B. S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~50 Ropanies	~5 Ropanies	X
Life	X	X	X
Build properties	X	X	X
Crops	~Paddy , 150 muri	~Paddy ,2 5 muri	X
Others	X	X	X

**f) Name of respondent: Jeeva Lal Kandel**      **Contact No: 9747055493**      **Date: 27/03/2069 B.S.**  
**Age: 53**      **Occupation: Agriculture**      **Location: Balithum-2, Shivapuri (Tari Gaun)**

**i) Year of the occurrence: 2018 B. S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~100 Ropanies	~50 Ropanies	~15 Ropanies
Life	X	X	X
Build properties	X	X	X
Crops	~Paddy , 300 muri	~Paddy ,150 muri	~Paddy ,50 muri
Others	X	X	X

**g) Name of respondent: Jeeva Lal Kandel**      **Contact No: 9747055493**      **Date: 27/03/2069 B.S.**  
**Age: 53**      **Occupation: Agriculture**      **Location: Balithum-2, Shivapuri (Tari Gaun)**

**i) Year of the occurrence: 2065 B. S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~60 Ropanies	X	X
Life	X	X	X
Build properties	X	X	X
Crops	~Paddy , 180 muri	X	X
Others	X	X	X

**h) Name of respondent: Yub Raj Kheral**      **Contact No: 9847059132**      **Date: 27/03/2069 B.S.**  
**Age: 59**      **Occupation: Agriculture**      **Location: Turang-7, Dihisotaha+Kumal Gaun**

**i) Year of the occurrence: 2018 B. S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~45 Ropanies	X	~20 Ropanies
Life	X	X	X
Build properties	2 houses	X	X
Crops	~Paddy , 140 muri	X	~Paddy , 60 muri
Others	X	X	X

**i) Name of respondent: Kapil Mani Aryal**      **Contact No:** 9847090536      **Date:** 27/03/2069 B.S.  
**Age:** 42      **Occupation:** Agriculture      **Location:** Turang-1, Majuwa Bazar

**i) Year of the occurrence:** 2018 B. S.

**ii) Cause of the flood:** Heavy Precipitation

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~20Ropanies	~28 Ropanies	~5 Ropanies
Life	2	X	X
Build properties	2 houses	X	X
Crops	~Paddy , 70 muri	~Paddy,60muri	~Paddy,15muri
Others	X	X	X

**j) Name of respondent: Bhim Lal Gautam**      **Contact No:** 9747390647      **Date:** 28/03/2069 B.S.  
**Age:** 90      **Occupation:** Agriculture      **Location:** Jubhung -8, Ghoraha

**i) Year of the occurrence:** 2018 B. S.

**ii) Cause of the flood:** Heavy Precipitation

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~15Ropanies	X	X
Life	X	X	X
Build properties	3 houses	X	X
Crops	~Paddy , 45 muri	X	X
Others	X	X	X

**k) Name of respondent: Chet Nath Bhandari**      **Contact No:** 076-692659      **Date:** 28/03/2069 B.S.

**Age:** 65      **Occupation:** Agriculture      **Location:** Rupakot-3, Sota Gaun.

**i) Year of the occurrence:** 1975 B. S.

**ii) Cause of the flood:** Heavy Precipitation

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~150Ropanies	~15Ropanies	X
Life	X	X	X
Build properties	3 houses	X	X
Crops	~Paddy , 500 muri	~Paddy , 50 muri	X
Others	X	X	X

**l) Name of respondent: Krishna Pd. Bhandari**

**Contact No:** 9747070421      **Age:** 41      **Date:** 28/03/2069 B.S.

**Occupation:** Business      **Location:** Rupakot-9, Damoga+Thulo Phant+Amphaur Gaun

**i) Year of the occurrence:** 2018 B. S.

**ii) Cause of the flood:** Heavy Precipitation

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~20Ropanies	X	X
Life	5	X	X
Build properties	2 houses	X	X
Crops	~Paddy , 50 muri	X	X
Others	X	X	X

**m) Name of respondent: Krishna Pd. Bhandari Contact No: 9747070421 Date: 28/03/2069 B.S.**  
**Age: 41 Occupation: Business Location: Rupakot-9, Damoga+Thulo Phant+Ampchaur Gaun**

**i) Year of the occurrence: 2064 B. S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~30Ropanies	X	X
Life	X	X	X
Build properties	X	X	X
Crops	~Paddy , 90 muri	X	X
Others	X	X	X

**n) Name of respondent: Rabibal Bote Contact No: 9819482962 Date: 28/03/2069 B.S.**  
**Age: 58 Occupation: Agriculture Location: Rupakot-4, Dakuwa, Bote Gaun.**

**i) Year of the occurrence: 2018 B. S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~15Ropanies	X	X
Life	X	X	X
Build properties	X	X	X
Crops	~Paddy , 20 muri	X	X
Others	X	X	X

**o) Name of respondent: Daya Nidhi Bhandari Contact No: 075-690775 Date: 28/03/2069 B.S.**  
**Age: 60 Occupation: Agriculture Location: Juniya-9, Sera Phant.**

**i) Year of the occurrence: 2018 B. S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~17Ropanies	X	~10Ropanies
Life	X	X	X
Build properties	2 houses	X	X
Crops	~Paddy , 50 muri	X	~Paddy , 30 muri
Others	X	X	X

**p) Name of respondent: Ghanashyam Neupane Contact No: X Date: 28/03/2069 B.S.**  
**Age: 56 Occupation: Business Location: Hunga-9, Bote Gaun.**

**i) Year of the occurrence: 2048 B. S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~10Ropanies	X	
Life	X	X	X
Build properties	3 houses	X	X
Crops	~Paddy , 35 muri	X	x
Others	X	X	X

**q) Name of respondent: Padam Bdr. Basnet Contact No: 9847200292 Date: 28/03/2069 B.S.**  
**Age: 55 Occupation: Agriculture Location: Juhang-1, Dhawa Gaun+Chorkate Ghat.**

**i) Year of the occurrence: 2018 B. S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~30Ropanies	X	
Life	X	X	X
Build properties	X	X	X
Crops	~Paddy , 90 muri	X	x
Others	X	X	X

r) Name of respondent: Resham Khatri Contact No: 9847030450 Date: 28/03/2069 B.S.  
 Age: 60 Occupation: Agriculture Location: Juhang-2,Kuhinikot(Kimkot).

i) Year of the occurrence: 2018 B. S.

ii) Cause of the flood: Heavy Precipitation

iii) Affects of the flood event:

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~15Ropanies	X	~23Ropanies
Life	X	X	X
Build properties	X	X	X
Crops	~Paddy , 50 muri	X	~paddy,65muri
Others	7 Cattles	X	X

s) Name of respondent: Giri Raj Pantha Contact No: 9847030450 Date: 29/03/2069 B.S.  
 Age: 52 Occupation: Business Location: Juhang-2, Ullikhola.

i) Year of the occurrence: 2048 B. S.

ii) Cause of the flood: Heavy Precipitation

iii) Affects of the flood event:

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~100Ropanies	X	X
Life	X	X	X
Build properties	3 houses	X	X
Crops	~Paddy , 300 muri	X	X
Others	5Cattles	X	X

t) Name of respondent: Shanti Devi Bhandari Contact No: 9847579865 Date: 29/03/2069 B.S.  
 Age: 54 Occupation: Agriculture Location: Juhang-4, Ritaudigaun.

i) Year of the occurrence: 2064 B. S.

ii) Cause of the flood: Heavy Precipitation

iii) Affects of the flood event:

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~34Ropanies	X	~25Ropanies
Life	1	X	X
Build properties	1 house	X	X
Crops	~Paddy , 100 muri	X	~Paddy , 90 muri
Others	7Cattles	X	4 Cattles

u) Name of respondent: Krishna Man Shrestha Contact No: 079-690995 Date: 29/03/2069 B.S.  
 Age: 59 Occupation: Business Location: Juhang-5,Arunga Bazar.

i) Year of the occurrence: 2037 B. S.

ii) Cause of the flood: Heavy Precipitation

iii) Affects of the flood event:

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~25Ropanies	X	X
Life	X	X	X
Build properties	Water mill & Belly bridge	X	X
Crops	~Paddy ,75 muri	X	X
Others	X	X	X



v) **Name of respondent:** Gana Pati Buda **Contact No:** 9847058241 **Date:** 29/03/2069 B.S.  
**Age:** 50 **Occupation:** Agriculture **Location:** Bamgha-5, Bote Gaun.

i) **Year of the occurrence:** 2039 B. S.

ii) **Cause of the flood:** Heavy Precipitation

iii) **Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~27Ropanies	~17Ropanies	X
Life	X	X	X
Build properties	X	X	X
Crops	~Paddy , 40 muri	~Paddy , 30 muri	X
Others	X	X	X

w) **Name of respondent:** Sali Gram Bhandari **Contact No:** X **Date:** 29/03/2069 B.S.  
**Age:** 65 **Occupation:** Agriculture **Location:** Bamgha-2, Bote Gaun

i) **Year of the occurrence:** 2047 B. S.

ii) **Cause of the flood:** Heavy Precipitation

iii) **Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~100Ropanies	X	X
Life	X	X	X
Build properties	X	X	X
Crops	~Paddy , 200 muri	X	X
Others	X	X	X

x) **Name of respondent:** Purshottam Bhandari **Contact No:**079-690721 **Date:** 29/03/2069 B.S.  
**Age:** 86 **Occupation:** Agriculture **Location:** Hasara-1, Khaireni

i) **Year of the occurrence:** 2037 B. S.

ii) **Cause of the flood:** Heavy Precipitation

iii) **Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~15Ropanies	Unknown	Unknown
Life	7	Unknown	Unknown
Build properties	Water Mill	Unknown	Unknown
Crops	~Paddy , 48 muri	Unknown	Unknown
Others	X	Unknown	Unknown

y) **Name of respondent:** Jay Lal Jueuli **Contact No:** 9747076873 **Date:** 29/03/2069 B.S.  
**Age:** 74 **Occupation:** Agriculture **Location:** Limgha-7, Dhandgaira gaun

i) **Year of the occurrence:** 2018 B. S.

ii) **Cause of the flood:** Heavy Precipitation

iii) **Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~20 Ropanies	Unknown	Unknown
Life	X	Unknown	Unknown
Build properties	X	Unknown	Unknown
Crops	~55Muri	Unknown	Unknown
Others	X	Unknown	Unknown

## 2.1.2 Landslide

Landslide events are relatively high in the influence area of candidate project. About 15 landslide events are reported from the area after heavy precipitation in the monsoon season with the loss of life and property. Table below presents the details of the landslide event as preported by the key informants.

**a) Name of respondent: Kala Dhar Aryal**

Year	Location	Cause	Affected Fields	
2053 B.S.	Ampchaur 7, Indregauda (Dhanda)	Heavy Precipitation	Affected Area	Indregauda (Dhanda)
			Loss of life	x
			Loss of Build	x
			Loss of Crops	Paddy
			Loss of Land	5 Ropanies

**b) Name of respondent: Padam Pani Bhandari**

Year	Location	Cause	Affected Fields	
2060 B.S.	Ampchaur - 3, Bhukwa Phant (Slide from ward no. 6 to ward no. 3)	Heavy Precipitation	Affected Area	Bhukwa Phant
			Loss of life	x
			Loss of Build	x
			Loss of Crops	Paddy and maize
			Loss of Land	7 Ropanies

**c) Name of respondent: Rudra Raj Kharel**

Year	Location	Cause	Affected Fields	
2042 B.S.	Ampchaur -4 Talla Phant Gaun (From ward No. 1 Dhaureni Gaun to ward No. 4)	Heavy Precipitation	Affected Area	Dhaureni Gaun
			Loss of life	7(One family)
			Loss of Build	3 Houses
			Loss of Crops	Paddy and maize
			Loss of Land	50 Ropanies

**d) Name of respondent: Bhakta Bdr. Magar**

Year	Location	Cause	Affected Fields	
2065 B.S.	Balithum-4, Sanolumpe.	Heavy Precipitation	Affected Area	Lauri simal
			Loss of life	2
			Loss of Build	1 House
			Loss of Crops	Paddy and maize
			Loss of Land	2 Ropanies

**e) Name of respondent: Jeeva Lal Kandel**

Year	Location	Cause	Affected Fields	
2064 B.S.	Balithum-2& , Sanolumpe.	Heavy Precipitation	Affected Area	Sanolumpe.
			Loss of life	2
			Loss of Build	X
			Loss of Crops	Paddy
			Loss of Land	100 Ropanies

**f) Name of respondent: Kashi Ram Gautam**

Year	Location	Cause	Affected Fields	
2019 B.S.	Balithum-5, Bote Gaun.	Heavy Precipitation	Affected Area	Sera Phant
			Loss of life	X
			Loss of Build	X
			Loss of Crops	Paddy and maize
			Loss of Land	25 Ropanies

**g) Name of respondent: Prem Parajuli**

Year	Location	Cause	Affected Fields	
2053 B. S.	Turang-5, Rampur	Heavy Precipitation	Affected Area	Rampur
			Loss of life	X
			Loss of Build	X
			Loss of Crops	Paddy & maize
			Loss of Land	25 Ropanies

**h) Name of respondent: Bhim Lal Gautam**

Year	Location	Cause	Affected Fields	
2025 B. S.	Jubhung -8, Ghoraha	Heavy Precipitation	Affected Area	Ghoraha Gaun
			Loss of life	X
			Loss of Build	2 houses
			Loss of Crops	Paddy
			Loss of Land	12 Ropanies

**i) Name of respondent: Chet Nath Bhandari**

Year	Location	Cause	Affected Fields	
1975 B. S.	Rupakot-2&9 Jogithum village	Heavy Precipitation	Affected Area	jogithum village
			Loss of life	X
			Loss of Build	10 houses
			Loss of Crops	Paddy
			Loss of Land	75 Ropanies

**j) Name of respondent: Krishna Pd. Bhandari**

Year	Location	Cause	Affected Fields	
2063 B. S.	Rupakot-9, Damoga	Heavy Precipitation	Affected Area	Damoga village
			Loss of life	X
			Loss of Build	X
			Loss of Crops	Paddy
			Loss of Land	24 Ropanies

**k) Name of respondent: Ghanashyam Neupane**

Year	Location	Cause	Affected Fields	
2038 B. S.	Huga-9, Bote Gaun	Heavy Precipitation	Affected Area	Simle
			Loss of life	X
			Loss of Build	X
			Loss of Crops	Paddy
			Loss of Land	15 Ropani

**l) Name of respondent: Padam Bdr. Basnet**

Year	Location	Cause	Affected Fields	
2068 B. S.	Juhang-1, Dhawa Gaun	Heavy Precipitation	Affected Area	Dhawa Pakho
			Loss of life	X
			Loss of Build	1 house
			Loss of Crops	maize
			Loss of Land	5 Ropani

**m) Name of respondent: Resham Khatri**

Year	Location	Cause	Affected Fields	
2063 B. S.	Juhang-2, Kuhinikot (Kimkot)	Heavy Precipitation	Affected Area	Kimkot
			Loss of life	X
			Loss of Build	X
			Loss of Crops	maize
			Loss of Land	30 Ropani

**n) Name of respondent: Giri Raj Pantha**

Year	Location	Cause	Affected Fields	
Since 2000 B. S. to this year	Juhang-2, Kamre ko pauro (largest landslide of Gulmi District) Kalo khola.	Heavy Precipitation	Affected Area	Kamre vir
			Loss of life	X
			Loss of Build	X
			Loss of Crops	x
			Loss of Land	100 Ropani

**o) Name of respondent: Sali Gram Bhandari**

Year	Location	Cause	Affected Fields	
2066 B. S.	Bamgha-2, Bote Gaun	Heavy Precipitation	Affected Area	Pakho vir
			Loss of life	X
			Loss of Build	1 house
			Loss of Crops	X
			Loss of Land	10 Ropanies

**p) Name of respondent: Purshottam Bhandari**

Year	Location	Cause	Affected Fields	
2064 B. S.	Hasara-1, Khaireni	Heavy Precipitation	Affected Area	Dumri chaur
			Loss of life	X
			Loss of Build	2 houses
			Loss of Crops	X
			Loss of Land	50 Ropanies

**q) Name of respondent: Jug Bdr. Darlami**

Year	Location	Cause	Affected Fields	
2039 B. S.	Rimuwa-9, Shaghat	Heavy Precipitation	Affected Area	Shaghat Besi
			Loss of life	X
			Loss of Build	X
			Loss of Crops	X
			Loss of Land	65 Ropanies

**r) Name of respondent: Jay Lal Jueuli**

Year	Location	Cause	Affected Fields	
2032 B. S.	Limgha-7, Dhandgaira gaun	Heavy Precipitation	Affected Area	Dhandgaira
			Loss of life	X
			Loss of Build	X
			Loss of Crops	X
			Loss of Land	100 Ropanies

### 2.1.3 Earthquake

In the memory of the local people the candidate project site communities have not experienced earthquake causing loss of life and property after the great earthquake of 1934.

### 3 FLORAL STUDY

Though the floral information at the regional level is available, there is no published literature on the site specific level of the candidate project at the central and district level offices of the government of Nepal. It is therefore, candidate project site is visited by the biological study team to gather information based on direct observation and through the participatory methods with the local key informants. Findings of the field study are presented in sections below.

#### 3.1 Vegetation Diversity

The information on the vegetation diversity is gathered from the direct observation by the members of biology study team during site visit. Besides, information is also collected from the key informants of the local area through interviews and focus group discussions with the local community forest user groups.

The candidate project site is rich in floral diversity. About 45 plant species were recorded through direct observation and interviews with the key informants. The list of plant species is presented in the table below.

S.N.	Local Name	Scientific Name
1	Khayer	<i>Acacia catechu</i>
2	bojo	<i>Acorus calamus</i>
3	Bel	<i>Aegla marmelos</i>
4	Chiuri	<i>Aesandra butyracea</i>
5	Utis	<i>Alnus nepalensis</i>
6	Rukh Katahar	<i>Artocarpus heterophyllus</i>
7	Badahar	<i>Artocarpus lakoocha</i>
8	Tanki	<i>Bauhinia purpuria</i>
9	Koiralo	<i>Bauhiniya variegata</i>
10	Chutro	<i>Berberis aristata</i>
11	Simal	<i>Bombax ceiba</i>
12	Lapsi	<i>Choerospondias axillaris</i>
13	Sissoo	<i>Dalbergia sissoo</i>
14	Bans	<i>Dendrocalamus hamiltoni</i>
15	Vyakur	<i>Dioscorea deltoidea</i>
16	Phaledo	<i>Erythrina arborescens</i>
17	Bar	<i>Ficus bengalensis</i>
18	Kavro	<i>Ficus lacor</i>
19	Peepal	<i>Ficus religiosa</i>
20	Khanayu	<i>Ficus semicordata</i>
21	Dabdabe	<i>Garuga pinnata</i>
22	Sisnu	<i>Girardinea diversifolia</i>
23	Khamari	<i>Gmelina arborea</i>
24	Kutmiro	<i>Litsea monopetala</i>
25	Mouwa	<i>Madhuca longifolia</i>
26	Sindure	<i>Mallotus philippensis</i>
27	Amp	<i>Mangifera indica</i>
28	Bakaino	<i>Melia azedarach</i>
29	Champ	<i>Michelia champaca</i>
30	Kimbu	<i>Morus alba</i>
31	Kafal	<i>Myrica esculenta</i>
32	Sajeevan	<i>Origanum vulgare</i>
33	Amla	<i>Phyllanthus emblica</i>
34	Aiselu	<i>Pyrys pashia</i>
35	Valayo	<i>Rhus javanica</i>
36	Chilaune	<i>Schima wallichii</i>
37	Sal	<i>Shorea robusta</i>

S.N.	Local Name	Scientific Name
38	Amaro	<i>Spondias pinnata</i>
39	Jamuno	<i>Syzygium cumini</i>
40	Barro	<i>Terminalia bellirica</i>
41	Harro	<i>Terminalia chebula</i>
42	Tuni	<i>Toona ciliate</i>
43	Bayer	<i>Zigyphus mauritiana</i>
44	Tidu	
45	Bot Dhairo	

Vindi ,Lichi , Naspatin ,Golvenda ,Amba, Anar, Kimu, Tori, Kovi ,Banda, Mula, Gulabi phul, Badam, Palans, Rahar Chana, Vatmas,Masuro, Mung,Mass, Methi, Bakilla, Koiralo, Gulmohar, Imili, Asok bot, Shirish, Lazawati jhar, Kursani, Daturu, Vanta, Aalu, Tite pati, Godavari phul, Piyajasun, Ghiukumari, Kukurdaino, Banmara, Hattibar Jai, Bans Duvo,Kodo, Jau, Dhan, Makai, Gahu etc. are the other commonplant species found in the area.

### 3.2 Forest Types

The candidate project site is characterized by the mixed braod leave forests, hill sal forest, Khayar /Sisso forest and Schima wallichii forest. The reservoir site is dominated by mixed braod leave forests and hill sal forest while higher altitudes of the influence area has Schima wallichii forest. Table below presents the forest types and associated species in the reservoir area and outside reservoir area.

Local( Within Reservoir)	Regional(Out of the reservoir)
Khayar /Sisso forest, Hill sal forest and Mixed broad leaved forest (Khayar is dominant plant along the valley bottom while other species such as Tuni,Utis, Simal, Sal and chilaune etc. are also found	Hill sal forest with Schima wallichii

### 3.3 Forest as per Forest Classification (Community Forest, Government Forest, Leasehold Forest, Private Forest, Religious Forest etc.)

The forests of the candidate project influence area are the government and community forests. The community forest are managed by the local community forest user groups within the framework of the community forest management plan approved by the district forest offices, while the government managed forest is managed by the district forest office. The reservoir occupied area has 12 community forests and 2 government managed forest. The name of the government and community forests, dominant species of plants and the location of the forests in the local administrative zone (VDCs) is presented in the tables below for the reservoir area and outside the reservoir area.

#### Local Area (Within the reservoir)

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C.
1	Community	Siddheshwor C.F.	Khayar	Ampchaur-7
2	Community	Ajammara C.F.	Khayar and Sissoo	Ampchaur-3
3	Community	Tinimini C.F.	Khayar	Ampchaur-4
4	Community	Rampur C.F.	Khayar and Sissoo	Turang-5
5	Community	Bote Khoriya C. F.	Uttis	Balithum-6
6	Government Managed	Rani Ban	Khayar and Sissoo	Turang-1
7	Community	Sijali C. F.	Khayar and Simal	Jubhung-8
8	Community	Ramashram C. F.	Khayar and Simal	Rupakot-3
9	Community	Ramkot C. F.	Sissoo	Rupakot-9
10	Community	Chiureni C. F.	Khayar	Rupakot-4
11	Community	Thulo Vir C. F.	Khayar	Juniya-9

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C.
12	Government Managed	Rani Ban	Uttis	Huga-9
13	Community	Baraha C. Forest	Khayar	Juhang-2
14	Community	Ramche C. F.	Uttis	Bamgha-5

### Regional Area (Outside the reservoir)

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C.
1	Community	Siddheshwor C.F.	Khayar and Sal	Ampchaur-7
2	Community	Ajammara C.F.	Khayar and Sissoo	Ampchaur-3
3	Community	Tinimini C.F.	Khayar and Sal	Ampchaur-4
4	Government	Rani Ban	Uttis	Badagaun-1
5	Community	Rampur C.F.	Khayar and Sissoo	Turang-5
6	Community	Bote Khoriya C. F.	Uttis	Balithum-6
7	Community	Khanimar C. F.	Sissoo	Balithum-4
8	Community	Jaluki pakho C. F.	Sissoo	Balithum-2
9	Government	Rani Ban	Khayar and Sissoo	Turang-1
10	Community	Rudrawoti C. F.	Khayar and Sissoo	Turang-7
11	Community	Sijali C. F.	Khayar and Simal	Jubhung-8
12	Community	Ramashram C. F.	Khayar and Simal	Rupakot-3
13	Community	Ramkot C. F.	Sissoo	Rupakot-9
14	Community	Chiureni C. F.	Khayar	Rupakot-4
15	Community	Thulo Vir C. F.	Khayar	Juniya-9
16	Government	Rani Ban	Uttis	Huga-9
17	Community	Baraha C. Forest	Khayar	Juhang-2
18	Private	Private Forest	Khayar	Juhang-1
19	Community	Ramche C. F.	Uttis	Bamgha-5
20	Private	Private Forest	Khayar	Juhang-5
21	Private	Private Forest	Khayar	Hasara-1
22	Private	Private Forest	Khayar	Rimuwa-9
23	Government	Rani Ban	Khayar	Limgha-7

### 3.4 Forest Plot Analysis

For the analysis of the forest status and characteristics 4 sample plots were measured within the reservoir area of the candidate project. The sample plots measured has a size of 25 x 25 meter. The detail of the sample plot measurements is presented in the tables below.

#### a) Forest: Rampuri community Forest

**Location:** Turang-1, Rampur

**G.P.S.** 28.50321N, 083.21546E

**Altitude:** 640m

S.N.	Tree Species	DBH(cm)	Height ft.(aprox)
1	<i>Toona ciliata</i>	78	38
2	<i>Bombax ceiba</i>	120	52
3	<i>Erythrina arborescens</i>	85	43
4	<i>Bombax ceiba</i>	210	60
5	<i>Bombax ceiba</i>	203	58
6	<i>Piper longum</i>	76	35
7	<i>Litsea monopetala</i>	50	32
8	<i>Toona ciliata</i>	38	41
9	<i>Toona ciliata</i>	43	28
10	<i>Garuga pinnata</i>	73	24
11	<i>Garuga pinnata</i>	65	39
12	<i>Litsea monopetala</i>	43	15
13	<i>Toona ciliata</i>	45	35
14	<i>Garuga pinnata</i>	77	25
15	<i>Litsea monopetala</i>	30	9
16	<i>Anthocephalus chinensis</i>	75	49

S.N.	Tree Species	DBH(cm)	Height ft.(aprox)
17	<i>Garuga pinnata</i>	55	43
18	<i>Bombax ceiba</i>	155	51
19	<i>Toona ciliata</i>	90	40
20	<i>Bridelia retusa</i>	54	36
21	<i>Piper longum</i>	78	45
Herbs and shrubs:- <i>Dendrocalamus hamiltonii</i> , <i>Justicia adhatoda</i> , <i>Girardinea diversifolia</i> etc.			

**Forest Density:** total no of tree/ area of the quadrate=336/ha

**Crown coverage of the forest:** 55%

**b) Forest: Ramashram community Forest**

**Location:** Rupakot-3, sota Gaun

**G.P.S.** N-28.050552, E-083.37113

**Altitude:** 631m

S.N.	Tree Species	DBH(cm)	Height ft.(aprox)
1	<i>Toona ciliata</i>	53	42
2	<i>Ficus nemoralis</i>	45	27
3	<i>Anthocephalus chinensis</i>	68	43
4	<i>Terminalia chebula</i>	62	30
5	<i>Shorea robusta</i>	70	36
6	<i>Shorea robusta</i>	75	39
7	<i>Shorea robusta</i>	65	38
8	<i>Toona ciliata</i>	40	44
9	<i>Ficus nemoralis</i>	42	20
10	<i>Bombax ceiba</i>	79	48
11	<i>Bombax ceiba</i>	56	35
12	<i>Piper longum</i>	114	30
13	<i>Acacia catechu</i>	30	32
14	<i>Acacia catechu</i>	36	27
15	<i>Acacia catechu</i>	42	35
16	<i>Acacia catechu</i>	54	31
17	<i>Shorea robusta</i>	58	38
18	<i>Bombax ceiba</i>	120	55
19	<i>Bombax ceiba</i>	93	42
20	<i>Toona ciliata</i>	58	30
21	<i>Toona ciliata</i>	76	37
22	<i>Acacia catechu</i>	43	38
23	<i>Terminalia chebula</i>	74	37
24	<i>Anthocephalus chinensis</i>	78	45
25	<i>Ficus nemoralis</i>	43	31
26	<i>Acacia catechu</i>	48	30
Herbs and shrubs:- <i>Dendrocalamus hamiltonii</i> , <i>Rauvolfia serpentine</i> , <i>Justicia adhatoda</i> , <i>Girardinea diversifolia</i> etc.			

**Forest Density:** total no of tree/ area of the quadrate=416/ha

**Crown coverage of the forest:** 65%

**c) Forest: Gahate community Forest**

**Location:** Juhang-4, Ritaudi Gaun

**G.P.S.** N-28.03056, E-083.42089

**Altitude:** 602m

S.N.	Tree Species	DBH(cm)	Height (ft)
1	<i>Anthocephalus chinensis</i>	55	36
2	<i>Anthocephalus chinensis</i>	62	40
3	<i>Acacia catechu</i>	37	28
4	<i>Shorea robusta</i>	35	48
5	<i>Shorea robusta</i>	55	62
6	<i>Ficus semicordata</i>	82	27
7	<i>Ficus semicordata</i>	65	25



S.N.	Tree Species	DBH(cm)	Height (ft)
8	<i>Toona ciliata</i>	70	54
9	<i>Toona ciliata</i>	86	45
10	<i>Bombax ceiba</i>	47	30
11	<i>Toona ciliata</i>	90	53
12	<i>Ficus semicordata</i>	96	36
13	<i>Shorea robusta</i>	52	65
14	<i>Acacia catechu</i>	60	47
15	<i>Bombax ceiba</i>	180	60
16	<i>Bombax ceiba</i>	124	58
17	<i>Bombax ceiba</i>	98	54
18	<i>Acacia catechu</i>	43	34
19	<i>Toona ciliata</i>	79	38
20	<i>Litsea monopelata</i>	58	26
21	<i>Litsea monopelata</i>	66	31
22	<i>Ficus lacor</i>	75	22
23	<i>Acacia catechu</i>	46	33
24	<i>Acacia catechu</i>	58	42
25	<i>Alnus nepalensis</i>	56	45
26	<i>Acacia catechu</i>	55	43
27	<i>Alnus nepalensis</i>	76	46
28	<i>Acacia catechu</i>	78	40

Herbs and shrubs:- *Rubus ellipticus, Dendrocalamus hamiltonii, Justicia adhatoda, Girardinea diversifolia etc.*

Forest Density: total no of tree/ area of the quadrate= 448/ha

Crown coverage of the forest: 70%

**d) Forest: Government Forest (Dam Site)**

**Location:** Limgha-7Dhadgaira Gaun

**G.P.S.** N-27.99977, E-083.45522

**Altitude:** 530m

S.N.	Tree Species	DBH(cm)	Height ft.(aprox)
1	<i>Acacia catechu</i>	45	22
2	<i>Acacia catechu</i>	55	28
3	<i>Dalbergia sissoo</i>	80	60
4	<i>Dalbergia sissoo</i>	38	34
5	<i>Dalbergia sissoo</i>	55	31
6	<i>Toona ciliata</i>	48	45
7	<i>Acacia catechu</i>	56	43
8	<i>Acacia catechu</i>	45	32
9	<i>Dalbergia sissoo</i>	63	28
10	<i>Toona ciliata</i>	64	42
11	<i>Acacia catechu</i>	75	37
12	<i>Bridelia retura</i>	76	30
13	<i>Bridelia retura</i>	69	34
14	<i>Acacia catechu</i>	64	37
15	<i>Ficus bengalensis</i>	78	29
16	<i>Dalbergia sissoo</i>	64	35
17	<i>Bombax ceiba</i>	89	47
18	<i>Bombax ceiba</i>	95	53
19	<i>Acacia catechu</i>	63	30
20	<i>Acacia catechu</i>	78	26
21	<i>Acacia catechu</i>	45	34
22	<i>Acacia catechu</i>	39	28
23	<i>Toona ciliate</i>	79	41

Herbs and shrubs:- *Rubus ellipticus, Dendrocalamus hamiltonii, Justicia adhatoda, Girardinea diversifolia etc.*

**Forest Density:** total no of tree/area of the quadrate=368

**Crown coverage of the forest:** 55%

### 3.5 Public Dependency on the Forest

The forests of the candidate project site provide a range of goods and services to the local communities. The local community extracts followings resources from the forest areas to support their livelihood.

- Firewood.
- Timber for domestic purpose as well as supplying out of village.
- Fodder.
- Grazing domestic animal.
- Medicine
- Ornamental
- Agricultural implements
- Religious
- Edibles, etc.

### 3.6 Floral Species of the Conservation Significance

Of the recorded floral species only 5 species have been categorized under the protection lists of the government of Nepal and CITES. However, none of the floral species have been listed in the IUCN red list. The table below presents the list of the protected species.

S.N.	Local Name	Common Name	Scientific Name	Status			Source		
				GoV	IUCN	CITES	Site survey	Hearing survey	Literature survey
1	Khayer	<i>Acacia catechu</i>		P			Confirmed at site		
2	Simal	<i>Bombax ceiba</i>		P			Confirmed at site		
3	Vyakur	<i>Dioscorea deltoidea</i>			II			Hearing at Juhang, Hasara, Rimuwa, and Limgha	
4	Champ	<i>Michelia champaca</i>		P				Hearing at Juhang, Hasara, Rimuwa, and Limgha	
5	Sal	<i>Shorea robusta</i>		P			Confirmed at site		

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## 4.0 FAUNAL STUDY (WILDLIFE)

Information on the wildlife of the candidate project site is scarce in the published literatures. It is therefore site investigations are conducted to gather information through direct observation and the participatory methods with the local communities and the key informants. The findings of the filed investigations are presented in section hereunder.

### 4.1 Wildlife Diversity

Information on wildlife diversity is gathered through direct observation and participatory methods which included focus group discussion with the local communities and key informant surveys.

#### a) Mammals

A total of 21 mammalian species were recorded from the focus group discussion and key informant surveys. Of the total reported species 5 mammalian species were directly observed by the field biological team. The details of the mammalian species and habitat types are presented in the table below.

S.N.	Consultation	Observation	Common Name	Scientific Name
1	Rat	-	Lesser Bandicoot-Rat	<i>Bandicota bengalensis</i>
2	Jackal	-	Golden Jackal	<i>Canis aureus</i>
3	Wild Dog	-	Dhole	<i>Cuon alpines</i>
4	Wild cat	-	Jungle Cat	<i>Felis chaus</i>
5	Mongoose	Mongoose	Small Indian Mongoose	<i>Herpestes auropunctatus</i>
6	Porcupine	-	Indian Crested Porcupine	<i>Hystrix indica</i>
7	Kharayo	-	Indian Hare	<i>Lepus nigricollis</i>
8	Khairo Oth	-	Smooth-coated Otter	<i>Lutrogale perspicillata</i>
9	Rato Bandar	Rato Bandar	Rhesus Macaque	<i>Macaca mulatta</i>
10	Malsapro	Malsapro	Yellow -throated Marten	<i>Martes flavigula</i>
11	Bange Chamero	-	Common Bent Winged Bat	<i>Miniopterus schreibersii</i>
12	Ratuwa	-	Barking Deer	<i>Muntiacus muntjak</i>
13	Khet Muso	-	Little Indian Field Mouse	<i>Mus booduga</i>
14	Ghoral	-	Common Ghoral	<i>Naemorhedus goral</i>
15	Chituwa	-	Leopard	<i>Panthera pardus</i>
16	Squirrel	-	Red Giant Flying Squirrel	<i>Petaurista petaurista</i>
17	Raj Chamero	-	Indian Flying Fox	<i>Pteropus giganteus</i>
18	House Rat	House Rat	House Rat	<i>Rattus rattus</i>
19	Langur	Langur	Nepal Grey Langur	<i>Semnopithecus schistaceus</i>
20	Badel	-	Eurasian Wild Boar	<i>Sus scrofa</i>
21	Nir Biralo	-	Small Indian Civet	<i>Viverricula indica</i>

#### b) Birds

A total of 30 bird species are reported by the local communities and key informants. Of the total reported species 15 species are directly observed by the field biological team. Table below presents list of the reported and observed species in the candidate project influence area.

S.N.	Consultation	Observation	Common Name	Scientific Name
1	Ban Baj	-	Eurasian Sparrowhawk	<i>Accipiter nisus</i>
2	Kingfisher	-	Common Kingfisher	<i>Alcedo atthis</i>
3	Gauthali	Gauthali	Fork-tail Swift	<i>Apus pacificus</i>
4	Egret	Egret	Cattl Egret	<i>Bubulcus ibis</i>
5	Pigeon	Owl	Rock Pigeon	<i>Columba livia</i>
6	Dhobeni	Dhobeni	Oriental Magpie Robin	<i>Copsychus Sularis</i>
7	Crow	Crow	House Crow	<i>Corvus splendens</i>
8	Battai	-	Blue-breasted Quail	<i>Coturnix chinensis</i>
9	Kafal Pakyo	-	Indian Cuckoo	<i>Cuculus micropterus</i>
10	Kokale	Kokale	Grey Treeepie	<i>Dendrocitta formosae</i>
11	Chibe	Rani Chari	Black Drongo	<i>Dicrurus macrocercus</i>

S.N.	Consultation	Observation	Common Name	Scientific Name
12	Top Baj	-	Saker Falcon	<i>Falco Cherrug</i>
13	Titra	-	Grey Francolin	<i>Francolinus pondicerianus</i>
14	Luiche	Luiche	Red Jungle Fowl	<i>Gallus gallus</i>
15	Cockoo	-	Common Hawk Cuckoo	<i>Hierococcyx varius</i>
16	Bhadari	-	Long-tail Shrike	<i>Lanius schach</i>
17	Adjutant	-	Greater Adjutant	<i>Leptoptilos dubius</i>
18	Kalij	Kalij	Kalij Pheasant	<i>Lophura leucomelanos</i>
19	Barbet	-	Blue-throated Barbet	<i>Magalaima asiatica</i>
20	Owl	Owl	Oriental Scops Owl	<i>Otus sunia</i>
21	Osprey	Osprey	Osprey	<i>Pandion haliaetus</i>
22	Sparrow	Sparrow	Eurasian Tree Sparrow	<i>Passer montanus</i>
23	Rani Chari	Rani Chari	Scarlet Minivet	<i>Pericrotodus flammeus</i>
24	Woodpecker	-	Greater Yellownape	<i>Picus flavinucha</i>
25	Parakeet	-	Rose-ranged Parakeet	<i>Psittacula krameri</i>
26	Jurelo	Jurelo	Black-crested Bulbul	<i>Pycnonotus melanicterus</i>
27	Vulture	-	Red headed Vulture	<i>Sarcogyps calvus</i>
28	Dove	Dove	Spotted Dove	<i>Streptopelia chinensis</i>
29	Babbler	-	Spiny Babbler	<i>Turdoides nipalensis</i>
30	Lampuchhre	-	Yellow-billed Magpie	<i>Urocissa flavirostris</i>

### c) Herpetofauna

The key informants and the local community reported a total of 9 herpetofauna species from the reservoir area. Of the total reported 4 of the species are observed by the field study team. Details of the herpetofauna species and their habitat types are presented in the table below.

S.N.	Consultation	Observation	Common Name	Scientific Name
1	Bufo	Bufo	Southern Hill Toad	<i>Bufo microtympanus</i>
2	Bufo	Bufo	Marble Toad	<i>Bufo stomaticus</i>
3	Lizard	-	Garden Lizard	<i>Calotes versicolor</i>
4	Snake	Snake	Snake	<i>Elaphe helena</i>
5	Snake	-	Himalayan Trinket Snake	<i>Elaphe hodgsoni</i>
6	Frog	-	Spotted Whipping Frog	<i>Rachophorus maculatus</i>
7	Rana	-	Water Skipping Frog	<i>Rana cyanophlyctis</i>
8	Frog	Frog	Indian Bull Frog	<i>Rana tigrina</i>
9	Pit Viper	-	Large Scaled Pit Viper	<i>Tremeresurus albolabris</i>

## 4.2 Habitat Type in the Reservoir Area

The wildlife habitat of the reservoir area has the following characteristics

S.N.	Common Name	Scientific Name	Habitat
1	Rhesus Macaque	<i>Macaca mulatta</i>	Cultivated, non-cultivated land, forest and temple areas .
2	Nepal Grey Langur	<i>Semnopithecus schistaceus</i>	Non-cultivated land and cliff of hill,etc.
3	Yellow -throated Marten	<i>Martes flavigula</i>	Forest and nearby area,etc.
4	Small Indian Mongoose	<i>Herpestes auropunctatus</i>	Bushy places nearby settlement areas,crops field,canals,rivers and thin forest,etc.
5	Indian Crested Porcupine	<i>Hystrix indica</i>	Maize field, shady places, burrows etc.
6	Lesser Bandicoot-Rat	<i>Bandicota bengalensis</i>	Human settlement areas, caves,etc.
7	Little Indian Field Mouse	<i>Mus booduga</i>	Paddy fields, holes and burrow,etc.
8	Smooth-coated Otter	<i>Lutrogale perspicillata</i>	Water shades area.

Almost all habitats of wild animals is disturbed and fragmented by the encroachment of human settlement because of unplanned urbanization.

### 4.3 Migratory Corridor

The area is seasonally used as feeding habitat by the wildlife of the area and is not reported to be a migratory corridor and shows following characteristics.

- Ghorals seem in winter months at the top of mountain.
- Occasionally, Leopard comes in forest as well as their settlement area.
- Monkeys like Rhesus and Langurs visit in human’s crop land, mostly in summer season.
- Avian fauna like Parrots, rock pigeon, Lampuchhre etc. come in winter season for feeding

### 4.4 Wild Animals of Conservation Significance

The reported wildlife of the candidate project site are cross checked with the protected wildlife lists of the government of Nepal, IUCN red book and the CITES Appendices. The lists of the wildlife which fall in the protection category of the government of Nepal, IUCN red book and the CITES Appendices are presented in the sections below.

#### a) Mammals

Of the reported species of mammal, 9 of the species are listed under the protection category of either IUCN red list or under CITES Appendices. Of the recorded species 4 is listed under IUCN red list and 8 under CITES Appendices. Table below presents the species and thier protection category under various protection lists.

S.N .	Local Name	Common Name	Scientific Name	Status			Source		
				GoV	IUCN	CITES	Site survey	Hearing survey	Literature survey
1	Jackal	Golden Jackal	<i>Canis aureus</i>			III		Hearing at Juhang, Hasara, Rimuwa, and Limgha	
2	Wild Dog	Dhole	<i>Cuon alpinus</i>	EN		II		Hearing at Juhang, Hasara, Rimuwa, and Limgha	
3	Mongoose	Small Indian Mongoose	<i>Herpestes auropunctatus</i>			III	Confirmed at site		
4	Khairo Oth	Smooth-coated Otter	<i>Lutrogale perspicillata</i>	VU				Hearing at Juhang, Hasara, Rimuwa, and Limgha	
5	Ghoral	Common Ghoral	<i>Naemorhedus goral</i>	NT		I		Hearing at Juhang, Hasara, Rimuwa, and Limgha	
6	Chitwaha	Leopard	<i>Panthera pardus</i>	NT		I		Hearing at Juhang, Hasara, Rimuwa, and Limgha	
7	Raj Chamerlo	Indian Flying Fox	<i>Pteropus giganteus</i>			II		Hearing at Juhang, Hasara, Rimuwa, and Limgha	
8	Langur	Nepal Grey Langur	<i>Semnopithecus schistaceus</i>			I	Confirmed at site		

S.N.	Local Name	Common Name	Scientific Name	Status			Source		
				GoV	IUCN	CITES	Site survey	Hearing survey	Literature survey
9	Nir Biralo	Small Indian Civet	<i>Viverricula indica</i>			III		Hearing at Juhang, Hasara, Rimuwa, and Limgha	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

### b) Birds

Of the recorded avian species 3 are listed under the protection category of IUCN red list. Table below presents the details of the protected species and the protection category as per the government of Nepal and CITES Appendices.

S.N.	Local Name	Common name	Scientific name	Status			Source		
				GoV	IUCN	CITES	Site survey	Hearing survey	Literature survey
1	Top Baj	Saker Falcon	<i>Falco Cherrug</i>		VU			Hearing at Juhang, Hasara, Rimuwa, and Limgha	
2	Adjutant	Greater Adjutant	<i>Leptoptilos dubius</i>		EN			Hearing at Juhang, Hasara, Rimuwa, and Limgha	
4	Vulture	Red headed Vulture	<i>Sarcogyps calvus</i>		CR			Hearing at Juhang, Hasara, Rimuwa, and Limgha	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

### c) Herpetofauna

None of the recorded herpetofauna species are listed under the protection lists of government of Nepal, IUCN redlist and CITES appendices.

## 5 FISHERY STUDY

There is scanty information in the fish diversity, fishermen, fish market, and cost of fish in the candidate project site at the central and district level offices. To fill the data gap fish related information was gathered from the field surveys using a checklist. The fish survey is based on the participatory method and key informant survey methods along the influence area of the candidate project. The findings of the field survey are presented in the sections below.

### 5.1 Fishermen and their Occupational /Social/Economic Status and Fish Market, Availability and Cost

Participatory and key informant interviews reported nearly 86 occupational, 91 part time and 40 occasional fishermen in the limits of the reservoir area. Majority of the fishermen belong to Bote, Kumal and Magar ethnic group with a low social and economic status among the other communities.

About 70% of the fish caught by the fishermen is sold in the fish market, while rest is consumed by the fishermen family. There are altogether 7 fish markets in the nearby areas. Every day about 4 to 25 kg of fish is sold in each of the fish markets. Average cost of the fish in the market varies between 250 rupees.

Table below presents the details of information on the fishermen, their fishing status, economic and social status, fish market and availability of fish in the fish market and the average cost of the fish in the different parts of the reservoir area of the candidate project.

**a) Village/Tole: Ampchaur -3, Bhukwa Phant**  
**Name of the respondent:** Padam Pani Bhandari

**Date:** 27/03/2069 B.S.  
**Age:** 61

#### Fishermen

Presence of fisherman in the village						Yes
If yes no. of fishermen						4
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	-	-	2	Chhetri	2	Kumal
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Kumal	Chhetri	-	Kumal	Chhetri	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

#### Fish Market, Fish Availability and Cost

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
No	No	No	No

**b) Village/Tole: Badagaun-1, Dovan.**  
**Name of the respondent:** Til Bdr. Rana (Kumal)

**Date:** 26/03/2069 B.S.  
**Age:** 63

#### Fishermen

Presence of fisherman in the village						Yes
If yes no. of fishermen						50
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	25	Kumal	15	Kumal	10	Kumal
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Kumal			Kumal		-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Indregaunda Bazar	Yes	50	280 Fresh, 700 Dried

**c) Village/Tole: Balithum-4, Sanolumpe**  
**Name of the respondent:** Bhakta Bdr. Magar

**Date:** 27/03/2069 B.S.  
**Age:** 50

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						13
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	12	Kumal	1	Magar	-	-
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Kumal	Magar	-	Kumal	Magar	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Sano Lumpe Bazar	Yes	7	250 Fresh, 700 Dried

**d) Village/Tole: Balithum-6, Bote Gaun +Khaireni Ghat.**  
**Name of the respondent:** Kashi Ram Gautam

**Date:** 27/03/2069 B.S.  
**Age:** 80

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						20
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	8	Bote	7	Bote	5	Chhetri
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Bote	Chhetri	-	Bote	Chhetri	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Majuwa Bazzar	Yes	20	300 Fresh, 700 Dried



**e) Village/Tole: Turang-1, Majuwa Bazar**  
**Name of the respondent:** Kapil Mani Aryal

**Date:** 27/03/2069 B.S.  
**Age:** 42

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						10
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	6	Bote	-	-	4	Kumal
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Bote	Kumal	-	Bote	Kumal	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*  
*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Majuwa Bazar	Yes	10	250 Fresh, 750 Dried

**f) Village/Tole: Jubhung -8, Ghoraha**  
**Name of the respondent:** Bhim Lal Gautam

**Date:** 28/03/2069 B.S.  
**Age:** 90

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						10
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	5	Kumal	3	Chhetri	2	Brahmin
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Kumal	Chhetri	Brahmin	Kumal	Chhetri	Brahmin

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*  
*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Majuwa Bazar	Yes	20	250 Fresh, 700 Dried

**g) Village/Tole: Rupakot-4, Dakuwa, Bote Gaun.**  
**Name of the respondent:** Rabibal Bote

**Date:** 28/03/2069 B.S.  
**Age:** 5

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						24
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	4	Bote	12	Bote	4	Bote
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Bote		-	Bote		-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*  
*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Sera Phant Bazar	Yes	20	200 Fresh, 700 Dried

**h) Village/Tole: Hunga-9, Bote Gaun**

**Date: 28/03/2069 B.S.**

**Name of the respondent: Sagar Bote**

**Age: 35**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						15
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	7	Bote	4	Bote	4	Bote
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Bote		-	Bote		-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Sera Phant	Yes	8	200 Fresh, 700 Dried

**i) Village/Tole: Juhang-2, Ullikhola**

**Date: 29/03/2069 B.S.**

**Name of the respondent: Giri Raj Pantha**

**Age: 52**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						6
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
			3	Dalit	3	Kumal
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Dalit, Kumal		-	Dalit, Kumal		-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Ullikhola Bazar	Yes	10	250 Fresh, 700 Dried

**j) Village/Tole: Juhang-5, Arunga Bazar**  
**Name of the respondent: Krishna Man Shrestha**

**Date: 29/03/2069 B.S.**  
**Age: 59**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						22
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	6+6=12	Kumal & Chhetri	8	Chhetri	2	Brahmin
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Kumal	Chhetri	Brahmin	Kumal	Chhetri	Brahmin

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Arunga Bazar	Yes	8	250 Fresh, 700 Dried

**k) Village/Tole: Bamgha-5, Bote Gaun**  
**Name of the respondent: Gana Pati Buda**

**Date:29/03/2069 B.S.**  
**Age: 50**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						30
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	20	Bote	2	Bote	-	-
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Bote	-	-	Bote	-	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Ullikhola Bazar	Yes	20	250 Fresh, 700 Dried

**l) Village/Tole: Bamgha-2, Bote Gaun**  
**Name of the respondent: Sali Gram Bhandari**

**Date:29/03/2069 B.S.**  
**Age: 65**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						25
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	12	Bote	13	Bote & Chhetri	-	-
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Bote	Chhetri	-	Bote	Chhetri	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Arunga Bazar and Khaireni Bazar	Yes	15	250 Fresh, 700 Dried

**m) Village/Tole: Hasara-1, Khaireni**

**Date: 29/03/2069 B.S.**

**Name of the respondent: Purshottam Bhandari**

**Age: 86**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						20
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
			12	Kumal	8	Brahmin
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	-	Kumal	Brahmin	Kumal	-	Brahmin

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Khaireni Bazar	Yes	12	250 Fresh, 700 Dried

**n) Village/Tole: Rimuwa-9, Shaghat**

**Date: 29/03/2069 B.S.**

**Name of the respondent: Jug Bdr. Darlami**

**Age: 66**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						5
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	-	-	5	Dalit	-	-
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Dalit	-	-	Dalit	-	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Khaireni Bazar	Yes	10	250 Fresh, 750 Dried

**5.2 Fishing Season, Fish Catch, and Use of Caught Fish**

Fishing in the river is carried out during the pre-monsoon and post monsoon seasons. Normally in the cold winter months (December - February) and monsoon months (June - September) fishing by the local fishermen is a rare activity. On an average daily catch of the fish by the occupational fishermen ranges between 2 to 3 kg with a maximum of 15 kg. Nearly 576% of the fish caught is sold in the nearby fish market. On an average the part time fishermen earn about 10 to 12000 rupees annually. According to the local fishermen the fish population in the candidate project sites is increasing over the years due to dewatering effect of the Kali Gandaki A hydroelectric project.

The tables below present the details of the fishing season, fish catch, types of fish available, annual income of the fishermen etc. based on the key informant survey in different location of the candidate project sites.

**a) Location:** Lower Badigad Khola **Date:** 26/03/2069 B.S.  
**Name of the fisherman:** Til Bdr. Rana(Kumal) **Age:** 63 **Address:** Badagaun-1, Dovan.

<b>Fishing detail</b>	Fishing season:	All months			
	Fishing days/week:	6-7days/ week			
	Maximum catch/day:	12 kg			
	Minimum catch/day:	2 kg			
	Average catch/day:	4 kg			
<b>using way</b>	All consumed	At home	1KG	Average cost	Income last year
		In market	Yes	280/kg	30000/-

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Sahar, Gonch, Rem, Bam, Bagi, Buduna, Yekkinna, Tite, Gardi, Katanga, Kavre, Gadela, Parena, Katle, etc.	Tite, Yekkinna, Buduna			* Due to banned of blasting, Poisoning and electric current.

**b) Location:** Lower Badigad Khola **Date:** 26/03/2069 B.S.  
**Name of the fisherman:** Indra Bdr. Rana **Age:** 51 **Address:** Badagaun-1, Dovan.

<b>Fishing detail</b>	Fishing season:	All months			
	Fishing days/week:	6-7days/ week			
	Maximum catch/day:	10 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	3 kg			
<b>using way</b>	All consumed	At home	1KG	Average cost	Income last year
		In market	Yes	280/kg	240000/-

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Sahar, Gonch, Rem, Bam, Bagi, Buduna, Yekkinna, Tite, Gardi, Katanga, Kavre, Gadela, Parena, Katle,etc.	Tite, Yekkinna, Buduna			* Due to banned of blasting, Poisoning and electric current

**c) Location:** Lower Badigad Khola **Date:** 27/03/2069 B.S.  
**Name of the fisherman:** Bhakta Bdr. Magar **Age:** 50 **Address:** Balithum-4, Sanolumpe

<b>Fishing detail</b>	Fishing season:	From Chaitra to Ashoj			
	Fishing days/week:	4-5days/ week			
	Maximum catch/day:	7 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	3 kg			
<b>using way</b>	All consumed	At home	1 kg	Average cost	Income last year
		In market	yes	250	7000/-

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Sahar, Gonch, Rem, Bam, Bagi, Buduna, Yekkinna, Tite, Gardi, Katanga, Kavre, Gadela, Parena, Katle, etc.	Tite, Yekkinna, Buduna			* Due to banned of blasting, Poisoning and electric current.

**d) Location: Lower Badigad Khola**

**Date: 27/03/2069 B.S.**

**Name of the fisherman: Hari Lal Bote Age: 50**

**Address: Balithum-6, Bote Gaun**

**Fishing and way of consumption detail of the caught fish**

<b>Fishing detail</b>	Fishing season:	Every month			
	Fishing days/week:	All days/ week			
	Maximum catch/day:	15 kg			
	Minimum catch/day:	4 kg			
	Average catch/day:	6 kg			
<b>using way</b>	All consumed	At home	1/2kg	Average cost	Income last year
		In market	Yes	300	20000/-

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Sahar, Gonch, Rem, Bam, Bagi, Buduna, Yekkinna, Tite, Gardi, Katanga, Kavre, Gadela, Parena, Katle, etc.	Tite, Yekkinna, Buduna, Bagi			* Due to banned of blasting, Poisoning and electric current

**e) Location: Lower Badigad Khola**

**Date: 27/03/2069 B.S.**

**Name of the fisherman: Prem Bote Age: 45**

**Address: Balithum-6, Bote Gaun**

<b>Fishing detail</b>	Fishing season:	Every month			
	Fishing days/week:	All days/ week			
	Maximum catch/day:	10 kg			
	Minimum catch/day:	2 kg			
	Average catch/day:	3 kg			
<b>using way</b>	All consumed	At home	1/2kg	Average cost	Income last year
		In market	Yes	300	23000/-

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Sahar, Gonch, Rem, Bam, Bagi, Buduna, Yekkinna, Tite, Gardi, Katanga, Kavre, Gadela, Parena, Katle, etc.	Tite, Yekkinna, Buduna, Bagi			* Due to banned of blasting, Poisoning and electric current

**f) Location: Lower Badigad Khola**

**Date: 27/03/2069 B.S.**

**Name of the fisherman: Bhag Bdr. Kumal Age: 50**

**Address: Turang-1, Majuwa Bazar**

<b>Fishing detail</b>	Fishing season:	Except Mansir and Poush because of too cold			
	Fishing days/week:	All days/ week			
	Maximum catch/day:	11 kg			
	Minimum catch/day:	4 kg			
	Average catch/day:	2 kg			
<b>using way</b>	All consumed	At home	No	Average cost	Income last year
		In market	Yes	250	23000/-

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Sahar, Gonch, Rem, Bam, Bagi, Buduna, Yekkinna, Tite, Gardi, Katanga, Kavre, Gadela, Parena, Katle, etc.	Tite, Yekkinna, Buduna, Bagi			* Due to banned of blasting, Poisoning and electric current.

**g) Location: Lower Badigad Khola**

**Date: 28/03/2069 B.S.**

**Name of the fisherman: Rabilal Bote**

**Age: 58**

**Address: Rupakot-4, Dakuwa, Bote Gaun**

<b>Fishing detail</b>	Fishing season:	Except Mansir to Magh			
	Fishing days/week:	4-5days/ week			
	Maximum catch/day:	4 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	3 kg			
<b>using way</b>	All consumed	At home	No	Average cost	Income last year
		In market	yes	200	8000/-

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Sahar, Gonch, Rem, Bam, Bagi, Buduna, Yekkinna, Tite, Gardi, Katanga, Kavre, Gadela, Parena, Katle,etc.	Tite, Yekkinna, Buduna, Bagi			* Due to banned of blasting, Poisoning and electric current.

**h) Location: Lower Badigad Khola**

**Date: 29/03/2069 B.S.**

**Name of the fisherman: Dal Bdr. Bote Age: 25**

**Address: Bamgha-5, Bote Gaun**

<b>Fishing detail</b>	Fishing season:	Every month			
	Fishing days/week:	All days/ week			
	Maximum catch/day:	5 kg			
	Minimum catch/day:	2 kg			
	Average catch/day:	3 kg			
<b>using way</b>	All consumed	At home	No	Average cost	Income last year
		In market	Yes	200	10000/-

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Sahar, Gonch, Rem, Bam, Bagi, Buduna, Yekkinna, Tite, Gardi, Katanga, Kavre, Gadela, Parena, Katle, Asla, Jalkapuri, Khurpe etc.	Tite, Yekkinna, Buduna, Bagi			* Due to banned of blasting, Poisoning and electric current.

### 5.3 Fish Diversity

A total of 12 fish species is reported by the local fishermen during the key informant survey. The lists of the fish species reported in the candidate project site is presented in the table below.

S.N.	Consultation	observation	Common Name	Scientific Name
1	Gardi	Gardi	Gardi	<i>Labeo dero</i>
2	Gouch	-	Gouch	<i>Bagarius bagarius</i>
3	Buduna	Buduna	Buduna	<i>Garra gotyla gotyla</i>
4	Fageta	Fageta	Fageta	<i>Barilius barilius</i>
5	Gadela	Gadela	Gadela	<i>Nemacheilu botia</i>
6	Baghi	-	Baghi	<i>Botia lohachata</i>
7	Bam	-	Bam	<i>Anguila sps.</i>
8	Asla	Asla	Asla	<i>Schizothorax richardsoni</i>
9	Katle	Katle	Katle	<i>Neolissochilus hexagonolepis</i>
10	Kapre	-	Kapre	<i>Glyptorhorax annandalei</i>
11	Kabre	-	Kabre	<i>Pseudecheneis sulcatus</i>
12	Sahar	-	Sahar	<i>Tor tor</i>

Others :-Yakina,Charinga,Maga,Rem,Katango, etc.

### 5.4 List of Fish Species of Conservation Significance

Of the 12 reported fish species 4 of the fish species are listed in the IUCN red list. Table below presents the list of the fish species of conservation significance.

S.N.	Local Name	Common name	Scientific name	Status			Source		
				IUCN	GOV	CITES	Site survey	Hearing survey	Literature survey
1	Gouch	Gouch	<i>Bagarius bagarius</i>	NT				Hearing at Dovan, Balithum, Majuwa, Bote gaon, Arunga etc.	
2	Katle	Katle	<i>Neolissochilus hexagonolepis</i>	NT				Hearing at Dovan, Balithum, Majuwa, Bote gaon, Arunga etc.	
3	Asla	Asla	<i>Schizothorax richardsoni</i>	VU				Hearing at Dovan, Balithum, Majuwa, Bote gaon, Arunga etc.	
4	Sahar	Sahar	<i>Tor tor</i>	EN				Hearing at Dovan, Balithum, Majuwa, Bote gaon, Arunga etc.	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

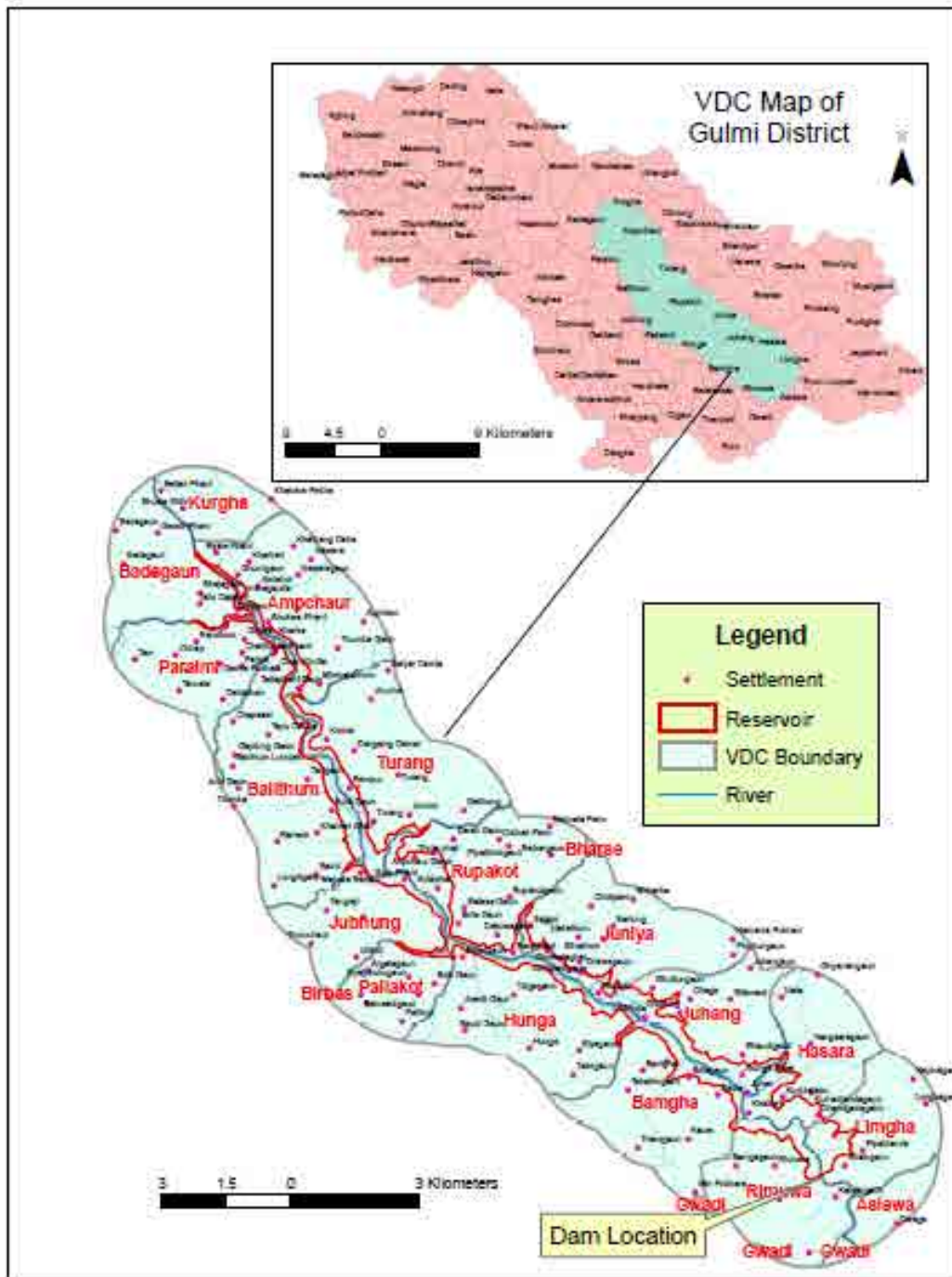
**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)



## 6 Topographic Map and Satellite Imagery Study

### 6.1 Project Location



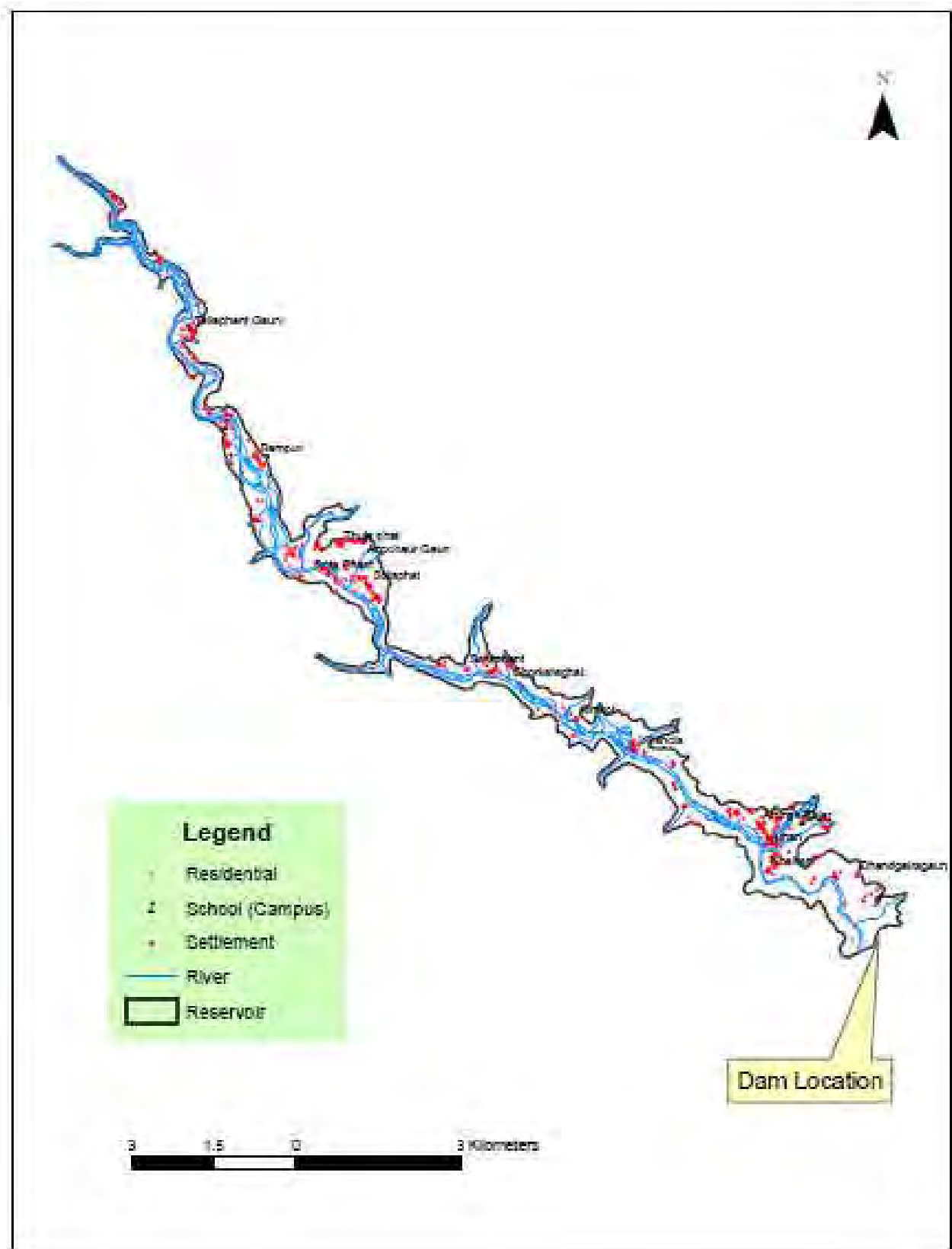
### 6.2 Topographic Maps

For this study, topographical maps of the scale of 1: 25000 prepared by the Government of Nepal, Survey Department (1996) has been used for the analysis of land cover, and built structures, after digitizing. All data used for the topographic map study were projected to the Universal Transverse Mercator (UTM) projection system that is World Geodetic System 1984 for the analysis of topographic maps.

The analysis results are presented in the table and maps below.

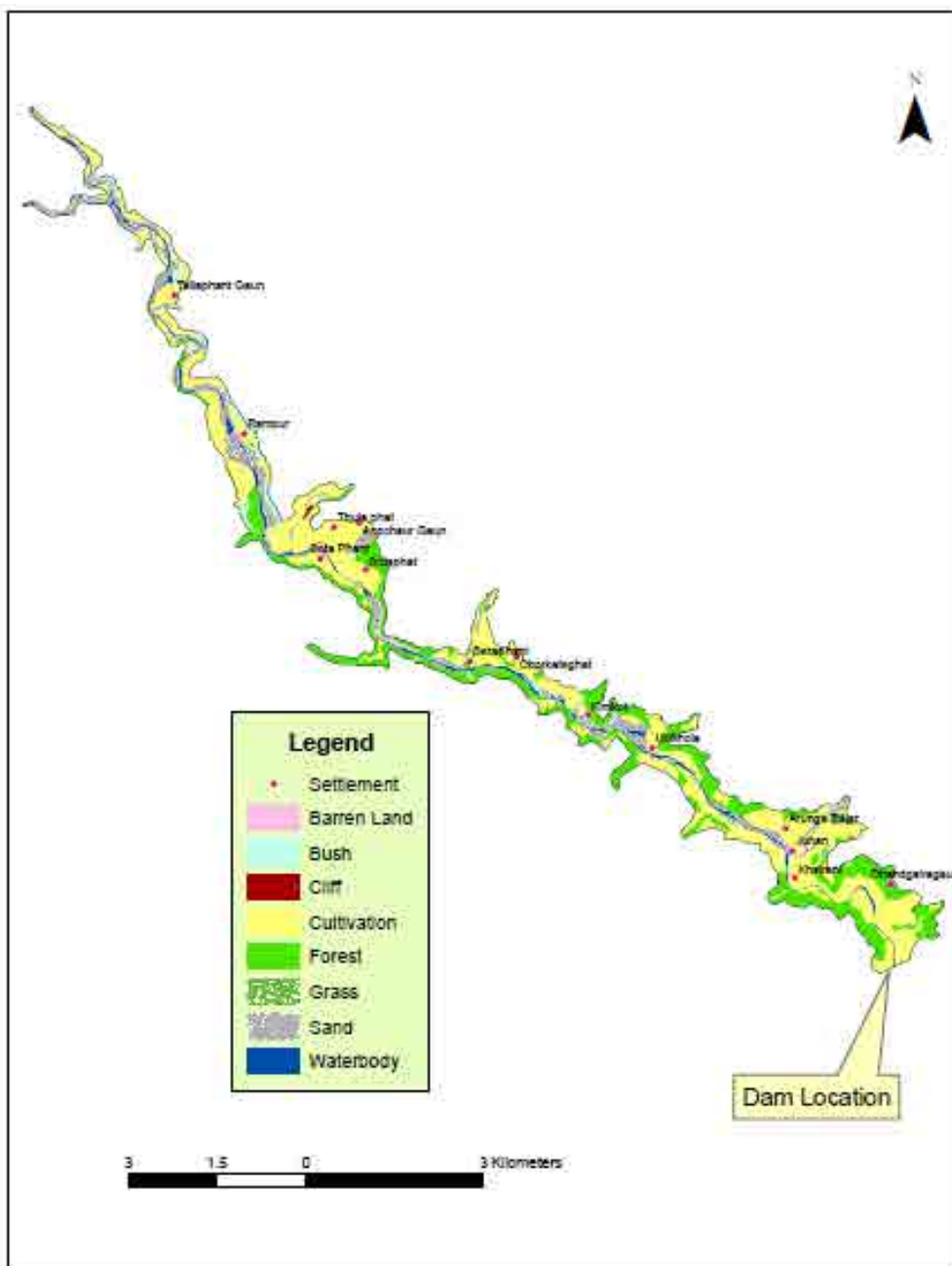
### 6.2.1 Built Structures

Nos. of building as per the Topographic maps	364
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### 6.2.2 Land Use

S.N.	Land Use Class	Land Use Topographic Maps (1996), Km <sup>2</sup>	Percentage
1	FOREST	3.7485706	27.52
2	BUSH	0.313582	2.3
3	SAND	1.419809	10.42
4	CULTIVATED	6.696385	49.16
5	CLIFF	0.020578	0.15
6	WATER	1.359523	9.98
7	GRASS LAND		
8	BARREN LAND	0.05581	0.4
	<b>TOTAL</b>	<b>13.62</b>	<b>100</b>

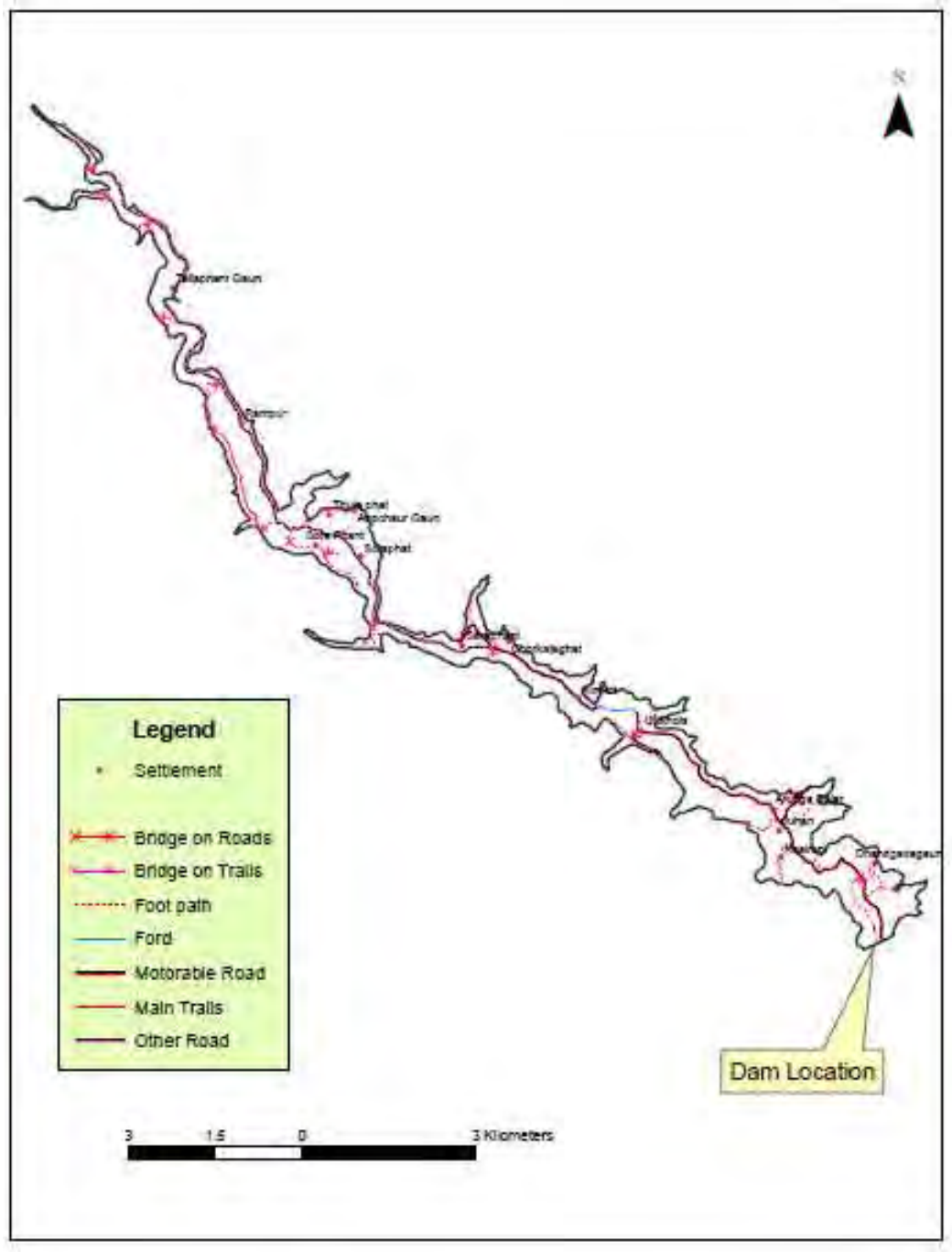






### 6.3.3 Infrastructures

Infrastructures	Nos. / Length
Total Nos. of bridge on motorable road	1
Total Nos. of bridge on trail	11
Total Nos. of fords	3
Gravel road (m)	26061
Paved road (Highway) (m)	0
Main trail (m)	2520
Foot path (m)	16092



## References

1. Bibhuti Ranjan Jha, 2006; *Fish Ecological Studies and its application in assessing Ecological Integrity of Rivers in Nepal*; Thesis Submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in The Department of Biological Sciences and Environmental Science, School of Science, Kathmandu University, Dhulikhel, Nepal, January 2006
2. CBS (2002), *Population Census 2001, National Report*, Kathmandu: Central Bureau of Statistics/UNFPA
3. CBS, 2012; *National Population and Housing Census 2011 (Village Development Committee/Municipalities)*, Government of Nepal, National Planning Commission Secretariate, Central Bureau of Statistics, Kathmandu, Nepal, November 2012.
4. Disaster Preparedness Network, Nepal, 2009; *Nepal Disaster Report: The hazardscape and vulnerabilities*, Ministry of Home Affairs, Nepal Disaster Preparedness Network, Nepal with support from with support from European Commission for Humanitarian Aid Department, United Nations Development Nepal and Oxfam Nepal
5. IUCN, 2011; *The Status of Nepal's Mammals: The National Red List Series*
6. NARMSAP, 2002; *Forest and Vegetation Types of Nepal*, TISC Document Series No 105, GoN/MOFSC/NARMSAP, 1-179.
7. Petr, T, 2002; *Cold water fish and fisheries in countries of the high mountain arc of Asia (Hindu Kush-Pamir-Karakoram-Himalayas) A review*, Symposium on coldwater fish species in the trans-Himalayan region. 10-14 July 2001.Kathmandu, Nepal
8. Rajbansi K.J, 1982; *A General Bibliography on Fish and Fisheries of Nepal*, Royal Nepal Academy, Kamaladi, Kathmandu, Nepal.
9. Rajbansi K.J, 2002; *Zoogeographical distribution and the status of cold water fishes of Nepal*. Paper presented in symposium on coldwater fish species in the trans-himalayan region. 10-14 July 2001.Kathmandu, Nepal
10. Shrestha et.al, 2012; *Fishes of Nepal: Mapping distributions based on voucher specimens*, Emporia State Research Studies Vol. 48, no. 2, p. 14-21 (2012)
11. Shrestha, J. (1995); *Enumeration of the Fishes of Nepal*, Bio-diversity Profiles Project, Publication No. 10, Department of National Parks and wildlife Conservation, Ministry of Forest & Soil Conservation, GoN, Kathmandu, Nepal.
12. Shrestha, T. K., 2008; *Icology of Nepal A study of Fishes of the Himalayan Waters*
13. Stainton, J.D.A., 1972; *Forests of Nepal*, John Murray, London.

## Photographs



Constructing Bridge On Majuwa Khola(



Drying Marcha At Sera Phant (Juniya Vdc)



Interviewing at sahaaghat settlement(rimuwa vdc)



Irrigation canal gengu khola



Public driking sources at rupakot



Sarswoti Mandir Turang-1 Majhuwa



House At Anpchar Vdc



Stucture Near Cremation Ghat



# Appendixes

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**Appendix 1: VDCs, Settlements and Population under the Lower Bodigad Storage Project, Gulmi**

S.N.	VDC	Settlement	Ward No.	HH	Population
1	Aanpchaur	Bhukuwa Jhakla	3	10	70
2		Indregaunda	7	55	295
3		Tallophant	4&5	80	450
4	Johang	Prabhananda Nagar (Chorkate)	1	31	145
5		Arunga (Khaireni)	4&5	140	800
6		Ulli Khola and Khukura phant	2	150	880
7		Dhaba (Khalurukhola)	1&2	25	210
8		Ritaudi Gaun	5	5	17
9	Rimuwa	Sidha Thum	8	18	105
10		Sakhar (Yaadi)	7	6	40
11	Balithum	Charkhute	4	21	110
12		Sivapuri / Tari	2,5&6	50	320
13		Sera Phant / Botegaun	6	35	300
14		Khaguwa	4	6	34
15	Rupakot	Sotaphant	2,3&9	150	900
16		Bote majhi (Chureni gaun)	4	25	250
17	Turang	Rampur	4&5	12	70
18		Majuwa bazar	1	120	1000
19		Sota	7	24	200
20		Kumal gaun	7	33	350
21	Hasara	Chatimpot	4	30	179
22		Upalo saghat	2	25	147
23		Khaireni bazar phat	1	121	667
24		Tallo saghat	3	30	200
25	Jubhung	Ghorha	NA	70	400
26	Hunga	Urleni, chorkat,tallo ramaudi	2&3	5	33
27	Bamgha	Majha / chamdi aatipata	1,2&5	125	850
28	Limgha	Nadeva	7	44	405
29	Juniya	Chorkot	9	65	239
30	Badagaun	Dovhan	1	95	450
<b>Total</b>	<b>13</b>	<b>30</b>	<b>35</b>	<b>1606</b>	<b>10116</b>

Source: NESS Field Survey, 2012

**Appendix 2: Ethnic / Caste Division of the Reservoir Area Population**

S.N.	VDC	Settlement	Brahmin	Chhetri	Magar (Disadvantage Group)	Gurung (Disadvantage group)	Newar (Advanced group)	Kumal (Marginalized group)	Thakali (Disadvantage group)	Bote (Highly marginalized group)	Dalit
1	Aanpchaur	Bhukuwa Jhakla	10	0	0	0	0	0	0	0	0
2		Indregaunda	40	5	2	4	0	0	0	0	0
3		Tallophant	60	7	4	1	0	3	0	0	0
4	Johang	Prabhananda nagar (Chorkate)	19	4	5	0	0	0	3	0	0
5		Arunga (Khaireni)	70	10	0	3	35	0	0	12	0
6		Ulli Khola and Khukura phant	100	35	4	4	0	0	0	0	2
7		Dhaba (Khalurukhola)	7	10	8	0	0	0	0	0	0
8		Ritaudi Gaun	4	0	1	0	0	0	0	0	0
9	Rimuwa	Sidha Thum	0	0	18	0	0	0	0	0	0
10		Sakhar (Yaadi)	2	0	0	0	0	0	0	0	0
11	Balithum	Charkhute	21	0	0	0	0	0	0	0	0
12		Sivapuri / Tari	43	5	2	0	0	0	0	0	0
13		Sera Phant / Botegaun	10	0	0	0	0	0	0	25	0
14		Khaguwa	3	0	3	0	0	0	0	0	0
15	Rupakot	Sotaphant	111	10	8	0	0	5	0	12	0
16		Bote majhi (Chureni gaun)	0	1	1	0	0	0	0	0	23
17	Turang	Rampur	9	0	0	0	3	0	0	0	0
18		Majuwa bazar	65	10	30	0	1	0	0	4	0
19		Sota	22	0	0	0	2	0	0	0	0
20		Kumal gaun	16	2	0	0	12	0	3	0	0
21	Hasara	Chatimpot	17	3	7	0	0	0	0	0	0
22		Upalo saghat	22	0	0	0	0	0	0	0	0
23		Khaireni bazar phat	95	7	14	0	0	0	0	0	0
24		Tallo saghat	19	0	5	0	0	0	0	0	0
25	Jbhung	Ghorha	66	0	4	0	0	0	0	0	0
26	Hunga	Urteni, chorkat, tallo ramaudi	3	0	2	0	0	0	0	0	0
27	Bamgha	Majha / chamdi	45	20	10	1	34	0	0	5	0

S.N.	VDC	Settlement	Brahmin	Chhetri	Magar (Disadvantage Group)	Gurung (Disadvantage group)	Newar (Advanced group)	Kumal (Marginalized group)	Thakali (Disadvantage group)	Bote (Highly marginalized group)	Dalit
		aatipata									
28	Limgha	Nadeva	36	0	3	0	0	0	0	0	0
29	Juniya	Chorkot	56	6	3	0	0	0	0	0	0
30	Badagaun	Dovhan	0	0	0	0	0	95	0	0	0
<b>Total</b>	<b>13</b>	<b>30</b>	<b>971</b>	<b>135</b>	<b>134</b>	<b>13</b>	<b>87</b>	<b>103</b>	<b>6</b>	<b>58</b>	<b>25</b>
<b>%</b>			<b>60.46</b>	<b>8.41</b>	<b>8.34</b>	<b>0.81</b>	<b>5.42</b>	<b>6.41</b>	<b>0.37</b>	<b>3.61</b>	<b>1.56</b>

Source: NESS Field Survey, 2012

**Appendix 3: Land Use Pattern of the Reservoir Area**

S.N.	VDC	Settlement	Agriculture	pasture	forest	other	Total
1	Aanpchaaur	Bhukuwa Jhakla	120	0	0	20	140
2		Indregaunda	275	2	0	25	302
3		Tallophant	1010	50	0	10	1070
4	Johang	Prabhananda nagar (Chorkate)	100	0	0	60	160
5		Arunga (Khaireni)	1050	0	0	500	1550
6		Ulli Khola and Khukura phant	3000	0	1000	0	4000
7		Dhaba (Khalurukhola)	540	0	0	50	590
8		Ritaudi Gaun	60	0	10	10	80
9	Rimuwa	Sidha Thum	100	0	0	500	600
10		Sakhar (Yaadi)	35	0	200	0	235
11	Balithum	Charkhute	140	20	0	0	160
12		Sivapuri / Tari	510	0	0	0	510
13		Sera Phant / Botegaun	475	0	0	25	500
14		Khaguwa	80	0	0	0	80
15	Rupakot	Sotaphant	45	13	0	13	71
16		Bote majhi (Chureni gaun)	16	0	8	0	24
17	Turang	Rampur	140	0	0	0	140
18		Majuwa bazar	900	0	0	0	900
19		Sota	204	20	0	20	244
20		Kumal gaun	154	5	0	4	163
21	Hasara	Chatimpot	250	0	20	20	290
22		Upalo saghat	350	0	0	0	350
23		Khaireni bazar phat	300	0	60	60	420
24		Tallo saghat	410	0	0	0	410
25	Jubhung	Ghorha	1000	500	500	0	2000
26	Hunga	Urleni, chorkat, tallo ramaudi	100	0	20	20	140
27	Bamgha	Majha / chamdi aatipata	500	0	0	300	800
28	Limgha	Nadeva	200	0	0	0	200
29	Juniya	Chorkot	200	0	15	15	230
30	Badagaun	Dovhan	350	0	25	50	425
<b>Total</b>	<b>13</b>	<b>30</b>	<b>12614</b>	<b>610</b>	<b>1858</b>	<b>1702</b>	<b>16784</b>
<b>%</b>			<b>75.15</b>	<b>3.63</b>	<b>11.07</b>	<b>10.14</b>	<b>100</b>

Source: NESS Field Survey, 2012

**Appendix 4: Land Holding of the Reservoir Area**

S.N.	VDC	Settlement	Khet	Bari	Other	Total	Average Hiding Size
1	Aanpchaur	Bhukuwa Jhakla	100	20	0	120	12.0
2		Indregaunda	260	15	25	300	5.5
3		Tallophant	1000	10	0	1010	12.6
4	Johang	Prabhananda nagar (Chorkate)	100	0	60	160	5.2
5		Arunga (Khaireni)	1000	50	0	1050	7.5
6		Ulli Khola and Khukura phant	3000	0	0	3000	20.0
7		Dhaba (Khalurukhola)	400	140	50	590	23.6
8		Ritaudi Gaun	60	0	10	70	14.0
9	Rimuwa	Sidha Thum	0	100	500	600	33.3
10		Sakhar (Yaadi)	25	10	0	35	5.8
11	Balithum	Charkhute	80	60	0	140	6.7
12		Sivapuri / Tari	500	10	0	510	10.2
13		Sera Phant / Botegaun	450	25	25	500	14.3
14		Khaguwa	80	0	0	80	13.3
15	Rupakot	Sotaphant	35	10	13	58	0.4
16		Bote majhi (Chureni gaun)	8	8	0	16	0.6
17	Turang	Rampur	140	0	0	140	11.7
18		Majuwa bazar	900	0	0	900	7.5
19		Sota	200	4	20	224	9.3
20		Kumal gaun	150	4	10	164	5.0
21	Hasara	Chatimpot	250	0	0	250	8.3
22		Upalo saghat	300	50	0	350	14.0
23		Khaireni bazar phat	300	0	60	360	3.0
24		Tallo saghat	400	10	0	410	13.7
25	Jubhung	Ghorha	500	500	0	1000	14.3
26	Hunga	Urleni, chorkat, tallo ramaudi	70	30	20	120	24.0
27	Bamgha	Majha / chamdi aatipata	250	250	300	800	6.4
28	Limgha	Nadeva	100	100	0	200	4.5
29	Juniya	Chorkot	200	0	15	215	3.3
30	Badagaun	Dovhan	0	350	50	400	4.2
<b>Total</b>	<b>13</b>	<b>30</b>	<b>10858</b>	<b>1756</b>	<b>1158</b>	13772	8.6
<b>%</b>			<b>78.84</b>	<b>12.75</b>	<b>8.41</b>	100.00	

Source: NESS Field Survey, 2012

**Appendix 5: Area (ropani) and Production (Kg) under Different Crops of the Project Area**

VDC / Settlement	Paddy		Maize		Millet		Wheat		Potato		Pulse		Oilseeds		Vegetable	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
<b>Aanpchaaur</b> / Bhukuwa Jhakla	100	20000	100	25200	0	0	100	2520	0	0	0	0	10	235	4	10000
Indregaunda	260	30000	15	2520	0	0	0	0	24	10500	10	1600	0	0	15	75000
Tallophant	1000	200000	500	63000	0	0	200	63000	100	120000	50	5000	0	0	50	50000
<b>Johang</b> / Prabhananda nagar (Chorkate)	100	20000	0	0	0	0	100	12600	15	50000	0	0	0	0	9	100000
Arunga (Khaireni)	1000	200000	1000	189000	0	0	700	157500	0	0	100	30000	0	0	100	100000
Ulli Khola and Khukura phant	3000	600000	2000	378000	0	0	1000	315000	500	45000	200	180000	0	0	500	250000
Dhaba (Khalurukhola)	400	100000	140	17640	0	0	400	63000	50	50000	0	0	0	0	10	50000
Ritaudi Gaun	60	5000	30	3150	0	0	20	1890	10	1500	0	0	0	0	2	4000
<b>Rimuwa</b> / Sidha Thum	0	0	100	5000	0	0	50	1890	0	0	0	0	0	0	10	2500
Sakhar (Yaadi)	25	5000	35	3150	0	0	10	1890	0	0	0	0	0	0	10	5000
<b>Balithum</b> /Chark ute	60	2500	60	9450	0	0	30	1890	10	5000	0	0	0	0	5	5000
Sivapuri/Tari	500	90000	400	75600	0	0	200	25200	100	45000	0	0	0	0	50	20000
Sera Phant/Botegaun	500	90000	100	18900	0	0	200	15750	20	12000	20	5000	0	0	30	15000
Khaguwa	80	15000	0	0	0	0	80	6300	0	0	0	0	0	0	10	5000
Rupakot / Sothaphat	35	140000	30	126000	0	0	20	94500	100	50000	0	0	0	0	50	200000
Bote majhi (Chureni gaun)	8	800	8	630	0	0	4	378	0	0	3	1500	0	0	2	4000
<b>Turang</b> / Rampur	140	25000	100	18900	0	0	0	0	0	0	10	1500	0	0	15	10000
Majuwa bazar	900	150000	800	151200	0	0	400	94500	200	300000	100	5000	0	0	60	50000
Sota	200	30000	100	18900	0	0	50	6300	0	0	10	3000	0	0	5	5000
Kumal gaun	150	30000	0	0	100	29080	100	25200	20	30000	0	0	0	0	20	10000
<b>Hasara</b> / Chatimpot	250	50000	100	31500	0	0	30	25200	0	0	0	0	0	0	10	50000
Upalo saghat	300	60000	0	0	200	58160	100	12600	0	0	0	0	0	0	50	100000

VDC / Settlement	Paddy		Maize		Millet		Wheat		Potato		Pulse		Oilseeds		Vegetable	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Khaireni bazar phat	300	60000	300	25200	0	0	300	18900	10	40000	0	0	0	0	10	100000
Tallo saghat	400	80000	300	44100	0	0	200	50400	0	0	0	0	0	0	100	40000
<b>jubhung</b> / Ghorha	500	90000	400	94500	0	0	500	63000	15	18000	5	1000	5	500	10	8000
<b>Hunga</b> / Urleni, chorkat, tallo ramaudi	70	15000	30	3150	0	0	20	1260	0	0	1	500	0	0	2	1500
<b>Bamgha</b> / Majha/chamdi aatipata	250	50000	250	37800	0	0	500	31500	100	225000	0	0	0	0	50	50000
<b>Limgha</b> / Nadeva	100	2000	100	18900	0	0	200	12600	0	0	0	0	0	0	10	50000
<b>Juniya</b> / Chorkot	200	40000	200	31500	0	0	200	25200	12	7200	0	0	0	0	40	100000
<b>Badagaun</b> / Dovhan	0	0	350	18900	200	7270	0	0	0	0	10	500	0	0	10	2000
<b>Total</b>	<b>10888</b>	<b>2200300</b>	<b>7548</b>	<b>1411790</b>	<b>500</b>	<b>94510</b>	<b>5714</b>	<b>1129968</b>	<b>1286</b>	<b>1009200</b>	<b>519</b>	<b>234600</b>	<b>15</b>	<b>735</b>	<b>1249</b>	<b>1472000</b>
<b>Cropping Intensity 219.75%</b>																

Source: NESS Field Survey, 2012



**Appendix 6: Sale of Crops**

S.N.	VDC	Settlement	crop name	quantity (kg)	value	place of sale
1	Aanpchaur	Bhukuwa Jhakla	0	0		
2		Indregaunda	vegetables	3000 (kg)	25/kg	near village
3		Tallophant	0	0		
4	Johang	Prabhananda nagar (Chorkate)	0			
5		Arunga (Khaireni)	vegetables	70000 (kg)	45/kg	NA
6		Ulli Kholi and Khukura phant	vegetables	100000 kg	40 /kg	NA
7		Dhaba (Khalurukhola)	0	0		
8		Ritaudi Gaun	0	0		
9	Rimuwa	Sidha Thum	0	0		
10		Sakhar (Yaadi)	0	0		
11	Balithum	Charkhute	0	0		
12		Sivapuri / Tari	0	0		
13		Sera Phant / Botegaun	Paddy, wheat	P(350), W(441)	P(32/kg), W(25/kg)	local village
14		Khaguwa	0			
15	Rupakot	Sotaphant	vegetables and paddy	V(40000), P(25000)	V(40/kg), P(32)	NA
16		Bote majhi (Chureni gaun)	0	0		
17	Turang	Rampur	vegetable	1000	35/kg	pullakamuk ho bazar
18		Majuwa bazar	vegetable	10000	35/kg	NA
19		Sota	0			
20		Kumal gaun	0			
21	Hasara	Chatimpot	0	0		
22		Upalo saghat	vegetable	50000	10/kg	NA
23		Khaireni bazar phat	vegetable	50000	9/kg	NA
24		Tallo saghat	0			
25	Jubhung	Ghorha	0			
26	Hunga	Urteni, chorkat, tallo ramaudi				
27	Bamgha	Majha / chamdi aatipata	0			
28	Limgha	Nadeva	0			
29	Juniya	Chorkot	vegetable	10000	40/kg	NA
30	Badagaun	Dovhan	0			
<b>Total</b>	<b>13</b>	<b>30</b>				

Source: NESS Field Survey, 2012

**Appendix 7: Occupation of Working Population**

S.N.	VDC	Settlement	Agriculture	Service	Wage labor	Foreign employment
1	Aanpchaaur	Bhukuwa Jhakla	15	0	0	20
2		Indregaunda	150	10	100	35
3		Tallophant	250	20	50	80
4	Johang	Prabhananda nagar (Chorkate)	60	5	50	20
5		Arunga (Khaireni)	300	140	150	150
6		Ulli Kholo and Khukura phant	250	10	100	300
7		Dhaba (Khalurukhola)	120	2	25	10
8		Ritaudi Gaun	8	3	0	2
9	Rimuwa	Sidha Thum	50	0	20	8
10		Sakhar (Yaadi)	18	1	4	4
11	Balithum	Charkhute	60	0	7	14
12		Sivapuri / Tari	170	10	50	20
13		Sera Phant / Botegaun	120	10	20	10
14		Khaguwa	18	1	0	1
15	Rupakot	Sotaphant	300	25	100	60
16		Bote majhi (Chureni gaun)	70	0	5	10
17	Turang	Rampur	30	0	7	8
18		Majuwa bazar	300	200	50	100
19		Sota	70	0	0	35
20		Kumal gaun	195	3	0	14
21	Hasara	Chatimpot	50	10	40	5
22		Upalo saghat	70	2	10	15
23		Khaireni bazar phat	300	20	45	30
24		Tallo saghat	80	5	10	25
25	Jubhung	Ghorha	200	5	10	35
26	Hunga	Urleni, chorkat, tallo ramaudi	14	0	3	3
27	Bamgha	Majha/chamdi aatipata	400	20	50	30
28	Lingha	Nadeva	250	4	10	30
29	Juniya	Chorkot	80	1	50	25
30	Badagaun	Dovhan	100	0	100	44
<b>Total</b>	<b>13</b>	<b>30</b>	<b>4098</b>	<b>507</b>	<b>1066</b>	<b>1143</b>
<b>%</b>			<b>60.14</b>	<b>7.44</b>	<b>15.64</b>	<b>16.77</b>

Source: NESS Field Survey, 2012

**Appendix 8: House Type**

S.N.	VDC	Settlement	Kacchi	Pakki	Total
1	Aanpchaur	Bhukuwa Jhakla	3	7	<b>10</b>
2		Indregaunda	4	51	<b>55</b>
3		Tallophant	15	65	<b>80</b>
4	Johang	Prabhananda nagar (Chorkate)	0	31	<b>31</b>
5		Arunga (Khaireni)	10	130	<b>140</b>
6		Ulli Khola and Khukura phant	15	135	<b>150</b>
7		Dhaba (Khalurukhola)	2	23	<b>25</b>
8		Ritaudi Gaun	2	3	<b>5</b>
9	Rimuwa	Sidha Thum	7	11	<b>18</b>
10		Sakhar (Yaadi)	0	6	<b>6</b>
11	Balithum	Charkhute	5	16	<b>21</b>
12		Sivapuri/Tari	10	40	<b>50</b>
13		Sera Phant/Botegaun	15	20	<b>35</b>
14		Khaguwa	0	6	<b>6</b>
15	Rupakot	Sotaphant	20	130	<b>150</b>
16		Bote majhi (Chureni gaun)	23	2	<b>25</b>
17	Turang	Rampur	4	8	<b>12</b>
18		Majuwa bazar	0	120	<b>120</b>
19		Sota	0	24	<b>24</b>
20		Kumal gaun	0	33	<b>33</b>
21	Hasara	Chatimpot	10	20	<b>30</b>
22		Upalo saghat	5	20	<b>25</b>
23		Khaireni bazar phat	6	115	<b>121</b>
24		Tallo saghat	7	23	<b>30</b>
25	Jubhung	Ghorha	0	70	<b>70</b>
26	Hunga	Urleni, chorkat, tallo ramaudi	0	5	<b>5</b>
27	Bamgha	Majha / chamdi aatipata	50	75	<b>125</b>
28	Limgha	Nadeva	10	34	<b>44</b>
29	Juniya	Chorkot	1	64	<b>65</b>
30	Badagaun	Dovhan	25	70	<b>95</b>
<b>Total</b>	<b>13</b>	<b>30</b>	<b>249</b>	<b>1357</b>	<b>1606</b>
<b>%</b>			<b>15.50</b>	<b>84.50</b>	<b>100.00</b>

Source: NESS Field Survey, 2012

**Appendix 9: Roads and Bridges in the Reservoir Area**

S.N.	VDC	Settlement	Roads			Bridges	
			Type	Length	Name of road	Type	Name of bridge
1	Aanpchaur	Bhukuwa Jhakla	NA	0.8 km	Burtibang rudabani road		
2		Indregaunda	paved	0.6 km	ridi-rudrabani		
3		Tallophant	NA	1.5 km	Riddi - khudrabesi	Suspension	Giddhi khola pool
4	Johang	Prabhananda nagar (Chorkate)				NA	bodighat
5		Arunga (Khaireni)	NA	3 km	Ridi wami	suspension	Arung puchr pool
6		Ulli Khola and Khukura phant	NA	2 km	Ridi wami	suspension	Bamgha urdi khola pool
7		Dhaba (Khalurukhola)	NA	1 km	Wami -ridi		
8		Ritaudi Gaun					
9	Rimuwa	Sidha Thum				suspension	NA
10		Sakhar (Yaadi)				NA	NA
11	Balithum	Charkhute					
12		Sivapuri / Tari				suspension	pulaka mukha pool
13		Sera Phant / Botegaun	NA	0.2 km	dalli khola-tamghas		
14		Khaguwa				suspension	jhakha pool
15	Rupakot	Sotaphant	NA	3 km	Ridi-wamitakkar		
16		Bote majhi (Chureni gaun)	paved	0.5 km	Wami -ridi		
17	Turang	Rampur	paved	3 km	Tamghas-balithum		
18		Majuwa bazar	NA	1 km	Rudrabani - wami	1 (suspension), 1 (concrete)	NA
19		Sota	paved	0.2 km	Burtibang rudabani road	suspension	bodigad pul
20		Kumal gaun	NA	0.2 km	Burtibang rudabani road	suspension	pulchowk
21	Hasara	Chatimpot	paved	0.7 km	Satyawat marg		
22		Upalo saghat	NA	0.4 km	Ridi- wami		
23		Khaireni bazar phat	paved	0.6 km	Radi - wami		
24		Tallo saghat	NA	0.4 km	Ridi-wami		
25	Jubhung	Ghorha				Suspension (2)	NA
26	Hunga	Urleni, chorkat, tallo ramaudi				suspension	bodigad pul
27	Bamgha	Majha / chamdi aatipata	NA	9 km	Bamgha tamghas	suspension	Arunga puchar
28	Limgha	Nadeva	NA	0.25 km	Ridi-wama		
29	Juniya	Chorkot	NA	1 km	Burti bang	concrete	juniya - rupakot pul
30	Badagaun	Dovhan	paved	0.4 km	Chaldipana - indragauda		
<b>Total</b>	<b>13</b>	<b>30</b>		<b>29.75</b>		<b>17 (2 Concrete and 15 Suspension)</b>	

Source: NESS Field Survey, 2012

## Appendix 10: Schools and Students in the Reservoir Area

S.N.	VDC	Settlement	School Detail		
			Name of school	No. of school	No. of students
1	Aanpachaur	Bhukuwa Jhakla		0	0
2		Indregaunda	Nepal Rastriya HSS	1	360
3		Tallophant	Name of school	1	NA
4	Johang	Prabhananda nagar (Chorkate)	NA	1	400
5		Arunga (Khaireni)	Rudra Ganga PS, Khareni PS, Himalaya PS	3	612
6		Ulli Khola and Khukura phant		0	0
7		Dhaba (Khalurukhola)		0	0
8		Ritaudi Gaun		0	0
9	Rimuwa	Sidha Thum	jana sahayog LSS	1	150
10		Sakhar (Yaadi)		0	0
11	Balithum	Charkhute		0	0
12		Sivapuri / Tari	Narahari kandel SS	1	313
13		Sera Phant / Botegaun	Majhi PS	1	70
14		Khaguwa		0	0
15	Rupakot	Sotaphant	Ramkot PS	1	115
16		Bote majhi (Chureni gaun)		0	0
17	Turang	Rampur		0	0
18		Majuwa bazar	NA	3	NA
19		Sota		0	0
20		Kumal gaun		0	0
21	Hasara	Chatimpot	Grade mother land academy LSS and satya wati HSS	2	895
22		Upalo saghat		0	0
23		Khaireni bazar phat		0	0
24		Tallo saghat		0	0
25	Jubhung	Ghorha		0	0
26	Hunga	Urleni, chorkat, tallo ramaudi		0	0
27	Bamgha	Majha / chamdi aatipata	Aatipata PS and Laxmi PS	2	250
28	Limgha	Nadeva	Nava durga	1	250
29	Juniya	Chorkot		0	0
30	Badagaun	Dovhan		0	0
<b>Total</b>	<b>13</b>	<b>30</b>		<b>18</b>	<b>3415</b>

Source: NESS Field Survey, 2012

**Appendix 11: Number of Irrigation Schemes and Command Area in the Reservoir Area**

S.N.	VDC	Settlement	Irrigation Scheme Detail	
			Number	Command Area ( Ropani)
1	Aanpchaur	Bhukuwa Jhakla	1	200
2		Indregaunda	2	NA
3		Tallophant	3	1000
4	Johang	Prabhananda nagar (Chorkate)	2	100
5		Arunga (Khaireni)	5	1000
6		Ulli Khola and Khukura phant	5	3000
7		Dhaba (Khalurukhola)	1	40
8		Ritaudi Gaun	3	60
9	Rimuwa	Sidha Thum	1	100
10		Sakhar (Yaadi)	2	25
11	Balithum	Charkhute	0	
12		Sivapuri / Tari	2	400
13		Sera Phant / Botegaun	1	500
14		Khaguwa	2	80
15	Rupakot	Sotaphant	2	700
16		Bote majhi (Chureni gaun)	1	8
17	Turang	Rampur	1	140
18		Majuwa bazar	2	1200
19		Sota	2	200
20		Kumal gaun	2	150
21	Hasara	Chatimpot	2	250
22		Upalo saghat	3	300
23		Khaireni bazar phat	3	300
24		Tallo saghat	2	400
25	Jubhung	Ghorha	2	500
26	Hunga	Urleni, chorkat, tallo ramaudi	1	70
27	Bamgha	Majha / chamdi aatipata	4	250
28	Limgha	Nadeva	0	
29	Juniya	Chorkot	1	200
30	Badagaun	Dovhan	0	
<b>Total</b>	<b>13</b>	<b>30</b>	<b>58</b>	<b>11173</b>

Source: NESS Field Survey, 2012

**Appendix 12: Number of Drinking Water Schemes in the Reservoir Area**

S.N.	VDC	Settlement	Drinking Water Scheme Detail	
			Number of Schemes	Number of Taps
1	Aanpchaur	Bhukuwa Jhakla	1	5
2		Indregaunda	1	5
3		Tallophant	1	5
4	Johang	Prabhananda nagar (Chorkate)	2	25
5		Arunga (Khaireni)	1	40
6		Ulli Khola and Khukura phant	1	35
7		Dhaba (Khalurukhola)	1	7
8		Ritaudi Gaun	0	0
9	Rimuwa	Sidha Thum	1	8
10		Sakhar (Yaadi)	1	1
11	Balithum	Charkhute	1	6
12		Sivapuri / Tari	1	2
13		Sera Phant / Botegaun	0	0
14		Khaguwa	0	0
15	Rupakot	Sotaphant	1	14
16		Bote majhi (Chureni gaun)	1	4
17	Turang	Rampur	1	7
18		Majuwa bazar	2	93
19		Sota	1	7
20		Kumal gaun	1	20
21	Hasara	Chatimpot	1	10
22		Upalo saghat	1	4
23		Khaireni bazar phat	1	35
24		Tallo saghat	1	7
25	Jubhung	Ghorha	1	35
26	Hunga	Urleni, chorkat,tallo ramaudi	1	4
27	Bamgha	Majha / chamdi aatipata	1	10
28	Limgha	Nadeva	1	10
29	Juniya	Chorkot	1	35
30	Badagaun	Dovhan	1	2
<b>Total</b>	<b>13</b>	<b>30</b>	<b>29</b>	<b>436</b>

Source: NESS Field Survey, 2012

**Appendix 13: Number of Water Mill Sources in the Reservoir Area**

S.N.	VDC	Settlement	Water Mill Sources
1	Aanpchaaur	Bhukuwa Jhakla	NA
2		Indregaunda	NA
3		Tallophant	Gendi khola
4	Johang	Prabhananda nagar (Chorkate)	Bharsa khola
5		Arunga (Khaireni)	jumli khola
6		Ulli Khola and Khukura phant	Jhulke chahara
7		Dhaba (Khalurukhola)	Dhare
8		Ritaudi Gaun	NA
9	Rimuwa	Sidha Thum	Damdi khola
10		Sakhar (Yaadi)	NA
11	Balithum	Charkhute	Bansa khola
12		Sivapuri / Tari	Hukhare khola and jaluke khola
13		Sera Phant / Botegaun	Dalli khola
14		Khaguwa	khouwa khola
15	Rupakot	Sotaphant	Hugadi khola
16		Bote majhi (Chureni gaun)	Bharsa khola
17	Turang	Rampur	Rampur khola
18		Majuwa bazar	Turang
19		Sota	NA
20		Kumal gaun	Aapchaaur khola
21	Hasara	Chatimpot	jumdi tardi khola
22		Upalo saghat	Tardi
23		Khaireni bazar phat	Tardi and jumdi
24		Tallo saghat	Saudi
25	Jubhung	Ghorha	NA
26	Hunga	Urleni, chorkat, tallo ramaudi	Padhare khola
27	Bamgha	Majha/chamdi aatipata	Urle khola
28	Limgha	Nadeva	Nadi khola
29	Juniya	Chorkot	Juniya
30	Badagaun	Dovhan	Tamane pani
<b>Total</b>	<b>13</b>	<b>30</b>	24

Source: NESS Field Survey, 2012



**Appendix 14: Culture and Religious Places**

S.N.	VDC	Settlement	Main festival	Any festivals of Janajatis	Religious site at the river	Cremation ghats
1	Aanpchaaur	Bhukuwa Jhakla	Dashain, tihar, teej, maghe sankranti, Saune Sankranti	Not any distinct festivals	Naag puja near river	None
2		Indregaunda	Dashain, tihar, teej, maghe sankranti, Saune Sankranti	Ghatu Naach	Malikeshwor and Radhakrishna mandir	Malika and Kharbang Khola
3		Tallophant	Dashain, tihar, teej, maghe sankranti, Saune Sankranti	none	Dhaudeni bagar (Walumada) and Ram Mandir	Rayele Ghat
4	Johang	Prabhananda nagar(Chorkate)	Dashain, tihar, teej, maghe sankranti, Saune Sankranti	none	Mukleshwor	Alge and Bharse
5		Arunga(Khaireni)	Dashain, tihar, teej, maghe sankranti, Saune Sankranti	Lakhe (Krishna Asthami)	Devi mandir and Ram mandir	Arunga puchar
6		Ulli Khola and Khukura phant	Dashain, tihar, teej, maghe sankranti, Saune Sankranti	none	Sivalaya, Kulyan and Radhakrishna mandir	Chega Khola
7		Dhaba (Khalurukhola)	Dashain, tihar, teej, maghe sankranti, Saune Sankranti	none	Sivalaya	Rokdi Khola
8		Ritaudi Gaun	Dashain, tihar, teej, maghe sankranti, Saune Sankranti	none	None	None
9	Rimuwa	Sidha Thum	hindu culture	None	Siddha Thum Mandir	Chisapani ghat
10		Sakhar (Yaadi)	hindu culture	none	Bhumi Puja at river site	Pulamuni
11	Balithum	Charkhute	hindu culture	none	Kuldevta and Pauwa	Balithum Bhanjyang
12		Sivapuri/Tari	hindu culture	none	Sivalaya	Hokhale khola
13		Sera Phant/Botegaun	hindu culture	Bote barkhi	None	Dalli khola
14		Khaguwa	hindu culture	none	Bhumi and Tutre Baraha Than	Khaguwa khola dobhan
15	Rupakot	Sotaphant	hindu culture	none	Ram Mandir, sivalaya, Nagapuja and Kulpuja	Sisne
16		Bote majhi (Chureni gaun)	hindu culture	none	Maithan Khola	Bharse khola
17	Turang	Rampur	hindu culture	none	Bhumithan	Rampur ghat
18		Majuwa bazar	hindu culture	none	shiva mandir	Majuwa dovan
19		Sota	hindu culture	none	chara gadi khola (nagko puja)	none
20		Kumal gaun	hindu culture	none	Bivalaya mandir	None
21	Hasara	Chatimpot	NA	NA	NA	NA

S.N.	VDC	Settlement	Main festival	Any festivals of Janajatis	Religious site at the river	Cremation ghats
22		Upalo saghat	hindu culture	none	Nagpuja bhumi puja	NA
23		Khaireni bazar phat	hindu culture	NA	devi bhagawati bhumi puja	Pulamuni
24		Tallo saghat	hindu culture	none	kulthati	saghat
25	Jubhunnig	Ghorha	hindu culture	none	shivalaya mandir	Bhanbhane,tallo ghora
26	Hunga	Urleni,chorkat,tallo ramaudi	hindu culture	none	None	sisne khola
27	Bamgha	Majha/chamdi aatipata	hindu culture	none	Nagpuja bhumi puja	Bagaune ghat
28	Limgha	Nadeva	hindu culture	none	Dabala devi mandir	NA
29	Juniya	Chorkot	hindu culture	none	none	none
30	Badagan	Dovhan	hindu culture	none	bhagawati mandir	chaldi dovan

Source: NESS Field Survey, 2012

**Appendix 15: Community Perception on Hydrpower**

S.N.	VDC	Settlement	Perception	
			Positive Impact	Negative Impact
1	Aanp chaur	Bhukuwa Jhakla	NA	loss of land
2		Indregaunda	available of electricity	submerge of house and land
3		Tallophant	infrastructure development	submerge of house and land
4	Johan g	Prabhananda nagar(Chorkate)	infrastructure development	submerge of house and land
5		Arunga(Khaireni)	available of electricity	loss of land
6		Ulli Khola and Khukura phant	job opportunity and development	submerge of house and land
7		Dhaba (Khalurukhola)	Infrastructures like industries will be established	submerge of house and land
8		Ritaudi Gaun	development	loss of land
9	Rimu wa	Sidha Thum	job opportunity and development	submerge of house and land
10		Sakhar (Yaadi)	development	submerge of house and land
11	Balit hum	Charkhute	electricity and development	submerge of house and land
12		Sivapuri/Tari	industrialization	submerge of house and land
13		Sera Phant/Botegaun	electricity and development	submerge of house and land
14		Khaguwa	development	loss of land and property
15	Rupa kot	Sotaphant	NA	NA
16		Bote majhi (Chureni gaun)	NA	NA
17	Turan g	Rampur	electricity and development	submerge of house and land
18		Majuwa bazar	employment and development	loss of land
19		Sota	NA	NA
20		Kumal gaun	electricity and development	NA
21	Hasar a	Chatimpot	NA	NA
22		Upalo saghat	employment and development	submerge of house and land
23		Khaireni bazar phat	development	submerge of house and land
24		Tallo saghat	employment and development	difficulties in transportation
25	Jubhu ng	Ghorha	electricity and development	submerge of house and land
26	Hung a	Urleni,chorakat,tallo ramaudi	NA	submerge of house and land
27	Bamg ha	Majha/chamdi aatipata	NA	NA
28	Limg ha	Nadeva	employment and development	translocation of village
29	Juniy a	Chorkot	NA	NA
30	Bada gaun	Dovhan	NA	Loss of land
<b>Total</b>	<b>13</b>	<b>30</b>		

Source: NESS Field Survey, 2012

**Appendix 16: List of FGD Participants (LOWER BODIGAD)**  
**District: Gulmi**

S.N.	Name of Respondent	Address	Occupation
1.	Sukhdev kharel	Aanpchaure-3, bhukuwa jhakla	Agriculture
2.	Dilli raj kharel	Aanpchaure-3, bhukuwa jhakla	Agriculture
3.	Sheskant bhandari	Aanpchaure-3, bhukuwa jhakla	NA
4.	Lila rana	Aanpchaure-3, bhukuwa jhakla	NA
5.	Ram prashad kharel	Aanpchaure-3, bhukuwa jhakla	NA
6.	Baburam kharel	Aanpchaure-7, Indregaunda	Agriculture
7.	Diliram ghimire	Aanpchaure-7, Indregaunda	Teacher
8.	Liladhar aryal	Aanpchaure-7, Indregaunda	Agriculture
9.	Kaladhar aryal	Aanpchaure-7, Indregaunda	Agriculture
10.	Jiban kharel	Aanpchaure-7, Indregaunda	Agriculture
11.	Baburam pariyar	Aanpchaure-7, Indregaunda	Agriculture
12.	Jivan kharel	Aanpchaure-4, tallofant	Social worker
13.	Bharat bhattacharai	Aanpchaure-4, tallofant	Business
14.	Jhabindra kharel	Aanpchaure-4, tallofant	Business
15.	Lilamani aryal	Aanpchaure-4, tallofant	Business
16.	Thakur prashad aryal	Aanpchaure-4, tallofant	Agriculture
17.	Basundhara bhandari	Aanpchaure-4, tallofant	Agriculture
18.	Chabilal bhattacharai	Juhang -1, pramananda nagar	Agriculture
19.	Tek bhd subedi	Juhang -1, pramananda nagar	Business(hotel)
20.	Dilli jung karki	Juhang -1, pramananda nagar	Agriculture
21.	Rajkumar bhusal	Juhang -1, pramananda nagar	Business(hotel)
22.	Dilli raj neupane	Juhang -1, pramananda nagar	NA
23.	Bishnu Prasad bhandari	Juhang -5, khareni	NA
24.	Devi Prasad bhandari	Juhang -5, khareni	Retired employee
25.	Mukti nath bhandari	Juhang -5, khareni	Retired army
26.	Giri raj panta	Juhang-2, ulli khola	Business
27.	Karna bhd karki	Juhang-2, ulli khola	Agriculture
28.	Bhojraj dhakal	Juhang-2, ulli khola	Agriculture
29.	Meghraj bhandari	Juhang-2, ulli khola	Agriculture
30.	Yam bhd karki	Juhang-2, ulli khola	Agriculture
31.	Bishnu pulami	Juhang-1, dhaba	Business(Furniture)
32.	Resham khatri	Juhang-1, dhaba	Agriculture
33.	Prakash bhusal	Juhang-1, dhaba	Driving
34.	Loknath bhandari	Juhang-1, dhaba	Agriculture
35.	Rishi ram bhattacharai	Juhang-1, dhaba	Agriculture
36.	Damodar dhakal	Juhang-5, ritaudi gaun	agriculture
37.	Yagya murti dhakal	Juhang-5, ritaudi gaun	Agriculture
38.	Thakur prashad dhakal	Juhang-5, ritaudi gaun	Agriculture
39.	Gopal dhakal	Juhang-5, ritaudi gaun	Agriculture
40.	Yubraj dhakal	Juhang-5, ritaudi gaun	Agriculture
41.	Bhim bhd regmi	Rimuwa-8, Sidha thum	Agriculture
42.	Rudra bahadur darlami	Rimuwa-8, Sidha thum	Agriculture
43.	Shova darlami	Rimuwa-8, Sidha thum	Agriculture
44.	Shan bhd darlami	Rimuwa-8, Sidha thum	Agriculture

S.N.	Name of Respondent	Address	Occupation
45.	Dhan bhd darlami	Rimuwa-8, Sidha thum	Agriculture
46.	Prem panday	Rimuwa-7, sakhar	Teacher
47.	Mahesh bhandari	Rimuwa-7, sakhar	NA
48.	Krishna gautam	Rimuwa-7, sakhar	NA
49.	Balakrista aryal	Balithum-4, charkhute	Agriculture
50.	Baburam aryal	Balithum-4, charkhute	Agriculture
51.	Harila kharel	Balithum-4, charkhute	Agriculture
52.	Nandaram kharel	Balithum-4, charkhute	Agriculture
53.	Tulsi ram kharel	Balithum-4, charkhute	Agriculture
54.	Narad karnel	Balithum-2, shivapuri	Agriculture
55.	Bishnu karnel	Balithum-2, shivapuri	Agriculture
56.	Top bhd saru	Balithum-2, shivapuri	Agriculture
57.	Chihnta bhd kumal	Balithum-2, shivapuri	Agriculture
58.	Chet bhd karnel	Balithum-2, shivapuri	Agriculture
59.	Hari prashad gautam	Balithum-6, sera phata	Agriculture
60.	Harihar gautam	Balithum-6, sera phata	Agriculture
61.	Pitambar gautam	Balithum-6, sera phata	Agriculture
62.	Khima nanda gautam	Balithum-6, sera phata	Agriculture
63.	Santa bhd bote	Balithum-6, sera phata	Fisherman
64.	Basante bote	Balithum-6, sera phata	Fisherman
65.	Keyar singh bote	Balithum-6, sera phata	Fisherman
66.	Bedh nidhi pokharel	Balithum-4, khaguwa	Agriculture
67.	Thanishowr pokharel	Balithum-4, khaguwa	Teacher
68.	Bhakta budha	Balithum-4, khaguwa	Agriculture
69.	Rom nath bhandari	Balithum-4, khaguwa	Agriculture
70.	Yam bhd darlami	Balithum-4, khaguwa	Agriculture
71.	Prem raj bhandari	Rupakot-2, sotaphat	Agriculture/social service
72.	Krishna prashad gaire	Rupakot-2, sotaphat	Services
73.	Sthaneshowr bhandari	Rupakot-2, sotaphat	Social worker
74.	Baburam bhandari	Rupakot-2, sotaphat	Agriculture
75.	Laxmi prashad bhandari	Rupakot-2, sotaphat	Social worker
76.	Rita majhi	Rupakot-4, bote majhi chureni gaun	Agriculture
77.	Shan bhd gharti	Rupakot-4, bote majhi chureni gaun	Agriculture
78.	Sabitra majhi	Rupakot-4, bote majhi chureni gaun	Agriculture
79.	Shanti majhi	Rupakot-4, bote majhi chureni gaun	Agriculture
80.	Kalpana majhi	Rupakot-4, bote majhi chureni gaun	Agriculture
81.	Prem narayan parajuli	Turung-4, rampur	Agriculture
82.	Tol lal parajuli	Turung-4, rampur	Agriculture
83.	Bhimsen shrestha	Turung-4, rampur	Agriculture
84.	Hari bhakta karnel	Turung-4, rampur	Agriculture
85.	Lal bhad shrestha	Turung-4, rampur	Agriculture
86.	Lila mani bhattacharai	Turung-1, majuwa bazaar	Service
87.	Laxmi gautam	Turung-1, majuwa bazaar	Business
88.	Bishnu gautam	Turung-1, majuwa bazaar	Business
89.	Santosh aryal	Turung-1, majuwa bazaar	Agriculture
90.	Bharat bhattacharai	Turung-7, sota	NA

S.N.	Name of Respondent	Address	Occupation
91.	Yubraj kharel	Turung-7, sota	Agriculture
92.	Surya prashad aryal	Turung-7, sota	Agriculture
93.	Basanti aryal	Turung-7, sota	Agriculture
94.	Manju aryal	Turung-7, sota	Agriculture
95.	Thakalni didi	Turung-7, kuma gaun	Business
96.	Chanda aryal	Turung-7, kuma gaun	NA
97.	Yubaraj shrestha	Turung-7, kuma gaun	NA
98.	Jhumkala shrestha	Turung-7, kuma gaun	NA
99.	Mahendra shrestha	Turung-7, kuma gaun	NA
100.	Indra bhd kala	Hasara-4, chatimpot	Agriculture
101.	Purna bhd sunar	Hasara-4, chatimpot	NA
102.	Baburam gyawali	Hasara-4, chatimpot	Teacher
103.	Dilli bhd sinjali	Hasara-4, chatimpot	NA
104.	Manju gyawali	Hasara-4, chatimpot	NA
105.	Arjun gyawali	Hasara-4, chatimpot	agriculture
106.	Hari prashad bhandari	Hasara-2, tapu	NA
107.	Hem lal bhandari	Hasara-2, tapu	NA
108.	Ghabindra phd bhandari	Hasara-2, tapu	NA
109.	Mahesh bhandari	Hasara-1, khaireni bazaar phat	Business
110.	Mahendra Prasad bhandari	Hasara-1, khaireni bazaar phat	Teacher
111.	Om prakash bhandari	Hasara-1, khaireni bazaar phat	Business
112.	Krishna Prasad gyawali	Hasara-1, khaireni bazaar phat	Teacher
113.	Lok nath bhandari	Hasara-1, khaireni bazaar phat	Business
114.	Lekh nath bhandari	Hasara-3, tallo saghat dabala	Agriculture
115.	Hem lal bhandari	Hasara-3, tallo saghat dabala	Business
116.	Devi bhandari	Hasara-3, tallo saghat dabala	Teacher
117.	Shanti man sinjali	Hasara-3, tallo saghat dabala	Business
118.	Raju bhandari	Hasara-3, tallo saghat dabala	Business
119.	Dilli raj paudyal	Jubhung, ghorha	Agriculture/business
120.	Om bhd ghartimagar	Jubhung, ghorha	Agriculture
121.	Harihar gautam	Jubhung, ghorha	Agriculture
122.	Surya mani gautam	Jubhung, ghorha	Agriculture
123.	Agyalal gautam	Jubhung, ghorha	Agriculture
124.	Deepak bhandari	Hunga-3, urleni	Business
125.	Shankar bhandari	Hunga-3, urleni	Agriculture
126.	Govinda bhandari	Hunga-3, urleni	Agriculture
127.	Mayila miya	Hunga-3, urleni	Agriculture
128.	Kancha miya	Hunga-3, urleni	Agriculture
129.	Ram Prasad bhandari	Bamgha-1, majha / chamdi pata	Business
130.	Amrit shrestha	Bamgha-1, majha / chamdi pata	Business
131.	Siddhi nath shrestha	Bamgha-1, majha / chamdi pata	Business
132.	Bir bhd majhi	Bamgha-1, majha / chamdi pata	Agriculture
133.	Bishnu Prasad bhandari	Bamgha-1, majha / chamdi pata	Teacher
134.	Pitamber gyawali	Limgha-7, nadeva	Social worker
135.	Kausal raj gyawali	Limgha-7, nadeva	Teacher
136.	Ganesh gyawali	Limgha-7, nadeva	Agriculture

S.N.	Name of Respondent	Address	Occupation
137.	Prem lal gyawali	Limgha-7, nadeva	Agriculture
138.	Arjun gyawali	Limgha-7, nadeva	Agriculture
139.	Kul nanda bhandari	Juniya-9, chorkate	NA
140.	Laxman bhandari	Juniya-9, chorkate	NA
141.	Dhan Prasad bhattarai	Juniya-9, chorkate	NA
142.	Bhakti ram bhandari	Juniya-9, chorkate	NA
143.	Ghanshyam neupane	Juniya-9, chorkate	NA
144.	Sarbajit kumal	Badagaun-1, dovhan	Agriculture
145.	Indra bhd kumal	Badagaun-1, dovhan	Agriculture
146.	Tika gurung	Badagaun-1, dovhan	Agriculture
147.	Shyam kala kumal	Badagaun-1, dovhan	Agriculture
148.	Suresh kumal	Badagaun-1, dovhan	Agriculture
149.	Junga bhd kumal	Badagaun-1, dovhan	Agriculture
150.	Kala Dhar Aryal	Ampchaur-7, Indregauda	Agriculture
151.	Padam Pani Bhandari	Ampchaur-3, Bhukwa Phant	Agriculture
152.	Rudra Raj Kharel	Ampchaur-4, Talla Phant Gaun	Agriculture
153.	Til Bdr. Rana(Kumal)	Badagaun-1, Dovan	Agriculture
154.	Bhakta Bdr. Magar	Balithum-4, Sanolumpe	Agriculture
155.	Jeeva Lal Kandel	Balithum-2, Shivapuri (Tari Gaun)	Agriculture
156.	Yub Raj Kheral	Turang-7, Dihisotaha	Agriculture
157.	Kapil Mani Aryal	Turang-1, Majuwa Bazar	Agriculture
158.	Bhim Lal Gautam	Jubhung-8, Ghoraha	Agriculture
159.	Chet Nath Bhandari	Rupakot-3, Sota Gaun	Agriculture
160.	Krishna Pd. Bhandari	Rupakot-9, Damoga	Business
161.	Rabilal Bote	Rupakot-4, Dakuwa, Bote Gaun	Agriculture
162.	Daya Nidhi Bhandari	Juniya-9, Sera Phant	Agriculture
163.	Ghanashyam Neupane	Hunga-9, Bote Gaun	Business
164.	Padam Bdr. Basnet	Juhang-1, Dhawa Gaun	Agriculture
165.	Resham Khatri	Juhang-2, Kuhinikot(Kimkot)	Agriculture
166.	Giri Raj Pantha	Juhang-2, Ullikhola	Business
167.	Shanti Devi Bhandari	Juhang-4, Ritaudigaun	Agriculture
168.	Krishna Man Shrestha	Juhang-5, Arunga Bazar	Business
169.	Gana Pati Buda	Bamgha-5, Bote Gaun	Agriculture
170.	Name of Respondent	Address	Occupation
171.	Sali Gram Bhandari	Bamgha-2, Bote Gaun	Agriculture
172.	Purshottam Bhandari	Hasara-1, Khaireni	Agriculture
173.	Jug Bdr. Darlami	Rimuwa-9, Shaghat	Agriculture
174.	Jay Lal Jueuli	Limgha-7, Dhandgaira Gaun	Agriculture
175.	Indra Bdr. Rana	Badagaun-1, Dovan	Fisherman
176.	Hari Lal Bote	Balithum-6, Bote Gaun	Fisherman
177.	Prem Bote	Balithum-6, Bote Gaun	Fisherman
178.	Bhag Bdr. Kumal	Turang-1, Majuwa Bazar	Fisherman
179.	Rabilal Bote	Rupakot-4, Dakuwa, Bote Gaun	Fisherman
180.	Dal Bdr. Bote	Bamgha-5, Bote Gaun	Fisherman

Source: NESS Field Survey, 2012

**Appendix 17: Public Consultation Lower Badigad Project (Gulmi District)**

Field visit to the Lower Badigad project site was made on 10<sup>th</sup> to 16<sup>th</sup> July 2012. The objective of the visit was to collect primary information on the social, socio-economic, cultural, forest resources, wildlife, disaster records and aquatic ecological aspects from the reservoir area and the key structural locations of the project.

Since the study period was limited, most of the information related to the above aspects was derived based on the public consultations and interviews with the key informants. The socio-economic information was solicited from the focus group discussions at various settlements within the reservoir area. Information on disaster, fishermen, and fish diversity is based on the key informant interviews, while information on the forest, floral and wildlife diversity is based on the direct observation and interviews with the key informants. Focus group consultation meetings were held at 29 sites within the reservoir area (Table 1), while 34 key informants were interviewed for in depth knowledgeable information (Table 2).

**Table 1: Participants of the Focus Group Discussion**

S.N.	NAME OF PARTICIPANTS	OCCUPATION / POSITION	LOCATION
<b>AAPCHAUR-3; BHUKUWA JHAKLA</b>			
1	SUKHDEV KHAREL	FARMER	AAPCHAUR-3; BHUKUWA JHAKLA
2	DILLI RAJ KHAREL	FARMER	AAPCHAUR-3; BHUKUWA JHAKLA
3	SHOSKANTA BHANDARI	FARMER	AAPCHAUR -3; BHUKUWA JHAKLA
4	LILA RANA	FARMER	AAPCHAUR -3; BHUKUWA JHAKLA
5	RAM PRASHAD KHAREL	FARMER	AAPCHAUR -3; BHUKUWA JHAKLA
<b>AAPCHAUR-7; INDREGAUNDA</b>			
1	BABURAM KHAREL	FARMER	AAPCHAUR-7; INDREGAUNDA
2	DILARAM GHIMIRE	TEACHER	AAPCHAUR-7; INDREGAUNDA
3	LILADHAR ARYAL	FARMER	AAPCHAUR-7; INDREGAUNDA
4	KALA DHARA ARYAL	FARMER	AAPCHAUR-7; INDREGAUNDA
5	JIVAN KHAREL	FARMER	AAPCHAUR-7; INDREGAUNDA
6	BABURAM PARIYAR	FARMER	AAPCHAUR-7; INDREGAUNDA
<b>AAPCHAUR-4; TALLAFANT</b>			
1	JIVAN KHAREL	SOCIAL WORKER	AAPCHAUR-4; TALLAFANT
2	BHARAT BHATTARAI	BUSINESSMAN	AAPCHAUR-4; TALLAFANT
3	JHABINDRA KHAREL	BUSINESSMAN	AAPCHAUR-4; TALLAFANT
4	LILAMANI ARYAL	BUSINESSMAN	AAPCHAUR-4; TALLAFANT
5	THAKUR PHD ARYAL	FARMER	AAPCHAUR-4; TALLAFANT
6	BASUNDHARA BHANDARI	BUSINESSMAN	AAPCHAUR-4; TALLAFANT
<b>JWANG-1; PRABHANANDA</b>			
1	CHABILAL BHATTARAI	FARMER	JWANG-1; PRABHANANDA
2	TEK BDR SUBEDI	HOTEL OWNER	JWANG-1; PRABHANANDA
3	DILLI JUNG KARKI	FARMER	JWANG-1; PRABHANANDA
4	RAJ KUMAR BHUSAL	HOTEL OWNER	JWANG-1; PRABHANANDA
5	DILL RAJ NEUPANE	FARMER	JWANG-1; PRABHANANDA
<b>JONANG-5; ARUNGA</b>			
1	BISHNU PRASHAD BHANDARI	FARMER	JONANG-5; ARUNGA
2	DEVI PRASHAD BHANDARI	RETIRED ARMY	JONANG-5; ARUNGA



S.N.	NAME OF PARTICIPANTS	OCCUPATION / POSITION	LOCATION
3	MUKTI BHANDARI	RETIRED ARMY	JONANG-5; ARUNGA
<b>JOHANG-2; KHUKURA FANT</b>			
1	GIRI RAJ PANTA	BUSINESSMAN	JOHANG-2; KHUKURA FANT
2	KARNA BDR KARKI	FARMER	JOHANG-2; KHUKURA FANT
3	BHOJ RAJ DHAKAL	FARMER	JOHANG-2; KHUKURA FANT
4	MEGH RAJ BHANDARI	FARMER	JOHANG-2; KHUKURA FANT
5	YAM BDR KARKI	FARMER	JOHANG-2; KHUKURA FANT
<b>JUHANG-2; DHABA</b>			
1	BISHNU PULAMI	BUSINESSMAN	JUHANG-2; DHABA
2	RESHAM KHATRI	FARMER	JUHANG-2; DHABA
3	PRAKASH BHUSAL	DRIVING	JUHANG-2; DHABA
4	LOKNATH BHANDARI	FARMER	JUHANG-2; DHABA
5	RISHI RAM BHATTARAI	FARMER	JUHANG-2; DHABA
<b>JOHANG-5; RITAUDI GAUN</b>			
1	DAMODAR DHAKAL	FARMER	JOHANG-5; RITAUDI GAUN
2	YAGYA MURTI DHAKAL	FARMER	JOHANG-5; RITAUDI GAUN
3	THAKUR PRASHAD DHAKAL	FARMER	JOHANG-5; RITAUDI GAUN
4	GOPAL DHAKAL	FARMER	JOHANG-5; RITAUDI GAUN
5	YUBRAJ DHAKAL	FARMER	JOHANG-5; RITAUDI GAUN
<b>RIMUWA-8; SIDDHA THUM</b>			
1	BHIM BDR REGMI	FARMER	RIMUWA-8; SIDDHA THUM
2	RUDRA BDR DARLAMI	FARMER	RIMUWA-8; SIDDHA THUM
3	SHOVA DARLAMI	FARMER	RIMUWA-8; SIDDHA THUM
4	SAN BDR DARLAMI	FARMER	RIMUWA-8; SIDDHA THUM
5	DHAN BDR DARLAMI	FARMER	RIMUWA-8; SIDDHA THUM
<b>RIMUWA-7; SAKHAR</b>			
1	PREM PANDEY	TEACHER	RIMUWA-7; SAKHAR
2	MAHESH BHANDARI	FARMER	RIMUWA-7; SAKHAR
3	KRISHNA GAUTAM	FARMER	RIMUWA-7; SAKHAR
<b>BALITHUM-; CHARKHUTE</b>			
1	BALAKUNTHA ARYAL	FARMER	BALITHUM- ; CHARKHUTE
2	BABURAM ARYAL	FARMER	BALITHUM- ; CHARKHUTE
3	HARILA KHAREL	FARMER	BALITHUM- ; CHARKHUTE
4	NANDA RAM KHAREL	FARMER	BALITHUM- ; CHARKHUTE
5	TULSI RAM KHAREL	FARMER	BALITHUM- ; CHARKHUTE
<b>BALITHUM-4; SHIVAPURI</b>			
1	NARAD KARNEL	AGRICULTURE	BALITHUM-4; SHIVAPURI
2	BISHNU KARNEL	AGRICULTURE	BALITHUM-4; SHIVAPURI
3	TOP BDR KARNEL	AGRICULTURE	BALITHUM-4; SHIVAPURI
4	CHINTA BDR KUMAL	AGRICULTURE	BALITHUM-4; SHIVAPURI
5	CHET NARAYAN KARNEL	AGRICULTURE	BALITHUM-4; SHIVAPURI
<b>BALITHUM-6; SERA PHATA</b>			
1	HARI PRASHAD GAUTAM	FARMER	BALITHUM-6; SERA PHATA
2	HARIHAR GAUTAM	FARMER	BALITHUM-6; SERA PHATA
3	PITAMBER GAUTAM	FARMER	BALITHUM-6; SERA PHATA
4	KHIMA NANDA GAUTAM	FARMER	BALITHUM-6; SERA PHATA
5	SANTA BDR BOTE	FISHERMEN	BALITHUM-6; SERA PHATA

S.N.	NAME OF PARTICIPANTS	OCCUPATION / POSITION	LOCATION
6	BASANTA BOTE	FISHERMEN	BALITHUM-6; SERA PHATA
7	KEYER SINGH BOTE	FISHERMEN	BALITHUM-6; SERA PHATA
<b>BALITHUM-4; KHAGUWA</b>			
1	BED NIDHI POKHAREL	FARMER	BALITHUM-4; KHAGUWA
2	YANISHOWR POKHAREL	TEACHER	BALITHUM-4; KHAGUWA
3	BHAKTA BUDHA	FARMER	BALITHUM-4; KHAGUWA
4	ROM NATH BHANDARI	FARMER	BALITHUM-4; KHAGUWA
5	YAM BDR DARLAMI	FARMER	BALITHUM-4; KHAGUWA
<b>RUPAKOT-2/3/9; SATAPHAT</b>			
1	PREM RAJ BHANDARI	SOCIAL WORKER	RUPAKOT-2/3/9; SATAPHAT
2	KRISHNA PRASHAD GAIRE	SERVICE	RUPAKOT-2/3/9; SATAPHAT
3	STHANESHOWR BHANDARI	SOCIAL WORKER	RUPAKOT-2/3/9; SATAPHAT
4	BABURAM BHANDARI	FARMER	RUPAKOT-2/3/9; SATAPHAT
5	LAXMI PRASHAD BHANDARI	SOCIAL WORKER	RUPAKOT-2/3/9; SATAPHAT
<b>RUPAKOT -4; CHURENI GAUN</b>			
1	RITA MAJHI	FARMER	RUPAKOT-4; CHURENI GAUN
2	GYAN BDR DHARTI	FARMER	RUPAKOT-4; CHURENI GAUN
3	SABITRI MAJHI	FARMER	RUPAKOT-4; CHURENI GAUN
4	SHANIT MAJHI	FARMER	RUPAKOT-4; CHURENI GAUN
5	KALPANA MAJHI	FARMER	RUPAKOT-4; CHURENI GAUN
<b>TURANG-4/5; RAMPUR</b>			
1	PREM NARAYAN PARAJULI	FARMER	TURANG-4/5; RAMPUR
2	TOL LAL PARJULI	FARMER	TURANG-4/5; RAMPUR
3	HARI BHAKTA KARNEL	FARMER	TURANG-4/5; RAMPUR
4	LAL BDR SHRESTHA	FARMER	TURANG-4/5; RAMPUR
5	BHIMSEN SHRESTHA	FARMER	TURANG-4/5; RAMPUR
<b>TURANG-1; MAJUWA BAZAR</b>			
1	LILA MANI BHATTARAI	SERVICE	TURANG-1; MAJUWA BAZAR
2	LAXMI GAUTAM	BUSINESS	TURANG-1; MAJUWA BAZAR
3	BISHNU GAUTAM	BUSINESS	TURANG-1; MAJUWA BAZAR
4	SANTOSH ARYAL	FARMER	TURANG-1; MAJUWA BAZAR
<b>TURANG- 7 ; SOTA</b>			
1	BHARAT BHATTARAI	FARMER	TURANG-7; SOTA
2	YUBRAJ KHAREL	FARMER	TURANG-7; SOTA
3	SURYA PRAKASH ARYAL	FARMER	TURANG-7; SOTA
4	BASANTI ARYAL	FARMER	TURANG-7; SOTA
5	MANJU ARYAL	FARMER	TURANG-7; SOTA
<b>TURANG-7; KUMA GAUN</b>			
1	THAKALI DIDI	BUSINESS	TURANG-7; KUMA GAUN
2	CHANDRA ARYAL	BUSINESS	TURANG-7; KUMA GAUN
3	YUBRAJ SHRESTHA	BUSINESS	TURANG-7; KUMA GAUN
4	BHUMIKALA SHRESTHA	BUSINESS	TURANG-7; KUMA GAUN
5	MAHENDRA SHRESTHA	BUSINESS	TURANG-7; KUMA GAUN
<b>HASARA-4; CHATIMPOT</b>			
1	INDRA BDR THAPA	FARMER	HASARA-4; CHATIMPOT

S.N.	NAME OF PARTICIPANTS	OCCUPATION / POSITION	LOCATION
2	PURNA BDR SUNAR	FARMER	HASARA-4; CHATIMPOT
3	BABURAM GYAWALI	TEACHER	HASARA-4; CHATIMPOT
4	DILLI BDR SINJYALI	FARMER	HASARA-4; CHATIMPOT
5	MANJU GYAWALI	FARMER	HASARA-4; CHATIMPOT
6	ARJUN GYAWALI	FARMER	HASARA-4; CHATIMPOT
<b>HASARA-2; UPALLO SAGHAT</b>			
1	HARI PRASHAD BHANDARI	FARMER	HASARA-2; UPALLO SAGHAT
2	HEMLAL BHANDARI	FARMER	HASARA-2; UPALLO SAGHAT
3	GHABINDRA PRASHAD BHANDARI	FARMER	HASARA-2; UPALLO SAGHAT
<b>HASARA-1; KHAIRENI BAZAAR PHANT</b>			
1	MAHESH BHANDARI	BUSINESS	HASARA-1; KHAIRENI BAZAAR PHANT
2	MAHENDRA PRASHAD BHANDARI	TEACHER	HASARA-1; KHAIRENI BAZAAR PHANT
3	OM PRAKASH BHANDARI	BUSINESS	HASARA-1; KHAIRENI BAZAAR PHANT
4	KRISHNA PRASHAD GYAWALI	TEACHER	HASARA-1; KHAIRENI BAZAAR PHANT
5	LOKNATH BHANDARI	BUSINESS	HASARA-1; KHAIRENI BAZAAR PHANT
<b>HASARA-3; TALLO SHAGHAT</b>			
1	LEKHA NATH BHANDARI	FARMER	HASARA-3; TALLO SHAGHAT
2	HEM LAL BHANDARI	BUSINESS	HASARA-3; TALLO SHAGHAT
3	DEVI BHANDARI	TEACHER	HASARA-3; TALLO SHAGHAT
4	SANTIMAN SINJALE	BUSINESS	HASARA-3; TALLO SHAGHAT
5	RAJU BHANDARI	BUSINESS	HASARA-3; TALLO SHAGHAT
<b>JUBHUNGA-4; GHORHA</b>			
1	DILLI RAJ POUDEL	FARMER /BUSINESS	JUBHUNGA-4; GHORHA
2	OM BDR DHARTI MAGAR	FARMER	JUBHUNGA-4; GHORHA
3	HARI HAR GAUTAM	FARMER	JUBHUNGA-4; GHORHA
4	SURYA MANI GAUTAM	FARMER	JUBHUNGA-4; GHORHA
5	YAGYA LAL GAUTAM	FARMER	JUBHUNGA-4; GHORHA
<b>HUNGA-3/2; URLANI</b>			
1	DIPAK BHANDARI	BUSINESS	HUNGA-3/2; URLANI
2	SHANKAR BHANDARI	FARMER	HUNGA-3/2; URLANI
3	GOVINDA BHANDARI	FARMER	HUNGA-3/2; URLANI
4	MAHILA MIYA	FARMER	HUNGA-3/2; URLANI
5	KANCHA MIYA	FARMER	HUNGA-3/2; URLANI
<b>BAMGHA-1/2/5; MAJHA</b>			
1	RAM PRASHAD BHANDARI	BUSINESS	BAMGHA-1/2/5; MAJHA
2	AMRIT SHRESTHA	BUSINESS	BAMGHA-1/2/5; MAJHA
3	SIDDHI NATH SHRESTHA	BUSINESS	BAMGHA-1/2/5; MAJHA
4	BIR BDR MAJHI	FARMER	BAMGHA-1/2/5; MAJHA
5	BISHNU PRASHAD BHANDARI	TEACHER	BAMGHA-1/2/5; MAJHA
<b>LIMGHA-7; NADEVA</b>			

S.N.	NAME OF PARTICIPANTS	OCCUPATION / POSITION	LOCATION
1	PITAMBER GYAWALI	SOCIAL WORKER	LIMGHA-7; NADEVA
2	KAUSHAL RAJ GYAWALI	TEACHER	LIMGHA-7; NADEVA
3	GANESH GYAWALI	FARMER	LIMGHA-7; NADEVA
4	PREM LAL GYAWALI	FARMER	LIMGHA-7; NADEVA
5	ARJUN GYAWALI	FARMER	LIMGHA-7; NADEVA
<b>JUNIYA -9; CHORKATE</b>			
1	KULNANDA BHANDARI	NA	JUNIYA-9; CHORKATE
2	LAXMAN BHANDARI	NA	JUNIYA-9; CHORKATE
3	DHAN PRAKASH BHATTARAI	NA	JUNIYA-9; CHORKATE
4	BHAKTI RAM BHANDARI	NA	JUNIYA-9; CHORKATE
5	GHANSHYAM NEUPANE	NA	JUNIYA-9; CHORKATE
<b>BADAGAUN-1; DOVHAN</b>			
1	SARBAJIT KUMAL	FARMER	BADAGAUN-1; DOVHAN
2	INDRA BDR KUMAL	FARMER	BADAGAUN-1; DOVHAN
3	TIKA GURUNG	FARMER	BADAGAUN-1; DOVHAN
4	SHYAM KALA KUMALNI	FARMER	BADAGAUN-1; DOVHAN
5	SURESH KUMAL	FARMER	BADAGAUN-1; DOVHAN
6	JUNGA BDR KUMAL	FARMER	BADAGAUN-1; DOVHAN

**Table 2: Key Informant for Interview**

S.N	NAME OF KEY INFORMANTS	OCCUPATION/POSITION	LOCATION
1	KALA DHAR ARYAL	AGRICULTURE	AMPCHAUR -7, INDREGAUDA
2	PADAM PANI BHANDARI	AGRICULTURE	AMPCHAUR -3, BHUKWA PHANT
3	RUDRA RAJ KHAREL	AGRICULTURE	AMPCHAUR -4, TALLA PHANT GAUN
4	TIL BDR. RANA(KUMAL)	AGRICULTURE	BADAGAUN-1, DOVAN
5	BHAKTA BDR. MAGAR	AGRICULTURE	BALITHUM-4, SANOLUMPE.
6	JEEVA LAL KANDEL	AGRICULTURE	BALITHUM-2, SHIVAPURI (TARI GAUN)
7	YUB RAJ KHERAL	AGRICULTURE	TURANG-7, DIHISOTAHA+KUMAL GAUN .
8	KAPIL MANI ARYAL	AGRICULTURE	TURANG-1, MAJUWA BAZAR
9	BHIM LAL GAUTAM	AGRICULTURE	JUBHUNG -8, GHORAHA
10	CHET NATH BHANDARI	: AGRICULTURE	RUPAKOT-3, SOTA GAUN
11	KRISHNA PD. BHANDARI	BUSINESS	RUPAKOT-9, DAMOGA+THULO PHANT+AMPCHAUR GAUN
12	RABILAL BOTE	AGRICULTURE	RUPAKOT-4, DAKUWA, BOTE GAUN.
13	DAYA NIDHI BHANDARI	AGRICULTURE	JUNIYA-9, SERA PHANT
14	GHANASHYAM NEUPANE	BUSINESS	HUNGA-9, BOTE GAUN
15	PADAM BDR. BASNET	AGRICULTURE	JUHANG-1, DHAWA GAUN+CHORKATE GHAT
16	RESHAM KHATRI	AGRICULTURE	JUHANG-2, KUHINIKOT(KIMKOT)
17	GIRI RAJ PANTHA	BUSINESS	JUHANG-2, ULLIKHOLA.
18	SHANTI DEVI BHANDARI	AGRICULTURE	JUHANG-4, RITAUDIGAUN.
19	KRISHNA MAN SHRESTHA	BUSINESS	JUHANG-5, ARUNGA BAZAR
20	GANAPATI BUDA	AGRICULTURE	BAMGHA-5, BOTE GAUN.

21	SALI GRAM BHANDARI	AGRICULTURE	BAMGHA-2, BOTE GAUN
22	PURSHOTTAM BHANDARI	AGRICULTURE	HASARA-1, KHAIRENI
23	JAY LAL JUEULI	AGRICULTURE	LIMGHA-7, DHANDGAIRA GAUN
24	KASHI RAM GAUTAM	AGRICULTURE	BALITHUM-6,BOTE GAUN +KHAIRENI GHAT
25	PREM PARAJULI	AGRICULTURE	
26	JUG BDR. DARLAMI	AGRICULTURE	RIMUWA-9, SHAGHAT
27	SAGAR BOT	FISHERMAN	HUNGA-9, BOTE GAUN
28	TIL BDR. RANA(KUMAL)	FISHERMAN	BADAGAUN-1, DOVAN.
29	INDRA BDR. RANA	FISHERMAN	BADAGAUN-1, DOVAN.
30	BHAKTA BDR. MAGAR	FISHERMAN	BALITHUM-4, SANOLUMPE
31	HARI LAL BOTE	FISHERMAN	BALITHUM-6,BOTE GAUN
32	PREM BOTE	FISHERMAN	BALITHUM-6,BOTE GAUN
33	BHAG BDR. KUMAL	FISHERMAN	TURANG-1, MAJUWA BAZAR
34	DAL BDR. BOTE	FISHERMAN	BAMGHA-5, BOTE GAUN

To get the information from the project site's local communities the strategic approach taken was to aware people on the Nationwide Master Plan Study of the Storage Type Hydro-electric Projects before seeking information on the local environmental and social resources and the concerns of the people regarding the Lower Badigad project.

It is therefore the field survey team, before initiating dialogue with the local communities described why the Nationwide Master Plan Study for Storage type hydroelectric project is needed? Who is undertaking the study? What will be the output of the study? In this process the team also highlighted on how this project in this area was selected for further study? And what the study team will like to get information from the local area communities not limiting to the social and environmental information but also the concerns of the people with regard to the project and their aspirations with the project if it is screened for further study and development.

This section describes the local people knowledge on the project apart from the concerns and aspirations of the people from the project.

The local people have a little knowledge on the project. The local people thanked the study team for giving some level of information on the project progress.

The local people are concerned on their future prospects if the project is developed. Many of the people located in the reservoir have all their property (land and building) within the reservoir area only. The land and the property is the only source of their livelihood. Though the people were not against the project development would want a proper resettlement and rehabilitation to sustain their livelihood. The other concern of the local people is the road network developed within the reservoir area. The road infrastructure provide means of connectivity with the district and the capital. As the entire network falls within the reservoir area, they were eager to know whether the project reestablish these road network as a part of the project.

They believe that the project will open the door of social and economic development not only for the local area but also to the entire region. Their aspiration with the project is the employment of the local people in the project and a host of the community development issues such as water supply, electrification, road network development, enhancement of educational institutions and health institutions.

**Annex 16: Environmental Survey Report**  
**Andhi Kholā Project (C-08)**

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## Introduction

Federal Democratic Republic of Nepal is rich in water resources, its potential water power is 83,000 MW and economically exploitable water power is 42,000 MW. However, as of 2011, the total generating capacity of the country is only about 718.62 MW. Of the total installed capacity 92% is from the hydroelectric power plants. In addition, since most of hydroelectric power plants are run-of-river type, their output decreases seriously in the dry seasons. Consequently, there is a rolling blackout of as long as 14 hours a day which poses many problems including affects in livelihood and industries which severely impact the national economy.

To cope with these situations, the government of Nepal has worked out “National Electricity Crisis Resolution Action Plan” and “10-Year Hydropower Development Task Force” at the end of 2008. The above action plan and task force recommended need of storage-type hydroelectric power plants able to supply sustainable electricity uninterruptedly even in dry seasons to solve current power shortage at an early date.

However, construction of storage-type hydroelectric power plants should be carried out systematically taking into consideration of various aspects including the overall water resource development policy of Nepal, hydrological and geological characteristics, environmental impact, etc. Therefore, the Government of Nepal has requested the Government of Japan to work out a nationwide master plan for storage-type hydroelectric power development.

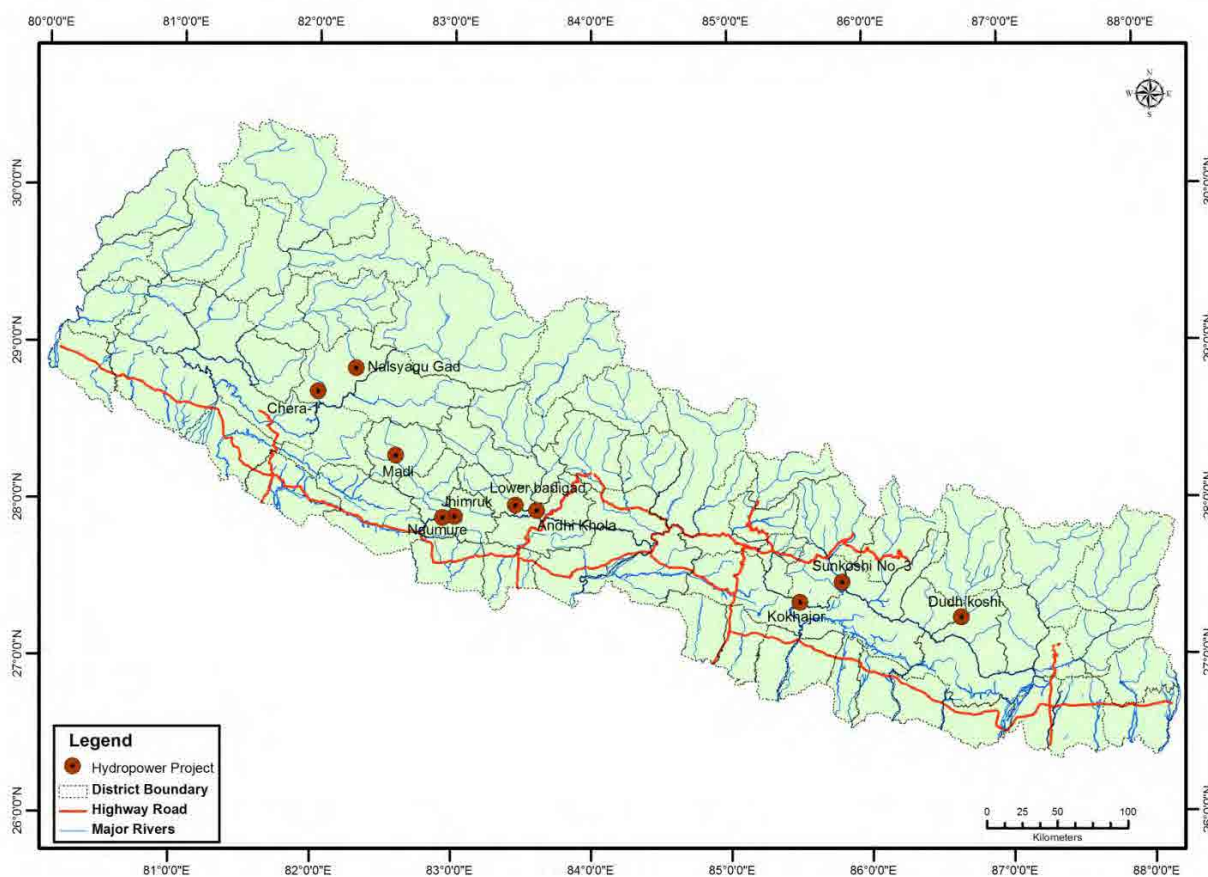
Electric Power Development Company Limited (J-Power) appointed by the JICA for the nationwide master plan study based on the desk level study in close association with NEA screened 10 candidate projects for the master plan study out of the list of 67 promising projects identified by NEA all over Nepal. **Table 1a and 1b** presents the salient features of the 10 promising projects screened for the master plan study, while **Figure 1** presents the location of the projects.

**Table 1a: Salient Features of Potential Projects**

No.	Project Name	Location (District)	Location of Dam Site		River	Installed Capacity (MW)	Catchment Area (km <sup>2</sup> )
			Longitude	Latitude			
E-01	Dudh Koshi	Okhaldhunga/Khotang Dist.	86° 39' 17.3	27° 15' 47.2	Dudh Koshi to Baiku Khola	300.0	4100
E-06	Kokhajor-1	Sinchuli, Sindhupalchok	85° 29' 59.6	27° 22' 21.9	Kokhajor	111.5	281
E-17	Sun Koshi No. 3, Kosi MP	Ramechhap, Kavre and Sindhupalanchok	85° 48' 14.3	27° 29' 50.5	Sun Koshi	536.0	5520
C-02	Lower Badigad	Gulmi	83° 27' 22.2	28° 0' 0.6	Badigad	180.3	2050
C-08	Andhi Khola	Syangja	83° 36' 30.6	27° 58' 2.6	Andhi Khola	180.0	475
W-02	Chera-1	Jajarkot	82° 1' 12.3	28° 42' 56.4	Chera	148.7	809
W-05	Lower Jhimruk	Arghakhachi, Pyuthan	83° 1' 1	27° 55' 30.8	Jhimruk	142.5	995
W-06	Madi	Rolpa	82° 35' 15.5	28° 18' 48.5	Madi	199.8	674
W-23	Nalsyau Gad	Jajarkot	82° 17' 42.8	28° 52' 4.7	Nalsyau Gad	410.0	571
W-25	Naumure (W. Rapti)	Argakhanchi, Pyuthan	82° 55' 42.9	27° 55' 6.1	West Rapti	245.0	3430

**Table 1b: Salient Features of Potential Projects**

No.	Project Name	Dam Height (m)	Total Storage Volume (MCM)	Effective Storage Volume (MCM)	Reservoir Area (km <sup>2</sup> )	FSL (m)	MOL (m)	TWL (m)	Rated Gross Head (m)	Rated Power Discharge (m <sup>3</sup> /sec)
E-01	Dudh Koshi	180.0	687.40	442.10	11.05	580.0	530.00	303.35	275.0	136.00
E-06	Kokhajor-1	107.0	218.70	166.10	8.92	437.00	390.00	200.00	226.3	63.90
E-17	Sun Koshi No.3, Kosi MP	140.0	1,220.00	555.00	23.99	700.0	674.00	575.00	116.3	109.34
C-02	Lower Badigad	191.0	995.90	505.50	13.65	688.00	654.00	475.00	196.0	232.60
C-08	Andhi Khola	157.0	336.50	238.70	5.52	675.00	626.70	368.48	307.0	81.40
W-02	Chera-1	186.0	254.90	141.10	4.00	866.0	814.00	640.00	220.0	80.50
W-05	Lower Jhimruk	167.0	386.00	211.60	4.98	597.0	557.0	390.0	194.6	88.10
W-06	Madi	190.0	359.50	235.10	7.66	1,090	1,030.00	800.00	280.8	84.90
W-23	Nalsyau Gad	200.0	419.6	296.3	6.3	1,570.0	1,498.00	872.0	644.0	75.00
W-25	Naumure (W.Rapti)	190.0	1,021.00	580.00	19.76	517.0	474.00	358.00	162.6	185.60



**Figure 1: Ten Promising Sites Identified for Survey**

The NESS, a local consulting firm of Nepal was entrusted by J-Power for the required SEA field studies of the 10 candidate projects. As per the ToR of works, there are basically two types of surveys required namely; geological, geotechnical, construction material and seismicity study, and environmental and social study. This report deals with the field survey findings of social and environmental study on **Andhi Khola Project** identified as one of the candidate project in the western Nepal.

## 1 Socio-economic Environment

The information regarding the social and economic conditions of the people in Nepal is available in the publications of the Central Bureau of Statistics. But such information is limited to administrative units such as VDCs, DDCs, Development Zones and at national level. As the candidate projects cross cut the administrative units, the available data on the social and economic concerns could not be used effectively to characterize the direct impact areas by the projects. To fill this gap field level studies on Socio-economic and Environmental Concerns are conducted through participatory methods. The findings of the field surveys are presented in the section below.

### 1.1 Demographic Concerns

#### 1.1.1 VDCs, Settlements and population

The proposed Andhi Khola storage type project is located in Syanja district in the Western Development region of Nepal and covers 6 VDCs, 12 settlements, >9 wards and 542 households. The total population of the reservoir area is estimated to be 3863 with the average family size of 7.12 which is slightly significantly higher than the national average family size (4.7) 2011 Census estimate) (Table 1c and **Appendix 1**). The reservoir area occupies 1.22% population of Syangja district<sup>2</sup>.

**Table 1c: VDCS and Settlements and Population under the Storage Project, Syangja**

S.N.	VDC	Settlement	Ward No.	Households	Population
1	Nibuwakharka	Motichaur, Pell, Chharak, Bhortak, Sera and Sushinda	4, 6, 7 and 9	129	815
2	Jagatradevi	illunga, Phalang and Tallo galyang bazar	3, 8 and 9	371	2788
3	Pelakot	Majuwa and Bardanda	9	12	80
4	Tulsi Bhanjyang	Mudkillla	8	30	180
5	Shri Krishna Gandaki				
6	Tindobato				
	<b>Total</b>	<b>12</b>	<b>&gt;9</b>	<b>542</b>	<b>3863</b>

Source: NESS Field Survey, 2012

#### 1.1.2 Ethnicity / Caste

The population of the reservoir area is dominated by the disadvantaged Adivasi/Janjati Magar groups (51%). Brahmin occupies the second largest population (36%). Other caste/ethnic groups dwelling in the area in limited number include *Dalit* (7%) and Guring (disadvantaged janjati 5%) and Newar (advanced Janjati 1%) (Figure 1 and **Appendix 2**).

<sup>1</sup> The findings are based on the NESS Rapid Field Survey Assessment (2012) using Focus Group Discussions (FGD) and Observation tools. Refer **Appendix 14** for the List of FGD participants.

<sup>2</sup> The total population of Syanja district according to preliminary estimate of CBS Census 2011 is estimated to be 317,320.

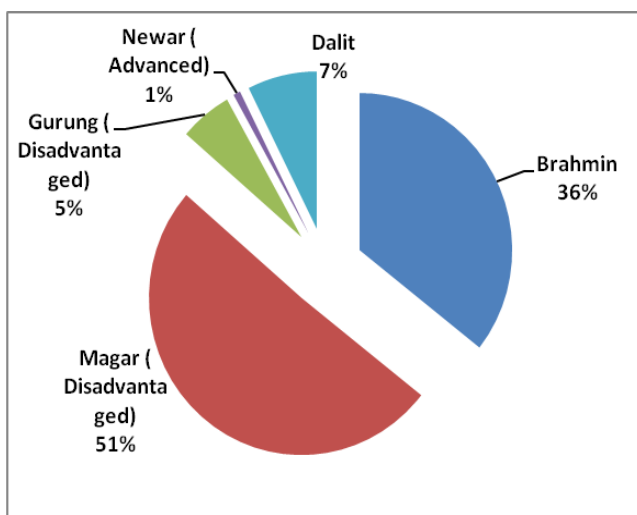


Figure1: Ethnic Composition of Population (%)

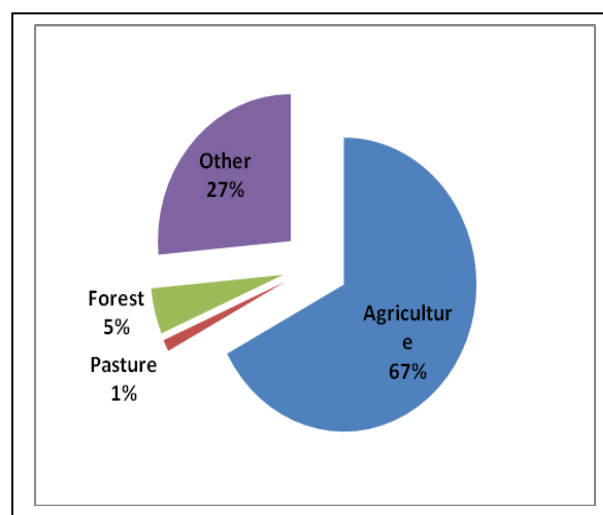


Figure2: Land Use Pattern (%)

## 1.2 Economic Concern

### 1.2.1 Land Use Pattern and Land Holding Size

The total land area in the reservoir area is estimated to be 4660 ropanis (1 ropani=20 hectare), 67% of which is used for agriculture followed by, other (kharbari), forest (5%) and pasture land (1%) (Figure 2). **Appendix 3** presents details on the land use pattern by each cluster of the VDC.

Land holding is one of the major indicators of the economic well being in the reservoir area as elsewhere in the country. The total agricultural land of the reservoir area is estimated to be 4060 ropanis including *kharbari* (thatch growing land). Of the total agricultural land 38% is *pakho* (un-irrigated up land), 37% *khet* (irrigated paddy field), and 25% *kharbari*. The average land holding of a household is calculated to be 7.49 ropanis with the minimum and maximum range of holding size of 1.15 and 35.71 ropanis (Table 2 and **Appendix 4**). Based on the Central Bureau of Statistics (CBS) classification<sup>3</sup>, the households fall in the marginal and small to medium farmers group when examined from the view point average land holding size.

Table 2: Total and Average Land Holding Size (Ropani)

Description	Total	%	Average/HH
Khet	1542	36.85	2.85
Pakho	1590	37.99	2.93
Other (Kharbari)	1053	25.16	1.94
<b>Total</b>	<b>4185</b>	<b>100</b>	<b>7.72</b>

Source: NESS Field Survey, 2012

The reservoir area is producing cereals such as paddy, maize, millet, wheat and cash crops such as potato, pulses, oilseeds and vegetables. Among the cereals, maize is grown in largest area (1017 ropanis) followed by paddy (373 ropanis), millet (169 ropanis) and wheat (115 ropanis). Among the cash crops, oilseeds occupy the largest area (116 ropanis).

Unlike the area, the quantity of production is also highest for paddy followed by maize, millet and wheat. Among the cash crops, the production is recorded to be highest for the oilseeds followed by vegetables

<sup>3</sup> According to CBS, a household holding < 15 ropani of land is classified as marginal farmer, holding 15-135 ropanis as small to medium farmers and holding > 135 ropani as large farmers.

and potato. The cropping intensity of the area is only about 59% (Table 3 and **Appendix 5**), because of lack of agriculture labour force in the village due to growing trend of youth migration for foreign jobs.

**Table 3: Crop Production and Yield**

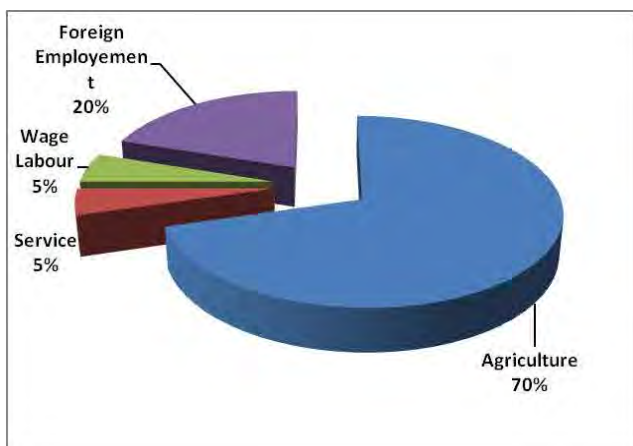
S.N.	Crop	Area (Ropani)	Production (Kg)	Yield (Kg/Ropani)
1	Paddy	1017	210900	207
2	Maize	373	69678	187
3	Millet	169	42905	254
4	Wheat	115	28224	245
5	Potato	24	37200	1550
6	Pulses	2	500	250
7	Oilseeds	116	72750	627
8	Vegetables	28	46050	1645
	<b>Cropping Intensity</b>	<b>58.88%</b>		

Source: NESS Field Survey, 2012

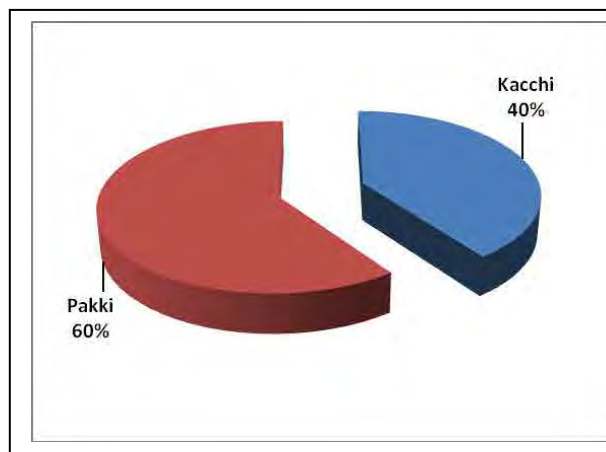
According to field study most of the productions are consumed locally. Only one settlement (Mudkila of Tulasibhanjyang VDC) reported selling of 400 kg of potato last year in Gawang Bazar @ Rs 5/kg.

### 1.2.2 Occupation

Only about half of the population is reported to be involved in economic earning activities. Of the working population, 70% are engaged in agriculture followed by foreign employment (20%) and services and wage labour (5% each) (Figure 3 and **Appendix 6**).



**Figure 3: Occupation of Population**



**Figure 4: Types of Houses**

### 1.2.3 Housing Type

Two types of houses are categorized in the reservoir area: i) Pakki house i.e permanent types of house built generally using cement and stone and roofed by using galvanized sheet (tin) or cemented and ii) kachhi house i.e built by using mud and stone and roofed using thatch.

60% of the households are residing in pakki (permanent ) types of house and 40% inkachhi (temporary ) types of house (Figure 4 and **Appendix 7**).

### 1.3 Service related Infrastructures

#### 1.3.1 Road

Only 7 settlements out of 12 are facilitated with minimum length of gravel and paved types of roads. Four settlements are also connected with national highways (Sidhartha and Prithivi). Altogether 11 suspension bridges are also constructed in different parts of the reservoir area of which seven are suspension type, two are cemented and one is wooden (**Appendix 8**).

#### 1.3.2 Schools

Two Higher Secondary and seven Primary level schools are providing the educational services in the reservoir area where more than 1350 students are enrolled (**Appendix 9**).

#### 1.3.3 Irrigation Infrastructure

Half of the reservoir area settlements are served by 23 irrigation schemes and most of them are farmers made (**Appendix 10**).

#### 1.3.4 Drinking Water

Ten water supply schemes are reported to be functioning in nine settlements of the reservoir area. More than 141 water taps are reported in the schemes with minimum and maximum number of taps installed between 4 and 60 in each of the schemes (Figure 5 and **Appendix 11**).

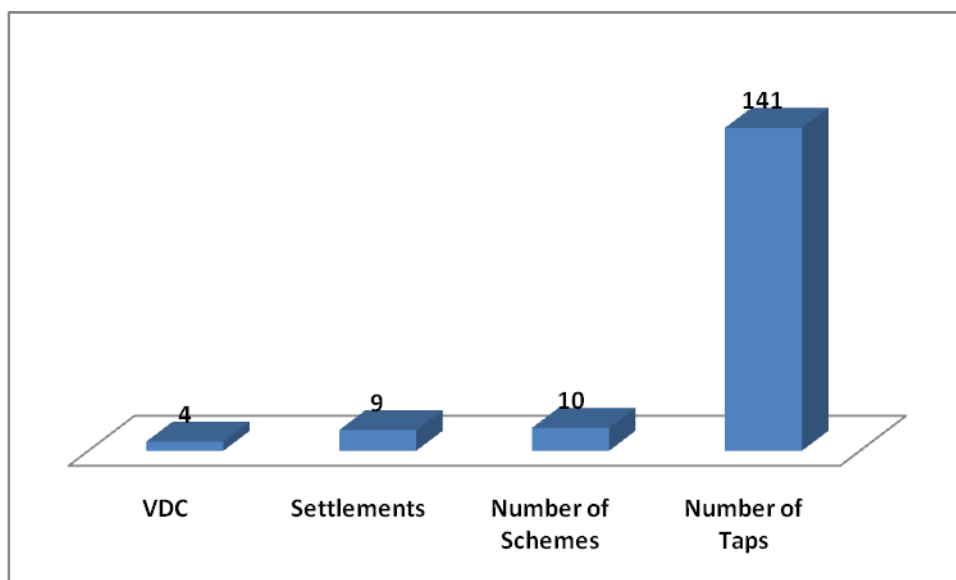


Figure 5: Number of drinking water Schemes in the Reservoir Area

#### 1.3.5 Community Forest

The reservoir area enjoys the facilities and services of four community forests and two wetlands and recreation centers as shown in Table 4.

**Table 4: Community Forests, Wetlands/ Recreation Centers in the Reservoir Area**

S.N.	VDC	Settlement	Community Forests	Wetland/ Recreation Centre
1	Nibuwakharka	Chharak	Marilung and Ghardanda CF	
2	Pelakot	Bardanda	Chowk CF and Shyamthunka CF	One Wetland ( Name not known)
3	Tulsi bhanjyang	Mudkillla		Bhurunge Tal
<b>Total</b>			<b>4</b>	<b>2</b>

Source: NESS Field Survey, 2012

### 1.3.6 Industries and Services

Six different types of industries such as milk dairy, furniture, rice mills, block etc. are established in the three clusters of the reservoir area. A typical handicraft that produces Nepali bags and woolen products is operated in Motichaur of Nuwakharka VDC that produces 100 pieces of goods and sale the products worth to Rs 240,000 in a year (Table 5).

**Table 5: Industries Types in the Reservoir Area**

S.N.	VDC	Settlement	Industry Type	Number	Employment	Remarks
1	Nuwakharka	Motichaur	Nepali bag, woolen products	1		Production-100 pieces/month and sale Rs 240,000/year
2	Jagatradevi	Phalang	Milk dairy	1	NA	
		Tallo galyang bazar	Furniture, rice mill, block, railing industries	5	50	
	<b>Total</b>			<b>7</b>		

Source: NESS Field Survey, 2012

The project reservoir site has one hydropower project named Andhi Khola Hydropower. This hydropower plant has an installed capacity of 5 MW which is now upgraded to 9.5 MW. Apart from this there are no other industries and services centre such as agriculture, 1 livestock etc. in the reservoir area. Gyalang Bazar and Thulo Galyang Bazar located in Pelakot and Jagatradevi VDCs are the most common market centers of the reservoir area (Table 6).

**Table 6: Major Market Centers of the Reservoir Area**

S.N.	VDC	Settlement	Name of the Market Centres
1	Jagatradevi	Phalang	Thullo galang bazar
2		Tallo galyang bazar	Thullo galang bazar
3	Pelakot	Majuwa	Galang bazar
4		Bardanda	Thullo galang bazar
<b>Total</b>	<b>2</b>	<b>4</b>	<b>4</b>

Source: NESS Field Survey, 2012

### 1.4 Culture and Religious Site

The major festivals celebrated in the reservoir area are: *Dasain, Tihar, Tija, Majhe Sankarati*, which are based on Hindu tradition and culture. Besides these festivals, the major janjati ( Magar) of the area celebrate Magar Diwas at 15<sup>th</sup> of Falgun ( February third week) every year while *Losar* is famous among Gurung communities. Four important temples are located in the reservoir area (Table 7 and **Appendix 12**.)

**Table 7: Cultural Sites and Festivals**

S.N.	VDC	Settlement	Culture/Festivals		
			Main festival	Any festivals of Janajatis	Religious site at the river
1	Nibuwakharka	Motichaur	Dashain, tihar, teej, maghe sankranti	Magar diwas (15th falgun) and Losar	Temple (balam devi mandir)
2		Tallo galyang bazar	Dashain, tihar, teej, maghe sankranti	Lhosar	Durga mandir
3	Pelakot	Bardanda	Dashain, tihar, teej, maghe sankranti		Siddha baba, kedarnath
4	Tulsi bhanjyang	Mudkillla	Dashain, tihar, teej, maghe sankranti		Kalika mandir (upper site)
	<b>Total</b>				

Source: NESS Field Survey, 2012

### 1.5 Ongoing and Proposed Development programmes

Andhikhola Development Programme at Tallogalyang of Jagardevi VDC and Aquatic Form at Majuwa of Pelakot VDCs are the only two development related ongoing programmes of the reservoir area. There are no any water resource (including hydropower) related proposed development programmes in the reservoir area.

### 1.6 Past Experience with community and their perception

The reservoir area people have not experience any types of conflict with regards to the development projects in the past as there are no such large scale development projects implemented in the past. The people have perceived different positive and negative impacts from the storage type hydropower project. Submerge of house and land, loss of their traditional property, losses of houses etc. are reported to be the major negative impacts perceived by the community. The communities have also expected different development activities from the project such as availability of electricity, infrastructure development and employment (Table 8 and **Appendix 13**).

**Table 8: Perceived Impacts of the Storage Type Hydropower Project**

Positive impacts	Negative Impact
Electricity and employment	loss of land and property
Available of electricity	loss of houses
Infrastructure development	loss of water source
Employment and development activities	submerge of house and land

Source: NESS Field Survey, 2012



## 2 DISASTER STUDY

There are no records of the disaster at the site specific level of the candidate project at the central level and district level offices of the government of Nepal. It is therefore, the disaster information is collected from the project site based on the key informant survey. The findings of the results are presented in the sections below.

### 2.1 Types of Disaster

Within the influence area of the Andhi Khola storage type hydroelectric project the flood disaster have been reported by the key informants. The landslide and earthquake as a disaster event is not in the memory of the local people.

#### 2.1.1 Flood

In the memory of the local people flood disaster is of common occurrence within the project site. Three flood events (B.S. 1995, 2018, 2028,) have a widespread damage of life and property. The cause of the floods as reported by the informants is the heavy precipitation in the catchment areas of the Andhi Khola in the monsoon season. The loss of life and property caused by the flood events in the candidate reservoir area are presented below.

**a) Name of Respondent: RAM BIR GURUNG** **Date: 26/03/2069 B.S.**  
**Age: 50** **Occupation: Agriculture** **Location: Pilakot, Bordanda**

**i) Year of the occurrence: 1995 B.S. (Around 74 yrs ago)**

**ii) Cause of the flood: Heavy Precipitation in the upstream catchment**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~40-50 Ropani	~30 Ropani	~40-50 Ropani
Life	X	X	x
Build properties	X	X	X
Crops	~Paddy, 100 muri	~Paddy, 50-80 muri	~Paddy, 150 muri
Others	x	X	X

*Note: One Muri is equivalent to 70 kg; 19.66 Ropani is equivalent to 1 ha*

**b) Name of Respondent: Hari Prashad Nawpane** **Date: 27/03/2069 B.S.**  
**Age: 66** **Occupation: Agriculture** **Location: Jagarra Devi- 8, Phalang.**

**i) Year of the occurrence: 2018 B.S. (Around 51 yrs ago)**

**ii.) Cause of the flood: Heavy Precipitation in the catchment**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~100 rpns	~80-90 rpns,	~120-130 rpns,
Life	X	X	1
Build properties	1 Bridge	Some cattle sheds	Some cattle sheds-goth
Crops	~Paddy, 300 muri	~Paddy, 250 muri	~Paddy, 350 muri
Others	x	X	X

*Note: One Muri is equivalent to 70 kg, 19.66 Ropani is equivalent to 1 ha*

**c) Name of respondent: PITAMBER THAPA** **Date: 27/03/2069 B.S.**  
**Age: 50** **Occupation: Agriculture** **Location: Nibuwakharka -9, Pelli**

**i) Year of the occurrence: 2028 B.S. (Around 41 yrs ago)**

**ii) Cause of the flood: Heavy Precipitation in the upstream catchment.**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~40-50 Ropani	~30 Ropani	~40-50 Ropani
Life	X	X	X
Build properties	X	X	Cattle sheds

Loss or Damages	Local Area	Upstream Area	Downstream Area
Crops	~Paddy, 80 muri	~Paddy,50-60 muri	~Paddy, 100 muri
Others	x	X	X

Note: One Muri is equivalent to 70 kg

### 2.1.2 Landslide

Landslide events are relatively rare in the influence area of candidate project. Small scale debris flows could be observed, however large landslide causing widespread damage within the project influence area is not in the memory of the local people.

### 2.1.3 Earthquake

In the memory of the local people the candidate project site communities have not experienced earthquake causing loss of life and property.

## 3.0 FLORAL STUDY

Though the floral information at the regional level is available, there is no published literature on the site specific level of the candidate project at the central and district level offices of the government of Nepal. It is therefore, candidate project site is visited by the biological study team to gather information based on direct observation and through the participatory methods with the local key informants. Findings of the field study are presented in sections below.

### 3.1 Vegetation Diversity

The information on the vegetation diversity is gathered from the direct observation by the members of biology study team during site visit. Besides, information is also collected from the key informants of the local area through interviews and focus group discussions with the local community forest user groups.

The candidate project site is rich in floral diversity. About 41 plant species were recorded through direct observation and interviews with the key informants. The list of plant species is presented in the table below.

S.N.	Local Name	Common Name	Scientific Name	Uses
1	Khayar	Cutch	<i>Acacia catechu</i>	
2	Bojho	Sweet flag calamus root	<i>Acorus calamus</i>	Medicine
3	Bell	Wood apple	<i>Aegle marmelos</i>	
4	Shiris	Tee-coma	<i>Albizia procera</i>	
5	Uttis	Alder	<i>Alnus nepalensis</i>	
6	Ghiukumari	Indian aloe	<i>Aloe vera</i>	
7	Katahar	Jack fruit	<i>Artocarpus heterophyllus</i>	
8	Neem	Neem	<i>Azadirachta indica</i>	
9	Bans	Bamboo	<i>Bambusa sp.</i>	
10	Koiralo	Moun. ebony	<i>Bauhinia variegata</i>	
11	Simal	Simal	<i>Bombax ceiba</i>	
12	Palans	Flame forest	<i>Butea monosperma</i>	
13	Bhang	Hemp	<i>Cannabis sativa</i>	
14	Sisso	Sisso	<i>Dalbergia sisso</i>	
15	Dhaturo	Devil's apple	<i>Datura stramonium</i>	Medicine
16	Amala	Amla	<i>Embllica officinalis</i>	
17	Banmara	Crofton weed	<i>Eupatorium adenophorum</i>	
18	Bar	Banyan tree	<i>Ficus benghalensi L</i>	

S.N.	Local Name	Common Name	Scientific Name	Uses
19	Kavro	Kavro	<i>Ficus infectoria</i>	
20	Pipal	Peepal tree	<i>Ficus religiosa</i>	Asthetic
21	Pinus	Pinus	<i>Gossypium arboretum</i>	
22	Okhar	Walnut	<i>Juglans regia</i>	
23	Epilipin	Leucaena / Ipil-Ipil	<i>Leucaena leucocephala</i>	
24	Lichi	Litchi	<i>Litchi</i>	Fruit
25	Aap	Mango	<i>Magnifera indica</i>	Fruit
26	Ampa	Mango	<i>Mangifera indica</i>	Fruit
27	Kimu	Mulberry	<i>Morus alba</i>	Medicine
28	Narkatt	Common reed grass	<i>Pharagmites karka</i>	
29	Amba	Guava	<i>Psidium guajava</i>	
30	Anar	Pomegranate	<i>Punica granatum</i>	
31	Naspati	Pear	<i>Pyrus communis</i>	
32	Sarpa gandha	Rauwolfia root surpentine	<i>Rauwolfia serpentina</i>	
33	Ashok	Ashok tree	<i>Saraca asoca</i>	
34	Sal	Sal	<i>Shorea rubsta</i>	
35	Jamuna	Blackberry	<i>Syzygium cumini</i>	
36	Imili	Tamarind	<i>Tamarindus indica</i>	
37	Barro	Bastard murobalan	<i>Terminalia bellirica</i>	Medicine
38	Harro	Chebulie myrobalan	<i>Terminalia chebula</i>	Medicine
39	Bayar	Indian plum	<i>Zizyphus</i>	
40	Ania			
41	Hunkot			

Source: NESS Field Survey, 2012

### 3.2 Forest Types

The candidate project site is characterized by the hill sal forest and *Schima wallichii forest* with isolated patches of Acacia / Bombax Forest both in the reservoir area and outside the reservoir area. Table below presents the forest types and associated species in the reservoir area and outside reservoir area.

Local (Within Reservoir)	Regional (Out of the reservoir)
Acacia /Bombax Forest with <i>Acacia catechu</i> (Khayar) and <i>Bombax ceibia</i> (Simal) as dominant species; Hill Sal Forest with <i>Shoera robusta</i> (Sal) and <i>Schima wallichii</i> (chilaune) as dominant species	Hill Sal Forest with <i>Shoera robusta</i> (Sal) and <i>Schima wallichii</i> (chilaune) as dominant species

### 3.3 Forest as per Forest Classification (Community Forest, Government Forest, Leasehold Forest, Private Forest, Religious Forest etc.)

The forests of the candidate project influence area are the government and community forests. The community forest are managed by the local community forest user groups within the framework of the community forest management plan approved by the district forest offices, while the government managed forest is managed by the district forest office. The reservoir occupied area has three community forests and one government managed forest, while the project influence area has about 3 government managed forests. The name of the government and community forests, dominant species of plants and the location of the forests in the local administrative zone (VDCs) is presented in the tables below for the reservoir area and outside the reservoir area.

**Local Area (Within the reservoir)**

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C.
1	community	Vagato Community Forest	Sal	Pilakot
2	community	Tarlung Community Forest	Khayar	Pilakot
3	community	Duk Community Forest	Sal	Pilakot
4	Government	Bordanda area forest	Sal	Pilakot

**Regional Area (Outside the reservoir)**

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C.
1	Government	Tormala Area	Sal and Khayar	Pilakot
2	Government	Pelli Area forest	Sal	Nibuwakharka
3	Government	Ruse Danda area forest	Khayar	Nibuwakharka

**3.4 Forest Plot Analysis**

For the analysis of the forest status and characteristics 3 sample plots were measured within the reservoir area of the candidate project. The sample plots measured has a size of 25 x 25 meter. The detail of the sample plot measurements is presented in the tables below.

**a) Forest: Bordanda Area Forest**

**Location:** VDC. Pilakot.

**Forest Density:** 432/h

**Dominant Species:** Sal (*Shorea robusta*) = 77.77%

**Crown coverage of the forest:** 50% Open

S.N.	Tree Species	DBH (inch)	Height (approx.)
1	<i>Shorea robusta</i>	25	29
2	<i>Shorea robusta</i>	36	40
3	<i>Shorea robusta</i>	28	25
4	<i>Shorea robusta</i>	22	35
5	<i>Shorea robusta</i>	24	28
6	<i>Shorea robusta</i>	29	21
7	<i>Shorea robusta</i>	28	36
8	<i>Shorea robusta</i>	36	45
9	<i>Shorea robusta</i>	12	15
10	<i>Shorea robusta</i>	29	30
11	<i>Shorea robusta</i>	22	21
12	<i>Shorea robusta</i>	27	36
13	<i>Shorea robusta</i>	26	28
14	<i>Shorea robusta</i>	18	24
15	<i>Acacia catechu</i>	19	26
16	<i>Acacia catechu</i>	34	45
17	<i>Acacia catechu</i>	35	50
18	<i>Shorea robusta</i>	26	30
19	<i>Shorea robusta</i>	21	25
20	<i>Acacia catechu</i>	16	20
21	<i>Acacia catechu</i>	34	46
22	<i>Bombax ceibia</i>	32	40
23	<i>Shorea robusta</i>	20	26
24	<i>Shorea robusta</i>	25	25
25	<i>Shorea robusta</i>	26	18
26	<i>Shorea robusta</i>	24	23
27	<i>Schima wallichii</i>	36	30

**b) Name of Forest: Ruse Danda Area Forest**

**Location:** Nibuwakharka VDC.

**Forest Density:** 567/ha

**Dominant Species:** Sal (*Shorea robusta*) = 52.77%

**Crown Coverage:** 25 % Open

S.N.	Name of spp.	DBH (inch.)	Height (ft.)
1	<i>Acacia catechu</i>	25	32
2	<i>Acacia catechu</i>	35	55
3	<i>Acacia catechu</i>	15	20
4	<i>Acacia catechu</i>	29	42
5	<i>Shorea robusta</i>	23	26
6	<i>Shorea robusta</i>	39	45
7	<i>Shorea robusta</i>	34	52
8	<i>Shorea robusta</i>	26	40
9	<i>Shorea robusta</i>	37	55
10	<i>Shorea robusta</i>	36	45
11	<i>Shorea robusta</i>	26	35
12	<i>Shorea robusta</i>	34	45
13	<i>Shorea robusta</i>	45	60
14	<i>Shorea robusta</i>	34	50
15	<i>Shorea robusta</i>	48	58
16	<i>Acacia catechu</i>	46	55
17	<i>Acacia catechu</i>	42	50
18	<i>Bombax ceibia</i>	57	60
19	<i>Shorea robusta</i>	47	55
20	<i>Shorea robusta</i>	36	45
21	<i>Shorea robusta</i>	42	58
22	<i>Shorea robusta</i>	39	60
23	<i>Schima wallichii</i>	36	45
24	<i>Schima wallichii</i>	32	45
25	<i>Schima wallichii</i>	36	45
26	<i>Bombax ceibia</i>	34	45
27	<i>Shorea robusta</i>	36	45
28	<i>Bombax ceibia</i>	31	40
29	<i>Acacia catechu</i>	25	36
30	<i>Acacia catechu</i>	26	35
31	<i>Bombax ceibia</i>	24	38
32	<i>Shorea robusta</i>	26	38
33	<i>Shorea robusta</i>	27	40
34	<i>Shorea robusta</i>	29	40
35	<i>Shorea robusta</i>	35	40
36	<i>Schima wallichii</i>	39	46

**c) Name of Forest: Pelli Area Forest**

**Location:** Nibuwakharka VDC.

**Forest density:** 528/ha

**Dominant Species:** Sal (*Shorea robusta*) = 54.54%

**Crown Coverage:** 40% Open

S.N.	Name of spp.	DBH (inch.)	Height (ft.)
1	<i>Acacia catechu</i>	20	26
2	<i>Acacia catechu</i>	24	35
3	<i>Acacia catechu</i>	26	31
4	<i>Shorea robusta</i>	21	31
5	<i>Shorea robusta</i>	15	26
6	<i>Shorea robusta</i>	19	40
7	<i>Shorea robusta</i>	31	45
8	<i>Shorea robusta</i>	35	45

S.N.	Name of spp.	DBH (inch.)	Height (ft.)
9	<i>Shorea robusta</i>	24	24
10	<i>Schima wallichii</i>	16	20
11	<i>Schima wallichii</i>	52	80
12	<i>Bombax ceibia</i>	26	40
13	<i>Shorea robusta</i>	34	40
14	<i>Bombax ceibia</i>	29	40
15	<i>Acacia catechu</i>	14	24
16	<i>Acacia catechu</i>	11	15
17	<i>Shorea robusta</i>	10	14
18	<i>Shorea robusta</i>	16	20
19	<i>Shorea robusta</i>	24	34
20	<i>Shorea robusta</i>	23	30
21	<i>Shorea robusta</i>	36	45
22	<i>Shorea robusta</i>	39	56
23	<i>Shorea robusta</i>	38	50
24	<i>Acacia catechu</i>	56	80
25	<i>Acacia catechu</i>	24	36
26	<i>Acacia catechu</i>	45	65
27	<i>Shorea robusta</i>	14	20
28	<i>Shorea robusta</i>	16	21
29	<i>Schima wallichii</i>	29	34
30	<i>Schima wallichii</i>	27	36
31	<i>Shorea robusta</i>	28	35
32	<i>Shorea robusta</i>	23	29
33	<i>Shorea robusta</i>	45	55

### 3.5 Public Dependency on the Forest

The forests of the candidate project site provide a range of goods and services to the local communities. The local community extracts followings resources from the forest areas to support their livelihood.

- Fodder
- Firewood
- For thatch
- Timber etc.

### 3.6 Floral Species of the Conservation Significance

Of the recorded floral species only 5 species have been categorized under the protection lists of the government of Nepal and CITES. However, none of the floral species have been listed in the IUCN red list. The table below presents the list of the protected species.

S.N .	Local name	Common name	Scientific name	Status			Sources		
				IUCN	GON	CITIES	Site survey	Hearing survey	Literature survey
1	Khayar	Cutch	<i>Acacia catechu</i>		P		Confirmed by site survey at Pelli, Rusedanda forest		
2	Simal	Simal	<i>Bombax ceiba</i>		P		Confirmed by site survey at Pelli, Rusedanda forest		
3	Okhar	Walnut	<i>Juglans regia</i>		P			Hearing at Nibuwakharka VDC	
4	Sarpagandha	Rauwolfia root surpentine	<i>Rauwolfia serpentina</i>		P	II		Hearing at Nibuwakharka VDC	
5	Sal	Sal	<i>Shorea rubsta</i>		P		Confirmed by site survey at Pelli, Rusedanda forest		

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## 4 FAUNAL STUDY (WILDLIFE)

Information on the wildlife of the candidate project site is scarce in the published literatures. It is therefore site investigations are conducted to gather information through direct observation and the participatory methods with the local communities and the key informants. The findings of the filed investigations are presented in section hereunder.

### 4.1 Wildlife Diversity

Information on wildlife diversity is gathered through direct observation and participatory methods which included focus group discussion with the local communities and key informant surveys.

#### a) Mammals

A total of 12 mammalian species were recorded from the focus group discussion and key informant surveys. Of the total reported species 5 mammalian species were directly observed by the field biological team. The details of the mammalian species and habitat types are presented in the table below.

S.N.	Consultation	Observation	Common Name	Scientific Name	Habitat	Remark
1	Chital		Spotted deer	<i>Axis axis</i>	Found in grassland.	Check
2	Musa		Jungle rat	<i>Bandicota indica</i>	Burrows in Forest land and close to cultivated land areas	Common
3	Sayal	*	Jackal	<i>Canis aureus</i>	Burrows in Forest land and close to cultivated land areas	Common
4	Biralo		Jungle cat	<i>Felis chaus</i>	Degraded and Dense Forest.	Rare
5	Nayauri	*	Common mongoose	<i>Herpetes edwardsi</i>	Burrows in Forest land and close to cultivated land areas	Common
6	Bandar	*	Assamese monkey	<i>Macaca assamensis</i>	Cultivated areas and forest lands	Common
7	Bandar	*	Rhesus monkey	<i>Macaca mulatta</i>	Cultivated Land and degraded forest areas	Common
8	Bagh		Common leopard	<i>Panther pardus</i>	Rock caves and sal forest.	Rare
9	Lokherke		Squirrel	<i>Ratufa indica</i>	Cultivated area and forest area	Common
10	Langur	*	Langur	<i>Semnopithecus entellus</i>	Riverine forest areas	Common
11	Char Singe Bakhra		Four horn antelope	<i>Tetracerus quadricornis</i>	Shrub line area	Check
12	Fyauro		Bengal fox	<i>Vulpus bengalensis</i>	Burrows in Forest land and close to cultivated land areas	Common



**b) Birds**

A total of 16 bird species are reported by the local communities and key informants. Of the total reported species 12 species are directly observed by the field biological team. Table below presents list of the reported and observed species in the candidate project influence area.

S.N.	Consultation	Observation	Common Name	Scientific Name	Habitat
1	Maina	*	Jungle mayna	<i>Acridotheres fuscus</i>	Green forest
2	Maina	*	Common myna	<i>Acridotheres tristis</i>	Found in village and cultivated area
3		*	Brown crane	<i>Amaurornis akool</i>	Evergreen forest
4		*	White breasted water hen	<i>Amaurornis phoenicurus</i>	Wetland marshes
5		*	Large egret	<i>Ardea alba</i>	Bank of river
6	Bakulla		Gray heron	<i>Ardea purpurea</i>	Bank of river
7	Ollu		Owl	<i>Bubo bubo</i>	Dense and wood land forest
8	Bakulla	*	Cattle egret	<i>Bulbulcus ibis</i>	Bank of river
9	Kalig		Cheer pheasant	<i>Catreus wallichii</i>	Dense saal and simal forest
10		*	Robin	<i>Copsychus saularis</i>	Green saal forest
11	Kag		Crow (house)	<i>Crovis splendens</i>	Village
12	Titra	*	Swam Partridge	<i>Erancolinus gularis</i>	Shrub near the water
13	Chil	*	Common kite	<i>Milvus migrans</i>	Simal and saal forest
14		*	Brown flycatcher	<i>Muscicapa latirostris</i>	Grass land and their edge
15		*	Sparrow	<i>Passer domesticus</i>	Shrubs and their edge
16	Bakulla	*	Spotted dove	<i>Streptopelia chinensis</i>	Wetland area

**c) Herpetofauna**

The key informants and the local community reported a total of 6 herpetofauna species from the reservoir area. Of the total reported 4 of the species are observed by the field study team. Details of the herpetofauna species and their habitat types are presented in the table below.

S.N.	Consultation	Observation	Common Name	Scientific Name	Habitat
1	Vyaguto	*	Toad	<i>Bufo melanostictus</i>	Wet land area and bank of river
2	Sarpa		Common karit	<i>Bungarus caeruleus</i>	Burrowing habitat
3	Chheparo	*	Common garden lizard	<i>Calotes versicolor</i>	Found in shrubs
4	Kalo Sarpa		Cobra	<i>Naja naja</i>	Dense and wooden forest
5	Vyaguto	*	Frog	<i>Rana tigrina</i>	Wet land area
6	Gora	*	Golden monitor lizard	<i>Varanus flevescens</i>	Wet and inside the rock corner .

## 4.2 Habitat Type in the Reservoir Area

The wildlife habitat of the reservoir area has the following characteristics.

- Fragmented due to intervening of settlement areas
- Degraded due to high degree of fodder collection and cattle grazing

## 4.3 Migratory Corridor

The area is seasonally used as feeding habitat by the wildlife of the area and is not reported to be a migratory corridor for wildlife. Seasonally, Sarus Crane (*Grus antigone*) is reported to visit the area from the Kali Gandaki reservoir located downstream of the project site.

## 4.4 Wild Animals of Conservation Significance

The reported wildlife of the candidate project site are cross checked with the protected wildlife lists of the government of Nepal, IUCN red book and the CITES Appendices. The lists of the wildlife which fall in the protection category of the government of Nepal, IUCN red book and the CITES Appendices are presented in the sections below.

### a) Mammal

Of the reported 12 species of mammal, 7 of the species are listed under the protection category of either government of Nepal or IUCN red list or under CITES Appendices. Of the recorded species 3 are listed under government of Nepal protection list, 3 under IUCN red list and all 6 under CITES Appendices. Table below presents the species and their protection category under various protection lists.

S.N.	Local Name	Common name	Scientific name	Status			Sources		
				GoV	IUCN	CITES	Site survey	Hearing survey	Literature survey
1	Nayauri	Common mongoose	<i>Herpetes edwardsi</i>	P		III	Confirmed at site		
2	Bandar	Assamese monkey	<i>Macaca assamensis</i>	P	NT		Confirmed at site		
3	Bagh	Common leopard	<i>Panther pardus</i>		NT	I		Hearing at Nibuwakhar ka VDC	
4	Lokherke	Squirrel	<i>Ratufa indica</i>			II		Hearing at Nibuwakhar ka VDC	
5	Langur	Langur	<i>Semnopithecus entellus</i>			I	Confirmed at site		
6	Char Singe Bakhra	Four horn antelope	<i>Tetracerus quadricornis</i>	P	VU	III		Hearing at Nibuwakhar ka VDC	
7	Fyauro	Bengal fox	<i>Vulpus bengalensis</i>			III		Hearing at Nibuwakhar ka VDC	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I - Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

**b) Birds**

Of the 16 recorded avian species 1 is listed under the protection category of government of Nepal and in the CITES Appendices. Table below presents the details of the protected species and the protection category as per the government of Nepal and CITES Appendices.

S.N.	Local Name	Common name	Scientific name	Status			Sources		
				GoV	IUCN	CITES	Site survey	Hearing survey	Literature survey
1	kalij	Cheer pheasant	<i>Catreus wallichii</i>	P		I	Confirmed at site		

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

**c) Herpetofauna**

Two of the herpetofauna species out of 6 recorded species are listed as protection category species of either government of Nepal protection list or CITES Appendices. Table below presents the details of the protection category under various protection lists.

S.N.	Local Name	Common name	Scientific name	Status			Sources		
				GoV	IUCN	CITES	Site survey	Hearing survey	Literature survey
1	Kalo Sarpa	Cobra	<i>Naja naja</i>			II		Hearing at Nibuwakh arka VDC	
2	Gora	Golden monitor lizard	<i>Varanus flevescens</i>	P		I	Confirmed at site		

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## 5 FISHERY STUDY

There is scanty information in the fish diversity, fishermen, fish market, and cost of fish in the candidate project site at the central and district level offices. To fill the data gap fish related information was gathered from the field surveys using a checklist. The fish survey is based on the participatory method and key informant survey methods along the influence area of the candidate project. The findings of the field survey are presented in the sections below.

### 5.1 Fishermen and their Occupational / Social / Economic Status and Fish Market, Availability and Cost

Participatory and key informant interviews reported nearly 50 part time and about 106 occasional fishermen in the limits of the Adhi Khola reservoir area. Majority of the fishermen belong to Magar ethnic group with a low social and economic status among the other communities.

About 50% of the fish caught by the fishermen is sold in the fish market, while rest is consumed by the fishermen family. There are altogether 4 fish markets in the nearby areas. Every day about 2 to 15 kg of fish is sold in each of the fish markets. Average cost of the fish in the market varies between 250 to 350 rupees.

Table below presents the details of information on the fishermen, their fishing status, economic and social status, fish market and availability of fish in the fish market and the average cost of the fish in the different parts of the reservoir area of the candidate project.

**Village/Tole:** Nibuwakharka-4, Matichaur

**Date:**28/03/2069 B.S.

**Name of the respondent:** Lal Bahadur Thapa

**Age:** 28

#### Fishermen

Presence of fisherman in the village						Yes
If yes no. of fishermen						154
Type of Fishermen	occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	X	X	50	Magar	104	Magar
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Magar	X	X	Magar	X	X

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell.*

#### Fish Market, Fish Availability and Cost

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Mirmi	Yes	04-07	Rs. 250-300/Kg
Guthi	Yes	02-04	Rs. 250-300/kg
Galayng	Yes	10-15	Rs.300-350/Kg

**Village / Tole :** Nibuwakharka -9, Pelli

**Date:**28/03/2069 B.S.

**Name of the respondent:** Pitamber Thapa

**Age:** 50

#### Fishermen

Presence of fisherman in the village						Yes
If yes no. of fishermen						02
Fishing Type	occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	X	X	X	X	02	Magar
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Magar	X	X	Magar	X	X

Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs  
 Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell.

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Mirmi	Yes	04-07	Rs. 250-300/Kg
Guthi	Yes	02-04	Rs. 250-300/kg
Galayng	Yes	10-15	Rs.300-350/Kg

**5.2 Fishing Season, Fish Catch, and Use of Caught Fish**

Fishing in the river is carried out during the pre-monsoon and post monsoon seasons. Normally in the cold winter months (December - February) and monsoon months (June - September) fishing by the local fishermen is a rare activity. On an average daily catch of the fish by the part time fishermen ranges between 1 kg with a maximum of 5 kg. Nearly 50% of the fish caught is sold in the nearby fish market. On an average the part time fishermen earn about 10000 rupees annually. According to the local fishermen the fish population in the candidate project sites is declining over the years due to illegal fishing practices.

The tables below present the details of the fishing season, fish catch, types of fish available, annual income of the fishermen etc. based on the key informant survey in different location of the candidate project sites.

**a) Location:** in the catchment **Date:** 28/03/2069 B.S.  
**Name of the fisherman:** Lal Bahadur Thapa **Age:** 28 **Address:** Matichaur -4

<b>Fishing detail</b>	Fishing season:	All months except Push, Magh and Kartik.			
	Fishing days/week:	4-5 days / week			
	Maximum catch/day:	4 kg			
	Minimum catch/day:	0.5 kg			
	Average catch/day:	1-1.5 kg			
<b>using way</b>	All consumed	At home	All	Average cost	Income last year
		In market	N/A	-	-

Name of fish Species (Nepali)	Abundant species	Trend of fish availability		
		Decreasing	Same as before	Increasing
Sahar, Katla , Bam And Gardi.	Katla and Gardi	*		
		Fisherman number has increased and due to poisoning up to last two years.		

**b) Location:** in the catchment **Date:** 28/03/2069 B.S.  
**Name of the fisherman:** Min Bahadur Thapa **Age:** 40 **Address:** Matichaur -4

<b>Fishing detail</b>	Fishing season:	Baishakh to Vadra and Magh to Chaitra.			
	Fishing days/week:	3-4 days / week			
	Maximum catch/day:	3-4 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	1-2 kg			
<b>using way</b>	All consumed	At home	Half	Average cost	Income last year
		In market	Half	Rs. 250-300	Rs. 10000-15000

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Sahar, Katla, Bam And Gardi.	Katla and Gardi	*		
		Fish is decreasing in ratio due to the low level of water and also affected by pesticides which is using in agriculture.		

c) Location: in the catchment

Date: 28/03/2069 B.S.

Name of the fisherman: Chan Bahadur Thapa Age: 30

Address: Matichaur -4

Fishing detail	Fishing season:	Baishakh to Vadra and Magh to Chaitra.			
	Fishing days/week:	2-3 days / week			
	Maximum catch/day:	3-4 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	1-2 kg			
using way	All consumed	At home	All	Average cost	Income last year
		In market	X	X	X

i) Fish detail of the catchment stream or river

Name of river: AndhiKhola

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Sahar, Katla, Bam And Gardi.	Katla.	*		
		Due to high population of people and declining level of water in the river.		

d) Location: in the catchment

Date: 28/03/2069 B.S.

Name of the fisherman: Bir Bahadur Thapa Age: 37

Address: Matichaur -4

Fishing detail	Fishing season:	Baishakh to Vadra and Magh to Chaitra.			
	Fishing days/week:	3-4 days/ week			
	Maximum catch/day:	4-5 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	2-3 kg			
using way	All consumed	At home	All	Average cost	Income last year
		In market	X	X	X

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Sahar, Katle, Bam And Gardi, khurpe.	Katla and Gardi	*		
		Fish population is decreasing due to the declining water levels and is also affected by use of pesticides for agriculture purpose		

e) **Location:** in the catchment

**Date:** 29/03/2069 B.S.

**Name of the fisherman:** Dev Bahadur Thapa **Age:** 41

**Address:** Matichaur -4

<b>Fishing detail</b>	Fishing season:	Baishakh ,Chaitra, Asar and Sawan			
	Fishing days/week:	3-4 days / week			
	Maximum catch/day:	3-4 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	1-2 kg			
<b>using way</b>	All consumed	At home	Half	Average cost	Income last year
		In market	Half	Rs. 250-300	Rs. 10000-12000

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Sahar, Katle , Bam And Gardi, Asala	Katla and Gardi	*		
		Fish is decreasing due to the use of poison and decreasing the water level in river.		

f) **Location:** in the catchment

**Date:** 29/03/2069 B.S.

**Name of the fisherman:** Pitamber Thapa **Age:** 50

**Address:** Nibuwakharka-9, Pelli

<b>Fishing detail</b>	Fishing season:	Baishakh ,Chaitra, Asar and Sawan			
	Fishing days/week:	3-4 days / week			
	Maximum catch/day:	3-4 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	1-2 kg			
<b>using way</b>	All consumed	At home	All	Average cost	Income last year
		In market	X	X	X

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Sahar, Katle, Bam And Gardi, Asala	Katla and Gardi	*		
		Fish is decreasing due to excessive use of poison for fishing and also due to decreasing water level in the river. In the past Vakur fish was abundant fish species of this river which is not found in the recent years.		

### 5.3 Fish Diversity

A total of 6 fish species is reported by the local fishermen during the key informant survey. The lists of the fish species reported in the candidate project site are presented in the table below.

S.N.	Local Name	Common Name	Scientific Name
1	Khurpe	-	<i>Cyprinon semiplotus</i>
2	Gardi	-	<i>Labeo dyocheilus</i>
3	Bam	-	<i>Nastacembelus armatus</i>
4	Katle	-	<i>Neolissochilus hexagonolepis</i>
5	Asla	-	<i>Schizothorax progastus</i>
6	Sahar	-	<i>Tor putitora</i>

### 5.4 List of Fish Species of Conservation Significance

Of the 6 reported fish species 2 of the fish species are listed in the IUCN red list. Table below presents the list of the fish species of conservation significance.

S.N.	Local Name	Common Name	Scientific Name	Conservation Status			Sources		
				IUCN	GON	CITES	Site survey	Hearing survey	Literature survey
1	Katle	-	<i>Neolissochilus/Acrosssocheilus hexagonolepis</i>	NT				Hearing at Matichaur and Pelli,	
2	Sahar	-	<i>Tor putitora</i>	EN				Hearing at Matichaur and Pelli,	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

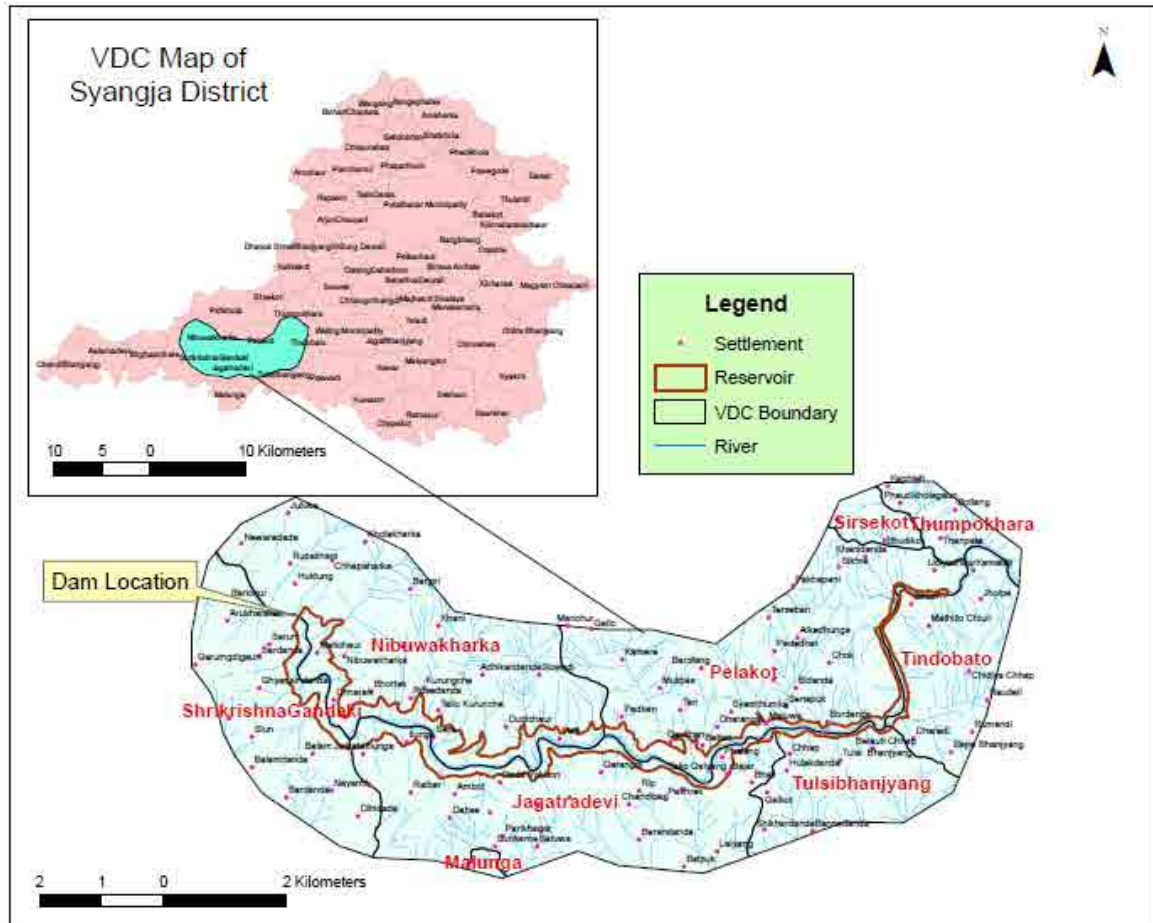
**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)



## 6 Topographic Map and Satellite Imagery Study

### 6.1 Project Location



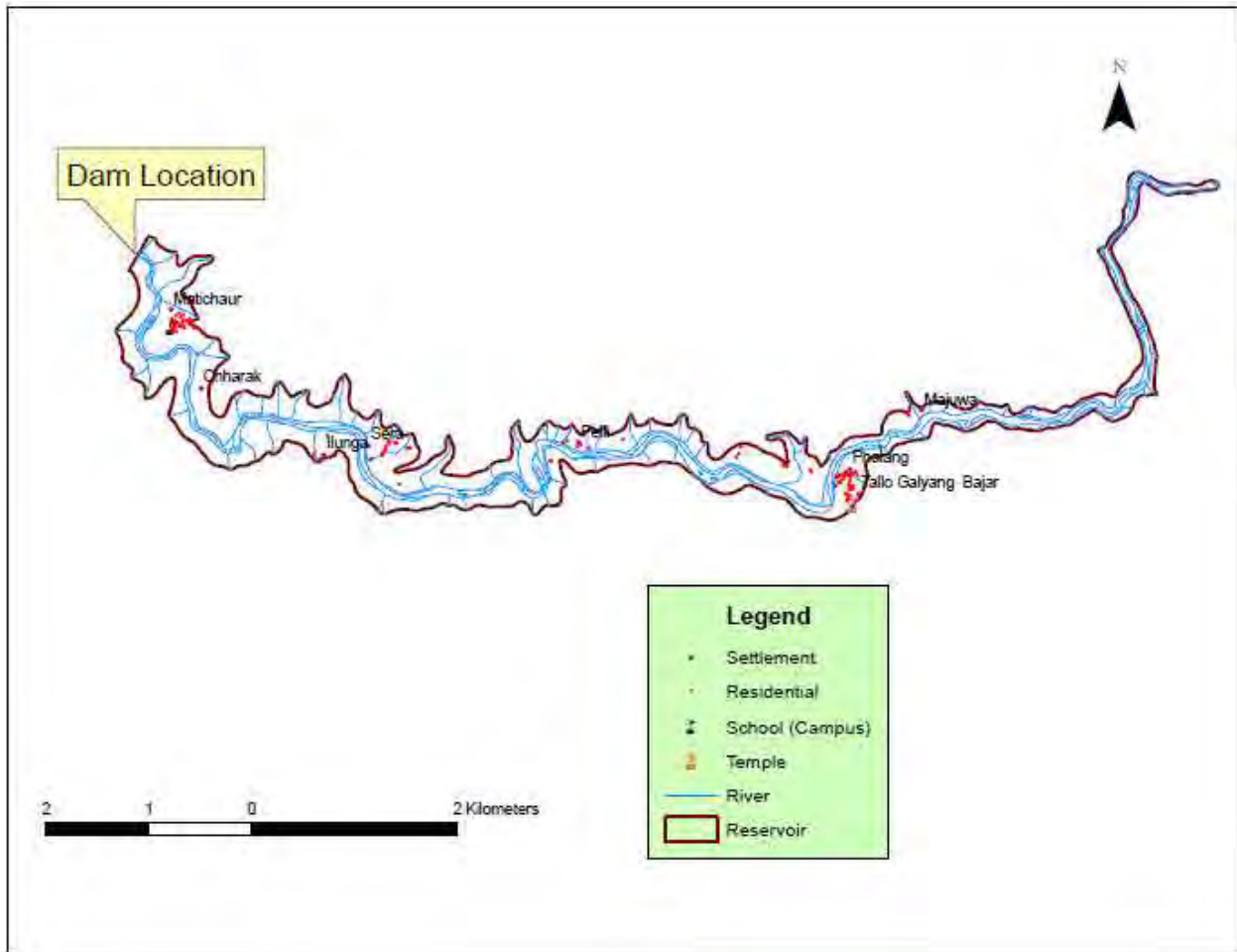
### 6.2 Topographic Maps

For this study, topographical maps of the scale of 1:25000 prepared by the Government of Nepal, Survey Department (1996/1998) has been used for the analysis of land cover, and built structures, after digitizing. All data used for the topographic map study were projected to the Universal Transverse Mercator (UTM) projection system that is World Geodetic System 1984 for the analysis of topographic maps.

The analysis results are presented in the table and maps below.

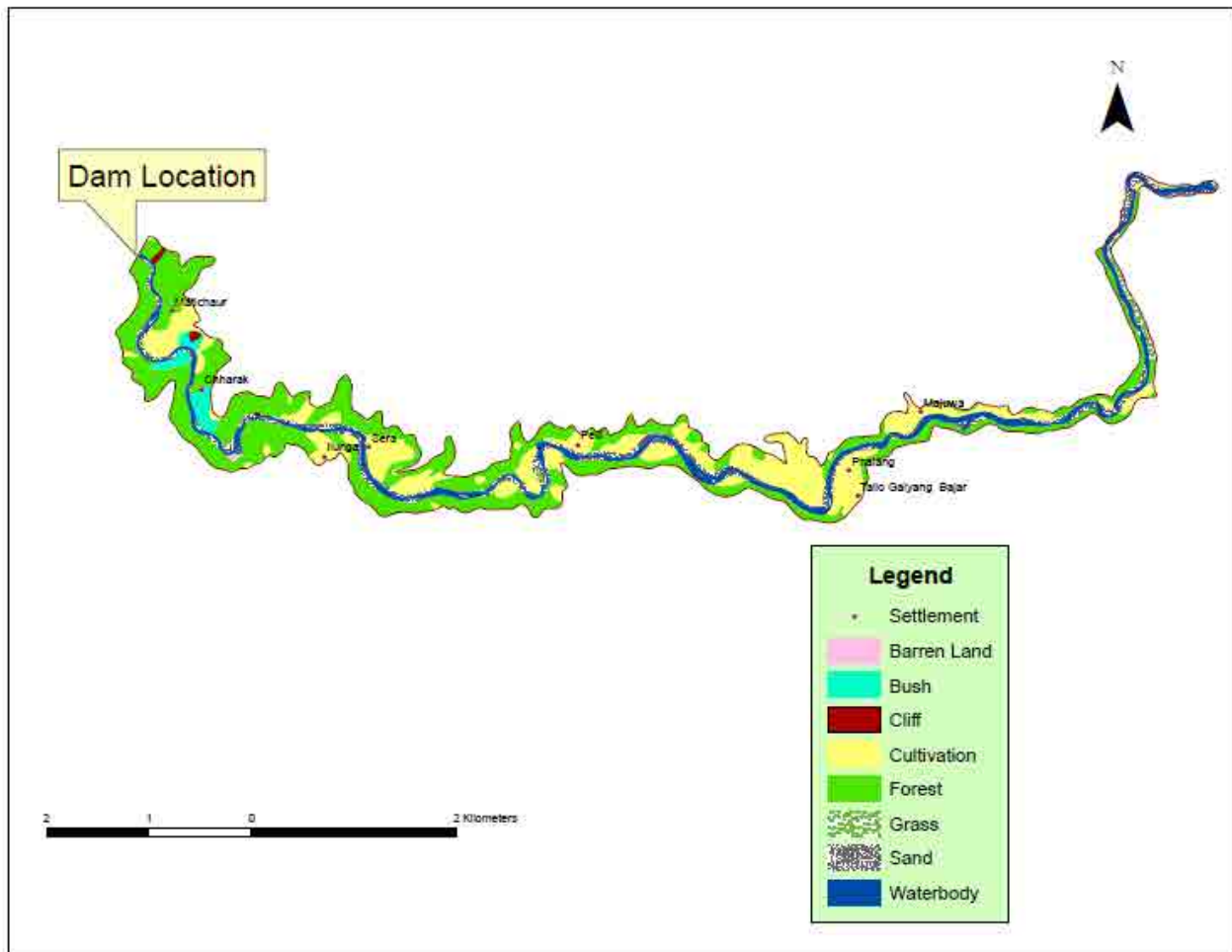
### 6.2.1 Built Structures

Nos. of building as per the Topographic maps	99
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### 6.2.2 Land Use

S.N.	Land Use Class	Land Use Topographic Maps (1996), Km <sup>2</sup>	Percentage
1	FOREST	2.539	45.988
2	BUSH	0.128478	2.3271
3	SAND	0.4477	8.109
4	CULTIVATED	1.5817	28.6488
5	CLIFF	0.0241	0.4365
6	WATER	0.7486	13.5591
7	GRASS LAND	0.045513	0.8284
8	BARREN LAND	0.006019	0.109
	<b>TOTAL</b>	<b>5.52</b>	<b>100</b>



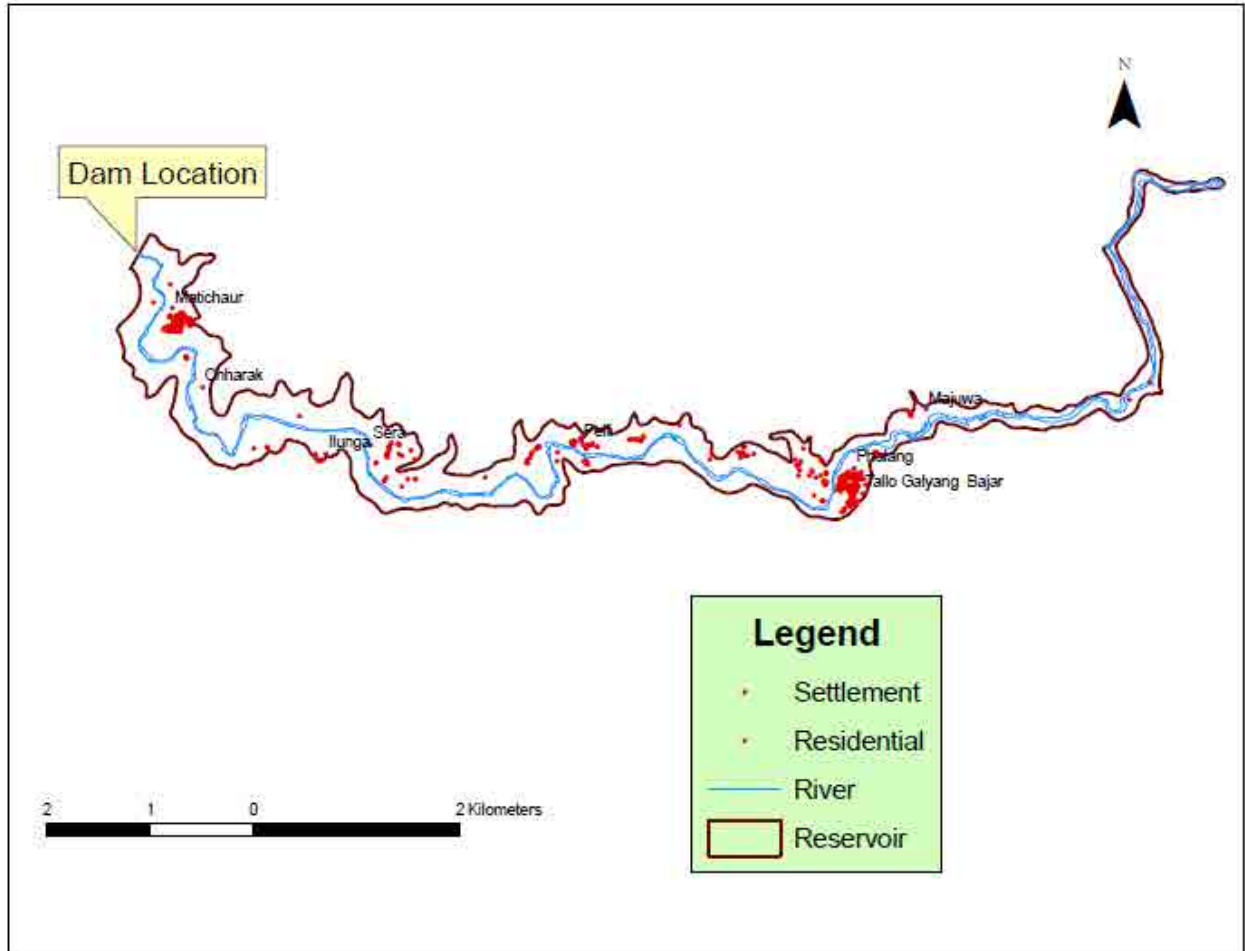
### 6.3 Satellite Image Maps

The Arc GIS 9.3 has been used for the analysis of image. World view 2 satellite image of 2012 has been used for the land use and other parameters such as built structures, road networks, bridges etc. analysis of the area.

The analysis results are presented in tables and Map below.

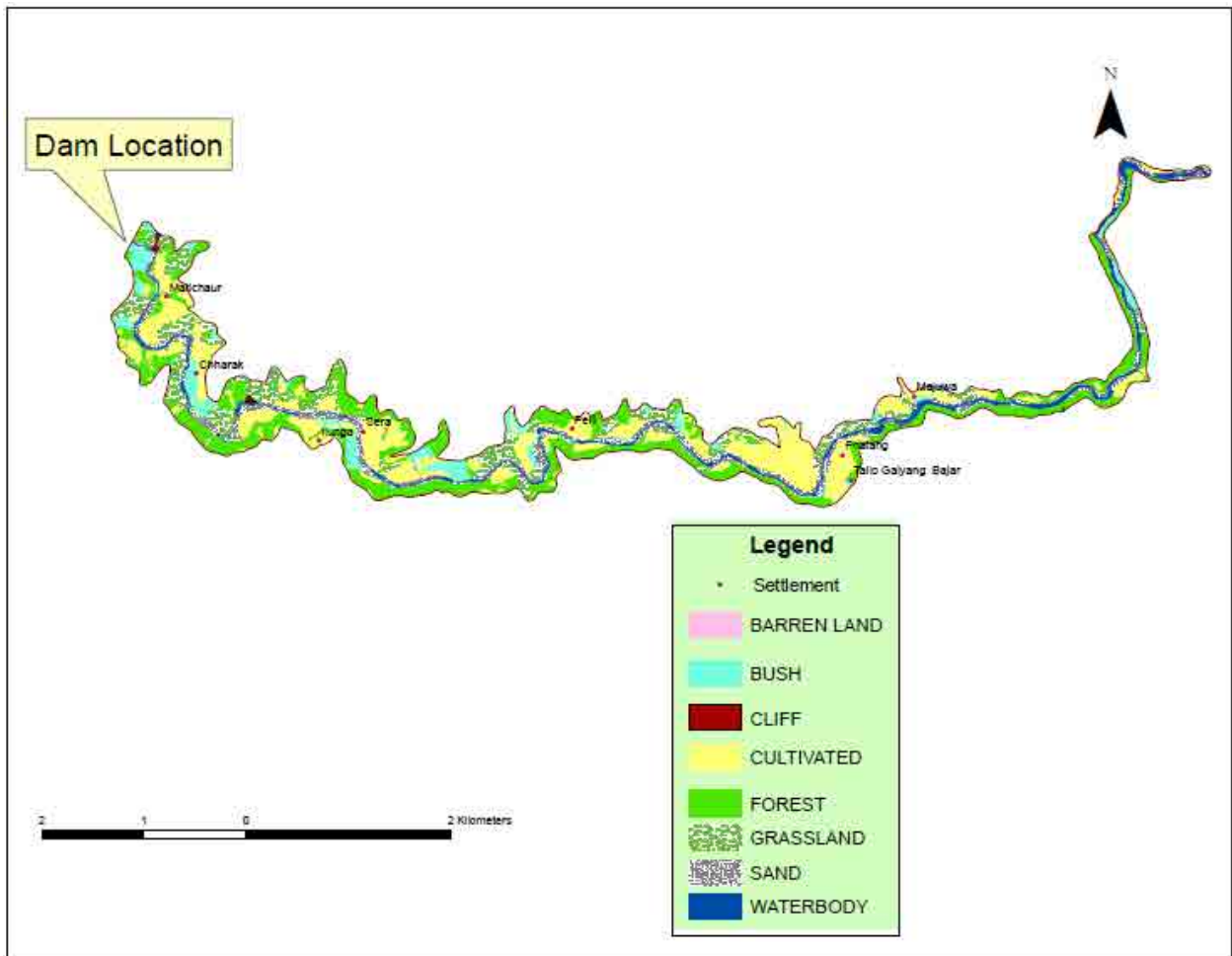
### 6.3.1 Building Structures

Nos. of building as per the Satellite Image	406
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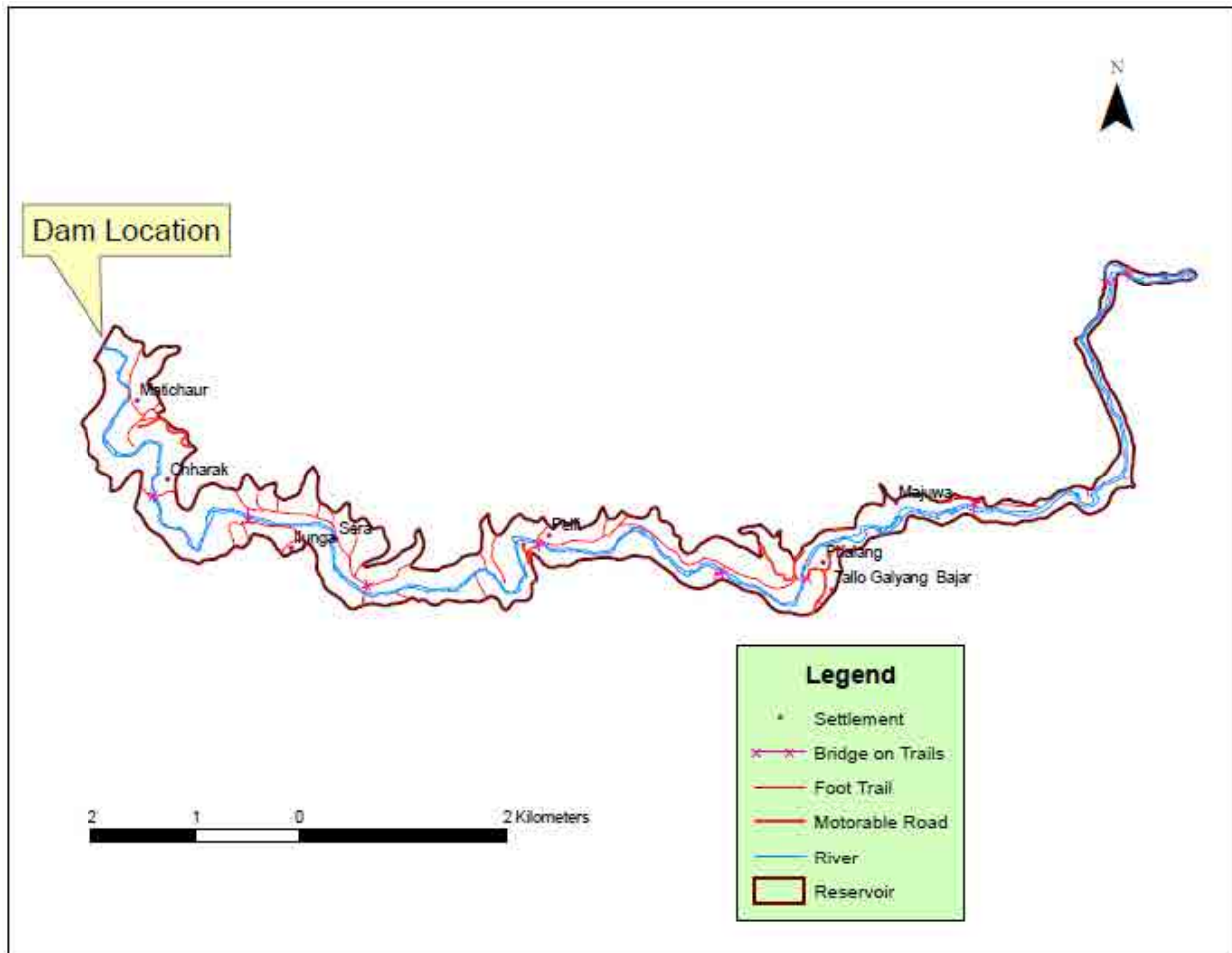
### 6.3.2 Land use

S.N.	Land Use Class	Land Use Satellite Image (2012), Km <sup>2</sup>	Percentage
1	FOREST	1.5086	27.3248
2	BUSH	0.3821	6.9208
3	SAND	0.6353	11.507
4	CULTIVATED	1.6529	29.9384
5	CLIFF	0.0129	0.3441
6	WATER	0.4204	7.6146
7	GRASS LAND	0.9061	16.4119
8	BARREN LAND	0.002496	0.0452
	<b>TOTAL</b>	<b>5.52</b>	<b>100</b>



### 6.3.3 Infrastructures

Infrastructures	Nos. / Length
Total Nos. of Bridge on motorable road	0
Total Nos. of bridge on trail	11
Total Nos. of fords	0
Gravel road (m)	3430
Paved Road (Highway) (m)	0
Foot path (m)	12971



## References

1. Bibhuti Ranjan Jha, 2006; *Fish Ecological Studies and its application in assessing Ecological Integrity of Rivers in Nepal*; Thesis Submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in The Department of Biological Sciences and Environmental Science, School of Science, Kathmandu University, Dhulikhel, Nepal, January 2006
2. CBS (2002), *Population Census 2001, National Report*, Kathmandu: Central Bureau of Statistics / UNFPA
3. CBS, 2012; *National Population and Housing Census 2011 (Village Development Committee / Municipalities)*, Government of Nepal, National Planning Commission Secretariate, Central Bureau of Statistics, Kathmandu, Nepal, November 2012.
4. Disaster Preparedness Network, Nepal, 2009; *Nepal Disaster Report: The hazardscape and vulnerabilities*, Ministry of Home Affairs, Nepal Disaster Preparedness Network, Nepal with support from with support from European Commission for Humanitarian Aid Department, United Nations Development Nepal and Oxfam Nepal
5. IUCN, 2011; *The Status of Nepal's Mammals: The National Red List Series*
6. NARMSAP, 2002; *Forest and Vegetation Types of Nepal*, TISC Document Series No 105, GoN / MOFSC / NARMSAP, 1-179.
7. Petr, T, 2002; *Cold water fish and fisheries in countries of the high mountain arc of Asia (Hindu Kush-Pamir-Karakoram-Himalayas) A review*, Symposium on coldwater fish species in the trans-Himalayan region. 10-14 July 2001, Kathmandu, Nepal
8. Rajbansi K.J, 1982; *A General Bibliography on Fish and Fisheries of Nepal*, Royal Nepal Academy, Kamaladi, Kathmandu, Nepal.
9. Rajbansi K.J, 2002; *Zoogeographical distribution and the status of cold water fishes of Nepal*. Paper presented in symposium on coldwater fish species in the trans-himalayan region. 10-14 July 2001. Kathmandu, Nepal
10. Shrestha et.al, 2012; *Fishes of Nepal: Mapping distributions based on voucher specimens*, Emporia State Research Studies Vol. 48, no. 2, p. 14-21 (2012)
11. Shrestha, J. (1995); *Enumeration of the Fishes of Nepal*, Bio-diversity Profiles Project, Publication No. 10, Department of National Parks and wildlife Conservation, Ministry of Forest & Soil Conservation, GoN, Kathmandu, Nepal.
12. Shrestha, T. K., 2008; *Icology of Nepal A study of Fishes of the Himalayan Waters*
13. Stainton, J.D.A., 1972; *Forests of Nepal*, John Murray, London.

## Photographs



Cultivated land connecting Sera and Guthi



Interacting with local people



Sal Forest seen in Dam Site



Simal tree at Rusedanda



Hydropower dam under construction at Tallo Galyan



Landslide at bordanda



Butterfly at Mattichaur



Tallo Galyan Bazaar



# Appendixes

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**Appendix 1: VDCS and Settlements and Population under the Andhi Khola Project, Syanja**

S.N.	VDC	Settlement	Ward No.	Households	Population
1	Nibuwakharka	Motichaur	4	65	400
2		Pelli	9	4	35
3		Chharak	6	21	150
4		Bhortak	6	12	70
5		Sera	7	15	90
6		Rushidanda	6	12	70
7	Jagatradevi	Illunga	3	98	650
8		Phalang	8	23	138
9		Tallo galyang bazar	8	250	2000
10	Pelakot	Majuwa	9	5	45
11		Bardanda	9	7	35
12	Tulsi bhanjyang	Mudkilla	8	30	180
	<b>Total</b>	<b>12</b>	<b>8</b>	<b>542</b>	<b>3863</b>

Source: NESS Field Survey, 2012

**Appendix 2: Ethnic Composition of the Project District Population (Andhikhola)**

VDC	Settlement	HH	Brahmin	Magar (Disadvantage Group)	Gurung (Disadvantage group)	Newar (Advanced group)	Dalit
Nibuwakharka	Motichaur	3	3	62	0	0	0
	Pelli	4	0	4	0	0	0
	Chharak	21	0	21	0	0	0
	Bhortak	12	12	0	0	0	0
	Sera	15	10	5	0	0	0
	Rushidanda	12	12	0	0	0	0
Jagatradevi	Illunga	98	12	82	0	4	0
	Phalang	23	22	1	0	0	0
	Tallo galyang bazar	250	80	100	30	0	40
Pelakot	Majuwa	5	5	0	0	0	0
	Bardanda	7	7	0	0	0	0
Tulsi bhanjyang	Mudkilla	30	30	0	0	0	0
	<b>Total</b>	<b>542</b>	<b>193</b>	<b>275</b>	<b>30</b>	<b>4</b>	<b>40</b>
	<b>%</b>	<b>100</b>	<b>35.60</b>	<b>50.74</b>	<b>5.54</b>	<b>0.74</b>	<b>7.38</b>

Source: NESS Field Survey, 2012

**Appendix 3: Land Use Pattern of the Reservoir Area**

VDC	Settlement	Ward No.	Land Use				Total
			Agriculture	Pasture	Forest	other	
Nibuwakharka	Motichaur	4	75	0	0	0	75
	Pelli	9	100	50	200	150	500
	Chharak	6	70	0	0	0	70
	Bhortak	6	0	0	0	100	100
	Sera	7	90	0	0	30	120
	Rushidanda	6	225	0	0	25	250
Jagatradevi	Illunga	3	1775	0	0	725	2500
	Phalang	8	225	0	0	25	250
	Tallo galyang bazar	8	200	0	0	0	200
Pelakot	Majuwa	9	120	10	10	10	150
	Bardanda	9	250	0	25	50	325
Tulsi bhanjyang	Mudkillia	8	2	0	0	118	120
<b>Total</b>			<b>3132</b>	<b>60</b>	<b>235</b>	<b>1233</b>	<b>4660</b>
<b>%</b>			<b>67.21</b>	<b>1.29</b>	<b>5.04</b>	<b>26.46</b>	<b>100.00</b>

Source: NESS Field Survey, 2012

**Appendix 4: Land Use Pattern of the Reservoir Area**

VDC	Settlement	Ward No.	Types of Agricultural/Productive Land			
			Khet	Bari	Others	Total
Nibuwakharka	Motichaur	4	70	5	0	75
	Pelli	9	75	25	20	120
	Chharak	6	55	15	0	70
	Bhortak	6	0	0	100	100
	Sera	7	60	30	30	120
	Rushidanda	6	125	100	25	250
Jagatradevi	Illunga	3	625	1150	725	2500
	Phalang	8	220	5	25	250
	Tallo galyang bazar	8	200	0	0	200
Pelakot	Majuwa	9	60	60	10	130
	Bardanda	9	50	200	0	250
Tulsi bhanjyang	Mudkillia	8	2	0	118	120
<b>Total</b>			<b>1542</b>	<b>1590</b>	<b>1053</b>	<b>4185</b>
<b>%</b>			<b>36.85</b>	<b>37.99</b>	<b>25.16</b>	<b>100.00</b>

Source: NESS Field Survey, 2012

**Appendix 5: Area and Production under Different Crops by Settlement of the Reservoir Area**

VDC Settlement /	Paddy		Maize		Millet		Wheat		Potato		Pulse		Oilseeds		Vegetable	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Nibuwakharka / Motichaur	70	14000	5	945	0	0	0	0	0	0	0	0	0	0	0	0
Pelli	75	18750	15	3780	10	3635	0	0	2	1200	0	0	0	0	3	200
Chharak	55	11000	55	13860	55	15994	0	0	0	0	0	0	0	0	0	0
Bhortak																
Sera	75	18750	15	3780	10	2908	2	378	1	50	0	0	0	0	3	200
Rushidanda	15	3000	5	1260	5	1454	0	0	0	0	0	0	0	0	0	0
Jagatradevi / illunga	250	50000	0	0	0	0	100	25200	0	0	0	0	100	60000	0	0
Phalang	190	38000	190	29925	0	0	0	0	5	15000	0	0	3	450	7	3500
Tallo galyang bazar	150	30000	10	1260	10	1454	10	1890	10	8800	0	0	0	0	10	3000
Pelakot / Majuwa	60	12000	1	189	0	0	0	0	3	150	0	0	10	12000	4	1200
Bardanda	75	15000	75	14175	75	16300	0	0	0	0	0	0	0	0	0	0
Tulsi bhanjyang / Mudkilla	2	400	2	504	4	1160	3	756	3	12000	2	500	3	300	1	150
<b>Total</b>	<b>1017</b>	<b>210900</b>	<b>373</b>	<b>69678</b>	<b>169</b>	<b>42905</b>	<b>115</b>	<b>28224</b>	<b>24</b>	<b>37200</b>	<b>2</b>	<b>500</b>	<b>116</b>	<b>72750</b>	<b>28</b>	<b>46050</b>
<b>Cropping Intensity 58.88%</b>																

Source: NESS Field Survey, 2012

**Appendix 6: Occupation by Settlement of the Reservoir Area**

VDC	Settlement	Ward No.	Types of Occupation and Population Engaged			
			Agriculture	Service	Wage labor	Foreign employment
Nibuwakharka	Motichaur	4	300	100	0	0
	Pelli	9	33	2	0	0
	Chharak	6	148	0	0	2
	Bhortak	6	70	0	0	0
	Sera	7	80	4	5	1
	Rushidanda	6	70	0	0	0
Jagatradevi	Illunga	3	130	0	0	520
	Phalang	8	127	4	0	7
	Tallo galyang bazar	8	1000	25	150	20
Pelakot	Majuwa	9	45	0	0	0
	Bardanda	9	35	0	0	0
Tulsi bhanjyang	Mudkillla	8	90	2	0	50
<b>Total</b>			<b>2128</b>	<b>137</b>	<b>155</b>	<b>600</b>
<b>%</b>			<b>70.46</b>	<b>4.54</b>	<b>5.13</b>	<b>19.87</b>

Source: NESS Field Survey, 2012

**Appendix 7: House Types by Settlement of the Reservoir Area**

S.N.	VDC	Settlement	Ward No.	Number of Houses by Types	
				Kacchi	Pakki
1	Nibuwakharka	Motichaur	4	58	7
2		Pelli	9	4	0
3		Chharak	6	12	9
4		Bhortak	6	8	4
5		Sera	7	14	1
6		Rushidanda	6	3	9
7	Jagatradevi	Illunga	3	20	78
8		Phalang	8	15	8
9		Tallo galyang bazar	8	50	200
10	Pelakot	Majuwa	9	5	0
11		Bardanda	9	7	0
12	Tulsi bhanjyang	Mudkillla	8	21	9
	<b>Total</b>	<b>12</b>	<b>8</b>	<b>217</b>	<b>325</b>
	<b>%</b>			<b>40.04</b>	<b>59.96</b>

Source: NESS Field Survey, 2012

**Appendix 8: Road and Suspension Bridge**

S.N.	VDC	Settlement	Road Detail			Bridges	
			Type	Length	Name of road	Type	Name
1	Nibuwakharka	Motichaur	NA	4 km	Katuwa-motichaur road	1 suspension, 1 wooden	Motichaur bridge, kasalung bridge
2		Pelli				Suspension	Pelli pool
3		Chharak				Suspension	Katuwa pool
4		Bhortak	gravel earthen	500 m	Bhortak road	Suspension	Katuwa pool
5		Sera				Suspension	Jari pool
6		Rushidanda					
7	Jagatradevi	Illunga	gravel earthen	2 km	Guthi illunga road		
8		Phalang	paved	NA	Siddhartha highway		
9		Tallo galyang bazar	paved	NA	Siddhartha highway	Cemented	Galyang pelakot
10	Pelakot	Majuwa	NA	NA	Siddhartha highway	Cemented	Galyang brigde
11		Bardanda				Suspension (2)	Galyang pool and Batdanda pool
12	Tulsi bhanjyang	Mudkillla	paved	1 km	Prithvi highway		
	<b>Total</b>			<b>7.5</b>		<b>10</b>	<b>10</b>

Source: NESS Field Survey, 2012

**Appendix 9: Number of Schools by Types and Number of Students**

S.N.	VDC	Settlement	Name of school	No. of school	No. of students
1	Nibuwakharka	Motichaur	Janahit Primary	1	85
2		Pelli		0	0
3		Chharak		0	0
4		Bhortak	NA	1	NA
5		Sera		0	0
6		Rushidanda		0	0
7	Jagatradevi	Illunga	Radhakrishna Primary	1	NA
8		Phalang	Galang Bahumukhi Campus	1	NA
9		Tallo galyang bazar	Chirag Bhanubhakta Primary	2	700
10	Pelakot	Majuwa		0	
11		Bardanda	Makhakali Primary, Nawa durga Primary and Shree Rastra Higher Secondary	3	565
12	Tulsi bhanjyang	Mudkillla	0	0	0
	<b>Total</b>	<b>12</b>	<b>9</b>	<b>9</b>	<b>1350</b>

Source: NESS Field Survey, 2012

**Appendix 10: Number of Irrigation Schemes**

S.N.	VDC	Settlement	Scheme Details		
			Number	Command area	Name of the scheme
1	Nibuwakharka	Motichaur	3	NA	Chhahara
2		Pelli	0	0	
3		Chharak	1	55 ropani	Chhahara
4		Bhortak	0	0	
5		Sera	0		
6		Rushidanda	0		
7	Jagatradevi	Illunga	0	0	
8		Phalang	0		
9		Tallo galyang bazar	3	NA	NA
10	Pelakot	Majuwa	3	NA	NA
11		Bardanda	11	NA	dharaudi kulo,manke khola,majuwa kulo
12	Tulsi bhanjyang	Mudkillla	2	NA	NA
	<b>Total</b>	<b>12</b>	<b>23</b>		

Source: NESS Field Survey, 2012

**Appendix 11: Number of Drinking Water Schemes**

S.N.	VDC	Settlement	Scheme Details		
			Number	Number of Taps	Name of scheme
1	Nibuwakharka	Motichaur	1	NA	Chisa khola
2		Pelli	1	4	NA
3		Chharak	1	5	Chhahara drinking water scheme
4		Bhortak	1	10	NA
5		Sera	NA	NA	
6		Rushidanda	1	12	NA
7	Jagatradevi	Illunga	1	60	NA
8		Phalang	1	8	Manki khola khane pani scheme
9		Tallo galyang bazar	0		
10	Pelakot	Majuwa	0		
11		Bardanda	1	12	NA
12	Tulsi bhanjyang	Mudkillla	2	30	juke and Khyore drinking water schemes
	<b>Total</b>	<b>12</b>	<b>10</b>	<b>141</b>	

Source: NESS Field Survey, 2012

**Appendix 12: Cultural Sites and Festivals**

S.N.	VDC	Settlement	Culture/Festivals		
			Main festival	Any festivals of Janajatis	Religious site at the river
1	Nibuwakharka	Motichaur	Dashain, tihar, teej	Magar diwas (15th falgun)	Temple(balam devi mandir)
2		Pelli	Dashain, tihar, teej	Magar diwas (15th falgun)	no such site
3		Chharak	Dashain, tihar, teej, maghe sankranti	Magar diwas (15th falgun)	no such site
4		Bhortak	Dashain, tihar, teej, maghe sankranti	no	no such site
5		Sera	Dashain, tihar, teej, maghe sankranti	Magar diwas (15th falgun)	no such site
6		Rushidanda	Dashain, tihar, teej, maghe sankranti	no	no such site
7	Jagatradevi	Illunga	Dashain, tihar, teej, maghe sankranti	Magar diwas (15th falgun)	no such site
8		Phalang	Dashain, tihar, teej, maghe sankranti	no	no such site
9		Tallo galyang bazar	Dashain, tihar, teej, maghe sankranti	Lhosar	Durga mandir
10	Pelakot	Majuwa	Dashain, tihar, teej, maghe sankranti	NA	no such site
11		Bardanda	Dashain, tihar, teej, maghe sankranti	NA	siddha baba,kedarnath
12	Tulsi bhanjyang	Mudkilla	Dashain, tihar, teej, maghe sankranti	no	Kalika mandir (upper site)
	<b>Total</b>	<b>12</b>			

Source: NESS Field Survey, 2012

**Appendix 13: Community Perception on the Project**

S.N.	VDC	Settlement	Positive impact	Negative impact
1	Nibuwakharka	Motichaur	electricity and employment	loss of land and property
2		Pelli	lectricity	loss of houses
3		Chharak	electricity and employment	loss of land and property
4		Bhortak	infrastructure development	submerge of house and land
5		Sera	available of electricity	loss of houses
6		Rushidanda	employment and electricity	submerge of house and land
7	Jagatradevi	Illunga	employment and electricity	submerge of house and land
8		Phalang	electricity and employment	loss of water source
9		Tallo galyang bazar	infrastructure development	submerge of house and land
10	Pelakot	Majuwa	employment and development activities	loss of land and property
11		Bardanda	electricity and employment	loss of land and property
12	Tulsi bhanjyang	Mudkilla	development	submerge of house and land

Source: NESS Field Survey, 2012



**Appendix 14: List of FGD Participants (ANDHI KHOLA)****District: Syanja**

<b>S.N.</b>	<b>Name of Respondent</b>	<b>Address</b>	<b>Occupation</b>
1	Gupta Thapa	Nibuwakharka-4, motichaur	Teacher
2	Lal Bhd Thapa	Nibuwakharka-4, motichaur	Farmer
3	Del Singh Thapa	Nibuwakharka-4, motichaur	Farmer
4	Debendra Thapa	Nibuwakharka-6, charak	Teacher
5	Ram Maya Thapa	Nibuwakharka-6, charak	Farmer
6	Thaka Kumar Thapa	Nibuwakharka-9, Pelli	NA
7	Mamata Rana	Nibuwakharka-9, Pelli	NA
8	Puspa Thapa	Nibuwakharka-9, Pelli	NA
9	Anita Rana	Nibuwakharka-9, Pelli	NA
10	Dependra Thapa	Nibuwakharka-6, Charak	Teacher
11	Santosh Rana	Nibuwakharka-6, Charak	Farmer
12	Sandeep Thapa	Nibuwakharka-6, Charak	Famer
13	Bhimi Thapa	Nibuwakharka-6, Charak	Farmer
14	Min Bhd Thapa	Nibuwakharka-6, Charak	Farmer
15	Shiva Sankar Rijal	Nibuwakharka-6, Bhortak	NA
16	Bal Krishna Newupane	Nibuwakharka-6, Bhortak	NA
17	Radhika Newupane	Nibuwakharka-6, Bhortak	NA
18	Lal Bhd Thapa	Nibuwakharka-7,Sera	NA
19	Kalesh Thapa	Nibuwakharka-7,Sera	NA
20	Naresh Thapa	Nibuwakharka-7,Sera	NA
21	Prakash Thapa	Nibuwakharka-7,Sera	NA
22	Ram Prashad Neupane	Nibuwakharka-6, Rushidanda	NA
23	Tikaram Neupane	Nibuwakharka-6, Rushidanda	NA
24	Basanta Neupane	Nibuwakharka-6, Rushidanda	NA
25	Girman Thapa	Jagatradevi-3, Illunga	NA
26	Radha Kumara Neupane	Jagatradevi-3, Illunga	NA
27	Rimlal Shrestha	Jagatradevi-3, Illunga	NA
28	Durga Prashad Neupane	Jagatradevi-8, Phalang	Agriculture
29	Keshab Raj Neupane	Jagatradevi-8, Phalang	Job
30	Romakanta Jaisi	Jagatradevi-8, Phalang	Business
31	Matrika Aryal	Jagatradevi-8, Phalang	Business
32	Netra Bhattarai	Jagatradevi-8, Phalang	Job
33	Churamani Thube	Jagatradevi-8,Tallo bazar	NA
34	Mani Prasad Neupane	Nibuwakharka-7,tallo galyang	NA
35	Dharma Raj Bhandari	Jagatradevi-8,Tallo bazar	NA
36	Rabi Lal Acharya	Jagatradevi-8,Tallo bazar	NA
37	Sita Aryal	Jagatradevi-8,Tallo bazar	NA
38	Gopal Adhikari	Pelakot-9,Majuwa	Business
39	Tanka Bhandari	Pelakot-9,Majuwa	Business
40	Dharmaraj Bhandari	Pelakot-9,Majuwa	Business
41	Chemkala Adhikari	Pelakot-9,Majuwa	Business
42	Bishow Pathak	Pelakot-9,Majuwa	Business
43	Ram Bhd Gurung	Pelkot-9,Bardanda	Social service
44	Tika Ram Bhandari	Pelkot-9,Bardanda	NA

S.N.	Name of Respondent	Address	Occupation
45	Rudra Bhd Gurung	Pelkot-9, Bardanda	NA
46	Hari Thapa	Pelkot-9, Bardanda	NA
47	Daya Ram Bhattarai	Tulsi Bhanjyang-8, mudkilla	Agriculture
48	Dilip Bhattarai	Tulsi Bhanjyang-8, mudkilla	Agriculture
49	Chandra Jyoti Bhattarai	Tulsi Bhanjyang-8, mudkilla	Agriculture
50	Prakash Bhattarai	Tulsi Bhanjyang-8, mudkilla	Agriculture
51	Ram Bir Gurung	Pilakot, Bordanda	Agriculture
52	Hari Prashad Nawpane	Jagarra Devi-8, Phalang	Agriculture
53	Pitamber Thapa	Nibuwakharka-9, Pelli	Agriculture
54	Lal Bahadur Thapa	Nibuwakharka-4, Matichaur	Fishermen
55	Min Bahadur Thapa	Matichaur-4	Fishermen
56	Chan Bahadur Thapa	Matichaur-4	Fishermen
57	Bir Bahadur Thapa	Matichaur-4	Fishermen
58	Dev Bahadur Thapa	Matichaur-4	Fishermen

Source: NESS Field Survey, 2012

**Appendix 15: Public Consultation Andhi Khola Project (Syanja District)**

Field visit to the Andhi Khola project site was made on 10<sup>th</sup> to 15<sup>th</sup> July 2012. The objective of the visit was to collect primary information on the social, socio-economic, cultural, forest resources, wildlife, disaster records and aquatic ecological aspects from the reservoir area and the key structural locations of the project.

Since the study period was limited, most of the information related to the above aspects was derived based on the public consultations and interviews with the key informants. The socio-economic information was solicited from the focus group discussions at various settlements within the reservoir area. Information on disaster, fishermen, and fish diversity is based on the key informant interviews, while information on the forest, floral and wildlife diversity is based on the direct observation and interviews with the key informants. Focus group consultation meetings were held at 11 sites within the reservoir area (Table 1), while 8 key informants were interviewed for in depth knowledgeable information (Table 2).

**Table 1: Participants of the Focus Group Discussion**

S.N	NAME OF RESPONDENT	OCCUPATION/POSITION	Location
<b>NIBUWAKHARKA-4; MOTICHAUR</b>			
1	GUPTA THAPA	TEACHER	NIBUWAKHARKA-4; MOTICHAUR
2	LAL BDR THAPA	AGRICULTURE	NIBUWAKHARKA-4; MOTICHAUR
3	DEL SINGH THAPA	AGRICULTURE	NIBUWAKHARKA-4; MOTICHAUR
4	DEBENDRA THAPA	TEACHER	NIBUWAKHARKA-4; MOTICHAUR
5	RAM MAYA THAPA	FARMER	NIBUWAKHARKA-4; MOTICHAUR
<b>NIBUWAKHARKA-9; PELLI</b>			
1	DHAKA KUMAR THAPA	NA	NIBUWAKHARKA-9; PELLI
2	MAMATA RANA	NA	NIBUWAKHARKA-9; PELLI
3	ANITA RANA	NA	NIBUWAKHARKA-9; PELLI
4	PUSHPA THAPA	NA	NIBUWAKHARKA-9; PELLI
<b>NIBUWAKHARKA-6, CHHARAK</b>			
1	DEBENDRA THAPA	TEACHER	NIBUWAKHARKA-6, CHHARAK
2	SANTOSH RANA	FARMER	NIBUWAKHARKA-6, CHHARAK
3	SANDEEP THAPA	FARMER	NIBUWAKHARKA-6, CHHARAK
4	BHIMI THAPA	FARMER	NIBUWAKHARKA-6, CHHARAK
5	MIN BDR THAPA	FARMER	NIBUWAKHARKA-6, CHHARAK
<b>NIBUWAKHARKA-6, BHORTAK</b>			
1	SHIVA SHANKAR RIJAL	NA	NIBUWAKHARKA-6, BHORTAK
2	BAL KRISHNA NEUPANE	NA	NIBUWAKHARKA-6, BHORTAK
3	RADHIKA NEUPANE	NA	NIBUWAKHARKA-6, BHORTAK
<b>NIBUWAKHARKA-7, SERA</b>			
1	LAL BHD THAPA	NA	NIBUWAKHARKA-7, SERA
2	KALESH THAPA	NA	NIBUWAKHARKA-7, SERA
3	NARESH THAPA	NA	NIBUWAKHARKA-7, SERA
4	PRAKASH THAPA	NA	NIBUWAKHARKA-7, SERA
<b>NIBUWAKHARKA-6, RUSHIDANDA</b>			
1	RAM PRASHAD NEUPANE	NA	NIBUWAKHARKA-6, RUSHIDANDA
2	TIKARAM NEUPANE	NA	NIBUWAKHARKA-6, RUSHIDANDA
3	BASANTA NEUPANE	NA	NIBUWAKHARKA-6, RUSHIDANDA
<b>JAGATRADEVI-3, ILLUNGA</b>			

S.N	NAME OF RESPONDENT	OCCUPATION/POSITION	Location
1	GIRMAN THAPA	NA	JAGATRADEVI-3, ILLUNGA
2	RADHA KUMARI NEUPANE	NA	JAGATRADEVI-3, ILLUNGA
3	RIM LAL SHRESTHA	NA	JAGATRADEVI-3, ILLUNGA
<b>JAGATRADEVI-8, PHALANG</b>			
1	DURGA PRASHAD NEUPANE	AGRICULTURE	JAGATRADEVI-8, PHALANG
2	KESHAB RAJ NEUPANE	SERVICE	JAGATRADEVI-8, PHALANG
3	ROMAKANTA JAISI	BUSSINESS	JAGATRADEVI-8, PHALANG
4	MATRIKA ARYAL	BUSSINESS	JAGATRADEVI-8, PHALANG
5	NETRA BHATTARAI	SERVICE	JAGATRADEVI-8, PHALANG
<b>JAGATRADEVI-8, TALLO GALYANG BAZAAR</b>			
1	MANI PRASHAD NEUPANE	BUSSINESS	JAGATRADEVI-8, TALLO GALYANG BAZAAR
2	DHARMA RAJ BHANDARI	AGRICULTURE	JAGATRADEVI-8, TALLO GALYANG BAZAAR
3	RABILAL ARYAL	BUSSINESS	JAGATRADEVI-8, TALLO GALYANG BAZAAR
4	SITA ARYAL	AGRICULTURE	JAGATRADEVI-8, TALLO GALYANG BAZAAR
<b>PELAKOT-9, MAJUWA</b>			
1	GOPAL ADHIKARI	BUSSINESS	PELAKOT-9, MAJUWA
2	TANKA BHANDARI	BUSSINESS	PELAKOT-9, MAJUWA
3	DHARMA RAJ BHANDARI	BUSSINESS	PELAKOT-9, MAJUWA
4	CHEMKALA ADHIKARI	BUSSINESS	PELAKOT-9, MAJUWA
5	BISHOW PATHAK	BUSSINESS	PELAKOT-9, MAJUWA
<b>PELAKOT-9, BARDANDA</b>			
1	RAM BHD GURUNG	SOCIAL SERVICES	PELAKOT-9, BARDANDA
2	TIKA RAM BHANDARI	AGRICULTURE	PELAKOT-9, BARDANDA
3	RUK BHD GURUNG	AGRICULTURE	PELAKOT-9, BARDANDA
4	HARI THAPA	AGRICULTURE	PELAKOT-9, BARDANDA
2	DILIP BHATTARAI	AGRICULTURE	PELAKOT-9, BARDANDA
3	CHANDRA JYOTI	AGRICULTURE	PELAKOT-9, BARDANDA
4	PRAKASH BHATTARAI	AGRICULTURE	PELAKOT-9, BARDANDA
5	DAN BHD	AGRICULTURE	PELAKOT-9, BARDANDA
<b>TULSI BHANJYAN-8, MUDKILLA</b>			
1	DAYARAM BHATTARAI	AGRICULTURE	TULSI BHANJYAN-8, MUDKILLA

**Table 2: Key Informant for Interview**

S.N.	NAME OF KEY INFORMANT	OCCUPATION/POSITION	
1	RAM BIR GURUNG	AGRICULTURE	PILAKOT, BORDANDA
2	HARI PRASHAD NAWPANE	AGRICULTURE	JAGARRA DEVI-8, PHALANG
3	PITAMBER THAPA	AGRICULTURE	NIBUWAKHARKA-9, PELLI
4	LAL BAHADUR THAPA	FISHERMAN	NIBUWAKHARKA-4, MATICHAUR
5	MIN BAHADUR THAPA	FISHERMAN	MATICHAUR-4
6	CHAN BAHADUR THAPA	FISHERMAN	MATICHAUR-4
7	BIR BAHADUR THAPA	FISHERMAN	MATICHAUR-4
8	DEV BAHADUR THAPA	FISHERMAN	MATICHAUR-4

To get the information from the project site’s local communities the strategic approach taken was to aware people on the Nationwide Master Plan Study of the Storage Type Hydro-electric Projects before seeking information on the local environmental and social resources and the concerns of the people regarding the Andhi Khola Project.

It is therefore the field survey team, before initiating dialogue with the local communities described why the Nationwide Master Plan Study for Storage type hydroelectric project is needed? Who is undertaking the study? What will be the output of the study? In this process the team also highlighted on how this project in this area was selected for further study? and what the study team will like to get information from the local area communities not limiting to the social and environmental information but also the concerns of the people with regard to the project and their aspirations with the project if it is screened for further study and development.

This section describes the local people knowledge on the project apart from the concerns and aspirations of the people from the project.

The local people were aware of the project since last 15 to 16 years. They also informed about the surveys done in the past, but since then there is no further information on the project development. They were happy to know that further study is being carried out now. The local people thanked the study team for giving some level of information on the project progress.

As in other projects, the main concern of the local people is on their future prospects if the project is developed. Many of the people located in the reservoir have all their property (land and building) within the reservoir area only. The land and the property is the only source of their livelihood. Though the people were not against the project development would want a proper resettlement and rehabilitation to sustain their livelihood. The other concern of the local people is the road network developed within the reservoir area. The road infrastructure is a part of the national highway and has many connection points to the west and east of the area. As a part of the highway falls within the reservoir area, they were eager to know whether the project reestablish these road network as a part of the project. The other issue raised is about the existing project in the Andhi Khola which supplies the electricity in the area.

They have the experience of the Andhi Khola and Kaligandaki A project and believe that the project will open the door of social and economic development not only for the local area but also to the entire region. Their aspiration with the project is the employment of the local people in the project and a host of the community development issues such as water supply, electrification, road network development, enhancement of educational institutions and health institutions.

**Annex 17: Environmental Survey Report**  
**Chera-1 Project (W-02)**

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## Introduction

Federal Democratic Republic of Nepal is rich in water resources, its potential water power is 83,000 MW and economically exploitable water power is 42,000 MW. However, as of 2011, the total generating capacity of the country is only about 718.62 MW. Of the total installed capacity 92% is from the hydroelectric power plants. In addition, since most of hydroelectric power plants are run-of-river type, their outputs decrease seriously in the dry seasons. Consequently, there is a rolling blackout of as long as 14 hours a day which poses many problems including affects in livelihood and industries which severely impact the national economy.

To cope with these situations, the government of Nepal has worked out “National Electricity Crisis Resolution Action Plan” and “10-Year Hydropower Development Task Force” at the end of 2008. The above action plan and task force recommended need of storage-type hydroelectric power plants able to supply sustainable electricity uninterruptedly even in dry seasons to solve current power shortage at an early date.

However, construction of storage-type hydroelectric power plants should be carried out systematically taking into consideration of various aspects including the overall water resource development policy of Nepal, hydrological and geological characteristics, environmental impact, etc. Therefore, the Government of Nepal has requested the Government of Japan to work out a nationwide master plan for storage-type hydroelectric power development.

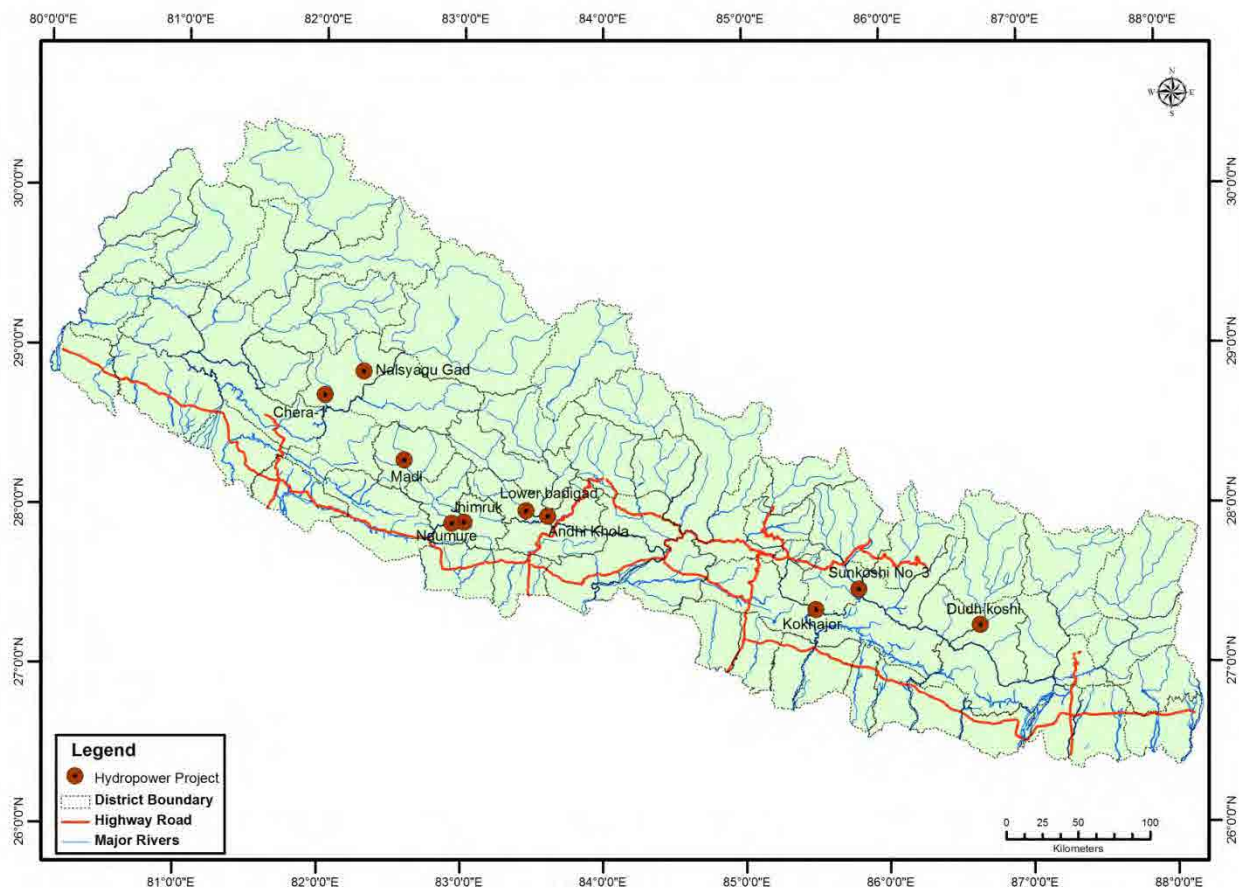
Electric Power Development Company Limited (J-Power) appointed by the JICA for the nationwide master plan study based on the desk level study in close association with NEA screened 10 candidate projects for the master plan study out of the list of 67 promising projects identified by NEA all over Nepal. **Table 1a and 1b** presents the salient features of the 10 promising projects screened for the master plan study, while **Figure 1** presents the location of the projects.

**Table 1a: Salient Features of Potential Projects**

No.	Project Name	Location (District)	Location of Dam Site		River	Installed Capacity (MW)	Catchment Area (km <sup>2</sup> )
			Longitude	Latitude			
E-01	Dudh Koshi	Okhaldhunga/Khotang Dist.	86° 39' 17.3	27° 15' 47.2	Dudh Koshi to Baiku Khola	300.0	4100
E-06	Kokhajor-1	Sinchuli, Sindhupalchok	85° 29' 59.6	27° 22' 21.9	Kokhajor	111.5	281
E-17	Sun Koshi No.3, Kosi MP	Ramechhap, Kavre and Sindhupalanchok	85° 48' 14.3	27° 29' 50.5	Sun Koshi	536.0	5520
C-02	Lower Badigad	Gulmi	83° 27' 22.2	28° 0' 0.6	Badigad	180.3	2050
C-08	Andhi Khola	Syangja	83° 36' 30.6	27° 58' 2.6	Andhi Khola	180.0	475
W-02	Chera-1	Jajarkot	82° 1' 12.3	28° 42' 56.4	Chera	148.7	809
W-05	Lower Jhimruk	Arghakhachi, Pyuthan	83° 1' 1	27° 55' 30.8	Jhimruk	142.5	995
W-06	Madi	Rolpa	82° 35' 15.5	28° 18' 48.5	Madi	199.8	674
W-23	Nalsyau Gad	Jajarkot	82° 17' 42.8	28° 52' 4.7	Nalsyau Gad	410.0	571
W-25	Naumure (W. Rapti)	Argakhanchi, Pyuthan	82° 55' 42.9	27° 55' 6.1	West Rapti	245.0	3430

**Table 1b: Salient Features of Potential Projects**

No.	Project Name	Dam Height (m)	Total Storage Volume (MCM)	Effective Storage Volume (MCM)	Reservoir Area (km <sup>2</sup> )	FSL (m)	MOL (m)	TWL (m)	Rated Gross Head (m)	Rated Power Discharge (m <sup>3</sup> /sec)
E-01	Dudh Koshi	180.0	687.40	442.10	11.05	580.0	530.00	303.35	275.0	136.00
E-06	Kokhajor-1	107.0	218.70	166.10	8.92	437.00	390.00	200.00	226.3	63.90
E-17	Sun Koshi No.3, Kosi MP	140.0	1,220.00	555.00	23.99	700.0	674.00	575.00	116.3	109.34
C-02	Lower Badigad	191.0	995.90	505.50	13.65	688.00	654.00	475.00	196.0	232.60
C-08	Andhi Khola	157.0	336.50	238.70	5.52	675.00	626.70	368.48	307.0	81.40
W-02	Chera-1	186.0	254.90	141.10	4.00	866.0	814.00	640.00	220.0	80.50
W-05	Lower Jhimruk	167.0	386.00	211.60	4.98	597.0	557.0	390.0	194.6	88.10
W-06	Madi	190.0	359.50	235.10	7.66	1,090	1,030.00	800.00	280.8	84.90
W-23	Nalsyau Gad	200.0	419.6	296.3	6.3	1,570.0	1,498.00	872.0	644.0	75.00
W-25	Naumure (W.Rapti)	190.0	1,021.00	580.00	19.76	517.0	474.00	358.00	162.6	185.60



**Figure 1: Ten Promising Sites Identified for Survey**

The NESS, a local consulting firm of Nepal was entrusted by J-Power for the required SEA field studies of the 10 candidate projects. As per the ToR of works, there are basically two types of surveys required namely; geological, geotechnical, construction material and seismicity study, and environmental and social study. This report deals with the field survey findings of social and environmental study on **Chera-1 Project** identified as one of the candidate project in the western Nepal.

## 1 Socio-economic Environment

The information regarding the social and economic conditions of the people in Nepal is available in the publications of the Central Bureau of Statistics. But such information is limited to administrative units such as VDCs, DDCs, Development Zones and at national level. As the candidate projects cross cut the administrative units, the available data on the social and economic concerns could not be used effectively to characterize the direct impact areas by the projects. To fill this gap field level studies on Socio-economic and Environmental Concerns<sup>1</sup> are conducted through participatory methods. The findings of the field surveys are presented in the section below.

### 1.1 Demographic Concerns

#### 1.1.1 VDCs, Settlements and Population

The proposed Chera Khola storage type project covers Jajarkot district from Mid-Western Development Region of Nepal. The project includes 5 Village Development Committees (VDC), 20 settlements, 13 wards and 556 households. The total population of the reservoir area is estimated to be 3660 with the average family size of 6.47 which is significantly higher than the national average family size of 2001 Census (e.g. 4.70) (Table 1c and **Appendix 1**). The reservoir area occupies 2.71% population of Jajarkot district<sup>2</sup>.

**Table 1c: VDCS and Settlements and Population under the Storage Project, Jajarkot**

S.N.	VDC	Settlement	Ward No.	Households	Population
1	Dashera	Jyula(managhat, Gaujeni, Jewa, Silpa, Chankhila, Rakhya, Thalaha Bazar, Baseni	2, 5, 7, 8, 9,	264	1715
2	Karkigaun	Manta, Chimchime(thati), Managhat, Sirpachaur, Jobra, Sirseni	3, 4,7	164	927
3	Jhapra	Dhungila, Phumna	1 and 2	79	716
4	Salma	Jyula(khara), Kholakhet	5	45	230
5	Pajaru	Challopole	3 and 4	14	72
<b>Total</b>	5	20	13	566	3660

Source: NESS Field Survey, 2012

#### 1.1.2 Ethnicity/Caste

Almost 80% of the reservoir area population is dominated by the Chhetri/Thakuri caste, while the other so called Brhmin caste represents 5% of the population. Among the Adivasi/Janjati, only few Magar (Disadvantaged Janjati) are found. The population of Dalit is also significant (17%) in the reservoir area (Figure 1 and **Appendix 2**).

<sup>1</sup> The findings are based on the NESS Rapid Field Survey Assessment (2012) using Focus Group Discussions (FGD) and Observation tools. Refer Appendix 12 for the List of FGD participants.

<sup>2</sup> The total population of Jajarkot district according to preliminary estimate of CBS Census 2011 is estimated to be 134,868.

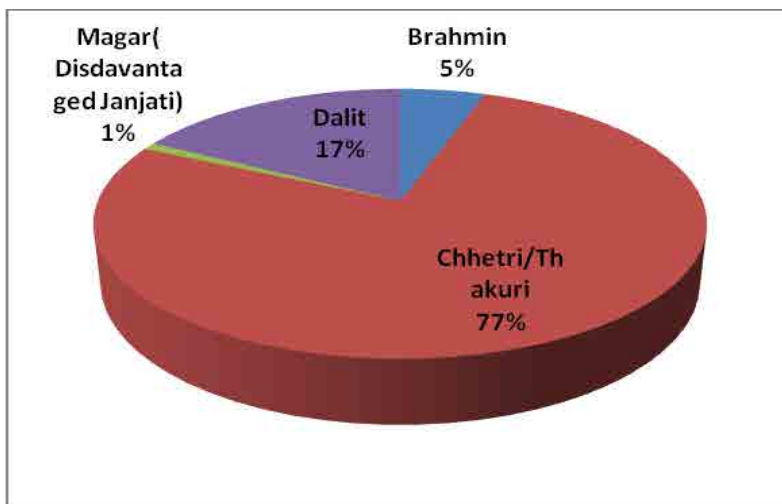
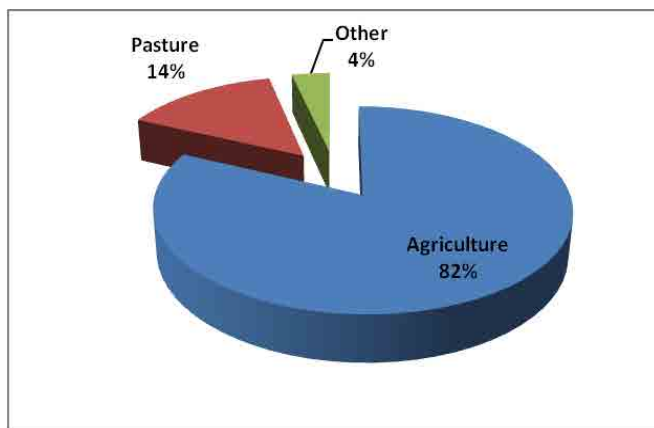


Figure1: Ethnic Composition of Reservoir Area Population

## 1.2 Economic Concern

### 1.2.1 Land Use Pattern and Land Holding

The total land area in the reservoir area is estimated to be 1375 ropani (1 ropani=20 hectare), more than 80% of which is used for agriculture (82%), followed by pasture (14.0%) and other (4%). **Appendix 3** presents details on the land use pattern by each cluster of the VDC.



The total agricultural land of the reservoir area is estimated to 1140 ropanies of which 69% is khet (irrigated paddy field) and 29% pakho (un-irrigated up land) and 1% other types of land. The average land holding of a household is calculated to be 2.01 ropani with the minimum and maximum range of holding between 0.20 and 20 ropanies (Table 2 and **Appendix 4**).

Figure 2: Land Use Pattern

Based on the Central Bureau of Statistics (CBS) classification<sup>3</sup>, all the households except one households of Kholakhet, Salma VDC; fall in the marginal group when examined from the view point of average land holding size. A household holding 20 ropanies of land in Salma falls under small to medium farmers.

<sup>3</sup> According to CBS, a households holding < 15 ropani of land is classified as marginal farmer, holding 15-135 ropanies as small to medium farmers and holding > 135 ropani as large farmers.

**Table 2: Total and Average Land Holding Size (Ropani)**

Description	Total	%	Average/HH
Khet	791	69.39	1.40
Pakho	335	29.39	0.59
Other (Kharbari)	14	1.23	0.02
<b>Total</b>	<b>1140</b>	<b>100</b>	<b>2.01</b>

Source: NESS Field Survey, 2012

The reservoir area is producing cereals such as paddy, maize, wheat and cash crops such as potato, oilseeds and vegetables. Among the cereals, wheat is grown in the largest area (921 ropanies) followed by paddy (893 ropanies) and maize (755 ropanies). Similarly, among the cash crops, potato occupy the largest area (162 ropanies) followed by vegetables (143 ropanies) and oilseeds (50 ropanies).

The quantity of production is also highest for paddy followed by maize and wheat. Among the cash crops, the production is calculated to be highest for oilseeds. The cropping intensity of the area is 256% (Table 3 and **Appendix 5**). According to field study all the production is consumed locally.

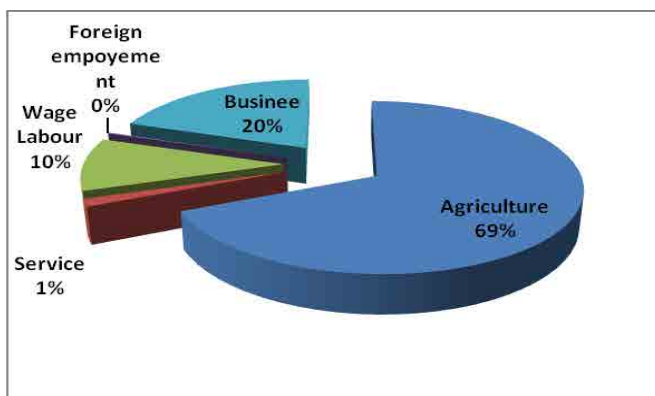
**Table 3: Crop Production and Yield**

S.N.	Crop	Area (Ropani)	Production ( Kg)	Yield (g/Ropani)
1	Paddy	893	80400	90.03
2	Maize	755	66906	88.62
3	Wheat	921	59031	64.09
4	Potato	162	1084	6.69
5	Oilseeds	50	3000	60.00
6	Vegetables	143	990	6.92
	<b>Cropping Intensity</b>		<b>256.49%</b>	

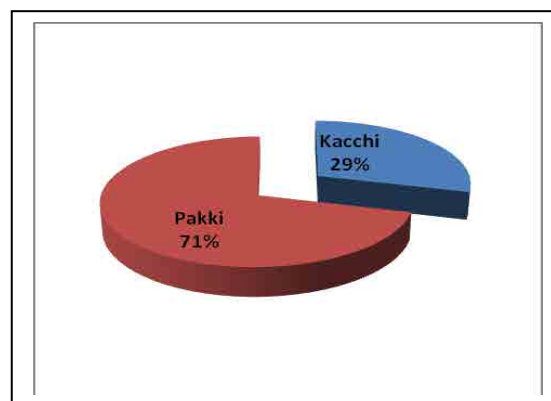
Source: NESS Field Survey, 2012

### 1.2.2 Occupation

Only 40% population residing in the reservoir area is reported to be actively engaged in economic earnings. Of the total active population, a majority (69%) is engaged in agriculture followed by business (20%) and wage labour (10%). Other 1% population is involved in business while only three persons (0.21%) are reported to be occupied in foreign employment from the reservoir area (Figure 3 and **Appendix 6**).



**Figure 3: Occupation of Population**



**Figure 4: Types of Houses**

### 1.2.3 Housing Type

Two types of houses are categorized in the reservoir area : i) Pakki house i.e permanent types of house built generally using cement and stone and roofed by using galvanized sheet (tin) or cemented and ii) kachhi house i.e built by using mud and stone and roofed using thatch.

A large majority of the households (71%) are residing in pakki (permanent) types of house and 20% in kacchi (temporary) types of house (Figure 4 and **Appendix 7**).

### 1.3 Service related Infrastructures

#### 1.3.1 Road and Bridges

The road access to reservoir area is limited to 3.8 km of gravel road in two of the settlements while 1 suspension bridge located in different settlements are serving the area (**Appendix 8**)

#### 1.3.2 Schools

Two primary levels and one lower secondary level school are running in the reservoir area where 574 students are enrolled (Table 4).

**Table 4: Number of Schools by Types and Number of Students**

S.N.	VDC	Settlement	Name of school	No. of students
1	Karkigaun	Managhat	Chandra jyoti Lower Secondary School	349
2		Jobra	Suryajyoti Primary School	35
3	Jhapra	Dhungila	Long river English Boarding School (Primary)	190
	<b>Total</b>	<b>3</b>	<b>3</b>	<b>574</b>

Source: NESS Field Survey, 2012

#### 1.3.3 Irrigation Infrastructure

There are seven major irrigation infrastructures built by farmers in the reservoir area which are proving irrigation services to 386 hectares of land. The minimum and maximum range of irrigation command area of a scheme ranges between 6 and 100 ropanies (Table 5).

**Table 5: Number of Irrigation Schemes**

S.N.	VDC	Settlement	Scheme Details		
			Number	command area (Ropani)	Name of the Sheme
1	Dashera	Jyula (managha)	1	60	NA
2		Chankhila	1	40	Lewa khola
3	Karkigaun	Chimchime (thati)	1	6	Chera khola
4		Managhat	1	100	Syale khola sinchai
5	Jhapra	Dhungila	1	80	Lunvati khola
6		Phumna	1	50	Kalodhunga khola
7	Salma	Jyula (khara)	1	50	Salma khola
<b>Total</b>	<b>4</b>	<b>7</b>	<b>7</b>	<b>386</b>	

Source: NESS Field Survey, 2012

#### 1.3.4 Drinking Water

Only two drinking water schemes are reported in the reservoir area and altogether nine taps are installed in two of the schemes (Table 6).

**Table 6: Drinking Water Schemes**

S.N.	VDC	Cluster	Name of the Scheme	Number of Taps
1	Dashera	Chankhila	Chankhila Khanepani	4
2		Thalaha Bazar	Thalaha Khanepani	5
<b>Total</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>9</b>

Source: NESS Field Survey, 2012

### 1.3.5 Community Forest

There are 10 community forests in the reservoir area and communities of the 17 clusters (out of 19) are involved in managing these forests. 10 of the Community Forestry (**Appendix 9**).

### 1.3.6 Industries and Services

There are no any industries and services centers related to agriculture, livestock, security etc. in the reservoir area. However, altogether nine water turbines are installed in different parts of the reservoir area and Saru khola is the water source for most of them (Table 7).

**Table 7: Water Turbines in the Reservoir Area**

S.N.	VDC	Settlement	Water Turbines	
			Number	Source
1	Dashera	Rakhya	3	Saru khola
2		Thalaha Bazar	2	Saru khola
3	Jhapra	Dhungila	2	Saru khola
4	Pajaru	Challopole	2	NA
<b>Total</b>	<b>4</b>	<b>4</b>	<b>9</b>	<b>4</b>

Source: NESS Field Survey, 2012

Four market centers are developed in four of the settlements of the reservoir area where local produces as well as daily consumer items are sold and purchased (Table 8).

**Table 8: Market Places in the Reservoir Area**

S.N.	VDC	Settlement	Markets	
			Number	Name
1	Dashera	Jyula(managhat)	1	Managhat
2	Dashera	Thalaha Bazar	1	Thalaha bazar
3	Japra	Dhungila	1	NA
4	Salma	Jyula(khara)	1	NA
	<b>Total</b>	<b>4</b>	<b>4</b>	<b>4</b>

Source: NESS Field Survey, 2012

## 1.4 Culture and Religious Site

All the members of the settlements adopt and celebrate Hindu based culture such as: *Dasain, Tihar, Tija, Majhe Sankarati*. Each settlement has *ghat* along the shore of river where *ekadasi mela* and *shivaratri mela* are celebrated. These *ghats* are also used for cremation purpose. Two Shiva temples are also located in the reservoir area (**Appendix 10**).

## 1.5 Ongoing and Proposed Development programmes

There are no any specific development projects ongoing or proposed in the reservoir area.

## 1.6 Past Experience with community and their perception

There were no any hydro powers or other specific development projects constructed in the past in the reservoir area so the communities have not experienced any types of conflict with regards to the development projects.

The communities have various positive and negative perceptions about the storage type hydropower project. Submerge of house and land and loss of their traditional property, flood and landslides, rise in

social conflicts are their major concerns with regards to the construction of storage types of the hydropower project. They also perceive number of positive impacts of the project such as availability of electricity, infrastructure development, job opportunities, increase in public awareness etc. (Table 9 and Appendix 11).

**Table 9: Perceived Impacts of the Storage Type Hydropower Project**

<b>Positive impacts</b>	<b>Negative Impact</b>
Development Activities	Loss of land and property
Available of electricity	Loss of houses
Infrastructure development	Loss of water source
Job Opportunities	Submerge of house and land
Increase in Public Awareness	Rise of social disputes
	Increase in social conflict
	Social impacts
	Difficulties in transportation from one place to other
	Flood and landslide

Source: NESS Field Survey, 2012

## **1.7 Disasters**

Flood and landslides are the common disasters prevailed in the area; however, the area has not experienced severe losses.



## 2 DISASTER STUDY

There are no records of the disaster at the site specific level of the candidate project at the central level and district level offices of the government of Nepal. It is therefore, the disaster information is collected from the project site based on the key informant survey. The findings of the results are presented in the sections below.

### 2.1 Types of Disaster

Within the influence area of the Chera Khola storage type hydroelectric project the flood and landslide disaster have been reported by the key informants. The earthquake as a disaster event is not in the memory of the local people.

#### 2.1.1 Flood

In the memory of the local people flood disaster is of common occurrence within the project site. Two flood events (B.S. 2046 and, 2062,) have a widespread damage of life and property. The cause of the floods as reported by the informants is the heavy precipitation in the catchment areas of the Chera-1 Project in the monsoon season. The loss of life and property caused by the flood events in the candidate reservoir area are presented below.

**a) Name of respondent:** PREM BDR KHATRI **Date:** 30/03/2069 B.S.  
**Age:** 32 **Occupation:** Teacher **Location:** Managhat-3, Karkigao

**i) Year of the occurrence:** 2062 B.S., Vadra evening of Tiz

**ii) Cause of the flood:** Heavy Precipitation

**iii) Affects of the flood event (on CHERA KHOLA):**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~26rpns	~54 rpns, Dhungila	~10 rpns, jyula
Life	X	X	X
Build properties	15 Houses	20house,10 Ghatta	4 House, 1 Ghatta
Crops	~Paddy, 100 muri	~Paddy, 200 muri	~Paddy, 20 muri
Others	X	x	x

*NOTE: The flood of the 2062 Vadra 10 was occurred due to flash flood because of the breakage of temporary dam at CHALNE of PAINKA VDC due to heavy rain and landslide.*

**b) Name of respondent:** KALIYA THAPA **Date:** 28/03/2069 B.S.  
**Age:** 68 **Occupation:** Agriculture **Location:** Lower Jewa-5, Dashera

**i) Year of the occurrence:** 2046 B.S. (Around 25 yrs ago)

**ii) Cause of the flood:** Heavy Precipitation

**iii) Affects of the flood event (on SALMA KHOLA):**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~25 rpns	~20-25 rpns, Tulikhet	~200 rpns, Jewatada
Life	X	X	2
Build properties	4 houses	1 ghatta	3 Cattle Sheds(goth)
Crops	~Paddy, 75 muri	~Paddy,100 muri	~Paddy, 600 muri
Others	x	x	

#### 2.1.2 Landslide

Landslide events are relatively rare in the influence area of candidate project. A major landslide is reported from the area 2 years back after heavy precipitation in the monsoon season with the loss of life and property. Table below presents the details of the landslide event as reported by the key informants.

a) Name of respondent: KALIYA THAPA  
(Salma khola)

Date: 28/03/2069 B.S.

Year	Location	Cause	Affected Fields	
2067 B.S. (2 years Ago)	Dashera-5	Heavy Precipitation	Affected Area	Jewa, Jyula
			Loss of life	x
			Loss of Build	x
			Loss of Crops	Paddy
			Loss of Land	4 rps

### 2.1.3 Earthquake

In the memory of the local people the candidate project site communities have not experienced earthquake causing loss of life and property.

### 3 FLORAL STUDY

Though the floral information at the regional level is available, there is no published literature on the site specific level of the candidate project at the central and district level offices of the government of Nepal. It is therefore, candidate project site is visited by the biological study team to gather information based on direct observation and through the participatory methods with the local key informants. Findings of the field study are presented in sections below.

#### 3.1 Vegetation Diversity

The information on the vegetation diversity is gathered from the direct observation by the members of biology study team during site visit. Besides, information is also collected from the key informants of the local area through interviews and focus group discussions with the local community forest user groups.

The candidate project site is rich in floral diversity. About 35 plant species were recorded through direct observation and interviews with the key informants. The list of plant species is presented in the table below.

S.N.	Local Name	Common Name	Scientific Name
1	Dabdabey		<i>Lannea coromandelica</i>
2	Khayer	Cuth tree	<i>Acacia catechu</i>
3	Karam	Yellow teak	<i>Adina cardifolia</i>
4	Bell	Wood Apple	<i>Aegle marmelos</i>
5	Chiuri	Nepal butter fruit	<i>Aesandra butyracea</i>
6	Siris	Tee-coma	<i>Albezia sps.</i>
7	Vorla	Camel's footclimber	<i>Bauhinia vahlii</i>
8	Simal	Silk cotton tree	<i>Bombax ceiba</i>
9	Rajbrichha	Cassia pods	<i>Cassia fistula</i>
10	Sinkauli	Garlic pear	<i>Cinnamomum glanduliferum</i>
11	Sandan	Sandan	<i>Desmodium oojeinense</i>
12	Githe tarul	Air potato	<i>Dioscorea bulbifera</i>
13	Unyoo	Eadible fern	<i>Dryopteris cochleata</i>
14	Mouwa		<i>Engelhardia spicata</i>
15	Khamari	Malay bush beech	<i>Gmelina arborea</i>
16	Vimal	Bush	<i>Grewia optiva</i>
17	Bot dhayaro		<i>Lagerstroemia parviflora</i>
18	Rain	Kamala	<i>Mallotus philipensis</i>
19	Pudina	peppermint	<i>Menthe arvensis</i>
20	Kafal	Bay berry	<i>Myrica esculenta</i>
21	Kaulo		<i>Persea odoratissima</i>
22	Amala	Emblic	<i>Phyllanthus emblica</i>
23	Khote Sallo	Pine	<i>Pinus roxburgii</i>
24	Valayo	Chinese sunmac	<i>Rhus javanica</i>
25	Ritho	Soap –nut	<i>Sapindus mukorossi</i>
26	Khirro	Tallow tree	<i>Sapium insigne</i>
27	Sall	Sall tree	<i>Sorea robusta</i>
28	Debre lahara		<i>Spatholobus parviflorus</i>
29	Jamun	Black berry	<i>Syzygium cumini</i>
30	Sajh	Laurel tree	<i>Terminalia alata</i>
31	Toono	Cedrela tree	<i>Toona sps.</i>
32	Uttis	Nepal black ceder	<i>Ulnus nepalensis</i>
33	Sisnoo	Stinging nettle	<i>Urtica dioca</i>
34	Dhayaro	Fire flame bush	<i>Woodfordia fruticosa</i>
35	Bayer	Indian plum	<i>Zizypulus mauritiana</i>

### 3.2 Forest Types

The candidate project site is characterized by the hill sal forest and *Pinus roxburgii* forest. The reservoir site is dominated by hill sal forest while higher altitudes of the influence area has *Pinus roxburgii* forest. Table below presents the forest types and associated species in the reservoir area and outside reservoir area.

#### a) Chedda khola

Local (Within Reservoir)	Regional (Out of the reservoir)
Hill Sal Forest (The lower parts <800m mostly Rain ( <i>Mallotus philipensis</i> ) and Dabdabey ( <i>Lannea coromandelica</i> ) are dominant but above up to 1000m sall ( <i>Shorea robusta</i> ) is dominated with Bot Dhayaro ( <i>Lagerstroemia parviflora</i> ))	< 1000m altitude is Hill sall Forest but above it is totally <i>Pinus roxburgii</i> forest dominated by <i>Pinus roxburgii</i> (sallo)

#### b) Salma khola

Local (Within Reservoir)	Regional (Out of the reservoir)
Mainly Hill sall Forest dominated by <i>Shorea robusta</i> associated with <i>Mallotus philippensis</i> . Occasionally <i>Alnus nepalensis</i> and <i>Pinus roxburgii</i> is observed	< 1000m altitude Hill sal forest dominated by <i>Shorea robusta</i> and above 1000m it is dominantly <i>Pinus roxburgii</i> forest

#### c) Dam site

Local (Within Reservoir)	Regional (Out of the reservoir)
Mainly Hill Sall Forest dominated by <i>Shorea robusta</i> in associattion with <i>Desmodium oojeinense</i>	< 1000m altitude Hill sal forest dominated by <i>Shorea robusta</i> and above 1000m it is dominantly <i>Pinus roxburgii</i> forest

### 3.3 Forest as per Forest Classification (Community Forest, Government Forest, Leasehold Forest, Private Forest, Religious Forest etc.)

The forests of the candidate project influence area are the leasehold and community forests, the community forest are managed by the local community forest user groups within the framework of the community forest management plan approved by the district forest offices, while the leasehold managed forest is managed by the lease households. The reservoir occupied area has twelve community forests and one leasehold forest, while the project influence area has about seven community managed forests. The name of the leasehold and community forests, dominant species of plants and the location of the forests in the local administrative zone (VDCs) is presented in the tables below for the reservoir area and outside the reservoir area.

#### a) Chera khola

##### Local Area (Within the reservoir)

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C.
1	community	Okhle Umraya C.F.	Sall	Dashera-7, 8
2	community	Kanda Halnya Co. Fo.	Sall and sallo	Dashera-8
3	community	Dhaiya Kailas Co. Fo.	Sall	Dashera-9
4	community	Nepani Hariyali Co. Fo.	Uttis,Rain	Karkigao-3
5	community	Chidala Co. Fo.		Karkigao-4
6	community	Kachurani Co. Fo.		Karkigao-4
7	community	Ghogane Co. Fo.		Jhapra-2
8	Kabuliyat (Leasehold)	Gouda Kalyan Tauri Kabuliyat Fo.		Pajaru-3
9	Community	Kotila Co. Fo.		Salmaraikar-4

**Regional Area (Outside the reservoir)**

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C.
1	community	Okhle Umraya C.F.	Sall, Sallo	Dashera-7, 8
2	community	Kanda Halnya Co. Fo.	Sall, Sallo	Dashera-8
3	community	Dhaiya Kailas Co. Fo.	Sallo	Dashera-9
4	community	Nepani Hariyali Co. Fo.	Sallo	Karkigao-3
5	community	Chidala Co. Fo.		Karkigao-4
6	community	Kachurani Co. Fo.		Karkigao-4
7	community	Ghogane Co. Fo.		Jhapra-2
8	Kabuliyat (Leasehold)	Gouda Kalyan Tauri Kabuliyat Fo.		Pajaru-3

**b) Salma khola**

**Local Area (Within the reservoir)**

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C.
1	community	Okhle Umraya C.F.	Sall ( <i>Shorea robusta</i> )	Dashera-7, 8
2	community	Sagina Gairi C.F.	Sall ( <i>Shorea robusta</i> ) and Khote Sallo	Dashera-4, 5
3	community	Baisani Thadokatya C.F.	Sall ( <i>Shorea robusta</i> )	Dashera-6
4	community	Pandhero Khola C.F.	Uttis,Rain	Shalma-5

**Regional Area (Outside the reservoir)**

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C.
1	community	Okhle Umraya C.F.	Sall ( <i>Shorea robusta</i> ), Sallo	Dashera-7, 8
2	community	Sagina Gairi C.F.	Sall ( <i>Shorea robusta</i> ), Sallo	Dashera-4, 5
3	community	Baisani Thadokatya C.F.	Sallo	Dashera-6
4	community	Pandhero Khola C.F.	Sallo	Shalma-5

**c) Dam site**

**Local Area (Within the reservoir)**

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C.
1	community	Kotila Co. Fo.	Sall ( <i>Shorea robusta</i> ) Sandan ( <i>Desmodium oojeinense</i> ) and Amala ( <i>Phyllanthus emblica</i> )	Salma Raikar
2	community	Nepane Hariyali Co. Fo.	Sall ( <i>Shorea robusta</i> ) and Amala ( <i>Phyllanthus emblica</i> )	Karkigao

**Regional Area (out of the reservoir)**

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C.
1	community	Kotila Co. Fo.	Khote Sallo ( <i>Pinus roxburgii</i> )	Salma Raikar
2	community	Nepane Hariyali Co. Fo.	Khote Sallo ( <i>Pinus roxburgii</i> )	Karkigao

### 3.4 Forest Plot Analysis

For the analysis of the forest status and characteristics 9 sample plots were measured within the reservoir area of the candidate project. The sample plots measured has a size of 25 x 25 meter. The detail of the sample plot measurements is presented in the tables below.

#### a) Chera khola

i) Forest: Okhle Umraya C.F.

Location: Chankhila-7, V.D.C.-Dashera

G.P.S. 86-01-880E, 31-79-673N

Altitude: 832m

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Height (approx.)
1	Sall	Sall Tree	<i>Shorea robusta</i>	40	10
2	Rain	Kamala	<i>Mallotus philippensis</i>	45	10
3	Botdhayaro		<i>Lagerstroemia parviflora</i>	60	12
4	Sall	Sall Tree	<i>Shorea robusta</i>	60	13
5	Rain	Kamala	<i>Mallotus philippensis</i>	40	5
6	Rain	Kamala	<i>Mallotus philippensis</i>	40	5
7	Sall	Sall Tree	<i>Shorea robusta</i>	40	8
8	Sanjh	Laurel Tree	<i>Terminalia alata</i>	35	5
9	Karam		<i>Adina cordifolia</i>	50	10
10	Dabdabey	Woodier wood	<i>Lennea coromandelica</i>	45	6
11	Sal	Sall Tree	<i>Shorea robusta</i>	40	5
12	Sal	Sall Tree	<i>Shorea robusta</i>	45	10
13	Botdhayaro		<i>Lagerstroemia parviflora</i>	50	10
14	Sall	Sall Tree	<i>Shorea robusta</i>	50	8
15	Sall	Sall Tree	<i>Shorea robusta</i>	60	10
16	Sandan	Sandan	<i>Desmodium oojeinense</i>	55	10
17	Sall	Sall Tree	<i>Shorea robusta</i>	35	10
18	Sall	Sall Tree	<i>Shorea robusta</i>	40	12
19	Sall	Sall Tree	<i>Shorea robusta</i>	50	8
20	Sall	Sall Tree	<i>Shorea robusta</i>	24	5
21	Rain	Kamala	<i>Mallotus philippensis</i>	40	5
22	Rain	Kamala	<i>Mallotus philippensis</i>	40	5
23	Sall	Sall Tree	<i>Shorea robusta</i>	40	8
24	Sall	Sall Tree	<i>Shorea robusta</i>	35	7
25	Botdhayaro		<i>Lagerstroemia parviflora</i>	70	12
26	Botdhayaro		<i>Lagerstroemia parviflora</i>	70	8
27	Botdhayaro		<i>Lagerstroemia parviflora</i>	55	6
28	Rain	Kamala	<i>Mallotus philippensis</i>	60	8
29	Rain	Kamala	<i>Mallotus philippensis</i>	60	8
30	Sall	Sall Tree	<i>Shorea robusta</i>	60	10
31	Sall	Sall Tree	<i>Shorea robusta</i>	50	8
Total	15 Sall,7 Rain,5 Botdhyaro, 1 Sajn, 1 Karam & 1 Sandan				

Forest Density: total no of tree/area of the quadrate=31/625X1000 per Hector=496/Hector

Dominant species: Sall=15/31X100%=48.38%

Crown coverage of the forest: 15%

ii) Forest: Okhle Umraya C.F.

Location: Near Silpey, V.D.C.-Dashera

G.P.S. 86-02-293E,31-80-374N

Altitude:866m

S.N.	Local Name	Common Name	Scientific Name	DBH(cm)	Height (approx.)
1	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	100	25
2	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	80	22
3	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	70	20
4	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	60	19
5	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	100	25
6	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	70	22

S.N.	Local Name	Common Name	Scientific Name	DBH(cm)	Height (approx.)
7	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	60	20
8	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	70	21
9	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	102	25
10	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	90	23
11	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	70	21
12	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	90	22
13	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	85	20
14	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	90	21
15	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	80	20
16	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	70	19
17	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	80	19
18	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	100	24
19	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	100	25
20	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	100	25
21	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	95	24
22	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	105	25
23	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	90	23
24	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	110	25
25	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	105	23
26	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	105	25
27	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	80	21
28	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	70	19
29	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	40	8
30	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	50	9
31	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	40	9
32	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	35	8
33	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	30	7
34	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	45	8
35	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	50	8
36	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	50	8
37	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	40	7
38	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	45	7
39	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	60	7
40	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	40	7
41	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	25	6
41 Pine Trees					

**Forest Density:** total no of tree/ area of the quadrat = 41/625X10000 per Hector = 656 /Hector

**Dominant species:** 100% *Pinus roxburgii*

**Crown coverage of the forest:** 50%

**iii) Forest:** Kanda Halnya Co. Fo.

**Location:** Thalaha-8, V.D.C.-Dashera

**G.P.S.** 86-03-411E, 31-82-186N

**Altitude:** 860m

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Height (approx.)
1	Sall	Sall Tree	<i>Shorea robusta</i>	40	10
2	Sall	Sall Tree	<i>Shorea robusta</i>	45	10
3	Sall	Sall Tree	<i>Shorea robusta</i>	60	12
4	Sall	Sall Tree	<i>Shorea robusta</i>	60	13
5	Sall	Sall Tree	<i>Shorea robusta</i>	40	5
6	Sall	Sall Tree	<i>Shorea robusta</i>	40	5
7	Sall	Sall Tree	<i>Shorea robusta</i>	40	8
8	Sall	Sall Tree	<i>Shorea robusta</i>	35	5
9	Sall	Sall Tree	<i>Shorea robusta</i>	50	10

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Height (approx.)
10	Sall	Sall Tree	<i>Shorea robusta</i>	45	6
11	Sall	Sall Tree	<i>Shorea robusta</i>	40	5
12	Sall	Sall Tree	<i>Shorea robusta</i>	45	10
13	Sall	Sall Tree	<i>Shorea robusta</i>	50	10
14	Sall	Sall Tree	<i>Shorea robusta</i>	50	8
15	Sall	Sall Tree	<i>Shorea robusta</i>	60	10
16	Sall	Sall Tree	<i>Shorea robusta</i>	55	10
17	Sall	Sall Tree	<i>Shorea robusta</i>	35	10
18	Sall	Sall Tree	<i>Shorea robusta</i>	40	12
19	Sall	Sall Tree	<i>Shorea robusta</i>	50	8
20	Sall	Sall Tree	<i>Shorea robusta</i>	24	5
21	Rain	Kamala	<i>Mallotus philippensis</i>	40	5
22	Sall	Sall Tree	<i>Shorea robusta</i>	40	5
23	Sall	Sall Tree	<i>Shorea robusta</i>	40	8
24	Sall	Sall Tree	<i>Shorea robusta</i>	35	7
25	Sall	Sall Tree	<i>Shorea robusta</i>	70	12
26	Sall	Sall Tree	<i>Shorea robusta</i>	70	8
27	Sall	Sall Tree	<i>Shorea robusta</i>	55	6
26 sall, 1rain					

**Forest Density:** total no of tree/area of the quadrat=27/625X10000 per Hector=432 trees/hector

**Dominant species:** Sall Tree=26/27X100%=96.30%

**Crown coverage of the forest:** 50%

**b) Salma Khola**

**i) Forest: Baisani Thadokatya co. forest.**

**Location:** Jewatada-5 side of Jewa Khola, V.D.C.-Dashera

**G.P.S.**

**Altitude:**

S.N.	Local Name	Common Name	Scientific Name	DBH(cm)	Height (approx.)
1	Sall	Sall Tree	<i>Shorea robusta</i>	85	30
2	Sall	Sall Tree	<i>Shorea robusta</i>	55	20
3	Sall	Sall Tree	<i>Shorea robusta</i>	53	19
4	Sall	Sall Tree	<i>Shorea robusta</i>	20	7
5	Rain	Kamala	<i>Mallotus philippensis</i>	30	8
6	Sall	Sall Tree	<i>Shorea robusta</i>	55	20
7	Sall	Sall Tree	<i>Shorea robusta</i>	50	18
8	Sall	Sall Tree	<i>Shorea robusta</i>	60	20
9	Sall	Sall Tree	<i>Shorea robusta</i>	70	23
10	Amala	Emblic	<i>Phyllanthus emblica</i>	40	5
11	Sall	Sall Tree	<i>Shorea robusta</i>	70	25
12	Sall	Sall Tree	<i>Shorea robusta</i>	55	20
13	Sall	Sall Tree	<i>Shorea robusta</i>	70	24
14	Sall	Sall Tree	<i>Shorea robusta</i>	40	15
15	Dabdabey		<i>Lennea coromandelica</i>	45	10
16	Sall	Sall Tree	<i>Shorea robusta</i>	55	20
17	Sall	Sall Tree	<i>Shorea robusta</i>	70	25
18	Sall	Sall Tree	<i>Shorea robusta</i>	60	20
19	Sall	Sall Tree	<i>Shorea robusta</i>	40	18
20	Sall	Sall Tree	<i>Shorea robusta</i>	70	26
21	Sall	Sall Tree	<i>Shorea robusta</i>	60	20
22	Sall	Sall Tree	<i>Shorea robusta</i>	55	19
23	Sall	Sall Tree	<i>Shorea robusta</i>	40	15
24	Sall	Sall Tree	<i>Shorea robusta</i>	35	11



S.N.	Local Name	Common Name	Scientific Name	DBH(cm)	Height (approx.)
25	Dabdabey		<i>Lennea coromandelica</i>	35	12
26	Sall	Sall Tree	<i>Shorea robusta</i>	40	14
27	Sall	Sall Tree	<i>Shorea robusta</i>	65	21
28	Valayo	Chinese Sunmac	<i>Rhus javanica</i>	65	10
29	Sall	Sall Tree	<i>Shorea robusta</i>	40	14
30	Sall	Sall Tree	<i>Shorea robusta</i>	50	16
31	Sall	Sall Tree	<i>Shorea robusta</i>	55	20
32	Sall	Sall Tree	<i>Shorea robusta</i>	50	18
33	Rain	Kamala	<i>Mallotus philippensis</i>	30	11
34	Rain	Kamala	<i>Mallotus philippensis</i>	32	11
35	Rain	Kamala	<i>Mallotus philippensis</i>	35	8
36	Sall	Sall Tree	<i>Shorea robusta</i>	65	22
37	Sall	Sall Tree	<i>Shorea robusta</i>	70	25
38	Sall	Sall Tree	<i>Shorea robusta</i>	65	23
Total	30 Sall, 4 Rain, 2 Dabdabey, 1 Amala, 1 Valayo				

**Forest Density:** total no of tree/area of the quadrate=38/625x10000 per Hector=608/Hector

**Dominant Species of the quadrate:** Sall=30/38x100%=78.95%

**Crown coverage of the forest:** 65%

## ii) Forest: Saginagairi Co.Fo.

**Location:** Gaujeni-2, V.D.C.-Dashera

**G.P.S.**

**Altitude:**

S.N.	Local Name	Common Name	Scientific Name	DBH(cm)	Height (approx..)
1	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	80	35
2	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	100	35
3	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	40	23
4	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	46	25
5	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	70	35
6	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	82	35
7	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	55	24
8	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	60	30
9	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	30	20
10	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	66	35
11	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	59	30
12	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	75	35
13	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	81	35
14	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	90	35
15	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	55	25
16	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	60	30
17	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	54	25
18	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	70	30
19	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	55	35
20	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	60	35
21	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	66	30
22	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	70	35
23	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	66	30
24	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	70	35
25	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	60	30
26	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	60	30
27	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	70	35
28	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	75	35
29	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	75	35
30	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	60	30
31	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	65	30
32	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	50	24
33	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	55	30
34	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	70	35

S.N.	Local Name	Common Name	Scientific Name	DBH(cm)	Height (approx.)
35	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	75	35
36	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	50	23
	36 khote sallo				

**Forest Density:** total no of tree/area of the quadrate=36/625X10000 per Hector=576/Hector

**Dominant species of the quadrate:** Pine=36/36X100%=100%

**Crown coverage of the forest:** 25%

**iii) Forest: Pandhero Khola Co. Fo.**

**Location:** Jalma-5, V.D.C.-Shalma Raikar

**G.P.S.** 85-98-198E, 31-78-954N

**Altitude:** 800m

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Height (approx.)
1	Rain	Kamala	<i>Mallotus philippensis</i>	50	10
2	Rain	Kamala	<i>Mallotus philippensis</i>	70	15
3	Rain	Kamala	<i>Mallotus philippensis</i>	100	18
4	Rain	Kamala	<i>Mallotus philippensis</i>	60	13
5	Rain	Kamala	<i>Mallotus philippensis</i>	70	13
6	Rain	Kamala	<i>Mallotus philippensis</i>	55	11
7	Rain	Kamala	<i>Mallotus philippensis</i>	70	14
8	Rain	Kamala	<i>Mallotus philippensis</i>	60	12
9	Rain	Kamala	<i>Mallotus philippensis</i>	65	12
10	Rain	Kamala	<i>Mallotus philippensis</i>	55	11
11	Rain	Kamala	<i>Mallotus philippensis</i>	70	13
12	Rain	Kamala	<i>Mallotus philippensis</i>	60	12
13	Rain	Kamala	<i>Mallotus philippensis</i>	30	8
14	Rain	Kamala	<i>Mallotus philippensis</i>	90	16
15	Rain	Kamala	<i>Mallotus philippensis</i>	90	17
16	Rain	Kamala	<i>Mallotus philippensis</i>	50	10
17	Rain	Kamala	<i>Mallotus philippensis</i>	50	11
18	Rain	Kamala	<i>Mallotus philippensis</i>	70	13
19	Rain	Kamala	<i>Mallotus philippensis</i>	30	8
20	Rain	Kamala	<i>Mallotus philippensis</i>	55	11
21	Jamun	Black Berry	<i>Syzygium cumini</i>	45	10
22	Rain	Kamala	<i>Mallotus philippensis</i>	70	14
23	Rain	Kamala	<i>Mallotus philippensis</i>	45	10
24	Rain	Kamala	<i>Mallotus philippensis</i>	80	13
25	Rain	Kamala	<i>Mallotus philippensis</i>	50	10
26	Rain	Kamala	<i>Mallotus philippensis</i>	60	13
27	Rain	Kamala	<i>Mallotus philippensis</i>	80	12
28	Rain	Kamala	<i>Mallotus philippensis</i>	40	1
29	Rain	Kamala	<i>Mallotus philippensis</i>	40	10
30	Rain	Kamala	<i>Mallotus philippensis</i>	120	17
31	Rain	Kamala	<i>Mallotus philippensis</i>	130	20
	30 Rain,1 Jamun				

**Forest Density:** total no of tree/area of the quadrate=31/625X10000 per Hector=496/Hector

**Dominant species:** Rain=30/31X100%=96.77%

**Crown coverage of the forest:** 70%

**c) Dam site**

**i) Forest: Kotila Co. Fo.**

**Location:** Jyula Khara-4, V.D.C.-Salma Raikar

G.P.S. 85-99-779E, 31-78-290N

Altitude: ~720m

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Height (approx.)
1	Sandan	Sandan	<i>Desmodium oojeinense</i>	60	10
2	Sandan	Sandan	<i>Desmodium oojeinense</i>	30	8
3	Sandan	Sandan	<i>Desmodium oojeinense</i>	60	15
4	Sandan	Sandan	<i>Desmodium oojeinense</i>	45	8
5	Sandan	Sandan	<i>Desmodium oojeinense</i>	67	15
6	Sall	Sall Tree	<i>Shorea robusta</i>	70	12
7	Rain	Kamala	<i>Mallotus philippensis</i>	50	10
8	Sandan	Sandan	<i>Desmodium oojeinense</i>	40	12
9	Sandan	Sandan	<i>Desmodium oojeinense</i>	50	8
10	Sandan	Sandan	<i>Desmodium oojeinense</i>	35	7
11	Sandan	Sandan	<i>Desmodium oojeinense</i>	40	7
12	Sandan	Sandan	<i>Desmodium oojeinense</i>	45	7
13	Sandan	Sandan	<i>Desmodium oojeinense</i>	45	7
14	Sandan	Sandan	<i>Desmodium oojeinense</i>	30	6
15	Sandan	Sandan	<i>Desmodium oojeinense</i>	20	5
16	Sandan	Sandan	<i>Desmodium oojeinense</i>	55	7
17	Sandan	Sandan	<i>Desmodium oojeinense</i>	45	7
18	Sandan	Sandan	<i>Desmodium oojeinense</i>	25	4
19	Sandan	Sandan	<i>Desmodium oojeinense</i>	60	15
20	Sanjh	Laurel Tree	<i>Terminalia alata</i>	60	5
21	Sall	Sall Tree	<i>Shorea robusta</i>	100	8 cut
22	Valayo	Chinese Sunmac	<i>Rhus javanica</i>	60	5
23	Pyari			60	3 cut
Total	17 Sandan, 2 Sall, 1 Rain, 1 Valayo, 1 Sanjh, 1 Pyari				

**Forest Density:** total no of tree/area of the quadrate=23/625X10000 per Hector=368/hector

**Dominant species:** Sandan=17/23X100%=73.91%

**Crown coverage of the forest:** 10%

**Note:**

Sandan trees are almost all cut off for fodder purpose and the forest is heavily disrupted with fodder and firewood collectors.

**ii) Forest: Nepani Hariyali Co. Fo.**

**Location:** Sirpachour-3, V.D.C.-Karkigao

G.P.S. 86-00-150E, 31-78-100N

Altitude: 780m

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Height (approx.)
1	Sall	Sall Tree	<i>Shorea robusta</i>	45	10
2	Sall	Sall Tree	<i>Shorea robusta</i>	35	9
3	Sall	Sall Tree	<i>Shorea robusta</i>	40	10
4	Sall	Sall Tree	<i>Shorea robusta</i>	30	8
5	Rain	Kamala	<i>Mallotus philippensis</i>	50	10
6	Sall	Sall Tree	<i>Shorea robusta</i>	50	10
7	Sall	Sall Tree	<i>Shorea robusta</i>	40	9
8	Sall	Sall Tree	<i>Shorea robusta</i>	35	8
9	Sall	Sall Tree	<i>Shorea robusta</i>	50	10
10	Sall	Sall Tree	<i>Shorea robusta</i>	45	9
11	Sall	Sall Tree	<i>Shorea robusta</i>	40	9
12	Sall	Sall Tree	<i>Shorea robusta</i>	40	9
13	Sall	Sall Tree	<i>Shorea robusta</i>	50	11
14	Sall	Sall Tree	<i>Shorea robusta</i>	40	9
15	Sall	Sall Tree	<i>Shorea robusta</i>	35	8
16	Sall	Sall Tree	<i>Shorea robusta</i>	50	10
17	Sall	Sall Tree	<i>Shorea robusta</i>	50	10
18	Sall	Sall Tree	<i>Shorea robusta</i>	50	10
19	Sandan	Sandan	<i>Desmodium oojeinense</i>	20	7
20	Sandan	Sandan	<i>Desmodium oojeinense</i>	25	7
21	Sandan	Sandan	<i>Desmodium oojeinense</i>	30	8

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Heightt (approx.)
22	Sandan	Sandan	<i>Desmodium oojeinense</i>	50	6
23	Sandan	Sandan	<i>Desmodium oojeinense</i>	35	7
24	Sandan	Sandan	<i>Desmodium oojeinense</i>	40	7
25	Sandan	Sandan	<i>Desmodium oojeinense</i>	40	10
26	Sandan	Sandan	<i>Desmodium oojeinense</i>	70	8
27	Sandan	Sandan	<i>Desmodium oojeinense</i>	50	7
28	Sandan	Sandan	<i>Desmodium oojeinense</i>	40	7
29	Sandan	Sandan	<i>Desmodium oojeinense</i>	40	7
30	Sandan	Sandan	<i>Desmodium oojeinense</i>	60	9
31	Sandan	Sandan	<i>Desmodium oojeinense</i>	50	7
32	Sandan	Sandan	<i>Desmodium oojeinense</i>	40	6
33	Sandan	Sandan	<i>Desmodium oojeinense</i>	50	6
34	pyari	-	-	35	8
Total	18 Sall, 15 sandan, 1 Pyari				

**Forest Density:** total no of tree/area of the quadrate, = 34/625x10000 per Hector=544/ Hector

**Dominant Species of the quadrate:** Sall=18/34x100%=52.94%

**Crown coverage of the forest:** 65%

### iii) Forest: Kotila Co. Fo.

**Location:** Jyula Khara-4, V.D.C.-Salma Raikar

**G.P.S.** 85-99-800E, 31-78-480N

**Altitude:** ~800m

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Height (approx.)
1	Sall	Sall Tree	<i>Shorea robusta</i>		
2	Sall	Sall Tree	<i>Shorea robusta</i>	50	12
3	Sall	Sall Tree	<i>Shorea robusta</i>	30	7
4	Sall	Sall Tree	<i>Shorea robusta</i>	30	7
5	Sall	Sall Tree	<i>Shorea robusta</i>	40	8
6	Sall	Sall Tree	<i>Shorea robusta</i>	50	11
7	Sall	Sall Tree	<i>Shorea robusta</i>	30	8
8	Sall	Sall Tree	<i>Shorea robusta</i>	30	7
9	Sall	Sall Tree	<i>Shorea robusta</i>	40	8
10	Sall	Sall Tree	<i>Shorea robusta</i>	50	10
11	Sall	Sall Tree	<i>Shorea robusta</i>	20	6
12	Sall	Sall Tree	<i>Shorea robusta</i>	50	10
13	Sandan	Sandan	<i>Desmodium oojeinense</i>	40	8
14	Sandan	Sandan	<i>Desmodium oojeinense</i>	30	7
15	Sandan	Sandan	<i>Desmodium oojeinense</i>	30	7
16	Sandan	Sandan	<i>Desmodium oojeinense</i>	22	5
17	Sandan	Sandan	<i>Desmodium oojeinense</i>	20	6
18	Amala	Emblic	<i>Phyllanthus emblica</i>	30	4
19	Amala	Emblic	<i>Phyllanthus emblica</i>	35	4
20	Amala	Emblic	<i>Phyllanthus emblica</i>	35	5
21	Amala	Emblic	<i>Phyllanthus emblica</i>	30	4
22	Amala	Emblic	<i>Phyllanthus emblica</i>	40	5
23	Amala	Emblic	<i>Phyllanthus emblica</i>	20	3
24	Amala	Emblic	<i>Phyllanthus emblica</i>	50	5
25	Amala	Emblic	<i>Phyllanthus emblica</i>	50	6
26	Amala	Emblic	<i>Phyllanthus emblica</i>	50	5
27	Amala	Emblic	<i>Phyllanthus emblica</i>	30	4
28	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	30	8
29	Khote Sallo	Chir Pine	<i>Pinus roxburgii</i>	30	10
30	Pyari			40	8
31	Pyari			35	7
32	Pyari			35	8
33	Pyari			35	4
34	Pyari			50	10
35	Pyari			40	3

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Height (approx.)
36	Dabdabey		<i>Lennea coromandelica</i>	30	5
Total	12 Sall, 10 Amala, 6 Pyari, 5 Sandan, 2 Pine, 1 Dabdabey				

**Forest Density:** total no of tree/ area of the quadrate =  $36/625 \times 10000$  per Hector = 576/ Hector

**Dominant Species of the quadrate:** Sall =  $12/36 \times 100\% = 33.33\%$

**Crown coverage of the forest:** 20%

### 3.5 Public Dependency on the Forest

The forests of the candidate project site provide a range of goods and services to the local communities. The local community extracts followings resources from the forest areas to support their livelihood.

- Fodder
- Firewood
- For thatch and other purposes as to make ceiling of local house mainly from Kachurani Co.Fo.
- Woods
- Vegetable like ramenta of fern, Bankhu etc.
- Medicine from tree like Khirro, Dabdabey etc.

### 3.6 Floral Species of the Conservation Significance

Of the recorded floral species only 3 species have been categorized under the protection lists of the government of Nepal. However, none of the floral species have been listed in the IUCN red list and CITES. The table below presents the list of the protected species.

S.N.	Local Name	Common Name	Scientific Name	Status			Sources		
				IUCN	CITES	GO N	Site survey	Hearing survey	Literature survey
1	Khayer	Cuth tree	<i>Acacia catechu</i>			P		Hearing at Salma VDC	
2	Simal	Silk cotton tree	<i>Bombax ceiba</i>			P		Hearing at Salma VDC	
3	Sall	Sall tree	<i>Sorea robusta</i>			P	Confirmed at site		

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I - Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## 4 FAUNAL STUDY (WILDLIFE)

Information on the wildlife of the candidate project site is scarce in the published literatures. It is therefore site investigations are conducted to gather information through direct observation and the participatory methods with the local communities and the key informants. The findings of the filed investigations are presented in section hereunder.

### 4.1 Wildlife Diversity

Information on wildlife diversity is gathered through direct observation and participatory methods which included focus group discussion with the local communities and key informant surveys.

#### a) Mammals

A total of 14 and 15 mammalian species were recorded from the focus group discussion and key informant surveys at Chera Khola and Salma Khola respectively. Of the total reported species 3 mammalian species were directly observed by the field biological team. The details of the mammalian species and habitat types are presented in the table below for Chera Khola and Salma Khola.

#### Chera khola

S.N.	Consultation	Observed	Common name	Scientific Name
1	Jackal		Golden Jackal	<i>Canis aureus</i>
2	Banbiralo		Wild cat	<i>Felis chaus</i>
3	Nyauri Muso		Common mongoose	<i>Herpetes edwardsi</i>
4	Hyauso Bagh		Hyena	<i>Hyena hynea</i>
5	Sando		Porcupine	<i>Hystrix indica</i>
6	Pakha Ott		Common otter	<i>Lutra lutra</i>
7	Pani Ot		Smooth coated otter	<i>Lutra perspicillata</i>
8	Rato Bandar	*	Rhesus Monkey	<i>Macaca mulata</i>
9	Malsapro		Yellow throated martin	<i>Martef Flabigula</i>
10	Ratuwa		Barking Deer	<i>Muntiacus muntjak</i>
11	Ghoral		Goral	<i>Naemorhed goral</i>
12	Langur(Guna)		Hanuman langur	<i>Presbytus entelus</i>
13	Bandel		Wild Bore	<i>Sus scroffa</i>
14	Phyauro		Bengal fox	<i>Vulpus bengalensis</i>

#### Salma khola

S.N.	Consultation	Observed	Common name	Scientific Name
1	Musa		Jungle rat	<i>Bandicota indica</i>
2	Syaal		Golden Jackal	<i>Canis aureus</i>
3	Banbiralo		Wild cat	<i>Felis chaus</i>
4	Nyauri		Common mongoose	<i>Herpetes edwardsi</i>
5	Hyauso Bagh		Hyena	<i>Hyena hynea</i>
6	Sando		Porcupine	<i>Hystrix javanica</i>
7	Pakha Ot		Common otter	<i>Lutra lutra</i>
8	Pani Ot		Smooth coated otter	<i>Lutra perspicillata</i>
9	Rato Bandar	*	Rhesus Monkey	<i>Macaca mulata</i>
10	Malsapro		Yellow throated martin	<i>Martef Flabigula</i>
11	Ratuwa	*	Barking Deer	<i>Muntiacus muntjac</i>
12	Ghoral		Goral	<i>Naemorhed goral</i>
13	Langur(Guna)		Hanuman langur	<i>Presbytus entelus</i>
14	Bandel		Wild Boar	<i>Sus scroffa</i>
15	Fyauro		Bengal fox	<i>Vulpus bengalensis</i>

**b) Birds**

A total of 28 and 26 bird species are reported from Chera Khola and Salma Khola respectively by the local communities and key informants. Of the total reported species 16 species are directly observed by the field biological team. Table below presents list of the reported and observed species in the candidate project influence area for Chera Khola and Salma Khola.

**Chera khola**

S.N.	Consultation	Observed	Common name	Scientific Name
1	Sdandale	*	Common maina	<i>Acredotheres tristis</i>
2	Kalno Chari		Upland Pipit	<i>Anthus Sylvanus</i>
3	Hunchil		Great horned owl	<i>Bubo bubo</i>
4	Oolloo		owl	<i>Bubo zeylonensis</i>
5	Kaliz		Chir pheasant	<i>Catreus wallichii</i>
6	Bhuputi Dove	*	Mountain emperial pigeon	<i>Dacula badia</i>
7	Kokale		Tree pie	<i>Dendrocitta vagabunda</i>
8	Kalo Chibe	*	Black Drongo	<i>Dicrurus macrocercus</i>
9	Kalo Titra	*	Black francolin	<i>Francolinus francolinus</i>
10	Luinche		Jungle fawl	<i>Gallus gallus</i>
11	Chhirbire Matikore	*	Crested kingfisher	<i>Megaceryle lugubris</i>
12	Nyauli	*	Blue-eared barbet	<i>Megalaima australis</i>
13	Kuturke	*	Goldenthroated barbet	<i>Megalaima franklinii</i>
14	Kalchoda	*	Blue whistling thrus	<i>Myophonus caeruleus</i>
15	Seto Gidha		Egyptian vulture	<i>Neophron Percnopterus</i>
16	Sunchari		Golden Oriole	<i>Oriolus oriolus</i>
17	Vangero	*	House Sparrow	<i>Passer domesticus</i>
18	Jungali Vagero		Tree sparrow	<i>Passer montanus</i>
19	Rani chari		Scarlet minivet	<i>Pericrocotus flammeus</i>
20	Patechari		Leaf warbler	<i>Phylloscopus schwarzi</i>
21	Thulo Kathfora	*	Greyheaded woodpecker	<i>Picus canus</i>
22	Suga	*	Rose ringed parakeet	<i>Psittacula krameri</i>
23	Jureli	*	Himalayan bulbul	<i>Pycnonotus leucogenys</i>
24		*	Common stonechat	<i>S. toquota</i>
25	Tame dhukur	*	Spotted dove	<i>Streptopelia chinensis</i>
26	Kalo Gidha		Black vulture	<i>Torgos calvus</i>
27	Haleso	*	Yellowfooted greenp pigeon	<i>Treron phoenicoptera</i>
28	Lampuchhre	*	Redbilled Blue Magpi	<i>Urocissa erythrorynca</i>

**Salma khola**

S.N.	Consultation	Observed	Common name	Scientific Name
1	Sandale	*	Common maina	<i>Acredotheres tristis</i>
2	Bakulla		Grey heron	<i>Ardea purpurea</i>
3	Huchil		Great horn owl	<i>Bubo bubo</i>
4	oolu		owl	<i>Bubo zeylonensis</i>
5	Kaliz		Chir pheasant	<i>Catreus wallichii</i>
6	Kag		Common house crow	<i>Corvus splendens</i>
7	Bhuputi dhukur	*	Mountain emperial pigeon	<i>Dacula badia</i>
8	kokale	*	Tree pie	<i>Dendrocitta vagabunda</i>
9	Kalo Chibe	*	Black Drongo	<i>Dicrurus macrocercus</i>
10	Khole Dhobi	*	Black backed forkail	<i>Enicurus immaculatus</i>
11	kalo Titra	*	Black francolin	<i>Francolinus francolinus</i>
12	Luinche		Jungle Fowl	<i>Gallus gallus</i>
13	Matikore	*	Whitethroated kingfisher	<i>Halcyon smyrnensis</i>
14	Chhirbire Matikore	*	Crested kingfisher	<i>Megaceryle lugubris</i>
15	Kuturke	*	Goldenthroated barbet	<i>Megalaima franklinii</i>
16	Kalchode	*	Blue whistling thrus	<i>Myophonus caeruleus</i>
17	Vangero	*	House Sparrow	<i>Passer domesticus</i>

S.N.	Consultation	Observed	Common name	Scientific Name
18	Rani chari	*	Scarlet minivet	<i>Pericrocotus flammeus</i>
19	Thulo Kathfora	*	Greyheaded woodpecker	<i>Picus canus</i>
20	Kanthesuga	*	Rose ring paraket	<i>Psittacula krameri</i>
21	Jureli	*	Himalayan bulbul	<i>Pycnonotus leucogenys</i>
22	Thyarthare	*	Common stonechat	<i>Saxicola torquata</i>
23	Tame dhukur	*	Spotted dove	<i>Streptopelia chinensis</i>
24	Kanthe dhukur	*	Eurasian collared dove	<i>Streptopelia decaocto</i>
25	Haleso	*	Yellowfooted greenp pigeon	<i>Treron phoenicoptera</i>
26	Lampuchhre	*	Redbilled Blue Magpi	<i>Urocissa erythrorynca</i>

### c) Herpetofauna

The key informants and the local community reported a total of 11 and 13 herpetofauna species from the reservoir area of Chera Khola and Salma Khola respectively. Of the total reported 4 of the species are observed by the field study team. Details of the herpetofauna species and their habitat types are presented in the table below.

#### Chera khola

S.N.	Consultation	Observation	Common name	Scientific Name
1	Khasre Vyaguto	*	Toad	<i>Bufo melanostictus</i>
2	Chheparo		Callotes	<i>Calotes versicolor</i>
3	Batasay Sapo			<i>Dendrelthesis tristis</i>
4	Goraya Sapo			<i>Lycodon aulicus</i>
5	Valemungro			<i>Mabuia carinata</i>
6	Supi Sapo		Cobra	<i>Naja naja</i>
7	Pani Sapo	*		<i>Natrix piscator</i>
8	Vyaguto	*	Frog	<i>Rana tigrina</i>
9	Hariyokano Sapo		Green pit viper	<i>Trimeresurus albolabris</i>
10	Gohoro		Monitor lizard	<i>Varanus sps</i>
11	Chichindopapi Sapo			<i>Xenochrophis sps</i>

#### Salma khola

S.N.	Consultation	Observation	Common name	Scientific Name
1	Valemungro			<i>Asymblepharus capitaneus</i>
2	Pani Sapo	*		<i>Atritium sesistosum</i>
3	Khasre Vyaguto	*	Toad	<i>Bufo melanostictus</i>
4	Chheparo		Callotes	<i>Calotes versicolor</i>
5	Batasay Sapo			<i>Dendrelthesis tristis</i>
6	Goraya Sapo			<i>Lycodon aulicus</i>
7	Valemungro			<i>Mabuia carinata</i>
8	Supi Sapo		Common Cobra	<i>Naja naja</i>
9	Himali Chheparo	*		<i>Phrynocephalus theobaldi</i>
10	Vyaguto	*	Frog	<i>Rana tigrina</i>
11	Hariyokano Sapo		Green tree snake	<i>Trimeresurus albolabris</i>
12	Gohoro		Monitor lizard	<i>Varanus sps.</i>
13	Chichindopapi Sapo			<i>Xenochrophis sps</i>

## 4.2 Habitat Type in the Reservoir Area

The wildlife habitat of the reservoir area has the following characteristics.

- Fragmented by different settlements and fields
- Degraded and disturbed by fodder collection and cattle grazing
- Mostly the habitat is sparse and not seems suitable for large wildlife such as leopard or other tigers but people say there is Hyauso Bagh that eats only dead as scavenger.



- The so called Hyauso Bagh might be Hyena but the forest habitat is not so supportive type due to sparse and fragmented nature of the forest habitat.

### 4.3 Migratory Corridor

The area is seasonally used as feeding habitat by the wildlife of the area and is not reported to be a migratory corridor and shows following characteristics.

- Not reported to be a migratory corridor and the vegetation status also do not support the area to be connected with other area of high biodiversity value. The area is seasonally used as feeding habitat by the wild life.
- Wild Boar is reported to visit the area in winter for feeding
- Jalewa (jall hans) comes in winter for feeding
- Brown Jackdow that is Himalayan crow also visit the area in winter for feeding

### 4.4 Wild Animals of Conservation Significance

The reported wildlife of the candidate project site are cross checked with the protected wildlife lists of the government of Nepal, IUCN red book and the CITES Appendices. The lists of the wildlife which fall in the protection category of the government of Nepal, IUCN red book and the CITES Appendices are presented in the sections below.

#### a) Mammal

Of the reported species of mammal, 7 of the species are listed under the protection category of either government of Nepal or IUCN red list or under CITES Appendices. Of the recorded species 1 is listed under government of Nepal protection list, 4 under IUCN red list and all 5 under CITES Appendices. Table below presents the species and their protection category under various protection lists.

S.N	Local Name	Common Name	Scientific Name	Status			Sources		
				IUCN	CITES	GON	Site survey	Hearing survey	Literature survey
1	Jackal	Golden Jackal	<i>Canis aureus</i>		III			Hearing at Dashera, Salma, Karki gaon, and Jhapra VDCs	
2	Nyauri Muso	Common mongoose	<i>Herpetes edwardsi</i>		III	P		Hearing at Dashera, Salma, Karki gaon, and Jhapra VDCs	
3	Hyauso Bagh	Hyena	<i>Hyena hyena</i>	NT				Hearing at Dashera, Salma, Karki gaon, and Jhapra VDCs	
4	Pakha Ot	Common otter	<i>Lutra lutra</i>	NT	I			Hearing at Dashera, Salma, Karki gaon, and Jhapra VDCs	
5	Pani Ot	Smooth coated otter	<i>Lutra perspicillata</i>	VU				Hearing at Dashera, Salma, Karki gaon, and Jhapra VDCs	
6	Ghoral	Goral	<i>Naemorhed goral</i>	NT	I			Hearing at Dashera, Salma, Karki gaon, and Jhapra VDCs	

S.N .	Local Name	Common Name	Scientific Name	Status			Sources		
				IUCN	CITES	GON	Site survey	Hearing survey	Literature survey
7	Fyauuro	Bengal fox	<i>Vulpus bengalensis</i>		III			Hearing at Dasher, Salma, Karki gaon, and Jhapra VDCs	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## b) Birds

Of the recorded avian species 2 are listed under the protection category of government of Nepal and in the CITES Appendices. Table below presents the details of the protected species and the protection category as per the government of Nepal and CITES Appendices.

S. N.	Local Name	Common Name	Scientific Name	Status			Sources		
				IUCN	CITES	GON	Site survey	Hearing survey	Literature survey
1	Kaliz	Chir pheasant	<i>Catreus wallichii</i>		I	P		Hearing at Dasher, Salma, Karki gaon, and Jhapra VDCs	
2	Seto Gidha	Egyptian vulture	<i>Neophron Percnopt erus</i>	EN				Hearing at Dasher,	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

**c) Herpetofauna**

Four of the herpetofauna species out of the recorded species are listed as protection category species of CITES Appendixes. Table below presents the details of the protection category under various protection lists.

S.N.	Local Name	Common Name	Scientific Name	Status			Sources		
				IUCN	CITES	GON	Site survey	Hearing survey	Literature survey
1	Pani Sapo		<i>Atritium sesistosum</i>		III		Confirmed at site		
2	Supi Sapo	Common Cobra	<i>Naja naja</i>		II			Hearing at Dashera	
3	Gohoro	Monitor lizard	<i>Varanus sps</i>		II			Hearing at Dashera, Salma, Karki gaon, and Jhapra VDCs	
4	Chichindopapi Sapo		<i>Xenochrophis sps</i>		III			Hearing at Dashera, Salma, Karki gaon, and Jhapra VDCs	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## 5 FISHERY STUDY

There is scanty information in the fish diversity, fishermen, fish market, and cost of fish in the candidate project site at the central and district level offices. To fill the data gap fish related information was gathered from the field surveys using a checklist. The fish survey is based on the participatory method and key informant survey methods along the influence area of the candidate project. The findings of the field survey are presented in the sections below.

### 5.1 Fishermen and their Occupational / Social / Economic Status and Fish Market, Availability and Cost

Participatory and key informant interviews reported nearly 23 occupational and 2 part time fishermen in the limits of the reservoir area. Majority of the fishermen belong to Badi ethnic minority group with a low social and economic status among the other communities.

About 50% of the fish caught by the fishermen is sold in the fish market, while rest is consumed by the fishermen family. There are altogether 3 fish markets in the nearby areas. Every day about 5 to 20 kg of fish is sold in each of the fish markets. Average cost of the fish in the market varies between 200 rupees.

Table below presents the details of information on the fishermen, their fishing status, economic and social status, fish market and availability of fish in the fish market and the average cost of the fish in the different parts of the reservoir area of the candidate project.

#### Chera Khola

a) Village/Tole: Managhat, Sirpachour & Sirseni-3, Karkigao  
Name of the respondent: PREM BDR KHATRI

Date: 30/03/2069 B.S.  
Age: 31

#### **Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						5
Fishing Type	occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	5	Chandara			All	Chheri
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	chandara	Chhetri	-	Badi	Chhetri	-

Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs

Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell

#### **Fish Market, Fish Availability and Cost**

Name of the Market/s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Khara Jyula Bazar	yes	5	200 Fresh, 800 Dried
Managhat Bazar	Yes	20	200 Fresh, 800 Dried

- NOTE**
- Among 5 fishermen 3 are from Sirpachour and 2 are from Managhat of the Karkigao VDC.
  - Mostly they sell fish at Managhat Bazar but some time they sell at Kahra Jyula Bazar also.
  - The fishermen of Sirpachour are fishing since 20 years ago (Aaite Chundara, fisherman Sirpachour)
  - They have mostly big family member even nuclear family structure rather having low economic condition.  
Aaite Chundara- 12 members  
Nare Chundara - 7 members etc.
  - The land for these fishermen is provided by the NIPANE HARIYALI Co.Fo. Karkigao-3.

**b) Village/Tole: Badaban-8, Dasera**  
**Name of the respondent: TULE SARKI**  
**Fishermen**

**Date: 30/03/2069 B.S.**  
**Age: 42**

Presence of fisherman in the village						Yes
If yes no. of fishermen						4
Fishing Type	occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	4	1 Chandara 2 Badi 1 Sarki			All	Chheri
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Chandara Badi Sarki	-	-	Chandara Badi Sarki	-	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs  
 Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Thalah Bazar	Yes	20	200-250 Fresh, 800 Dry

**c) Village/Tole: Dhungila & Fumna, V.D.C. Jhapra**  
**Name of the respondent: JAY BDR SHAHI**

**Date: 31/03/2069 B.S.**  
**Age: 35 Occupation: Teaching**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						12
Fishing Type	occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	12	Badi	-	-	-	-
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Badi	-	-	Badi	-	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs  
 Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Thalah Bazar	Yes	20	200-250 Fresh, 800 Dry

**NOTE:**

- Fisherman never they get chance to sell dry fish because they have to sell daily for hand to mouth problem.
- Among 12 fishermen 9 from fumna and remaining are from Dhungila of the Jhapra V.D.C.
- There is no occupational fisherman from Thalaha Bazar but as part time all villagers they visit to fishing with fishing net.
- Maya Badi, Kaite Badi, Dabale Badi, Chane Badi, Debe Badi Nilo Badi, Chandre Badi, Tilak Badi and Parte Badi are from Jhapra, Fumna village.
- These Badi are almost totally depends up on fishing except in shrawan and vadra they also works for fair in field because of heavy flood that makes difficulty for fishing.

**Salma khola**

**a) Village / Tole: Gaujeni-2, Dashera**  
**Name of the respondent: NAR BDR KHADGA**

**Date: 28/03/2069 B.S.**  
**Age: 31**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						4
Fishing Type	occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	2	Badi	2	Chhetri	-	-
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Badi	Chhetri	-	Badi	Chhetri	-

Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs

Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Khara Jyula Bazaar	yes	5	200 Fresh, 800 Dried

**5.2 Fishing Season, Fish Catch, and Use of Caught Fish**

Fishing in the river is carried out during the pre-monsoon and post monsoon seasons. Normally in the cold winter months (December - February) and monsoon months (June - September) fishing by the local fishermen is a rare activity. On an average daily catch of the fish by the occupational fishermen ranges between 2 kg with a maximum of 3 kg. Nearly 50% of the fish caught is sold in the nearby fish market. On an average the occupational and part time fishermen earn about 15000 rupees annually. According to the local fishermen the fish population in the candidate project sites is declining over the years due to illegal fishing practices.

The tables below present the details of the fishing season, fish catch, types of fish available, annual income of the fishermen etc. based on the key informant survey in different location of the candidate project sites.

**a) Location: Reservoir area**  
**Name of the fisherman: NARE CHUNDARA** **Age: 39**  
**Family: 2 parents, 4 children**

**Date: 29/03/2069 B.S.**  
**Address: Sirpachour-3, Karkigao**

Fishing detail	Fishing season:	All seasons but Shrawan and Vadra (July – Sep) is difficult			
	Fishing days/week:	7 days / week			
	Maximum catch/day:	3 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	2 kg			
using way	All consumed	At home	-	Average cost	Income last year
		In market	2 kg	Rs.200/kg	20000 to 30000

**Name of stream: Chera Khola**

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Masino ( <i>Schizothorax progastus</i> ), Kharcho ( <i>Barilius bendelisis</i> ), Buduno,Sahar, kathe, Panpa, Dhami	Buduno, Kharcho	*		
		Due to increment of the amateur fishermen		

b) **Location:** in the Reservoir

**Date:** 28/03/2069 B.S.

**Name of the fisherman:** Jaya Bdr Thapa

**Age:** 26

**Address:** Dashera-2

<b>Fishing detail</b>	Fishing season:	Except Mansir and Poush because of too cold			
	Fishing days/week:	4-5 days / week			
	Maximum catch/day:	3 kg			
	Minimum catch/day:	0 kg			
	Average catch/day:	1 kg			
<b>using way</b>	All consumed	At home	All	Average cost	Income last year
		In market	N/A	-	-

**Name of stream:** Salma Khola

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Masino ( <i>Schizothorax progastus</i> ), Kharcho ( <i>Barilius bendelisis</i> ), Buduno ( <i>psilorynchus psudecheneis</i> ), Panpa ( <i>Acrossocheilus hexagonolepis</i> ), Dhami ( <i>Glyptothorax alaknandi</i> )	Buduno ( <i>Psilorynchus psudecheneis</i> ) Kharcho ( <i>Barilius bendelisis</i> )	* Fisherman number has increased and due to use of poison for fishing		

### 5.3 Fish Diversity

A total of 11 fish species is reported by the local fishermen during the key informant survey. The lists of the fish species reported in the candidate project site is presented in the table below.

S.N.	Local Name	Common Name	Scientific Name
1	Panpa	Copper Mahaseer	<i>Acrossocheilus hexagonolepis</i>
2	Tatya		<i>Barilius barna</i>
3	Kharcho		<i>Barilius bendelisis</i>
4	Baghi		<i>Botia lohachata</i>
5	Dhami		<i>Glyptothorax alaknandi</i>
6	Naoor		<i>Lebio dero</i>
7	Rim		<i>Mastacembalus armatus/puncatus</i>
8	Buduno	Stone Carp	<i>Psilorynchus psudecheneis</i>
9	Chepto		<i>Puntius ticto</i>
10	Masino	Point nosed snow trout	<i>Schizothorax progastus</i>
11	Sahar		<i>Tor tor</i>

### 5.4 List of Fish Species of Conservation Significance

Of the 11 reported fish species 2 of the fish species are listed in the IUCN red list. Table below presents the list of the fish species of conservation significance.

S.N.	Local Name	Common Name	Scientific Name	Status			Sources		
				IUCN	CITES	GON	Site survey	Hearing survey	Literature survey
1	Panpa	Copper Mahaseer	Acrossocheilu / Neolissochilus hexagonolepis	NT				Hearing at Karkigaon, Dashera,	
2	Sahar		Tor tor	NT				Hearing at Karkigaon, Dashera,	

**IUCN Red List Categories:** *Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)*

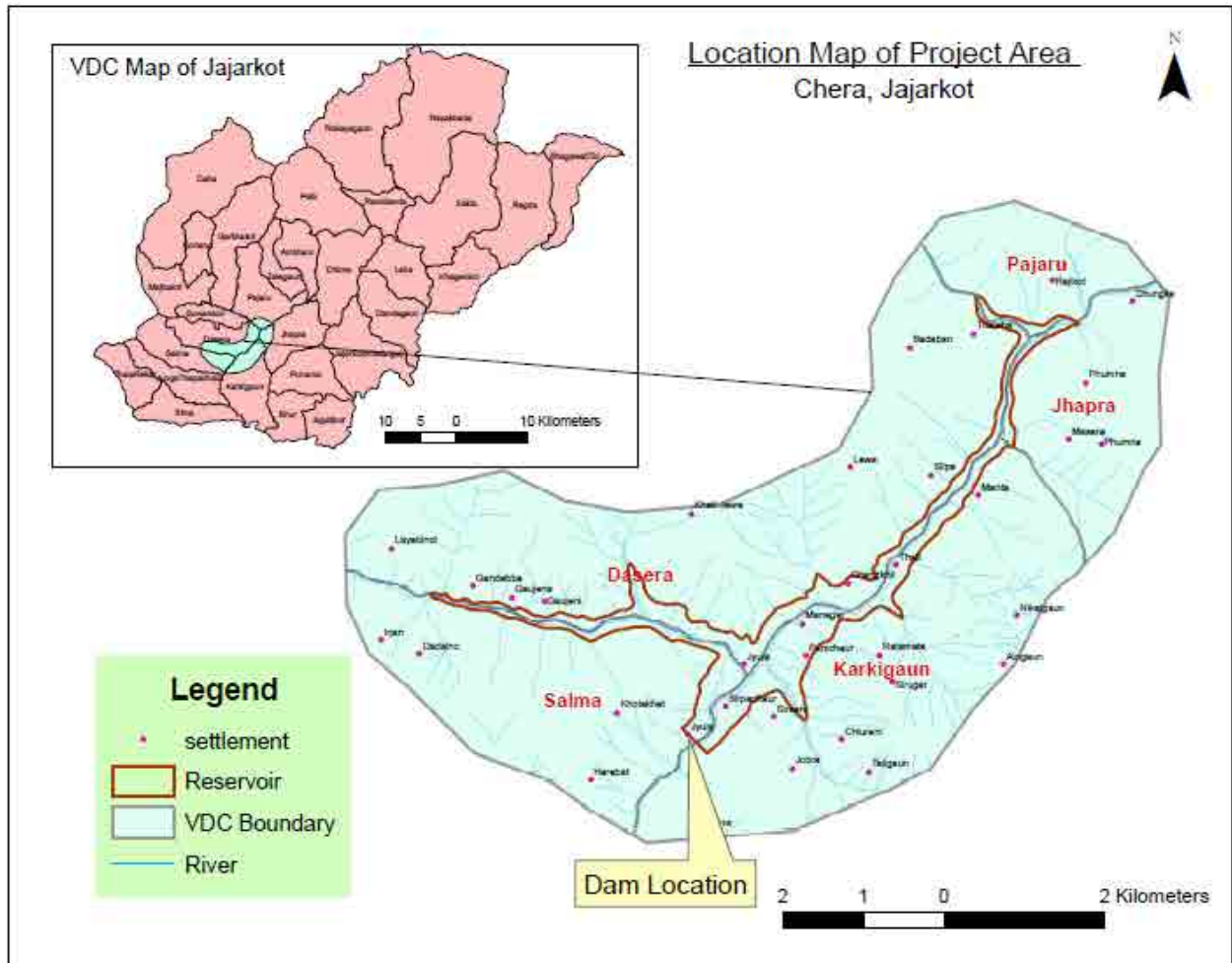
**GOV Categories:** *P Protected by legislation*

**CITES Categories:** *I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)*



## 6 Topographic Map and Satellite Imagery Study

### 6.1 Project Location



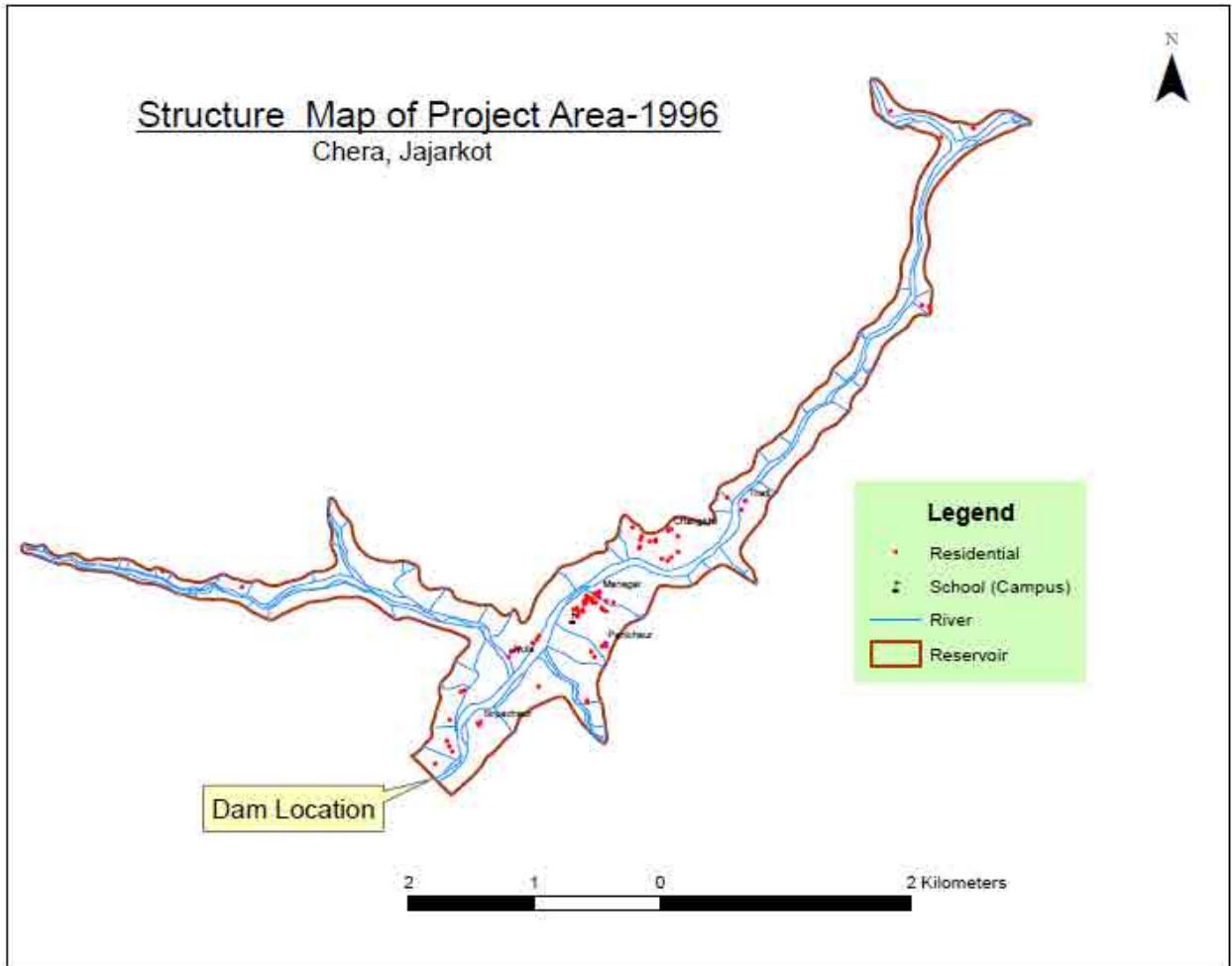
### 6.2 Topographic Maps

For this study, topographical maps of the scale of 1:25000 prepared by the Government of Nepal, Survey Department (1996) has been used for the analysis of land cover, and built structures, after digitizing. All data used for the topographic map study were projected to the Universal Transverse Mercator (UTM) projection system that is World Geodetic System 1984 for the analysis of topographic maps.

The analysis results are presented in the table and maps below.

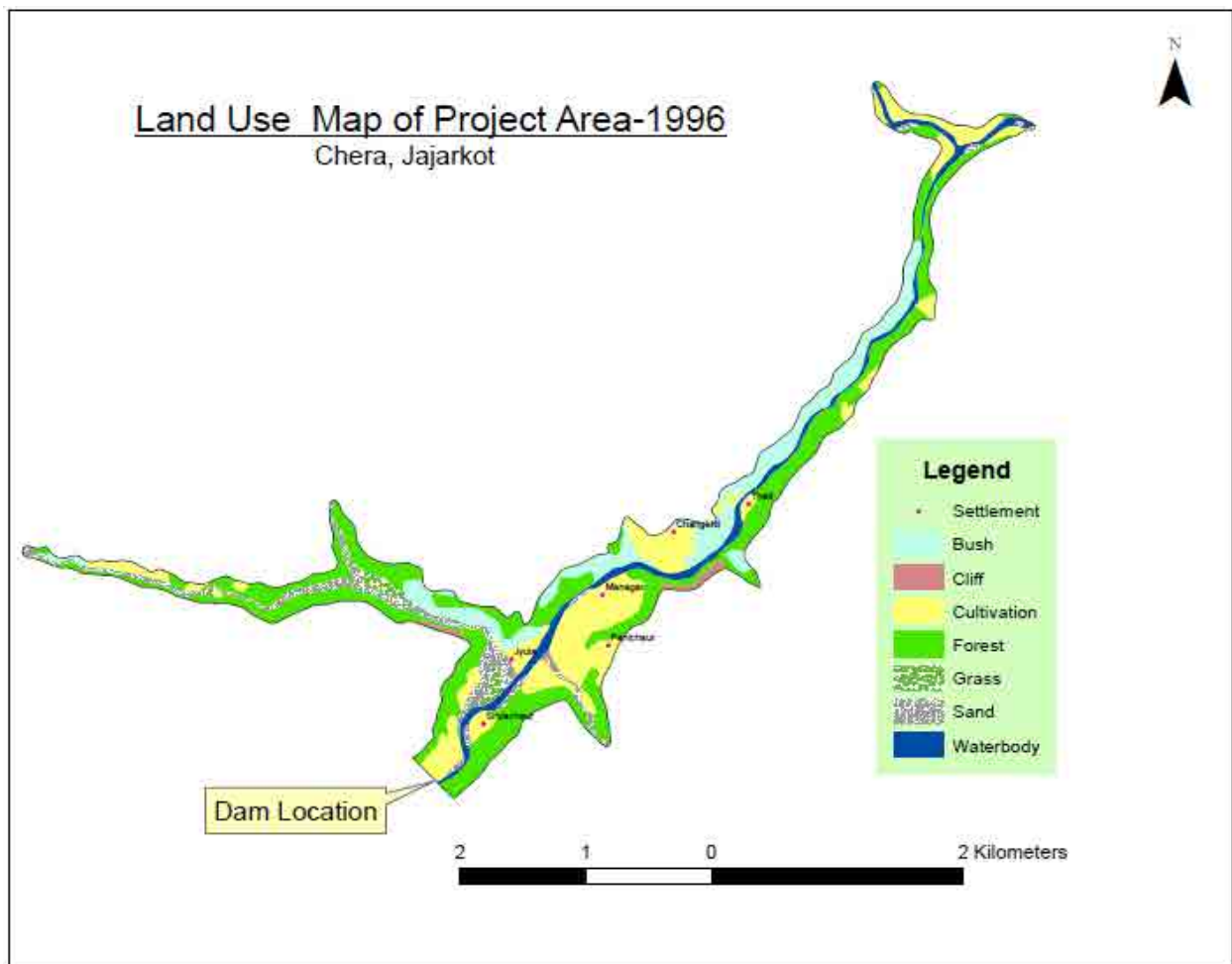
### 6.2.1 Built Structures

Nos. of building as per the Topographic maps	76
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### 6.2.2 Land Use

S.N.	Land Use Class	Land Use Topographic Maps (1996), Km <sup>2</sup>	Percentage
1	BUSH	0.617123	15.4
2	CLIFF	0.030599	0.8
3	CULTIVATION	0.97389	24.3
4	FOREST	1.575672	39.3
5	GRASS	0.066509	1.7
6	SAND	0.371147	9.2
7	WATER	0.374855	9.3
8	BARREN LAND		
	<b>TOTAL</b>	<b>4.01</b>	<b>100</b>



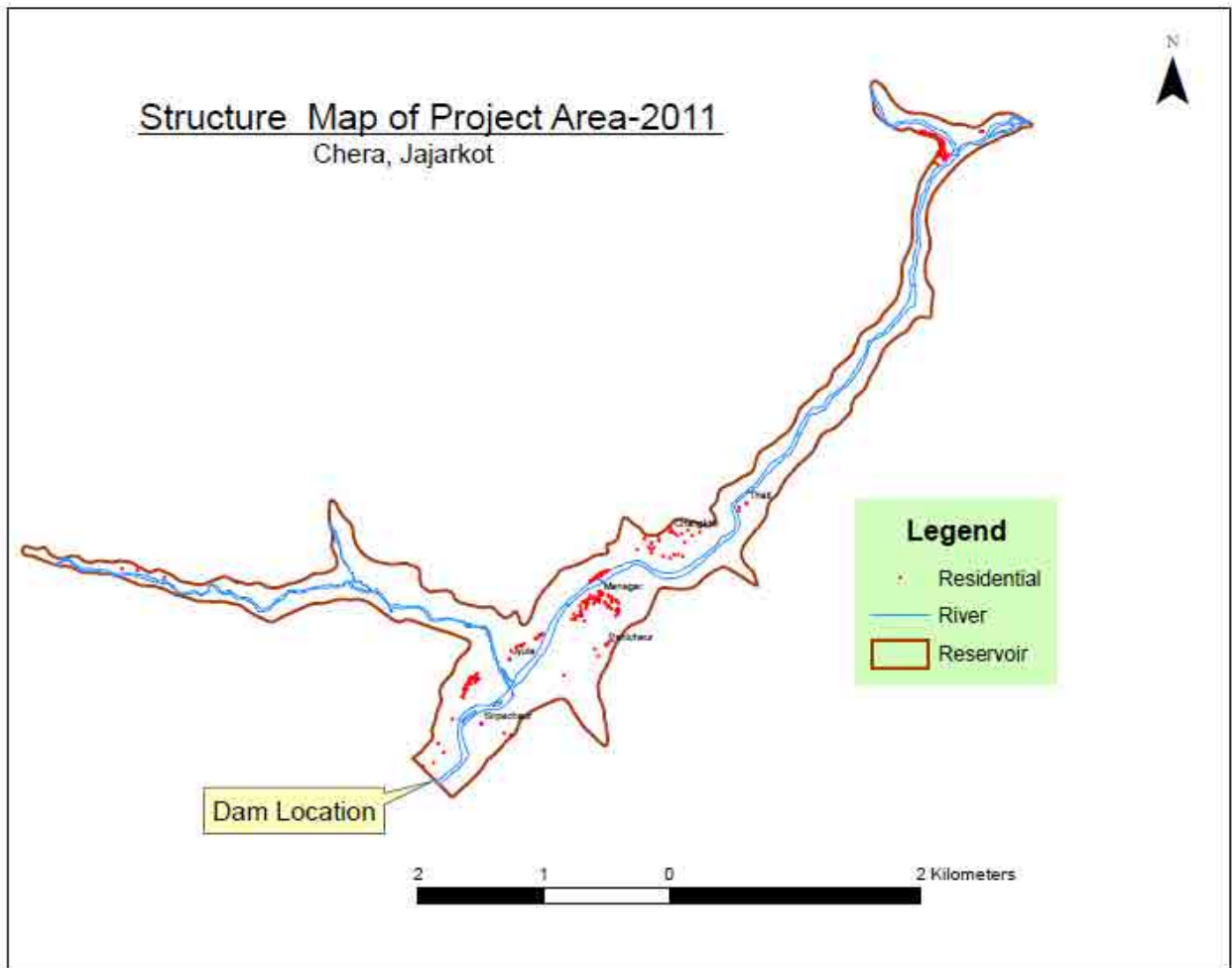
### 6.3 Satellite Image Maps

The Arc GIS 9.3 has been used for the analysis of image. World view 2 satellite image of 2011 has been used for the land use and other parameters such as built structures, road networks, bridges etc. analysis of the area.

The analysis results are presented in tables and Map below.

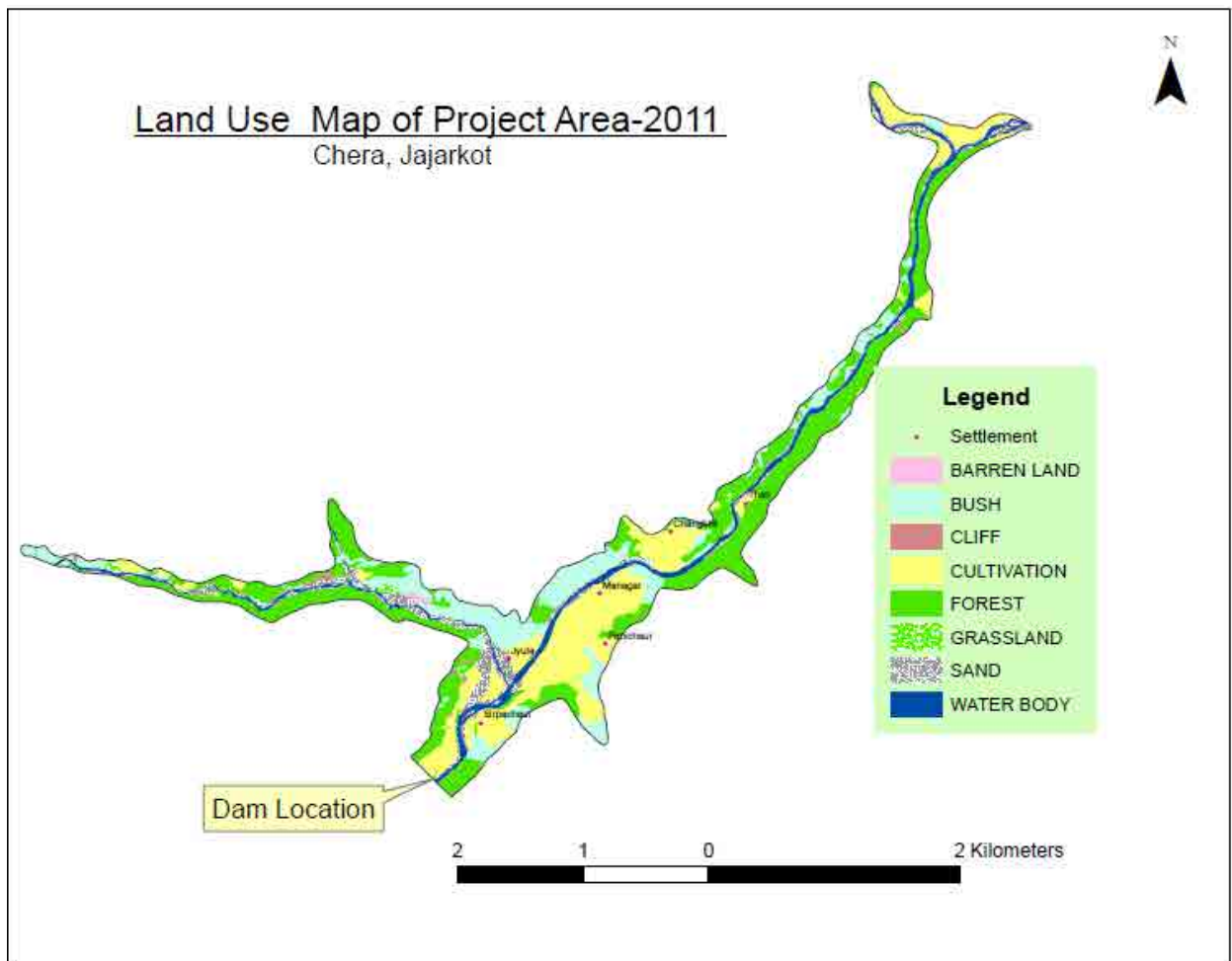
### 6.3.1 Building Structures

Nos. of building as per the Satellite Image	224
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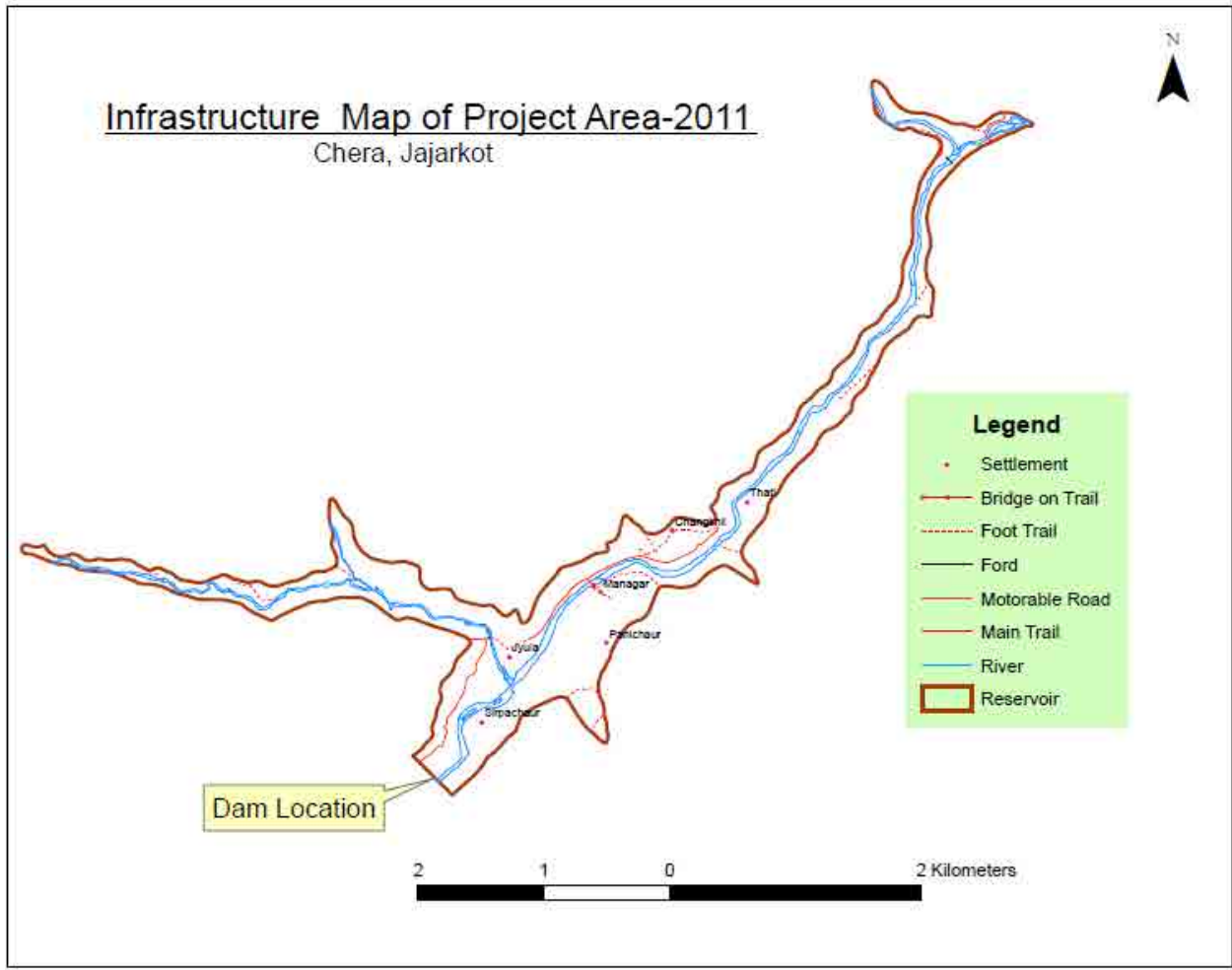
### 6.3.2 Land use

S.N.	Land Use Class	Land Use Satellite Image (2011), Km <sup>2</sup>	Percentage
1	BUSH	0.715238	17.8
2	CLIFF	0.021803	0.5
3	CULTIVATION	1.076789	26.9
4	FOREST	1.457872	36.4
5	GRASS	0.023862	0.6
6	SAND	0.354741	8.8
7	WATER	0.358449	8.9
8	BARREN LAND	0.010731	0.3
	<b>TOTAL</b>	<b>4.01</b>	<b>100</b>



### 6.3.3 Infrastructures

Infrastructures	Nos. / Length
Total Nos. of bridge on motorable road	0
Total Nos. of bridge on trail	1
Total Nos. of fords	2
Gravel road (m)	3758
Paved road (highway) (m)	0
Main trail (m)	255
Foot path (m)	4583



## References

1. Bibhuti Ranjan Jha, 2006; *Fish Ecological Studies and its application in assessing Ecological Integrity of Rivers in Nepal*; Thesis Submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in The Department of Biological Sciences and Environmental Science, School of Science, Kathmandu University, Dhulikhel, Nepal, January 2006
2. CBS (2002), *Population Census 2001, National Report*, Kathmandu: Central Bureau of Statistics / UNFPA
3. CBS, 2012; *National Population and Housing Census 2011 (Village Development Committee / Municipalities)*, Government of Nepal, National Planning Commission Secretariate, Central Bureau of Statistics, Kathmandu, Nepal, November 2012.
4. Disaster Preparedness Network, Nepal, 2009; *Nepal Disaster Report: The hazardscape and vulnerabilities*, Ministry of Home Affairs, Nepal Disaster Preparedness Network, Nepal with support from with support from European Commission for Humanitarian Aid Department, United Nations Development Nepal and Oxfam Nepal
5. IUCN, 2011; *The Status of Nepal's Mammals: The National Red List Series*
6. NARMSAP, 2002; *Forest and Vegetation Types of Nepal*, TISC Document Series No 105, GoN / MOFSC / NARMSAP, 1-179.
7. Petr, T, 2002; *Cold water fish and fisheries in countries of the high mountain arc of Asia (Hindu Kush-Pamir-Karakoram-Himalayas) A review*, Symposium on coldwater fish species in the trans-Himalayan region. 10-14 July 2001, Kathmandu, Nepal
8. Rajbansi K.J, 1982; *A General Bibliography on Fish and Fisheries of Nepal*, Royal Nepal Academy, Kamaladi, Kathmandu, Nepal.
9. Rajbansi K.J, 2002; *Zoogeographical distribution and the status of cold water fishes of Nepal*. Paper presented in symposium on coldwater fish species in the trans-himalayan region. 10-14 July 2001, Kathmandu, Nepal
10. Shrestha et.al, 2012; *Fishes of Nepal: Mapping distributions based on voucher specimens*, Emporia State Research Studies Vol. 48, no. 2, p. 14-21 (2012)
11. Shrestha, J. (1995); *Enumeration of the Fishes of Nepal*, Bio-diversity Profiles Project, Publication No. 10, Department of National Parks and wildlife Conservation, Ministry of Forest & Soil Conservation, GoN, Kathmandu, Nepal.
12. Shrestha, T. K., 2008; *Icology of Nepal A study of Fishes of the Himalayan Waters*
13. Stainton, J.D.A., 1972; *Forests of Nepal*, John Murray, London.

## Photographs



Cremation ghat at bank of Chera khola



Children carrying logs for firewood



Fisherman fishing at Chera khola



Meeting with people at thala bazar



womens carrying fodder at Khara



Women collecting drinking water from spring



Water mill at bank of Salma khola



Neeting fish net sirpachour



# Appendixes

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**Appendix 1: VDCS and Settlements and Population under the Storage Project, Jajarkot**

S.N.	VDC	Settlement	Ward No.	Households	Population
1	Dashera	Jyula (Managhat)	7	80	495
2		Gaujeni	2	3	26
3		Jewa	5	17	120
4		Silpa	7	5	33
5		Chankhila	7	32	182
6		Rakhya	8 and 9	6	45
7		Thalaha Bazar	8	120	795
8		Baseni	7	1	19
9	Karkigaun	Manta	4	11	70
10		Chimchime (Thati)	7	2	13
11		Managhat	3	105	550
12		Sirpachaur	3	8	60
13		Jobra	3	16	98
14		Sirseni	3	22	136
15	Jhapra	Dhungila	1	51	533
16	Jhapra	Phumna	1 and 2	28	183
17	Salma	Jyula (Khara)	5	44	221
18		Kholakhet	5	1	9
19	Pajaru	Challopole	3 and 4	14	72
	<b>Total</b>	<b>19</b>	<b>13</b>	<b>566</b>	<b>3660</b>

Source: NESS Field Survey, 2012

**Appendix 2: Ethnic Composition of the Reservoir Area**

VDC	Settlement	Brahmin	Chhetri	Thakuri	Magar (Disadvantage Janjati)	Dalit
Dashera	Jyula (Managhat)	5	70	0	0	5
	Gaujeni	0	3	0	0	0
	Jewa	0	14	0	0	3
	Silpa	0	3	2	0	0
	Chankhila	15	12	0	0	5
	Rakhya	1	2	3	0	0
	Thalaha Bazar	5	55	40	5	15
	Baseni	0	0	1	0	0
Karkigaun	Manta	0	11	0	0	0
	Chimchime (Thati)	0	2	0	0	0
	Managhat	0	65	0	0	40
	Sirpachaur	0	0	0	0	8
	Jobra	0	16	0	0	0
	Sirseni	0	20	0	0	2
Jhapra	Dhungila	2	44	3	0	2
	Phumna	0	19	1	0	8
Salma	Jyula (Khara)	2	34	0	0	8
	Kholakhet	0	1	0	0	0
Pajaru	Challopole	0	13	0	0	1
<b>Total</b>		<b>30</b>	<b>384</b>	<b>50</b>	<b>5</b>	<b>97</b>
%		<b>5.30</b>	<b>67.84</b>	<b>8.83</b>	<b>0.88</b>	<b>17.14</b>

Source: NESS Field Survey, 2012

**Appendix 3: Land Use Pattern of the Reservoir Area**

VDC	Settlement	Ward No.	Land Use				Total
			Agriculture	Pasture	Forest	other	
Dashera	Jyula (Managhat)	7	60	0	0	0	60
	Gaujeni	2	12	0	0	4	16
	Jewa	5	22	0	0	0	22
	Silpa	7	35	200	0	0	235
	Chankhila	7	52	0	0	0	52
	Rakhya	8 and 9	35	0	0	0	35
	Thalaha Bazar	8	10	0	0	10	20
	Baseni	7	3	0	0	0	3
	Karkigaun	Manta	4	21	0	0	0
Chimchime (Thati)		7	8	0	0	0	8
Managhat		3	328	0	0	0	328
Sirpachaur		3	22	0	0	15	37
Jobra		3	40	0	0	0	40
Sirseni		3	64	0	0	0	64
Jhapra	Dhungila	1	250	0	0	15	265
	Phumna	1 and 2	52	0	0	0	52
Salma	Jyula (Khara)	5	85	0	0	5	90
Salma	Kholakhet	5	20	0	0	0	20
Pajaru	Challopole	3 and 4	7	0	0	0	7
<b>Total</b>	19		<b>1126</b>	<b>200</b>	<b>0</b>	<b>49</b>	<b>1375</b>
<b>%</b>			<b>81.89</b>	<b>14.55</b>	<b>0</b>	<b>3.56</b>	100

Source: NESS Field Survey, 2012

**Appendix 4: Land Use Pattern of the Reservoir Area**

VDC	Settlement	Ward No.	Types of Agricultural/Productive Land			Total
			Khet	Bari	Others	
Dashera	Jyula (Managhat)	7	60	0	0	60
	Gaujeni	2	0	12	4	16
	Jewa	5	0	22	0	22
	Silpa	7	35	0	0	35
	Chankhila	7	40	12	0	52
	Rakhya	8 and 9	35	0	0	35
	Thalaha Bazar	8	0	10	10	20
	Baseni	7	0	3	0	3
	Karkigaun	Manta	4	0	21	0
Chimchime (Thati)		7	6	2	0	8
Managhat		3	250	78	0	328
Sirpachaur		3	15	7	0	22
Jobra		3	30	10	0	40
Sirseni		3	0	64	0	64
Jhapra	Dhungila	1	200	50	0	250
	Phumna	1 and 2	52	0	0	52
Salma	Jyula (Khara)	5	50	35	0	85
	Kholakhet	5	15	5	0	20
Pajaru	Challopole	3 and 4	3	4	0	7
<b>Total</b>	19		<b>791</b>	<b>335</b>	<b>14</b>	1140
<b>%</b>			<b>69.39</b>	<b>29.39</b>	<b>1.23</b>	<b>100.00</b>

Source: NESS Field Survey, 2012

**Appendix 5: Area (ropani) and Production (Kg) under different crops of the Reservoir Area**

VDC / Settlement	Paddy		Maize		Millet		Wheat		Potato		Pulse		Oilseeds		Vegetable	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Dashera / Juyla (Managhat)	60	10000	60	7560	0	0	60	7560	15	300	0	0	0	0	0	0
Gaujeni	0	0	12	1260	0	0	0	0	4	20	0	0	0	0	1	20
Jewa	0	0	22	945	0	0	10	630	1	50	0	0	0	0	1.5	25
Silpa	35	2000	10	630	0	0	10	378	0	0	0	0	0	0	2	30
Chankila	52	3250	12	945	0	0	52	3276	0	0	0	0	0	0	0	0
Rakhaya	35	2000	0	0	0	0	10	630	0	0	0	0	0	0	0	0
Thalaha bazar	0	0	10	756	0	0	10	630	4	20	0	0	0	0	2	20
Baseni	0	0	3	189	0	0	0	0	0	0	0	0	0	0	0	0
Karkigaun / Manta	0	0	21	1323	0	0	0	0	0	0	0	0	0	0	0	0
Chimchime	6	400	2	126	0	0	0	0	0	0	0	0	0	0	0	0
Managhat	328	32500	328	31500	0	0	328	15750	100	500	0	0	0	0	105	550
Sirpachaur	22	1800	22	1575	0	0	22	1764	8	24	0	0	0	0	8	40
Jobra	30	3250	40	2520	0	0	30	1890	10	20	0	0	0	0	4	50
Sirseni	0	0	64	5670	0	0	64	4032	10	50	0	0	0	0	10	55
Jhapra / Dhungila	200	15000	50	4410	0	0	200	15750	0	0	0	0	50	3000	0	0
phumna	52	2500	0	0	0	0	52	1890	0	0	0	0	0	0	0	0
Salma / Jyula (Khara)	50	6000	85	6300	0	0	50	3780	10	100	0	0	0	0	10	200
Kholakhet	20	1500	10	945	0	0	20	945	0	0	0	0	0	0	0	0
Pajaru / Challopole	3	200	4	252	0	0	3	126	0	0	0	0	0	0	0	0
<b>Total</b>	<b>893</b>	<b>80400</b>	<b>755</b>	<b>66906</b>	<b>0</b>	<b>0</b>	<b>921</b>	<b>59031</b>	<b>162</b>	<b>1084</b>	<b>0</b>	<b>0</b>	<b>50</b>	<b>3000</b>	<b>143.5</b>	<b>990</b>
<b>Cropping Intensity 256.49%</b>																

Source: NESS Field Survey, 2012

**Appendix 6: Occupation by Settlement of the Reservoir Area**

VDC	Settlement	Types of Occupation and Population Engaged				
		Agriculture	Service	Wage labor	Foreign employment	Business
Dashera	Jyula (Managhat)	60	0	40	0	160
	Gaujeni	10	0	0	0	0
	Jewa	35	1	15	0	0
	Silpa	10	0	5	0	0
	Chankhila	70	2	8	0	0
	Rakhya	16	0	2	0	0
	Thalaha Bazar	16	3	15	0	120
	Baseni	4	0	0	0	0
	Karkigaun	Manta	20	0	10	0
Chimchime (Thati)		10	0	0	0	0
Managhat		250	2	8	3	0
Sirpachaur		38	0	8	0	0
Jobra		30	1	0	0	0
Sirseni		44	1	0	0	0
Jhapra	Dhungila	150	6	20	0	0
	Phumna	80	1	4	0	0
Salma	Jyula (Khara)	95	3	7	0	0
	Kholakhet	5	0	0	0	0
Pajaru	Challopole	32	0	3	0	0
<b>Total</b>		<b>975</b>	<b>20</b>	<b>145</b>	<b>3</b>	<b>280</b>
<b>%</b>	<b>19</b>	<b>68.52</b>	<b>1.41</b>	<b>10.19</b>	<b>0.21</b>	<b>19.68</b>

Source: NESS Field Survey, 2012

**Appendix 7: House Types by Settlement of the Reservoir Area**

VDC	Settlement	Number of Houses by Types	
		Kacchi	Pakki
Dashera	Jyula (Managhat)	10	70
	Gaujeni	0	3
	Jewa	9	8
	Silpa	2	3
	Chankhila	0	32
	Rakhya	4	2
	Thalaha Bazar	75	45
	Baseni	1	0
	Karkigaun	Manta	11
Chimchime (Thati)		0	2
Managhat		0	105
Sirpachaur		2	6
Jobra		10	6
Sirseni		0	22
Jhapra	Dhungila	16	35
	Phumna	5	23
Salma	Jyula (Khara)	16	28
	Kholakhet	0	1
Pajaru	Challopole	4	10
<b>Total</b>	<b>19</b>	<b>165</b>	<b>401</b>
<b>%</b>		<b>29.15</b>	<b>70.85</b>

Source: NESS Field Survey, 2012

**Appendix 8: Road and Suspension Bridge**

S.N.	VDC	Settlement	Road Detail			Bridges	
			Type	Length	Name of road	Type	Name
1	Dashera	Jyula (managhat)	graveled earthen	1.7 km	Chera dhungil road		
2		Gaujani	0	0	0		
3		Jewa					
4		Silpa	0	0			
5		Chankhila					
6		Rakhya	0	0			
7		Thalaha Bazar	0	0			
8		Baseni					
9	Karkigaun	Manta	0				
10		Chimchime(Thati)	0				
11		Managhat				Suspension	Managhat pool
12		Sirpachaur					
13		Jobra					
14		Sirseni	0	0			
15	Jhapra	Dhungila	0				
16		Phumna	0				
17	Salma	Jyula (Khara)	1	2 km	Chera road		
18		Kholakhet	0				
19	Pajaru	Challopole	0				
	<b>Total</b>	<b>19</b>		<b>3.7 km</b>		<b>1</b>	<b>1</b>

Source: NESS Field Survey, 2012

**Appendix 9: Status of Community Forestry in Reservoir Area**

VDC	Settlement	Community Forestry	
		Number	Name
Dashera	Jyula (Managhat)	1	Okhale Omrai CF
	Gaujani	1	Sagine Gaire Galmade CF
	Jewa	1	Sagine Gaire Galmade CF
	Silpa	0	
	Chankhila	1	Ogne Amrapakha CF
	Rakhya	0	
	Thalaha Bazar	1	Kada Halna CF
	Baseni	0	
Karkigaun	Manta	2	Mulpani CF and Kajureni CF
	Chimchime (Thati)	1	Kajureni CF
	Managhat	1	Nepali Hariyali CF
	Sirpachaur	1	Nepali Hariyali CF
	Jobra	1	Nepali Hariyali CF
	Sirseni	1	Nepali Hariyali CF
Jhapra	Dhungila	1	Gogane CF
	Phumna	1	Gogane CF
Salma	Jyula (Khara)	1	Korila CF
	Kholakhet	1	Pandher Khola CF
Pajaru	Challopole	1	Syakkudanda CF
<b>Total</b>	<b>19</b>	<b>17</b>	<b>17</b>

Source: NESS Field Survey, 2012

**Appendix 10: Cultural Sites and Festivals**

VDC	Settlement	Festivals and Sites		
		Main festival	Religious site at the river	Cremation Ghat
Dashera	Jyula (Managhat)	Hindu culture	No such site	Managhat
	Gaujeni	Hindu culture	No such site	Managhat and Pipaltada
	Jewa	Hindu culture	No such site	Managhat and Pipaltada
	Silpa	Hindu culture	Thalaha, Managhat (Ekadashi Mela)	Managhat and Thalaghat
	Chankhila	Hindu culture	Managhat (Ekadashi Mela)	Managhat
	Rakhya	Hindu culture	Shiva Mandir	Thalaha Ghat
	Thalaha Bazar	Hindu culture	Shiva Mandir at Thalaha Mandir	Thalaha Ghat
	Baseni	Hindu culture	No such site	Thalaha Ghat
Karkigaun	Manta	Hindu culture	No such site	Thalaha Ghat
	Chimchime (Thati)	Hindu culture	No such site	
	Managhat	Hindu culture	Managhat (Ekadashi Mela)	Managhat
	Sirpachaur	Hindu culture	Managhat (Ekadashi Mela)	Managhat
	Jobra	Hindu culture	Managhat (Ekadashi Mela)	Managhat
	Sirseni	Hindu culture	Managhat (Ekadashi Mela)	Managhat
Jhapra	Dhungila	Hindu culture	Puni Parba at Tribeni, Bhumi Tihar at Upper Dhungila	Thalaha Ghat, Lumtikhola Ghat
	Phumna	Hindu culture	Thalahaghat (Shiva Ratri Mela)	Thalaha Ghat
Salma	Jyula (Khara)	Hindu culture	Managhat (Ekadashi Mela)	Managhat
	Kholakhet	Hindu culture	No such site	
Pajaru	Challopole	Hindu culture	Thalaha Ghat (Shiva Ratri Mela)	Thalaghat

Source: NESS Field Survey, 2012

**Appendix 11: Community Perception on the Project**

VDC	Settlement	Positive impact	Negative impact
Dashera	Jyula (Managhat)	Development Activities	Loss of land
	Gaujeni	Available of electricity	Flood and landslide
	Jewa	Infrastructure development	Difficulties in transportation from one place to other
	Silpa	Infrastructure development	Submerge of house and land
	Chankhila	Development Activities	Rise of social disputes
	Rakhya	Development Activities	Submerge of house and land
	Thalaha Bazar	Infrastructure development, job opportunities	Rise of social disputes,
	Baseni	Development Activities	Loss of land
Karkigaun	Manta	Development Activities	Submerge of house and land
	Chimchime (Thati)	Development Activities	Submerge of house and land
	Managhat	Development activities, increase in public awareness	Increase in social conflict
	Sirpachaur	Development Activities	Social impacts
	Jobra	Development Activities	Social impacts
	Sirseni	Road accessibility	Social impacts
Jhapra	Dhungila	Development Activities	Social impacts
	Phumna	Development Activities	Social impacts
Salma	Jyula (Khara)	Development Activities	Social impacts
	Kholakhet	Development Activities	Social impacts
Pajaru	Challopole	Development Activities	Submerge of house and land

Source: NESS Field Survey, 2012

**Appendix 12: List of FGD Participants (CHERA KHOLA)  
District: Jajarkot**

S.N.	Name of Respondent	Address	Occupation
1	Bhagiram Jaisi	Dashera-7, Jyaula	Teacher
2	Prem Bdr. Adhikari	Dashera-7, Jyaula	Businessman
3	Jaya Bdr. Khatri	Dashera-7, Jyaula	Farmer
4	Khadka Bdr. Khatri	Dashera-7, Jyaula	Student
5	Aaite Adhikari	Dashera-7, Jyaula	Farmer
6	Nim Bdr. Adhikari	Dashera-7, Jyaula	Farmer
7	Prem . Sunar	Dashera-7, Jyaula	Farmer
8	Gita Buda	Dashera-2, Gaujeni	Agriculture
9	Mune Chudara	Dashera-3	Agriculture
10	Kale Thapa	Dashera-5	Agriculture
11	Setu Thapa	Dashera-5	Agriculture
12	Bhakta Bdr. Buda	Dashera-2, Gaujeni	Agriculture
13	Man Bdr. Buda	Dashera-2, Gaujeni	Agriculture
14	Sarpe Thapa	Dashera-5	Farmer
15	Jaya Lal Thapa	Dashera-5	Farmer
16	Prithvi Bdr. Thapa	Dashera-4	Farmer
17	Birsingh Chudara	Dashera-5	Farmer
18	Nar Bdr. Khadka	Dashera-1	Farmer
19	Nar Bdr. Sahi	Dashera-7, Silpa	Agriculture
20	Tilak Shahi	Dashera-7, Silpa	Agriculture
21	Karna Bdr. Rawat	Dashera-7, Silpa	Agriculture
22	Karna Bdr. Rawat	Dashera-7, Silpa	Agriculture
23	Ratna Bdr. Khadka	Dashera-7, Silpa	Agriculture
24	Laxmi Jaisi	Dashera-7, Chankhila	Farmer
25	Nayana Ram Jaisi	Dashera-7, Chankhila	Farmer
26	Dal Bdr. Buda	Dashera-7, Chankhila	Farmer
27	Tike Sarki	Dashera-7, Chankhila	Farmer
28	Laxman Mijar	Dashera-7, Chankhila	Farmer
29	Gorakh Bdr. Rawat	Dashera-8, Rakhya	Agriculture
30	Bahadur Rawat	Dashera-8, Rakhya	Agriculture
31	Hari Bdr. Shahi	Dashera-8, Banka	Agriculture
32	Krishna Pd. Upadhyaya	Dashera-8, Banka	Agriculture
33	Jayalal Shahi	Dashera-8, Banka	Agriculture
34	Gopal Shahi	Dashera-8, Banka	Agriculture
35	Jaya Bdr. Shahi	Dashera-8, Thalaha	Teacher
36	Bhima Khatri	Dashera-8, Thalaha	Teacher
37	Mahendra Bdr. Shahi	Dashera-8, Thalaha	Social worker
38	Man Bdr. Giri	Dashera-8, Thalaha	Teacher
39	Rudra Adhikari	Dashera-8, Thalaha	Teacher
40	Man Bdr. Shahi	Dashera-7, Baseri	Farmer
41	Junge Bdr. Giri	Dashera-7, Baseri	Farmer
42	Tule Sarki	Dashera-7, Baseri	Farmer
43	Top Bdr. Adhikari	Karkigaun-4, Manta	Agriculture
44	Nir Bdr. Oli	Karkigaun-4, Manta	Agriculture



S.N.	Name of Respondent	Address	Occupation
45	Dip Bdr. Oli	Karkigaun-4, Manta	Agriculture
46	Jaya Bdr. Adhikari	Karkigaun-4, Manta	Agriculture
47	Padam Bhddr. Adhikari	Karkigaun-4, Manta	Agriculture
48	Dole Khatri	Karkigaun-7, Chimchime	Farmer
49	Jul Bdr. .Adhikari	Karkigaun-4, Chimchime	Farmer
50	Nar Bdr. Adhikari	Karkigaun-4, Chimchime	Farmer
51	Prem Bdr. Khatri	Karkigaun-3, Managhat	Teacher
52	Bhim Bdr. Khatri	Karkigaun-3, Managhat	Farmer
53	Harka Bdr. Khatri	Karkigaun-3, Managhat	Farmer
54	Bir Bdr. Khatri	Karkigaun-3, Managhat	Farmer
55	Tek Bdr. Khatri	Karkigaun-3, Managhat	Farmer
56	Birbal Chadara	Karkigaun-3, Managhat	Farmer
57	Bhuban Jaisi	Karkigaun-3, Managhat	Farmer
58	Gauri Khatri	Karkigaun-3, Managhat	Farmer
59	Sarki Lohar	Karkigaun-3, Sirpachaur	Farmer
60	Sampate Lohar	Karkigaun-3, Sirpachaur	Farmer
61	Jaya Lohar	Karkigaun-3, Sirpachaur	Farmer
62	Aaite Chadara	Karkigaun-3, Sirpachaur	Farmer
63	Nar Bdr. Chadara	Karkigaun-3, Sirpachaur	Farmer
64	Hari Bdr. Mahatara	Karkigaun-3, Jobra	Student
65	Aaite Mahatara	Karkigaun-3, Jobra	Farmer
66	Tularam Mahatara	Karkigaun-3, Jobra	Farmer
67	Nar Bdr. Mahatara	Karkigaun-3, Jobra	Farmer
68	Maisara Mahatara	Karkigaun-3, Jobra	Health worker (ma. Si. Ka.)
69	Karna Bdr. Khatri	Karkigaun-3, Sirseni	Farmer
70	Bir Bdr. Khatri	Karkigaun-3, Sirseni	Farmer
71	Bahadur Khatri	Karkigaun-3, Sirseni	Farmer
72	Surya Bdr. Khatri	Karkigaun-3, Sirseni	Farmer
73	Jaikura Khatri	Karkigaun-3, Sirseni	Farmer
74	Tuli Khatri	Karkigaun-3, Sirseni	Farmer
75	Govinda Thapa	Jhapra-2, Dhunghila	Student
76	Krishna Bdr. Thapa	Jhapra-2, Phupha	farmer
77	Bir Bdr. Thapa	Jhapra-1, Dhunghila	Farmer
78	Bhadra Bdr. Khatri	Jhapra-1, Dhunghila	Farmer
79	Harka Bdr. Thapa	Jhapra-1, Dhunghila	Teacher
80	Rita Thapa	Jhapra-2, Dhunghila	House wife
81	Tulsing Khadka	Jhapra-1, Dhunghila	Agriculture
82	Khadak Bdr. shahi	Jhapra-1, Dhunghila	Agriculture
83	Kare Tamata	Jhapra-1, Dhunghila	Agriculture
84	Krishna Bdr. Thapa	Jhapra-1, Phumna	Farmer
85	Bhakta Bdr. Khatri	Jhapra-1, Phumna	Teacher
86	Nar Bdr. Khatri	Jhapra-1, Phumna	Farmer
87	Nar Bdr. Thapa	Jhapra-1, Phumna	Farmer
88	Dhurba bhd Thapa	Jhapra-1, Phumna	Student
89	Nainsari Sunar	Jhapra-1, Phumna	Farmer

S.N.	Name of Respondent	Address	Occupation
90	Pashupati Chadara	Jhapra-2, Phumna	Farmer
91	Bir Bdr. Thapa	Salma-5, Jyula	Business
92	Birbal Basnet	Salma-5, Jyula	Agriculture
93	Jaya Bdr. Basnet	Salma-5, Jyula	Agriculture
94	Janak Raj Acharya	Salma-5, Jyula	Agriculture
95	Bhumiram Jaisi	Salma-5, Jyula	Teacher
96	Chane Bhr. Buda	Salma-5, Kholakhet	Farmer
97	Hari Sharma Jaisi	Salma-5, Kholakhet	Farmer
98	Bhumi Ram Jaisi	Salma-5, Kholakhet	Teacher
99	Lal Bdr. Buda	Salma-5, Kholakhet	Farmer
100	Bir Bdr. Mahatara	Pajaru-3, Paltada	Farmer
101	Kripal Khatri	Pajaru-4, Challopole	Farmer
102	Bhune Mahatara	Pajaru-4, Challopole	Farmer
103	Bishnu Giri	Pajaru-4, Challopole	Health worker
104	Prem Bdr. Mahatara	Pajaru-4, Challopole	Farmer
105	Sher Bdr. Basnet	Pajaru-4, Challopole	Farmer
106	Purna Bdr. Mahatara	Pajaru-4, Challopole	Farmer
107	Prem Bdr. Khatri	Managhat-3, Karkigao	Teacher
108	Kaliya Thapa	Lower Jewa-5, Dashera	Farmer
109	Prem Bdr. Khatri	Sirseni-3, Karkigao	Fishermen
110	Tule Sarki	Badaban-8, Dasera	Fishermen
111	Jay Bdr. Shahi	Jhapra, Fumna	Teacher
112	Nar Bdr. Khadga	Gaujani-2, Dashera	Fishermen
113	Nare Chundara	Sirpachour-3, Karkigao	Fishermen
114	Jaya Bdr. Thapa	Dashera-2	Fishermen

Source: NESS Field Survey, 2012

### Appendix 13: Public Consultation Chera-1 Project (Jajarkot District)

Field visit to the Chera Khola project site was made on 14<sup>th</sup> to 27<sup>th</sup> July 2012. The objective of the visit was to collect primary information on the social, socio-economic, cultural, forest resources, wildlife, disaster records and aquatic ecological aspects from the reservoir area and the key structural locations of the project.

Since the study period was limited, most of the information related to the above aspects was derived based on the public consultations and interviews with the key informants. The socio-economic information was solicited from the focus group discussions at various settlements within the reservoir area. Information on disaster, fishermen, and fish diversity is based on the key informant interviews, while information on the forest, floral and wildlife diversity is based on the direct observation and interviews with the key informants of the local area. Focus group consultation meetings were held at 19 sites within the reservoir area (Table 1), while 6 key informants were interviewed for in depth knowledgeable information (Table 2).

**Table 1: Participants of the Focus Group Discussion**

S.N	NAME OF PARTICIPANTS	OCCUPATION/POSITION	LOCATION
<b>DASHERA -7; JYULA</b>			
1	BHAGI RAM JAISI	TEACHER	DASHERA -7; JYULA
2	PREM BDR ADHIKARI	BUSINESSMAN	DASHERA -7; JYULA
3	JAYA BDR KHATRI	FARMER	DASHERA -7; JYULA
4	KHADKA BDR KHATRI	STUDENT	DASHERA -7; JYULA
5	AAITE ADHIKARI	FARMER	DASHERA -7; JYULA
6	NIM BDR ADHIKARI	FARMER	DASHERA -7; JYULA
7	PREM BDR SUNAR	FARMER	DASHERA -7; JYULA
<b>DASHERA -2; GAUJENI</b>			
1	GITA BUDHA	FARMER	DASHERA -2; GAUJENI
2	MUNE CHUDARA	FARMER	DASHERA -2; GAUJENI
3	KALE THAPA	FARMER	DASHERA -2; GAUJENI
4	SETU THAPA	FARMER	DASHERA -2; GAUJENI
5	BHAKTA BDR BUDHA	FARMER	DASHERA -2; GAUJENI
6	MAN BDR BUDHA	FARMER	DASHERA -2; GAUJENI
<b>DAHSERA -5; JEWANA</b>			
1	SARPE THAPA	FARMER	DAHSERA -5; JEWANA
2	JAYA LAL THAPA	FARMER	DAHSERA -5; JEWANA
3	PRITHI BDR THAPA	FARMER	DAHSERA -5; JEWANA
4	BIRSINGH CHUDHARA	FARMER	DAHSERA -5; JEWANA
5	NAR BDR KHADKA	FARMER	DAHSERA -5; JEWANA
<b>DASHERA -7; SILPA</b>			
1	NAR BDR SHAHI	AGRICULTURE	DASHERA -7; SILPA
2	TILAK SHAHI	AGRICULTURE	DASHERA -7; SILPA
3	FARE RAWAL	AGRICULTURE	DASHERA -7; SILPA
4	KARNA BDR RAWAL	AGRICULTURE	DASHERA -7; SILPA
5	RATNA BDR KHADKA	AGRICULTURE	DASHERA -7; SILPA
<b>KORCHABANG-5; KUMBANG</b>			
1	LACCHI RAM JAISI	AGRICULTURE	KORCHABANG-5; KUMBANG
2	NAYANA RAM JAISI	AGRICULTURE	KORCHABANG-5; KUMBANG
3	DAL BDR BUDHA	AGRICULTURE	KORCHABANG-5; KUMBANG
4	TIKE SARKI	AGRICULTURE	KORCHABANG-5; KUMBANG

S.N	NAME OF PARTICIPANTS	OCCUPATION/POSITION	LOCATION
5	LAXMAN MIJAR	AGRICULTURE	KORCHABANG-5; KUMBANG
<b>DASHERA -8; RAKHYA</b>			
1	GORAKH BDR RAWAT	AGRICULTURE	DASHERA -8; RAKHYA
2	BAHADUR RAWAT	AGRICULTURE	DASHERA -8; RAKHYA
3	HARI BDR SHAHI	AGRICULTURE	DASHERA -8; RAKHYA
4	KRISHNA PD UPADHYA	AGRICULTURE	DASHERA -8; RAKHYA
5	JAYALAL SHAHI	AGRICULTURE	DASHERA -8; RAKHYA
6	GOPAL SHAHI	AGRICULTURE	DASHERA -8; RAKHYA
<b>DASHERA – 8; THALAHA BAZAR</b>			
1	JAYA BDR SHAHI	TEACHER	DASHERA – 8; THALAHA BAZAR
2	BHIMA KHATRI	TEACHER	DASHERA – 8; THALAHA BAZAR
3	MAHENDRA BDR SHAHI	SOCIAL WORKER	DASHERA – 8; THALAHA BAZAR
4	MAN BDR GIRI	TEACHER	DASHERA – 8; THALAHA BAZAR
5	RUDRA ADHIKARI	TEACHER	DASHERA – 8; THALAHA BAZAR
<b>DASHERA –7; BASENI</b>			
1	MAN BDR SHAHI	AGRICULTURE	DASHERA –7; BASENI
2	JUNGE BDR GIRI	AGRICULTURE	DASHERA –7; BASENI
3	TULE SARKI	AGRICULTURE	DASHERA –7; BASENI
<b>KARKIGAUN –4; MANTA</b>			
1	TOP BDR ADHIKARI	AGRICULTURE	KARKIGAUN –4; MANTA
2	NIR BDR OLI	AGRICULTURE	KARKIGAUN –4; MANTA
3	DIP BDR OLI	AGRICULTURE	KARKIGAUN –4; MANTA
4	JAYA BDR ADHIKARI	AGRICULTURE	KARKIGAUN –4; MANTA
5	PADAM BDR ADHIKARI	AGRICULTURE	KARKIGAUN –4; MANTA
<b>KARKIGAUN – 7; CHIMCHIME</b>			
1	DHOLE KHATRI	FARMER	KARKIGAUN – 7; CHIMCHIME
2	TUL BDR ADHIKARI	FARMER	KARKIGAUN – 7; CHIMCHIME
3	NAR BDR ADHIKARI	FARMER	KARKIGAUN – 7; CHIMCHIME
<b>KARKIGAUN – 3; MANAGHAT</b>			
1	PREM BDR KHATRI	TEACHER	KARKIGAUN – 3; MANAGHAT
2	BHIM BDR KHATRI	FARMER	KARKIGAUN – 3; MANAGHAT
3	HARKA BDR KHATRI	FARMER	KARKIGAUN – 3; MANAGHAT
4	BIR BDR KHATRI	FARMER	KARKIGAUN – 3; MANAGHAT
5	TEK BDR KHATRI	FARMER	KARKIGAUN – 3; MANAGHAT
6	BIRBAL CHADARA	FARMER	KARKIGAUN – 3; MANAGHAT
7	BHUBAN JAISI	FARMER	KARKIGAUN – 3; MANAGHAT
8	GAUSI KHATRI	FARMER	KARKIGAUN – 3; MANAGHAT
<b>KARKIGAUN– 3; SIRPACHAUR</b>			
1	SARKI LOHAR	AGRICULTURE	KARKIGAUN– 3; SIRPACHAUR
2	SAMPATE LOHAR	AGRICULTURE	KARKIGAUN– 3; SIRPACHAUR
3	JAYA LOHAR	AGRICULTURE	KARKIGAUN– 3; SIRPACHAUR
4	AAITE CHADARA	AGRICULTURE	KARKIGAUN– 3; SIRPACHAUR
5	NAR BDR CHARDARA	AGRICULTURE	KARKIGAUN– 3; SIRPACHAUR
<b>KARKIGAUN -3; JOBRA</b>			
1	HARI BDR MAHATRA	STUDENT	KARKIGAUN -3; JOBRA
2	AAITE BDR MAHATARA	AGRICULTURE	KARKIGAUN -3; JOBRA
3	TULARAM MAHTRA	AGRICULTURE	KARKIGAUN -3; JOBRA
4	NAR BDR MAHATARA	AGRICULTURE	KARKIGAUN -3; JOBRA
5	MAISARA MAHATARA	HEALTH WORKER	KARKIGAUN -3; JOBRA
<b>KARKIGAUN -3; SIRSEN</b>			

S.N	NAME OF PARTICIPANTS	OCCUPATION/POSITION	LOCATION
1	KARNA BDR KHATRI	AGRICULTURE	KARKIGAUN -3; SIRSEN
2	BIR BDR KHATRI	AGRICULTURE	KARKIGAUN -3; SIRSEN
3	BAHADUR KHATRI	AGRICULTURE	KARKIGAUN -3; SIRSEN
4	SURYA BDR KHATRI	AGRICULTURE	KARKIGAUN -3; SIRSEN
5	JAIKURA KHATRI	AGRICULTURE	KARKIGAUN -3; SIRSEN
6	TULSI KHATRI	AGRICULTURE	KARKIGAUN -3; SIRSEN
<b>JHAPRA -1; DHUNGILA</b>			
1	GOVINDA THAPA	STUDENT	JHAPRA -1; DHUNGILA
2	KRISHNA BDR THAPA	FARMER	JHAPRA -1; DHUNGILA
3	BIR BDR THAPA	FARMER	JHAPRA -1; DHUNGILA
4	BHADRA BDR KHATRI	FARMER	JHAPRA -1; DHUNGILA
5	HARKA BDR THAPA	TEACHER	JHAPRA -1; DHUNGILA
6	RATI THAPA	HOUSEWIFE	JHAPRA -1; DHUNGILA
7	TULSING KHADKA	FARMER	JHAPRA -1; DHUNGILA
8	KHADARE BDR SHAHI	FARMER	JHAPRA -1; DHUNGILA
9	KARE TAMATA	FARMER	JHAPRA -1; DHUNGILA
<b>JHAPRA -2 ; PHUMNA</b>			
1	KRISHNA BDR THAPA	FARMER	JHAPRA -2 ; PHUMNA
2	BHAKTA BDR KHATRI	TEACHER	JHAPRA -2 ; PHUMNA
3	NAR BDR KHATRI	FARMER	JHAPRA -2 ; PHUMNA
4	DHURBA BDR THAPA	STUDENT	JHAPRA -2 ; PHUMNA
5	NAINSIRI SUNAR	FARMER	JHAPRA -2 ; PHUMNA
6	PASHUPATI CHADARA	FARMER	JHAPRA -2 ; PHUMNA
<b>SALMA -5; JYAULA</b>			
1	BIR BDR THAPA	BUSINESS	SALMA -5; JYAULA
2	BIRBAL BASNET	FARMER	SALMA -5; JYAULA
3	JAYA BDR BASNET	FARMER	SALMA -5; JYAULA
4	JANAK RAJ ACHARYA	FARMER	SALMA -5; JYAULA
5	BHUMI RAM JAISI	TEACHER	SALMA -5; JYAULA
<b>SALMA -3 ; KHOLAKHET</b>			
1	CHANE BDR BUDHA	AGRICULTURE	SALMA -3 ; KHOLAKHET
2	HARI SHARMA JAISI	AGRICULTURE	SALMA -3 ; KHOLAKHET
3	BHUMI RAM JAISI	TEACHER	SALMA -3 ; KHOLAKHET
4	LAL BDR BUDHA	AGRICULTURE	SALMA -3 ; KHOLAKHET
<b>PAJARU -3 ; CHALLOPOLE</b>			
1	BIR BDR MAHATARA	AGRICULTURE	PAJARU -3 ; CHALLOPOLE
2	KRIPAL KHATRI	AGRICULTURE	PAJARU -3 ; CHALLOPOLE
3	BHUNE MAHATARA	AGRICULTURE	PAJARU -3 ; CHALLOPOLE
4	BISHNU GIRI	HEALTH WORKER	PAJARU -3 ; CHALLOPOLE
5	PREM BDR MAHATARA	AGRICULTURE	PAJARU -3 ; CHALLOPOLE
6	SHER BDR BASNET	AGRICULTURE	PAJARU -3 ; CHALLOPOLE
7	PURNA BDR MAHATARA	AGRICULTURE	PAJARU -3 ; CHALLOPOLE

**Table 2: Key Informant for Interview**

S.N	NAME OF KEY INFORMANT	OCCUPATION/POSITION	LOCATION
1	PREM BDR KHATRI	TEACHER	MANAGHAT-3, KARKIGAO
2	KALIYA THAPA	AGRICULTURE	LOWER JEW A-5
3	TULE SARKI		BADABAN-8, DASERA
4	JAY BDR SHAHI		JHAPRA ; DHUNGILA & FUMNA
5	NAR BDR KHADGA		GAUJENI-2, DASHERA
6	NARE CHUNDARA		SIRPACHOUR-3, KARKIGAO
	JAYA BDR THAPA		DASHERA-2

To get the information from the project site’s local communities the strategic approach taken was to aware people on the Nationwide Master Plan Study of the Storage Type Hydro-electric Projects before seeking information on the local environmental and social resources and the concerns of the people regarding the Chera project.

It is therefore the field survey team, before initiating dialogue with the local communities described why the Nationwide Master Plan Study for Storage type hydroelectric project is needed? Who is undertaking the study? What will be the output of the study? In this process the team also highlighted on how this project in this area was selected for further study? And what the study team will like to get information from the local area communities not limiting to the social and environmental information but also the concerns of the people with regard to the project and their aspirations with the project if it is screened for further study and development.

This section describes the local people knowledge on the project apart from the concerns and aspirations of the people from the project.

For the overall development of the region and to ease the current electricity crisis, the communities were ready to support the project development. The major concern of the people is regarding the resettlement and rehabilitation. The place they are currently living is the food bowl of the area and is the major source of the community livelihood. The concern was whether they will be resettled and rehabilitated in a similar productive area.

The local community aspiration is that the affected communities should get job opportunities in the project considering their contribution to the project. The community infrastructures such as schools, health posts, and road network are not adequate to meet the needs and aspired that the project will contribute significantly in the development of the community infrastructures. They also aspired to get skill trainings so as to maximize the benefit of the available job opportunities in the project.

**Annex 18: Environmental Survey Report**  
**Lower Jhimruk Project (W-05)**

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## Introduction

Federal Democratic Republic of Nepal is rich in water resources, its potential water power is 83,000 MW and economically exploitable water power is 42,000 MW. However, as of 2011, the total generating capacity of the country is only about 718.62 MW. Of the total installed capacity 92% is from the hydroelectric power plants. In addition, since most of hydroelectric power plants are run-of-river type, their output decreases seriously in the dry seasons. Consequently, there is a rolling blackout of as long as 14 hours a day which poses many problems including affects in livelihood and industries which severely impact the national economy.

To cope with these situations, the government of Nepal has worked out “National Electricity Crisis Resolution Action Plan” and “10-Year Hydropower Development Task Force” at the end of 2008. The above action plan and task force recommended need of storage-type hydroelectric power plants able to supply sustainable electricity uninterruptedly even in dry seasons to solve current power shortage at an early date.

However, construction of storage-type hydroelectric power plants should be carried out systematically taking into consideration of various aspects including the overall water resource development policy of Nepal, hydrological and geological characteristics, environmental impact, etc. Therefore, the Government of Nepal has requested the Government of Japan to work out a nationwide master plan for storage-type hydroelectric power development.

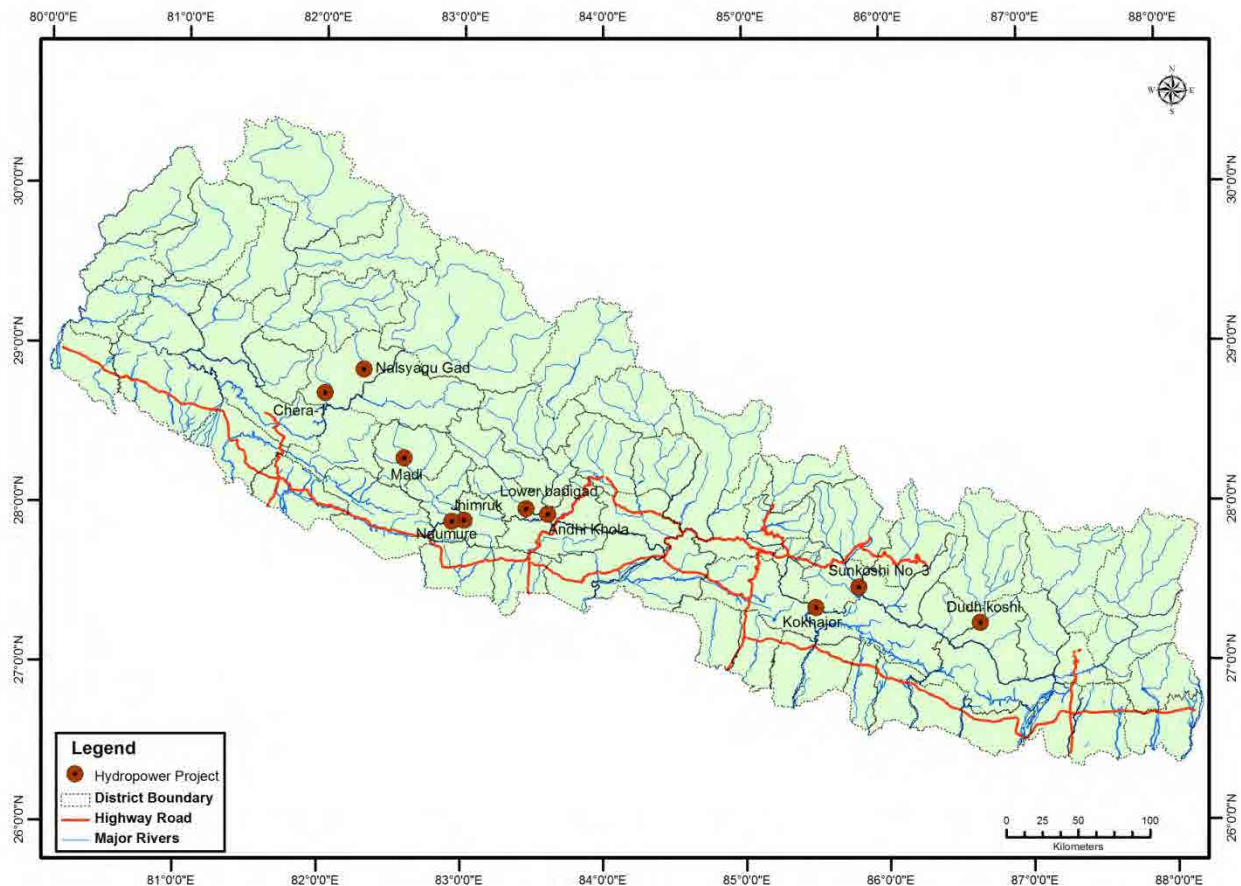
Electric Power Development Company Limited (J-Power) appointed by the JICA for the nationwide master plan study based on the desk level study in close association with NEA screened 10 candidate projects for the master plan study out of the list of 67 promising projects identified by NEA all over Nepal. **Table 1a and 1b** presents the salient features of the 10 promising projects screened for the master plan study, while **Figure 1** presents the location of the projects.

**Table 1a: Salient Features of Potential Projects**

No.	Project Name	Location (District)	Location of Dam Site		River	Installed Capacity (MW)	Catchment Area (km <sup>2</sup> )
			Longitude	Latitude			
E-01	Dudh Koshi	Okhaldhunga/Khotang Dist.	86° 39' 17.3	27° 15' 47.2	Dudh Koshi to Baiku Khola	300.0	4100
E-06	Kokhajor-1	Sinchuli, Sindhupalchok	85° 29' 59.6	27° 22' 21.9	Kokhajor	111.5	281
E-17	Sun Koshi No.3, Kosi MP	Ramechhap, Kavre and Sindhupalanchok	85° 48' 14.3	27° 29' 50.5	Sun Koshi	536.0	5520
C-02	Lower Badigad	Gulmi	83° 27' 22.2	28° 0' 0.6	Badigad	180.3	2050
C-08	Andhi Khola	Syangja	83° 36' 30.6	27° 58' 2.6	Andhi Khola	180.0	475
W-02	Chera-1	Jajarkot	82° 1' 12.3	28° 42' 56.4	Chera	148.7	809
W-05	Lower Jhimruk	Arghakhachi, Pyuthan	83° 1' 1	27° 55' 30.8	Jhimruk	142.5	995
W-06	Madi	Rolpa	82° 35' 15.5	28° 18' 48.5	Madi	199.8	674
W-23	Nalsyau Gad	Jajarkot	82° 17' 42.8	28° 52' 4.7	Nalsyau Gad	410.0	571
W-25	Naumure (W. Rapti)	Argakhanchi, Pyuthan	82° 55' 42.9	27° 55' 6.1	West Rapti	245.0	3430

**Table 1b: Salient Features of Potential Projects**

No.	Project Name	Dam Height (m)	Total Storage Volume (MCM)	Effective Storage Volume (MCM)	Reservoir Area (km <sup>2</sup> )	FSL (m)	MOL (m)	TWL (m)	Rated Gross Head (m)	Rated Power Discharge (m <sup>3</sup> /sec)
E-01	Dudh Koshi	180.0	687.40	442.10	11.05	580.0	530.00	303.35	275.0	136.00
E-06	Kokhajor-1	107.0	218.70	166.10	8.92	437.00	390.00	200.00	226.3	63.90
E-17	Sun Koshi No.3, Kosi MP	140.0	1,220.00	555.00	23.99	700.0	674.00	575.00	116.3	109.34
C-02	Lower Badigad	191.0	995.90	505.50	13.65	688.00	654.00	475.00	196.0	232.60
C-08	Andhi Khola	157.0	336.50	238.70	5.52	675.00	626.70	368.48	307.0	81.40
W-02	Chera-1	186.0	254.90	141.10	4.00	866.0	814.00	640.00	220.0	80.50
W-05	Lower Jhimruk	167.0	386.00	211.60	4.98	597.0	557.0	390.0	194.6	88.10
W-06	Madi	190.0	359.50	235.10	7.66	1,090	1,030.00	800.00	280.8	84.90
W-23	Nalsyau Gad	200.0	419.6	296.3	6.3	1,570.0	1,498.00	872.0	644.0	75.00
W-25	Naumure (W.Rapti)	190.0	1,021.00	580.00	19.76	517.0	474.00	358.00	162.6	185.60



**Figure 1: Ten Promising Sites Identified for Survey**

The NESS, a local consulting firm of Nepal was entrusted by J-Power for the required SEA field studies of the 10 candidate projects. As per the ToR of works, there are basically two types of surveys required namely; geological, geotechnical, construction material and seismicity study, and environmental and social study. This report deals with the field survey findings of social and environmental study on **Lower Jhimruk Project** identified as one of the candidate project in the western Nepal.

## 1 SOCIO-ECONOMIC ENVIRONMENT

The information regarding the social and economic conditions of the people in Nepal is available in the publications of the Central Bureau of Statistics. But such information is limited to administrative units such as VDCs, DDCs, Development Zones and at national level. As the candidate projects cross cut the administrative units, the available data on the social and economic concerns could not be used effectively to characterize the direct impact areas by the projects. To fill this gap field level studies on Socio-economic and Environmental Concerns<sup>1</sup> are conducted through participatory methods. The findings of the field surveys are presented in the section below.

### 1.1 Demographic Concerns

#### 1.1.1 VDCs, Settlements and Population

The proposed lower Jhimruk storage type project covers two districts from each of the development regions of Nepal i.e. Arghakhanchi district from Western Development Region and Pyuthan from the Mid Western Development Region Nepal. The reservoir area includes 7 VDCs, 14 settlements, >8 wards and 225 households of two districts. The total population of the reservoir area is estimated to be 1493 with the average family size of 6.51 which is slightly higher than the national average family size (4.70) (Table 1c and Appendix 1). The reservoir area occupies only 0.35% of the total population of two districts<sup>2</sup>

**Table 1c: Districts, VDCs and Settlements and Population under the Storage Project**

Region/District	VDCs	Settlements	Number of Households	Population
<b>A. Western</b>				
Arghakhanchi	Asurkot	Sotighat, Bajhapata	14	29
	Nuwakot			
	Khilji	Damar, Durbang	64	364
	Dhanchaur	Badare	5	25
<b>Sub-total A</b>	<b>4</b>	<b>5</b>	<b>83</b>	<b>418</b>
<b>B. Mid Western</b>				
Pyuthan	Dangwang	Cheddaghat, Chaklaghat, juda Pateri, Sajbot, Angri, Simpani	128	940
	Baraula	Kodkura, Rakasha	18	135
	Bijuli			
<b>Sub-total B</b>	<b>3</b>	<b>9</b>	<b>146</b>	<b>1075</b>
<b>Total (A+B)</b>	<b>7</b>	<b>14</b>	<b>229</b>	<b>1493</b>

Source: NESS Field Survey, 2012

#### 1.1.2 Ethnicity / Caste

Above half of the population of the reservoir area is dominated by the Adivasi/Janjati groups (55%). Among the Adivasi/Janjati, the population of Magar (Disadvantaged Adivasi/Janjati) is dominant (34.1%) followed by Gurung (9.2%). Newar represent (2.2%) among the advanced Adivasi / Jjanjati and Kumal (9.6%) among the marginalized Adivasi/Janjati group. Chhetri and Brahmin represent second and third largest population occupying 29.3% and 10.9% of the reservoir area population. Almost 5% population is Dalit that are traditionally known as untouchables (Figure 1 and Appendix 2).

<sup>1</sup> The findings are based on the NESS Rapid Field Survey Assessment (2012) using Focus Group Discussions (FGD) and Observation tools. Refer **Appendix 7** for the List of FGD participants.

<sup>2</sup> The total population of Arghakhanchi and Pyuthan districts according to preliminary estimate of CBS Census 2011 is estimated to be 208,391 and 212,484 respectively.

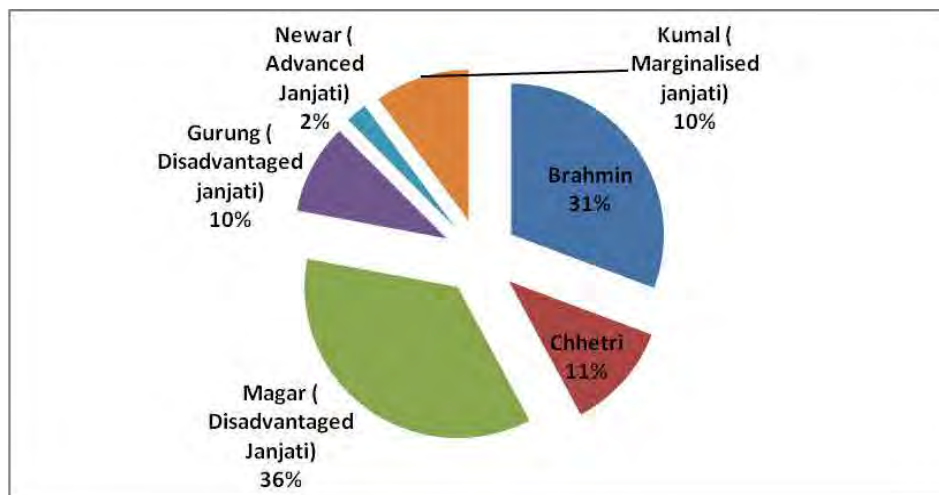


Figure 1: Ethnic Composition of Reservoir Area Population

## 1.2 Economic Concern

### 1.2.1 Land Use Pattern and Land Holding

The total land area in the reservoir area is estimated to be 1520 ropani, a large proportion of which is used for agriculture (93.42%), followed by forest (5.26%) and pasture (1.32%). **Appendix 3** presents details on the land use pattern by each cluster of the VDC.

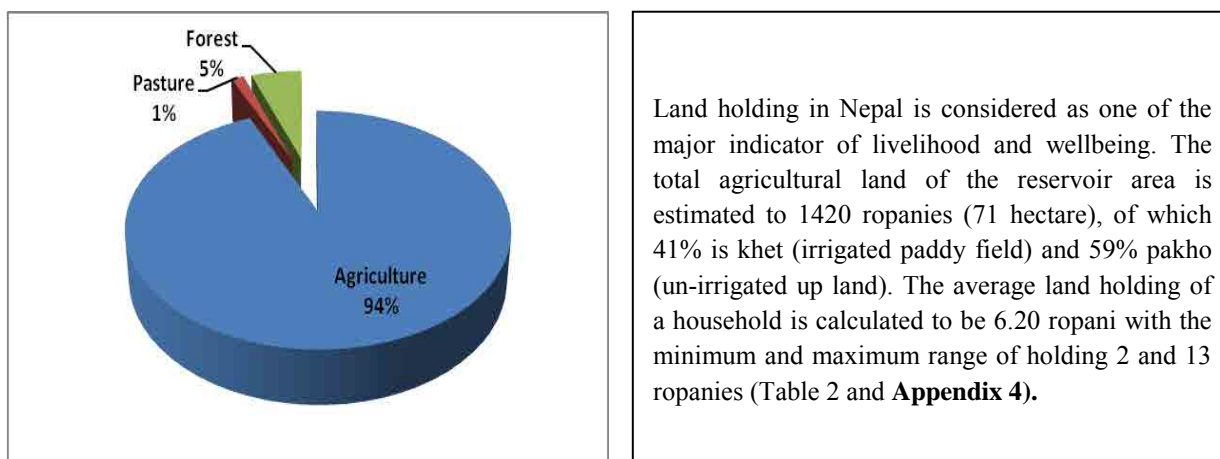


Figure 2: Land Use Pattern

Land holding in Nepal is considered as one of the major indicator of livelihood and wellbeing. The total agricultural land of the reservoir area is estimated to 1420 ropanies (71 hectare), of which 41% is khet (irrigated paddy field) and 59% pakho (un-irrigated up land). The average land holding of a household is calculated to be 6.20 ropani with the minimum and maximum range of holding 2 and 13 ropanies (Table 2 and **Appendix 4**).

Based on the Central Bureau of Statistics (CBS) classification<sup>3</sup>, all the households fall in the marginal group when examined from the view point of average land holdings.

Table 2: Land Holding Size by Settlements of the Reservoir Area

District	VDC	Cluster	Total and Average Holding Size of Agricultural Land (Ropani), One Ha=20 ropani			
			Khet	Pakho	Total	Average
Pyuthan	2	9	380	235	615	7.41
Arghakhanchi	3	5	200	605	805	5.51
	<b>5</b>	<b>14</b>	<b>580</b>	<b>840</b>	<b>1420</b>	<b>6.20</b>

Source: NESS Field Survey, 2012

<sup>3</sup> According to CBS, a households holding < 15 ropani of land is classified as marginal farmer, holding 15-135 ropanies as small to medium farmers and holding > 135 ropani as large farmers.

The reservoir area is producing cereals such as paddy, maize, wheat and cash crops such as potato, oilseeds and vegetables. Among the cereals, maize is grown in largest area (1010 ropanis) followed by paddy (577 ropanis) and wheat (455 ropanis). Among the cash crops, potato occupies the largest area (54.5 ropanis) followed by vegetables (29.5 ropanis) and oilseeds (9 ropanis). Unlike the area, the quantity of production is also highest for maize followed by paddy wheat, potato, vegetables and oilseeds. The cropping intensity of the area is 150% (Table 3 and Appendix 5). According to field study all the production is consumed locally.

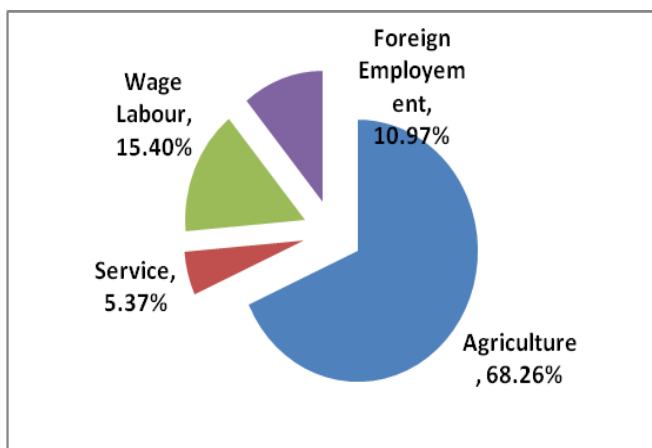
**Table 3: Crop Production and Yield**

S.N.	Crop	Area (Ropani)	Production (Kg)	Yield (Kg/Ropani)
1	Paddy	577	60050	104.07
2	Maize	1010	158130	156.56
3	Wheat	455	42714	93.88
4	Potato	54.5	4225	77.52
5	Oilseeds	9	350	38.89
6	Vegetables	29.5	1270	43.05
	<b>Cropping Intensity</b>		<b>150.35%</b>	

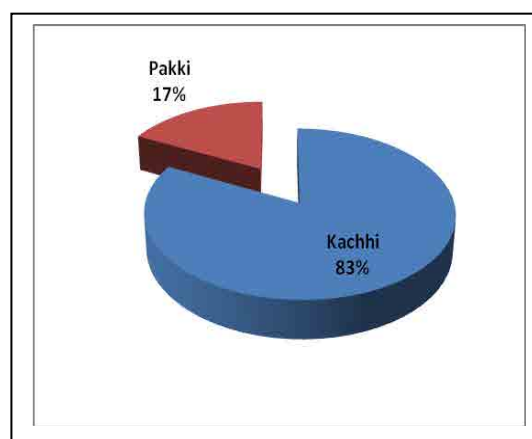
Source: NESS Field Survey, 2012

### 1.2.2 Occupation

Almost 60% of the reservoir area population are estimated to be economically active and are engaged in different occupations. A majority of the population (68%) are occupied in agriculture followed by wage labour (15.40%), foreign employment (11%) and services (5.4%) (Figure 3).



**Figure 3: Occupation of Population**



**Figure 4: Types of Houses**

### 1.2.3 Housing Type

Two types of houses are categorized in the reservoir area: i) Pakki house i.e permanent types of house built generally using cement and stone and roofed by using galvanized sheet (tin) or cemented and ii) kachhi house i.e built by using mud and stone and roofed using thatch.

A large majority of the households (83%) are residing in kachhi (temporary) types of house and 17% in pakki (permanent) types of house.

### 1.3 Service related Infrastructures

#### 1.3.1 Road

Only four settlements out of 14 are facilitated with minimum length of gravel earthen types of road and the road length within four settlements is only 3.3 km. 3 suspension bridges constructed in the reservoir area are serving 4 settlements of the area (Table 4).

**Table 4: Roads and Bridges**

District	VDC	Cluster	Road Type			Suspension Bridge
			Road Type	Length (Km)	Name	
Pyuthan	Dangwang	Juda	Gravel earthen	500 km	Sahid tanka Marg	
		Cheddaghat				Cheddaghat Suspension bridge
		Pateri				Pateri Suspension Bridge
		Sajbot	Gravel earthen	1 km	NA	
Arghakhanchi	Khilji	Damar	Gravel earthen	1 km	Damara Marg	
		Durbang	Gravel earthen	1.3 km	NA	Durbang Suspension bridge
	Dhanchaur	Badare				Cheddaghat Suspension bridge
<b>Total</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>3.3</b>		

Source: NESS Field Survey, 2012

#### 1.3.2 Schools

Four primary schools are running in the reservoir area where 233 students are enrolled. Of the four schools, three are located in Pyuthan district and one in Arghakhanchi district (Table 5).

**Table 5: Number of Schools**

District	VDC	Cluster	Type of School	Number of Students
Pyuthan	Dangwang	Cheddaghat	Dhankanya neta Primary School	20
		juda	Janata Primary school	115
	Baraula	Kodkura	Bal shikchya (bal bikash)	8
Arghakhanchi	Khilji	Durbang	Dharmawoti Primary School	90
<b>Total</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>233</b>

Source: NESS Field Survey, 2012

#### 1.3.3 Irrigation Infrastructure

There are three major irrigation infrastructures in the reservoir area and all of them are located in Pyuthan district. The total area irrigated by these three schemes is estimated to be 240 ropani (Table 6).

**Table 6: Details of irrigation Infrastructures**

District	VDC	Cluster	Irrigation Scheme Name	Command Area (Ropani)
Pyuthan	Dangwang	Cheddaghat	Cheddghat Sichai	150
		Juda	Bhalu Khola kulo	50
		Angri	Angri Khet Sinchai Yojana	40
<b>Total</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>240</b>

Source: NESS Field Survey, 2012

Seven major drinking water schemes with 44 numbers of taps are reported in the reservoir area. Of the seven schemes, six are located in Pyuthan district and one in Arghakhanchi (Table 7).

**Table 7: Drinking Water Schemes**

District	VDC	Cluster	Name of the Scheme	Number of Taps
Pyuthan	Dangwang	Cheddaghat	Pachim Nepal khanepani yojana	4
		Chaklaghat	Chaklaghat khane Pani	2
		Juda	Gaun bikash programme	18
		Sajbot	Jimbire khola sajbot khane pani	3
		Angri	Angri Khane Pani	7
		Simpani	Simpani Khanepani	3
Arghakhanchi	Khilji	Durbang	Durbang khane Pani	7
<b>Total</b>	<b>2</b>	<b>7</b>	<b>7</b>	<b>44</b>

Source: NESS Field Survey, 2012

### 1.3.4 Community Forest

There are six Community Forests managed by the community. Of the six Community Forests five are located in Pyuthan and one is located in Arghakhanchi district (Table 8).

**Table 8: Community Forests in the Reservoir Area**

District	VDC	Cluster	Community Forest
Pyuthan	Dangwang	Juda	Jarayodip Community Forest
		Pateri	Shree khanda gabu danda Community Forest
		Sajbot	Jarayodip Community Forest
		Angri	Antika jhara Community Forest
		Baraula	Chisapani Community Forest
Arghakhanchi	Khilji	Durbang	Durbang Community Forest
<b>Total</b>	<b>2</b>	<b>6</b>	<b>6</b>

Source: NESS Field Survey, 2012

### 1.3.5 Industries and Services

Establishment of one electricity mill and 2 small cottage industries are reported in Durbang village of Khiji VDC, Arghakhanchi district, while none of the of the other settlements have existence of such industries. However, in every settlements people make *gundri* (mat), *doko* (basket) and *namlo* (head rope to carry basket), for their own use.

Besides above, none of the settlements located with the command of reservoir area reported the existence of other services such as Agriculture Service Centre, Livestock Service Centre, Health Centre, Security Post, market centers, micro hydro etc. in their vicinity.

## 1.4 Culture and Religious Site

The major festivals celebrated in the reservoir area are: *Dasain*, *Tihar*, *Tija*, *Majhe Sankarati*, which are based on Hindu tradition and culture. Each settlement has cremation ghat just below the settlements adjacent to river (**Appendix 6**).

## 1.5 Ongoing and Proposed Development programmes

There are no any specific development projects ongoing or proposed in the reservoir area except a drinking water scheme under construction in Damar of Khiji VDC in Arghakhanchi district.



## **1.6 Past Experience with community and their perception**

There are no any hydropower's or other specific development projects constructed in the past in the reservoir area so the communities have not experienced any types of conflict with regards to the development projects. Submerge of house and land and loss of their traditional property are their major concerns with regards to the construction of storage types of the hydropower project.

## **1.7 Disasters**

The reservoir area has not experienced severe disasters in general, However, Damar of Khiji VDC, Arghakhachi encountered earthquake nine months ago and Durbang of same VDC was captured by forest fire three months ago.

## 2 DISASTER STUDY

There are no records of the disaster at the site specific level of the candidate project at the central level and district level offices of the government of Nepal. It is therefore, the disaster information is collected from the project site based on the key informant survey. The findings of the results are presented in the sections below.

### 2.1 Types of Disaster

Within the influence area of the Lower Jhimruk storage type hydroelectric project the flood, landslide and the earthquake as a disaster event is not in the memory of the local people.

#### 2.1.1 Flood

In the memory of the local people flood disaster is not experienced by the communities within the project site.

**a) Name of respondent: BHIM BDR. RAJALI** **Date: 28/04/2069 B.S.**  
**Age: 29** **Occupation: FARMING** **Location: DANGBANG-9, CHEDE (PYUTHAN)**  
**Year of the occurrence:** No disastrous in the memory

**b) Name of respondent: KHIM BDR. RANAMAGAR** **Date: 28/04/2069 B.S.**  
**Age: 60** **Occupation: Agriculture** **Location: NUWAKOT-8, GHORAKHORI**  
**(ARGHAKHACHI)**  
**Year of the occurrence:** No disastrous flood happened till now

**c) Name of respondent: REM BDR. GHARTIMAGAR** **Date: 28/04/2069 B.S.**  
**Age: 52** **Occupation: FARMER** **Location: NUWAKOT-8, SALYANDHARA**  
**(ARGHAKHACHI)**  
**Year of the occurrence:** No disastrous flood in the memory

**d) Name of respondent: KUMARI BARAL** **Date: 28/04/2069 B.S.**  
**Age: 52** **Occupation: Agriculture** **Location: KHILJI-4, DURBANG (ARGHA.)**  
**Year of the occurrence:** No disastrous flood in the memory

**e) Name of respondent: NUM BDR. GURUNG** **Date: 29/04/2069 B.S.**  
**Age: 36** **Occupation: Agriculture** **Location: BARAULA-1, KADKURA (PYUTHAN)**  
**Year of the occurrence:** No disastrous flood in the memory

**f) Name of respondent: HARI BDR. GHARTI** **Date: 29/04/2069 B.S.**  
**Age: 42** **Occupation: Agriculture** **Location: BIJULI-6, AITAR (PYUTHAN)**  
**Year of the occurrence:** No disastrous flood in the memory

### 2.1.2 Landslide

In the memory of the local people landslide disaster is not experienced by the communities within the project site.

**a) Name of respondent: KHIM BDR. RANAMAGAR** **Date: 28/04/2069 B.S.**  
**Age: 36** **Occupation: Farming** **Add.: Nuwakot-8, Ghorakhori (Arghakhachi)**  
**River: Lower Jhimruk**

Year	Location	Cause	Affected Fields
No disastrous Landslide in the memory			

**b) Name of respondent: NUM BDR. GURUNG** **Date: 30/04/2069 B.S.**  
**Age: 36** **Occupation: Farming** **Add.: Baraula-1, Kadkura (Pyuthan)**  
**LOWER JHIMRUK KHOLA**

Year	Location	Cause	Affected Fields
No disastrous Landslide in the memory			

### 2.1.3 Earthquake

In the memory of the local people the candidate project site communities have not experienced earthquake causing loss of life and property

**Respondents:**

1. Bhim Bahadur Rajali
2. Khim Bahadur Ranamagar
3. Rem Bahadur Ghartimagar
4. Num Bahadur Gurung

**Address:**

Dangbang-9, Chhede(Pyuthan)  
 Nuwakot-8, Ghorakhori(Arghakhachi)  
 Nuwakot-8, Salyandhara(Arghakhachi)  
 Baraula-1, Kadkura(Pyuthan)

Year	Loss of life	Loss of Build Structures
No disastrous earthquake in the memory		

### 3 FLORAL STUDY

Though the floral information at the regional level is available, there is no published literature on the site specific level of the candidate project at the central and district level offices of the government of Nepal. It is therefore, candidate project site is visited by the biological study team to gather information based on direct observation and through the participatory methods with the local key informants. Findings of the field study are presented in sections below.

#### 3.1 Vegetation Diversity

The information on the vegetation diversity is gathered from the direct observation by the members of biology study team during site visit. Besides, information is also collected from the key informants of the local area through interviews and focus group discussions with the local community forest user groups.

The candidate project site is rich in floral diversity. About 55 plant species were recorded through direct observation and interviews with the key informants. The list of plant species is presented in the table below.

S.N.	Local Name	Common Name	Scientific Name
1	Dabdabey		<i>Lannea coromandelica</i>
2	Khayer	Cuth tree	<i>Acacia catechu</i>
3	Karam	Yellow teak	<i>Adina cardifolia</i>
4	Bell	Wood Apple	<i>Aegle marmelos</i>
5	Chiuri	Nepal butter fruit	<i>Aesandra butyracea</i>
6	Siris	Tee-coma	<i>Albezia sps.</i>
7	Vorla	Camel's footclimber	<i>Bauhinia vahlii</i>
8	Pakhanbet	Rock Foil	<i>Berginia ciliate</i>
9	Simal	Red cotton tree	<i>Bombax ceiba</i>
10	Vutuko (Palas)	Bengal Kino Tree	<i>Butea monosperma</i>
11	Rajbrichha	Cassia pods	<i>Cassia fistula</i>
12	Sinkauli	Garlic pear	<i>Cinnamomum glanduliferum</i>
13	Dhurseta (Dhasure)		<i>Colebrookea oppositifolia</i>
14	Sandan	Sandan	<i>Desmodium oojeinense</i>
15	Githe tarul	Air potato	<i>Dioscorea bulbifera</i>
16	Unyoo	Eadible fern	<i>Dryopteris cochleata</i>
17	Bar	Banyan Tree	<i>Ficus benghalensis</i>
18	Kavro	Elephant Fig	<i>Ficus lacor</i>
19	Pipal	Pipal (Bio-Tree)	<i>Ficus religiosa</i>
20	Khamari	Malay bush beech	<i>Gmelina arborea</i>
21	Vimal	Bush	<i>Grewia optiva</i>
22	Bot dhayaro		<i>Lagerstroemia parviflora</i>
23	Mouwa	Mahua	<i>Madhuca longifolia</i>
24	Rain	Kamala	<i>Mallotus philipensis</i>
25	Pudina	Peppermint	<i>Menthe arvensis</i>
26	Kafal	Bay berry	<i>Myrica esculenta</i>
27	Parijat	Night Jusmine	<i>Nyctanthes arbor</i>
28	Kaulo		<i>Persea odoratissima</i>
29	Amala	Emblic	<i>Phyllanthus emblica</i>
30	Khote Sallo	Pine	<i>Pinus roxburghii</i>
31	Rudilo		<i>Pogostmon benghalensis</i>
32	Sarpa Gandha		<i>Rawolfia serpentina</i>
33	Valayo	Chinese sunmac	<i>Rhus javanica</i>
34	Ritho	Soap -nut	<i>Sapindus mukorossi</i>
35	Khirro	Tallow tree	<i>Sapium insigne</i>
36	Sall	Sall tree	<i>Sorea robusta</i>
37	Debre lahara		<i>Spatholobus parviflorus</i>

S.N.	Local Name	Common Name	Scientific Name
38	Chiraito	Chiretta	<i>Swertia chirayita</i>
39	Jamun	Black berry	<i>Syzygium cumini</i>
40	Sajh	Laurel tree	<i>Terminalia alata</i>
41	Barro	Bedda Nuts	<i>Terminalia bellirica</i>
42	Harro	Black Myrobolon	<i>Terminalia chebula</i>
43	Tooni	Red Cedar	<i>Toona ciliata</i>
44	Uttis	Nepal black cedar	<i>Ulnus nepalensis</i>
45	Sisnoo	Stinging nettle	<i>Urtica dioica</i>
46	Hadchur	Devils-fuge	<i>Viscum album Linn.</i>
47	Dhayaro	Fire flame bush	<i>Woodfordia fruticosa</i>
48	Bayer	Indian plum	<i>Zizypulus mauritiana</i>
49	Tidu		
50	Surai (Gayo)		
51	Tilke		
52	Pepari (Badkoule)		
53	Khurkath		
54	Vaki Amilo		
55	Gunyelo		

### 3.2 Forest Types

The candidate project site is characterized by the mixed broad leaf forests, and hill sal forest Table below presents the forest types and associated species in the reservoir area and outside reservoir area.

Local (Within Reservoir)	Regional (Out of the reservoir)
-Mainly hill sall ( <i>Shorea robusta</i> ) dominated -Some places are mixed with sanjh ( <i>Terminalia alata</i> ) -Most slopy area is Dhayero ( <i>Woodfordia fruticosa</i> ) dominated. - Sandan ( <i>Desmodium oojeinense</i> ) noteworthy	-Mainly hill sall ( <i>Shorea robusta</i> ) and Chir pine in some places. -Sarpagandha ( <i>Rauvolfia serpentina</i> ) is noteworthy

### 3.3 Forest as per Forest Classification (Community forest, Government Forest, Leasehold Forest, Private Forest, Religious Forest etc.)

The forests of the candidate project influence area are the government and community forests. The community forest are managed by the local community forest user groups within the framework of the community forest management plan approved by the district forest offices, while the government managed forest is managed by the district forest office. The reservoir occupied area has 6 community forests and 3 government managed forest and 1 private forest. The name of the government and community forests, dominant species of plants and the location of the forests in the local administrative zone (VDCs) is presented in the tables below for the reservoir area and outside the reservoir area.

#### Local Area (Within the reservoir)

S.N.	Ownership	Name of the Forest	Dominant Species	V.D.C.
1	Community	Gazi Damar Co. Fo.	<i>Shorea robusta</i>	Dangbang-6, 8, 9, Pyuthan
2	Community	Shrikhanda Gagudada Co. Forest	<i>Shorea robusta</i>	Dangbang-8, Pyuthan
3	Community	Jarayodip Co.Forest	<i>Shorea robusta</i>	Dangbang-1, Pyuthan
4	Community	Gaidadip Co.Forest	<i>Shorea robusta</i>	Danbang-7
5	National	National Forest	Sparsed sal mixed forest	Dhanchaur, Upallopaku, Arghakhachi
6	Community	Ghorakhori Co. Forest	Sparsed sal mixed forest	Nuwakot-6, 8, Arghakhachi
7	Community	Bahi Takura Co. Forest	Mixed sal forest	Nuwakot-9, Arghakhachi

S.N.	Ownership	Name of the Forest	Dominant Species	V.D.C.
8	Community	Proposed Co. Forest	Dense mixed sal forest	Khilji, Dadagaun, Argha.
9	Community	Proposed Co. Forest	Dense mixed sal forest	Asurkoot, Sotighat, Arghakhachi

**Regional Area (Outside the reservoir)**

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C.
1	community	Gazi Damar Co.Fo.	<i>Shorea robusta</i>	Dangbang-6, 8, 9, Pyuthan
2	community	Shrikhanda Gagudada Co. Forest	<i>Shorea robusta</i>	Dangbang-8, Pyuthan
3	community	Jarayodip Co. Forest	<i>Shorea robusta</i>	Dangbang-1, Pyuthan
4	community	Gaidadip Co. Forest	<i>Shorea robusta</i>	Danbang-7
5	National	National Forest	Sparsed sal mixed forest	Dhanchaur, Upallopaku, Arghakhachi
6	community	Proposed Co. Forest	Dense mixed sal forest	Asurkoot, Sotighat, Arghakhachi

### 3.4 Forest Plot Analysis

For the analysis of the forest status and characteristics 3 sample plots were measured within the reservoir area of the candidate project. The sample plots measured has a size of 25 x 25 meter. The detail of the sample plot measurements is presented in the tables below.

**a) Forest:** Vahi Takura community forest

**Location:** Nuwakot-9, Arghakhachi

**G.P.S.** 04-3-601E, 30-92-921N

**Altitude:** 580m

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Height (approx.)
1	Sal	Hill Sal	<i>Shorea robusta</i>	120	18
2	Sal	Hill Sal	<i>Shorea robusta</i>	80	7
3	Sal	Hill Sal	<i>Shorea robusta</i>	60	7
4	Sal	Hill Sal	<i>Shorea robusta</i>	40	5
5	Sal	Hill Sal	<i>Shorea robusta</i>	35	5
6	Sal	Hill Sal	<i>Shorea robusta</i>	70	8
7	Sal	Hill Sal	<i>Shorea robusta</i>	70	8
8	Sal	Hill Sal	<i>Shorea robusta</i>	70	8
9	Sal	Hill Sal	<i>Shorea robusta</i>	60	7
10	Sal	Hill Sal	<i>Shorea robusta</i>	60	7
11	Sal	Hill Sal	<i>Shorea robusta</i>	90	9
12	Sal	Hill Sal	<i>Shorea robusta</i>	40	5
13	Sal	Hill Sal	<i>Shorea robusta</i>	60	7
14	Sal	Hill Sal	<i>Shorea robusta</i>	45	5
15	Sal	Hill Sal	<i>Shorea robusta</i>	30	5
16	Sal	Hill Sal	<i>Shorea robusta</i>	60	5 cut
17	Sal	Hill Sal	<i>Shorea robusta</i>	60	7
18	Sal	Hill Sal	<i>Shorea robusta</i>	70	8
19	Sal	Hill Sal	<i>Shorea robusta</i>	70	8
20	Sal	Hill Sal	<i>Shorea robusta</i>	60	7
21	Sal	Hill Sal	<i>Shorea robusta</i>	60	7
22	Sal	Hill Sal	<i>Shorea robusta</i>	70	8
23	Sal	Hill Sal	<i>Shorea robusta</i>	60	7
24	Sal	Hill Sal	<i>Shorea robusta</i>	35	4
25	Sal	Hill Sal	<i>Shorea robusta</i>	60	7
26	Sal	Hill Sal	<i>Shorea robusta</i>	50	6
27	Phadil	Black Plum	<i>Syzygium sps.</i>	60	5
28	Saanjh	Lourel Tree	<i>Terminalia alata</i>	60	7
29	Karam	Yellow Teak	<i>Adina cardifolia</i>	80	7
30	Karam	Yellow Teak	<i>Adina cardifolia</i>	30	4
31	Chiuri	Butter Tree	<i>Diploknema butyracea</i>	70	6 cut
Total- 31, Sal-26, Phadil-1, Saanjh-1, Karam-2, Chiuri-1					

**Forest Density:** (total no of tree/area of the quadrate)x10000 per hector=(31/625)X10000 per Hector=496 Trees per Hector

**Dominant species:** Sall=26/31X100%=83.88%

**Crown coverage of the forest:** 35%

**Note:** Other important floral species found in the quadrat are Bhalayo, Rudilo, Pepari, Dhayaro, Raino etc. less than 20cm DBH.

**b) Forest:** Jarayodip community forest

**Location:** Juda, V.D.C.-Dangbang-1

**G.P.S.** 40-15-72E, 30-95-413N

**Altitude:**590m

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Height (approx.)
1	Sal	Hill Sal	<i>Shorea robusta</i>	65	8
2	Sal	Hill Sal	<i>Shorea robusta</i>	60	10
3	Sal	Hill Sal	<i>Shorea robusta</i>	45	6
4	Sal	Hill Sal	<i>Shorea robusta</i>	60	7
5	Sal	Hill Sal	<i>Shorea robusta</i>	30	4
6	Sal	Hill Sal	<i>Shorea robusta</i>	50	6
7	Sal	Hill Sal	<i>Shorea robusta</i>	30	4
8	Sal	Hill Sal	<i>Shorea robusta</i>	60	8
9	Sal	Hill Sal	<i>Shorea robusta</i>	70	9
10	Sal	Hill Sal	<i>Shorea robusta</i>	40	5
11	Sal	Hill Sal	<i>Shorea robusta</i>	40	5
12	Sal	Hill Sal	<i>Shorea robusta</i>	50	6
13	Sal	Hill Sal	<i>Shorea robusta</i>	100	10
14	Sal	Hill Sal	<i>Shorea robusta</i>	80	10
15	Sal	Hill Sal	<i>Shorea robusta</i>	60	7
16	Sal	Hill Sal	<i>Shorea robusta</i>	40	5
17	Sal	Hill Sal	<i>Shorea robusta</i>	60	7
18	Sal	Hill Sal	<i>Shorea robusta</i>	80	8
19	Sal	Hill Sal	<i>Shorea robusta</i>	50	6
20	Sal	Hill Sal	<i>Shorea robusta</i>	70	8
21	Sal	Hill Sal	<i>Shorea robusta</i>	90	11
22	Bhalayo	Marking nut Tree	<i>Semecarpus anacardium</i>	40	4
Total- 22, Sal-21 and Bhalayo-1					

**Forest Density:** (total no of tree/area of the quadrate)X10000 per hector=22/625X10000 per Hector=352 Trees per Hector

**Dominant species:** Hill Sal (*Shorea robusta*)=(21/22) X100%=95.45%

**Crown coverage of the forest:** 20%

**Note:** Other floral species are also found in the Quadarat, which are less than 20cm DBH, They are; Phadil, Raino, Dabdabe, Kande maida and Thakal.

**c) Forest:** Gaida community forest

**Location:** Dangbang-7, Pyuthan

**G.P.S** 03-99-331E, 30-97-194N

**Altitude:** 581m

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Height (approx.)
1	Sall	Hill Sal	<i>Shorea robusta</i>	50	8
2	Sall	Hill Sal	<i>Shorea robusta</i>	40	7
3	Sall	Hill Sal	<i>Shorea robusta</i>	50	8
4	Sall	Hill Sal	<i>Shorea robusta</i>	30	7
5	Sall	Hill Sal	<i>Shorea robusta</i>	40	7
6	Sall	Hill Sal	<i>Shorea robusta</i>	60	9
7	Sall	Hill Sal	<i>Shorea robusta</i>	50	8
8	Sall	Hill Sal	<i>Shorea robusta</i>	55	7
9	Sall	Hill Sal	<i>Shorea robusta</i>	45	7
10	Sall	Hill Sal	<i>Shorea robusta</i>	50	8
11	Sall	Hill Sal	<i>Shorea robusta</i>	80	9
12	Sall	Hill Sal	<i>Shorea robusta</i>	60	8
13	Sall	Hill Sal	<i>Shorea robusta</i>	35	6

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Height (approx.)
14	Sall	Hill Sal	<i>Shorea robusta</i>	40	7
15	Sall	Hill Sal	<i>Shorea robusta</i>	70	8
16	Sall	Hill Sal	<i>Shorea robusta</i>	60	8
17	Sall	Hill Sal	<i>Shorea robusta</i>	40	7
18	Sall	Hill Sal	<i>Shorea robusta</i>	80	8
19	Sall	Hill Sal	<i>Shorea robusta</i>	50	7
20	Sall	Hill Sal	<i>Shorea robusta</i>	90	10
21	Sall	Hill Sal	<i>Shorea robusta</i>	60	8
22	Sall	Hill Sal	<i>Shorea robusta</i>	40	7
23	Sall	Hill Sal	<i>Shorea robusta</i>	40	6
24	Sall	Hill Sal	<i>Shorea robusta</i>	30	5
25	Sall	Hill Sal	<i>Shorea robusta</i>	40	7
26	Sall	Hill Sal	<i>Shorea robusta</i>	50	8
27	Sall	Hill Sal	<i>Shorea robusta</i>	50	7
28	Sall	Hill Sal	<i>Shorea robusta</i>	70	8
29	Sall	Hill Sal	<i>Shorea robusta</i>	90	10
30	Sall	Hill Sal	<i>Shorea robusta</i>	40	6
31	Pepari			50	7
Total-31, Sall-30 and Pepari-1					

**Forest Density:** total no of tree/area of the quadrate $\times 10,000=31/625\times 10000$  per Hector= $496$  trees per hector

**Dominant species:** Sall Trees= $(30/31)\times 100\%=96.77\%$

**Crown coverage of the forest:** 25%

**Note:** Other species are also found in the quadrat which are less than 20cm DBH, they are; Raino, Taki, Maloo, and Bhalayo.

### 3.5 Public Dependency on the Forest

The forests of the candidate project site provide a range of goods and services to the local communities. The local community extracts followings resources from the forest areas to support their livelihood.

- Fodder
- Firewood
- For thatch and other purposes as to make ceiling of local house
- Woods
- Vegetable like ramenta of fern, Bankhu etc.
- Medicine from tree like Khirro, Dabdabey, Pakhanbet, Khayar etc.

### 3.6 Floral Species of the Conservation Significance

Of the recorded floral species only 4 species have been categorized under the protection lists of the government of Nepal and CITES. However, none of the floral species have been listed in the IUCN red list. The table below presents the list of the protected species.

S.N.	Local Name	Common Name	Scientific Name	Status		
				IUCN	CITES	GON
1	Khayer	Cuth tree	<i>Acacia catechu</i>			P
2	Simal	Red cotton tree	<i>Bombax ceiba</i>			P
3	Sarpa Gandha		<i>Rawolfia serpentina</i>		II	P
4	Sall	Sall tree	<i>Sorea robusta</i>			P

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)



## 4 FAUNAL STUDY (WILDLIFE)

Information on the wildlife of the candidate project site is scarce in the published literatures. It is therefore site investigations are conducted to gather information through direct observation and the participatory methods with the local communities and the key informants. The findings of the filed investigations are presented in section hereunder.

### 4.1 Wildlife Diversity

Information on wildlife diversity is gathered through direct observation and participatory methods which included focus group discussion with the local communities and key informant surveys.

#### a) Mammals

A total of 23 mammalian species were recorded from the focus group discussion and key informant surveys. Of the total reported species 5 mammalian species were directly observed by the field biological team. The details of the mammalian species and habitat types are presented in the table below.

S.N.	Consultation	Observed	Common Name	Scientific Name
1	Jackal		Jackal	<i>Canis aureus</i>
2	Banbiralo		Banbiralo	<i>Felis chaus</i>
3	Lokharke(dhwanse)	*	Lokharke(dhwanse)	<i>Funambulus palmarum</i>
4	Lokharke (dharke)		Lokharke (dharke)	<i>Funambulus sps.</i>
5	Nyauri Muso	*	Nyauri Muso	<i>Herpestes edwardsii</i>
6	Bhede Bagh		Bhede Bagh	<i>Hyaena hyaena</i>
7	Sara(dumsi)		Sara(dumsi)	<i>Hystrix indica</i>
8	Kharayo		Kharayo	<i>Lepus nigricollis</i>
9	Pakha Ott		Pakha Ott	<i>Lutra lutra</i>
10	Pani Ot		Pani Ot	<i>Lutra sps.</i>
11	Rato Bandar	*	Rato Bandar	<i>Macaca mulatta</i>
12	Malsapro		Malsapro	<i>Martes flavigula</i>
13	Ratuwa		Ratuwa	<i>Muntiacus muntjak</i>
14	Dukure Muso		Dukure Muso	<i>Mus musculus</i>
15	Ghoral		Ghoral	<i>Naemoredus goral</i>
16	Chituwa		Chituwa	<i>Panthera pardus</i>
17	Udne Lokharke		Udne Lokharke	<i>Petaurista sps.</i>
18	Langur(Guna)	*	Langur(Guna)	<i>Semnopithecus entellus</i>
19	Chhuchundro		Chhuchundro	<i>Sorex sps.</i>
20	Bandel		Bandel	<i>Sus scrofa</i>
21	Phyauro		Phyauro	<i>Vulpes vulpes</i>
22	Ghar Chamero	*	Ghar Chamero	
23	Ban Chamero		Ban Chamero	

#### b) Birds

A total of 49 bird species are reported by the local communities and key informants. Of the total reported species 31 species are directly observed by the field biological team. Table below presents list of the reported and observed species in the candidate project influence area.

S.N.	Consultation	Observed	Common Name	Scientific Name
1	Sari	*	Common maina	<i>Acredotheres tristis</i>
2	Chuinya		Upland Pipit	<i>Anthus Sylvanus</i>
3	Vudrung (Huchil)		Great horned owl	<i>Bubo bubo</i>
4	Oolloo		Owl	<i>Bubo zeylonensis</i>
5	Seto Bakulla	*	Cattle egret	<i>Bubulcus ibis</i>
6	Petkaile Koili		Plaintive Cuckoo	<i>Cacomantis merulinus</i>

S.N.	Consultation	Observed	Common Name	Scientific Name
7	Kalij		Chir pheasant	<i>Catreus wallichi</i>
8	Haril Dhukur	*	Emerald Dove	<i>Chalcophaps indica</i>
9		*	Orange-bellied Leafbird	<i>Chloropsis hardwickii</i>
10	Hile Gidha	*	Wooly-necked stork	<i>Ciconia episcopus</i>
11	Dhobi Chara	*	Oriental-maggi Robin	<i>Copsychus saularis</i>
12	Kag(jungle)	*	Jungle Crow	<i>Corvus macrorhynchus</i>
13	Kag (house)	*	House Crow	<i>Corvus splendens</i>
14	Kokale	*	Tree pie	<i>Dendrocitta vagabunda</i>
15	Chibe	*	Spangled Drongo	<i>Dicrurus hottentottus</i>
16	Kalo Chibe	*	Black Drongo	<i>Dicrurus macrocerus</i>
17	Chiute Chara		Black-backed Forktail	<i>Enicurus immaculatus</i>
18	Kalo Titra	*	Black francolin	<i>Francolinus francolinus</i>
19	Luinche		Jungle fowl	<i>Gallus gallus</i>
20	Toriganda	*	White crested laughingthrush	<i>Garrulax leucolophus</i>
21		*	Long-tailed Sibia	<i>Heterophasia picaoides</i>
22	Bhadrayu	*	Long-tailed Shrike	<i>Lanius schach</i>
23	Kotero	*	Scaly-breasted Munia	<i>Lonchura sps.</i>
24	Chhirbire Matikore	*	Crested kingfisher	<i>Megaceryle lugubris</i>
25	Kuturke	*	Goldentrotted barbet	<i>Megalaima franklinii</i>
26	Kuthruke	*	Lineated barbet	<i>Megalaima lineata</i>
27	Chil	*	Black Kite	<i>Milvus migrans</i>
28	Kalchoda	*	Blue whistling thrush	<i>Myophonus caeruleus</i>
29	Seto Gidha		Egyptian vulture	<i>Neophron Percnopterus</i>
30	Sunchari		Golden Oriole	<i>Oriolus oriolus</i>
31	Vangero	*	House Sparrow	<i>Passer domesticus</i>
32	Jungali Vagero		Tree sparrow	<i>Passer montanus</i>
33	Mujur		Indian peafowl	<i>Pavo cristatus</i>
34	Rani chari		Scarlet minivet	<i>Pericrocotus flammeus</i>
35	Kalo Jalewa		Great Cormorant	<i>Phalacrocorax carbo</i>
36	Fisto		Leaf warbler	<i>Phylloscopus schwarzi</i>
37	Thulo Kathfora	*	Greyheaded woodpecker	<i>Picus canus</i>
38	Seto Jalewa		Great-crested Gerbe	<i>Podiceps cristatus</i>
39	Suga	*	Rose ringed parakeet	<i>Psittacula krameri</i>
40	Kalo Jureli	*	Red Vented Bulbul	<i>Pycnonotus cafer</i>
41	Khairo Jureli	*	Himalayan bulbul	<i>Pycnonotus leucogenys</i>
42		*	White-throated Fantail	<i>Rhipidura albicollis</i>
43		*	Common stonechat	<i>S. toquota</i>
44	Kurle Dhukur	*	Spotted dove	<i>Streptopelia chinensis</i>
45	Kalo Gidha		Black vulture	<i>Torgos calvus</i>
46	Haleso	*	Pompadour greenppigeon	<i>Treron pompadora</i>
47	Fafare Chara		Hoopoe	<i>Upupa epops</i>
48	Lampuchhre	*	Redbilled Blue Magpie	<i>Urocissa erythroryncha</i>
49	Hutityau		Grey-headed lapwing	<i>Vanellus duvaucelii</i>

### c) Herpetofauna

The key informants and the local community reported a total of 17 herpetofauna species from the reservoir area. Of the total reported 5 of the species are observed by the field study team. Details of the herpetofauna species and their habitat types are presented in the table below.

S.N.	Consultation	Observation	Common name	Scientific Name
1	Khasre Vyaguto	*	Toad	<i>Bufo melanostictus</i>
2	Chheparo		Callotes	<i>Calotes versicolor</i>
3	Batasay Sarpa			<i>Dendrelthesis tristis</i>
4	Goraya Sarpa			<i>Lycodon aulicus</i>
5	Valemungro	*		<i>Mabuia carinata</i>

S.N.	Consultation	Observation	Common name	Scientific Name
6	Sepe Sarpa		Cobra	<i>Naja naja</i>
7	Pani Sarpa	*		<i>Natrix piscator</i>
8	Dhamil Sarpa	*	Asiatic Rat snake	<i>Ptyas mucosus</i>
9	Vyaguto	*	Frog	<i>Rana tigrina</i>
10	Hariyokano Sarpa		Green pit viper	<i>Trimeresurus albolabris</i>
11	Sun Gohoro		yellow monitor lizard	<i>Varanus flavescens</i>
12	Gohoro		Monitor lizard	<i>Varanus flavescense</i>
13	Chichinde Sarpa			<i>Xenochrophis sps</i>
14	Pate Girgiti			
15	Uduwa Sarpa			
16	Paha (Pahenlo pate)			
17	Tiris Sarpa			

#### 4.2 Habitat Type in the Reservoir Area

The wildlife habitat of the reservoir area has the following characteristics.

- Mostly the forests are sparsly distributed and open type.
- Most of the project affected forests are fragmented by human settlements and for cultivation.
- Some forests are dense and high crown coverage.

#### 4.3 Migratory Corridor

The area is seasonally used as feeding habitat by the wildlife of the area and is not reported to be a migratory corridor and shows following characteristics.

- Wild Boar comes to feed seasonally and returns to uppermountain.
- Jalewa (jall hans) comes in winter (January to late April) for feeding and return in summer.
- Basically peacock comes to visit in summer season (July to October) for feeding as well as breeding and returns in the winter seasons.
- According to local people, rarely Bengal tiger (*Panthera tigris*) visit the area from lower parts of terai forest

#### 4.4 Wild Animals of Conservation Significance

The reported wildlife of the candidate project site are cross checked with the protected wildlife lists of the government of Nepal, IUCN red book and the CITES Appendices. The lists of the wildlife which fall in the protection category of the government of Nepal, IUCN red book and the CITES Appendices are presented in the sections below.

##### a) Mammals

Of the reported species of mammal, 8 of the species are listed under the protection category of either government of Nepal or IUCN red list or under CITES Appendices. Of the recorded species 1 is listed under government of Nepal protection list, 4 under IUCN red list and 6 under CITES Appendices. Table below presents the species and thier protection category under various protection lists.

S.N.	Local Name	Common Name	Scientific Name	Status			Source		
				IUCN	CITES	GON	Site survey	Hearing survey	Literature survey
1	Jackal	Jackal	<i>Canis aureus</i>		III			Hearing at Dangbang, Dhanchaur, Asurkot	

S.N.	Local Name	Common Name	Scientific Name	Status			Source		
				IUCN	CITES	GON	Site survey	Hearing survey	Literature survey
2	Nyauri Muso	Nyauri Muso	<i>Herpestes edwardsii</i>		III	P	Confirmed at site		
3	Bhede Bagh	Bhede Bagh	<i>Hyaena hyaena</i>	NT				Hearing at Dangbang, Dhanchaur, Asurkot	
4	Pani Ot	Pani Ot	<i>Lutra sps.</i>	VU				Hearing at Dangbang, Dhanchaur, Asurkot	
5	Ghoral	Ghoral	<i>Naemorhedus goral</i>	NT	I			Hearing at Dangbang, Dhanchaur, Asurkot	
6	Chituwa	Chituwa	<i>Panthera pardus</i>	NT	I			Hearing at Dangbang, Dhanchaur, Asurkot	
7	Langur(Guna)	Langur(Guna)	<i>Semnopithecus entellus</i>		I		Confirmed at site		
8	Phyauro	Phyauro	<i>Vulpes vulpes</i>		III			Hearing at Dangbang, Dhanchaur, Asurkot	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## b) Birds

Of the recorded avian species 3 are listed under the protection category of IUCN red list and in the CITES Appendices. Table below presents the details of the protected species and the protection category as per the government of Nepal and CITES Appendices.

S.N.	Local Name	Common name	Scientific name	Status			Source		
				IUCN	CITES	GoV	Site survey	Hearing survey	Literature survey
1	Kalij	Chir pheasant	<i>Catreus wallichi</i>		I	P		Hearing at Dangbang, Dhanchaur, Asurkot	
2	Kotero	Scaly-breasted Munia	<i>Lonchura sps.</i>		II			Hearing at Dangbang, Dhanchaur, Asurkot	
3	Seto Gidha	Egyptian vulture	<i>Neophron percnopterus</i>	EN				Hearing at Dangbang, Dhanchaur, Asurkot	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

**c) Herpetofauna**

Four of the herpetofauna species out of the recorded species are listed as protection category species of CITES Appendices. Table below presents the details of the protection category under various protection lists.

S.N.	Local Name	Common Name	Scientific Name	Status			Source		
				IUCN	CITES	GoV	Site survey	Hearing survey	Literature survey
1	Sepe Sarpa	Cobra	<i>Naja naja</i>		II			Hearing at Dangbang, Dhanchaur, Asurkot	
2	Dhamil Sarpa	Asiatic Rat snake	<i>Ptyas mucosus</i>		II		Confirmed at site		
3	Sun Gohoro	yellow monitor lizard	<i>Varanus flavescens</i>		I			Hearing at Dangbang, Dhanchaur, Asurkot	
4	Chichinde Sarpa		<i>Xenochrophis sps</i>		III			Hearing at Dangbang, Dhanchaur, Asurkot	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## 5 FISHERY STUDY

There is scanty information in the fish diversity, fishermen, fish market, and cost of fish in the candidate project site at the central and district level offices. To fill the data gap fish related information was gathered from the field surveys using a checklist. The fish survey is based on the participatory method and key informant survey methods along the influence area of the candidate project. The findings of the field survey are presented in the sections below.

### 5.1 Fishermen and their Occupational / Social / Economic Status and Fish Market, Availability and Cost

Participatory and key informant interviews reported nearly 4 occupational, 21 part time fishermen in the limits of the reservoir area. While all the members of communities' practice occasional fishing. Majority of the fishermen belong to Badi, and Magar ethnic group with a low social and economic status among the other communities.

About 50% of the fish caught by the fishermen is sold in the fish market, while rest is consumed by the fishermen family. There are altogether 3 fish markets in the nearby areas. Every day about 2 to 25 kg of fish is sold in each of the fish markets. Average cost of the fish in the market varies between 180 rupees.

Table below presents the details of information on the fishermen, their fishing status, economic and social status, fish market and availability of fish in the fish market and the average cost of the fish in the different parts of the reservoir area of the candidate project.

**a. Village / Tole: Nuwakot-8, Salyandhara**  
**Name of the respondent:** Rem Bahadur Ghartimagar

**Date:** 30/04/2069 B.S.  
**Age:** 52

#### Fishermen

Presence of fisherman in the village						Yes
If yes no. of fishermen						4
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	No	-	4	Magar	All	Magar and Chhetri
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low*	Medium*	High*
	Chandara	Chhetri	-	Badi	Chhetri	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

#### Fish Market, Fish Availability and Cost

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Durbang Bazar	Yes	5-10	180 Fresh, 1200 Dried

**NOTE:**

- Mostly they sell fish at Durbang Bazar but some time they sell at Khilji Bazar also.
- They have mostly big family member having low economic condition.

**b. Village / Tole: Khilji-4, Durbang**  
**Name of the respondent:** Kumari Baral Magar

**Date:** 30/03/2069 B.S.  
**Age:** 32

### Fishermen

Presence of fisherman in the village						Yes
If yes no. of fishermen						5
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	2	1 Chandara 2 Badi 1 Sarki	3	1 Gurung 2 Magar 3 Sarki	All	Chheri, Magar, Sarki and Gurung etc.
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Chandara Badi Sarki	-	-	Chandara Badi Sarki	-	-

Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs

Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell

### Fish Market, Fish Availability and Cost

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Durbang Bazar	Yes	10-15	180-200 Fresh, 1000-1200 Dried
Khilji Bazar	Yes	20-25	180 Fresh, 1000-1200 Dried

c. Village/Tole: Kadkura-1 V.D.C. Baraula  
Name of the respondent: Num Bahadur Gurung

Date:30/03/2069 B.S.  
Age: 35 Occupation: Teaching

### Fishermen

Presence of fisherman in the village						Yes
If yes no. of fishermen						16
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	2	Magar and Nepali	14	Gurung and Magr	All	Brahmin, Chhetri,Badi and Magar
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Magar and Nepali	-	-	Magar and Nepali	Chhetri and Brahman	-

Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs

Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell

### Fish Market, Fish Availability and Cost

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Baraula Bazar	Yes	15-20	180-200 Fresh, 1200 Dried

NOTE:

- Fisherman never they get chance to sell dry fish because they have to sell daily for hand to mouth problem
- There is no occupational fisherman from Thalaha Bazar but as part time all villagers they visit to fishing with fishing net.
- These Badi are almost totally depends upon fishing except in shrawan and vadra they have also busy in field because of heavy flood that makes difficulty for fishing in rainy season.

## 5.2 Fishing Season, Fish Catch, and Use of Caught Fish

Fishing in the river is carried out during the pre-monsoon and post monsoon seasons. Normally in the cold winter months (December - February) and monsoon months (June - September) fishing by the local fishermen is a rare activity. On an average daily catch of the fish by the occupational fishermen ranges between 2 to 3 kg with a maximum of 10kg. Nearly 50% of the fish caught is sold in the nearby fish

market. On an average the occupational fishermen earn about 9000 rupees annually. According to the local fishermen the fish population in the candidate project sites is declining over the years due to illegal fishing practices.

The tables below present the details of the fishing season, fish catch, types of fish available, annual income of the fishermen etc. based on the key informant survey in different location of the candidate project sites.

**a) Location: in residence**

**Date: 29/04/2069 B.S.**

**Name of the fisherman:** Rem Bahadur Ghartimagar **Age:** 52 **Address:** Nuwakot, Arghakhachi

**Family:** 2 parents, 5 children

<b>Fishing detail</b>	Fishing season:	All seasons but Poush and Magh, Shrawan and Bhadra ( July – Sep) is difficult because of flood.			
	Fishing days/week:	6 days / week			
	Maximum catch/day:	3-5 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	2 kg			
<b>using way</b>	Consumed	At home	-	Average cost	Income last year
		In market	2 Kg	Rs.180-200/kg	No save

**Name of stream:** Chheda Khola

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Therd, Sahar, Ghorat, Kashare or Chokri, Manera, Buduna, Tilaura, Gardi, Rim, Chuche Bam, Sidre and Gonch.	Buduna, Chokri and Gardi	*		
		1) Increasing the population of fishermen. 2) Blasting activities done near the river.		

**b) Location:** Baraula-1, Kadmura

**Date: 30/04/2069 B.S.**

**Name of the fisherman:** Num Bahadur Gurung

**Age:** 36

<b>Fishing detail</b>	Fishing season:	Except Poush and magh because of too cold			
	Fishing days/week:	4-5 days / week			
	Maximum catch/day:	9-10 kg			
	Minimum catch/day:	1-2 kg			
	Average catch/day:	3-5 kg			
<b>using way</b>	Part consume and Part sell.	At home	Part	Average cost	Income last year
		In market	Part	Rs 180-200	Rs8,000-10,000

**Name of stream:** Lower Jhimruk

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Therd, Sahar, Ghorat, Kashare or Chokri, Manera, Buduna, Tilaura, Gardi, Rim, Chuche Bam, Sidre and Gonch.	Gardi and Karanga (Chokri)	*		
		-Fishermen number has increased. -Due to poisoning up to last 2 years - Blasting activities done near the river side.		



### 5.3 Fish Diversity

A total of 11 fish species is reported by the local fishermen during the key informant survey. The lists of the fish species reported in the candidate project site are presented in the table below.

S.N.	Local Name	Common Name	Scientific Name
1	Bam(Chuche)	Blind- serpent	<i>Amphiphnous cuchia</i>
2	Rim	Eel	<i>Anguilla bengalensis</i>
3	Therd		<i>Bagarius bagarius</i>
4	Buduna		<i>Garra annadalei</i>
5	Gardi		<i>Labeo dyochailus</i>
6	Sidre		<i>Puntius sarana</i>
7	Sahar		<i>Tor tor</i>
8	Ghorat		
9	Kasare or Chokre		
10	Manera		
11	Tilaura		

### 5.4 List of Fish Species of Conservation Significance

Of the 11 reported fish species 2 of the fish species is listed in the IUCN red list. Table below presents the list of the fish species of conservation significance.

S.N.	Local Name	Common Name	Scientific Name	Status			Site survey	Hearing survey	Literature survey
				IUCN	CITES	GON			
1	Therd		<i>Bagarius bagarius</i>	NT				Hearing at Barula, Nuwakot, Durbang	
2	Sahar		<i>Tor tor</i>	NT				Hearing at Barula, Nuwakot, Durbang	

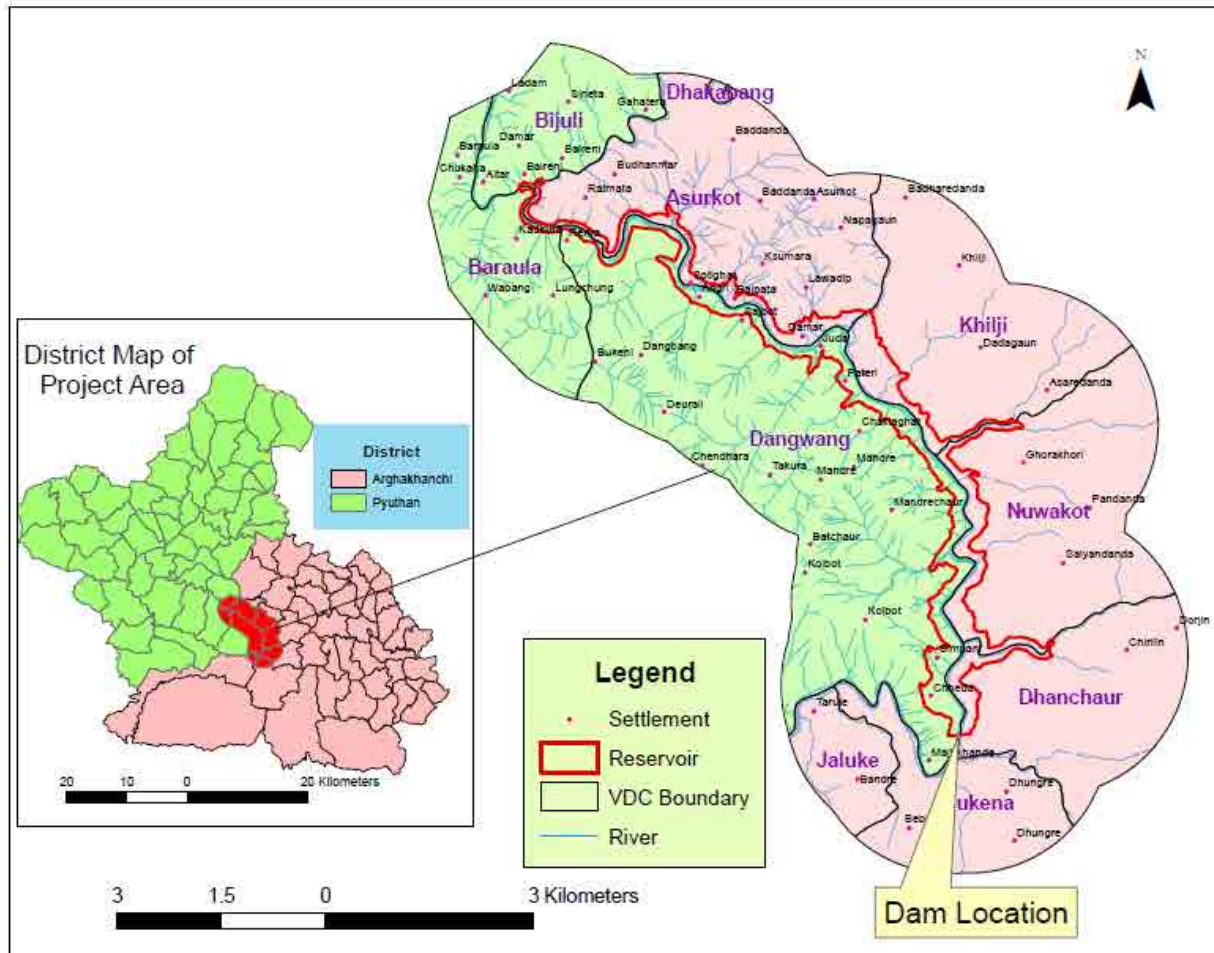
**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## 6 Topographic Map and Satellite Imagery Study

### 6.1 Project Location



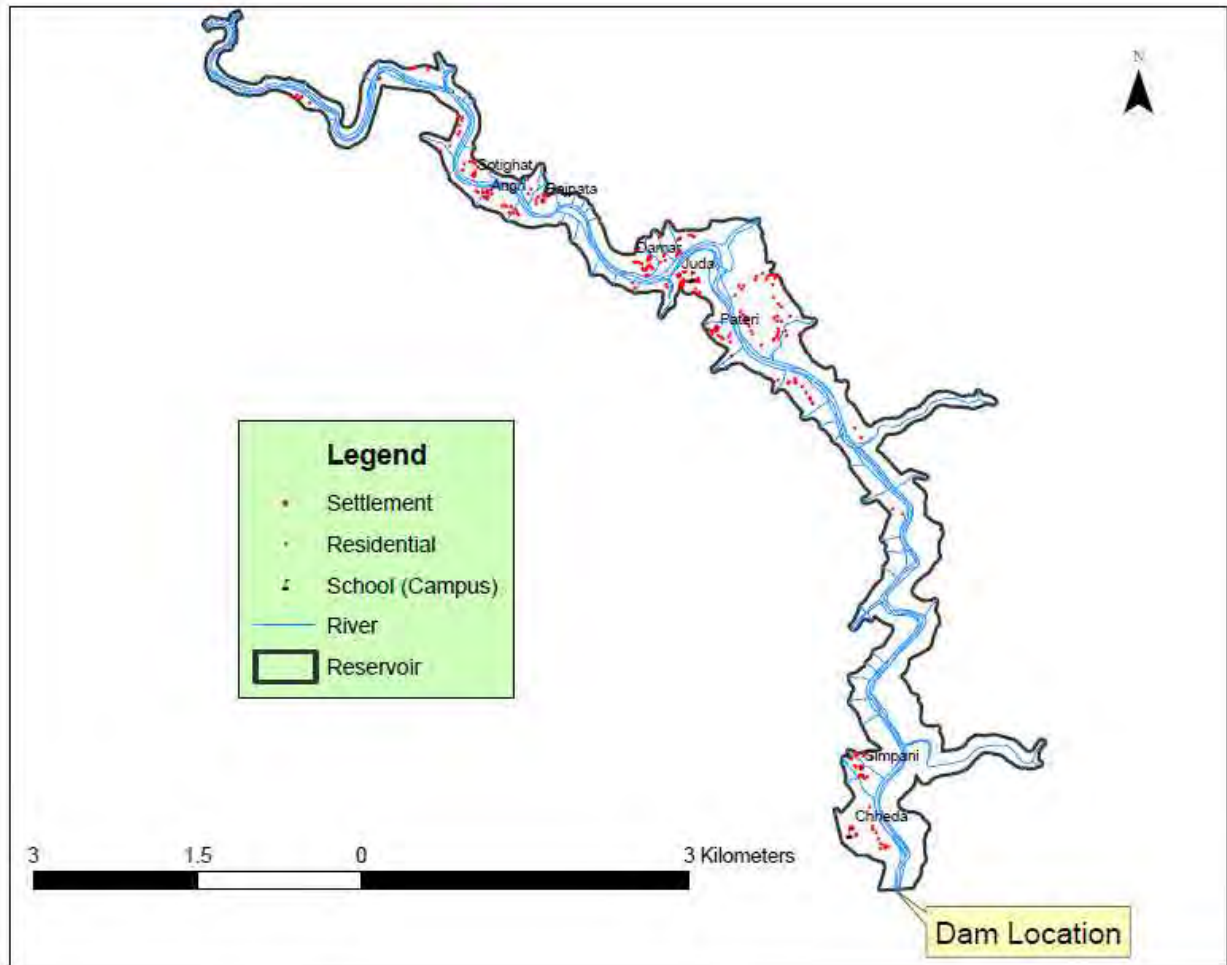
### 6.2 Topographic Maps

For this study, topographical maps of the scale of 1: 25000 prepared by the Government of Nepal, Survey Department (1996) has been used for the analysis of land cover, and built structures, after digitizing. All data used for the topographic map study were projected to the Universal Transverse Mercator (UTM) projection system that is World Geodetic System 1984 for the analysis of topographic maps.

The analysis results are presented in the table and maps below.

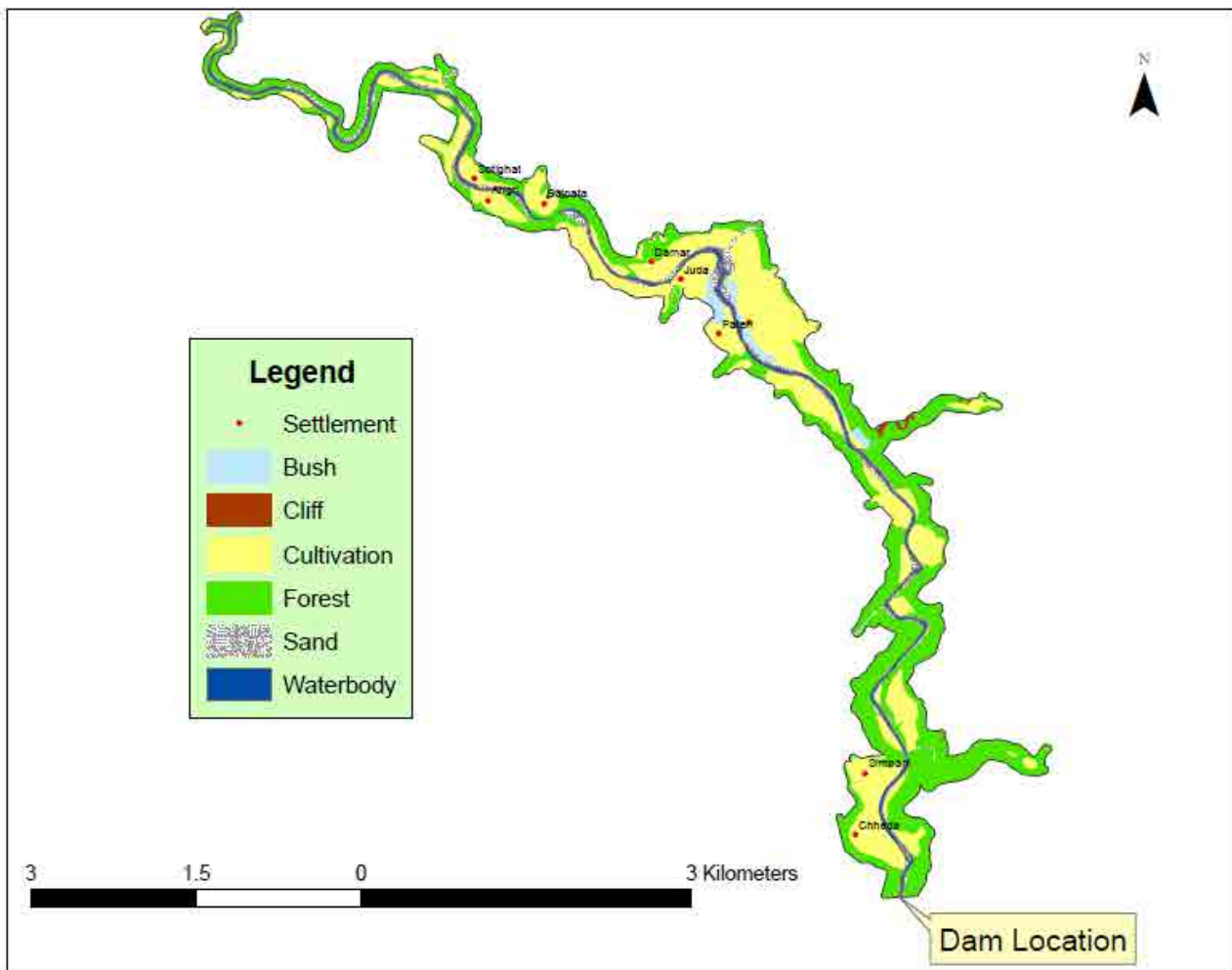
### 6.2.1 Built Structures

Nos. of building as per the Topographic maps	206
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### 6.2.2 Land Use

S.N.	Land Use Class	Land Use Topographic Maps (1996), Km <sup>2</sup>	Percentage
1	FOREST	2.473386	43.5455
2	BUSH	0.112439	1.9795
3	SAND	0.442215	7.7854
4	CULTIVATED	2.268157	39.9323
5	CLIFF	0.013494	0.2375
6	WATER	0.378323	6.6606
7	GRASS LAND		
8	BARREN LAND		
	<b>TOTAL</b>	<b>5.68</b>	<b>100</b>

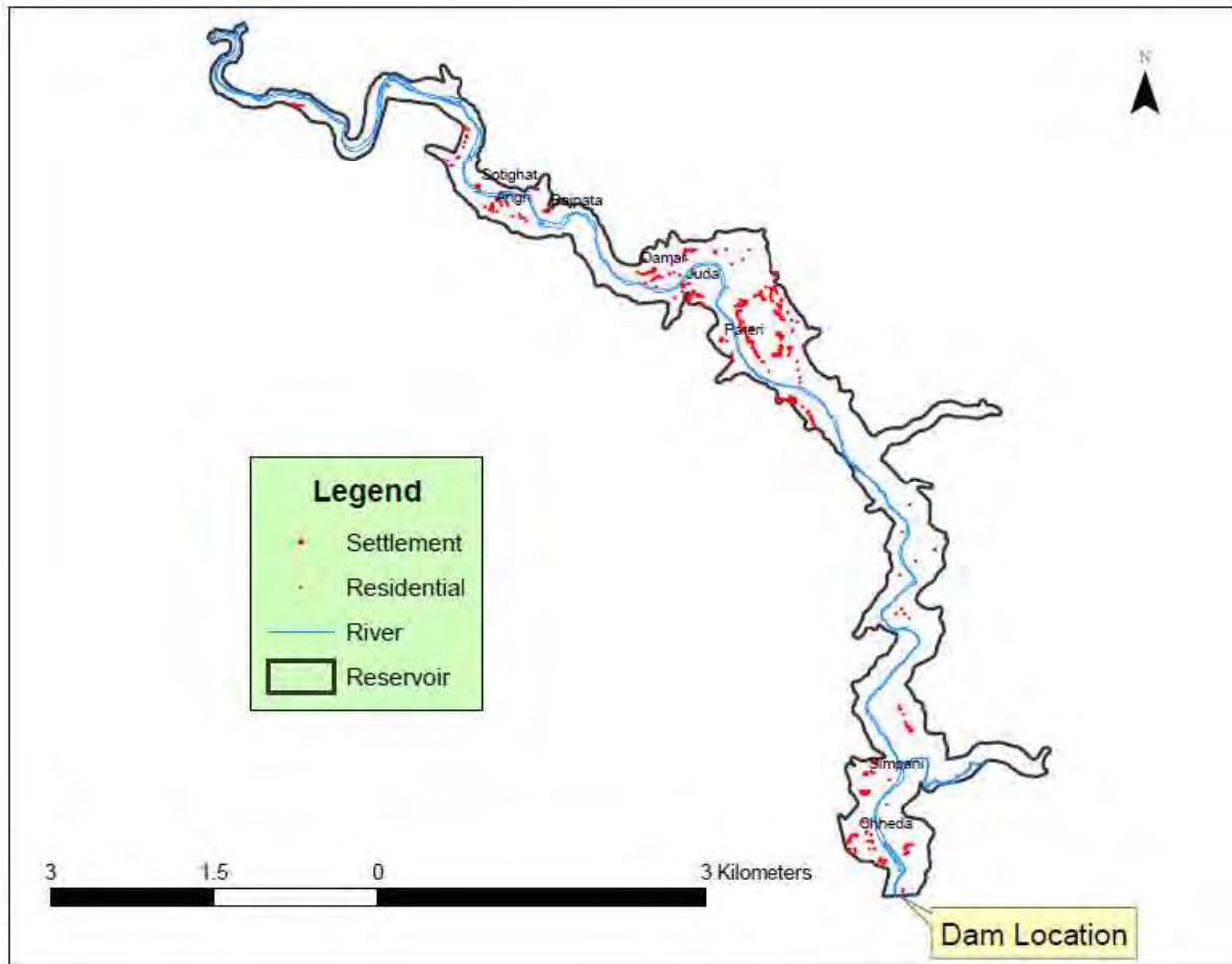


### 6.3 Satellite Image Maps

The Arc GIS 9.3 has been used for the analysis of image. World view 2 image of 2010 has been used for the land use and other parameters such as built structures, road networks, bridges etc. analysis of the area. The analysis results are presented in tables and Map below.

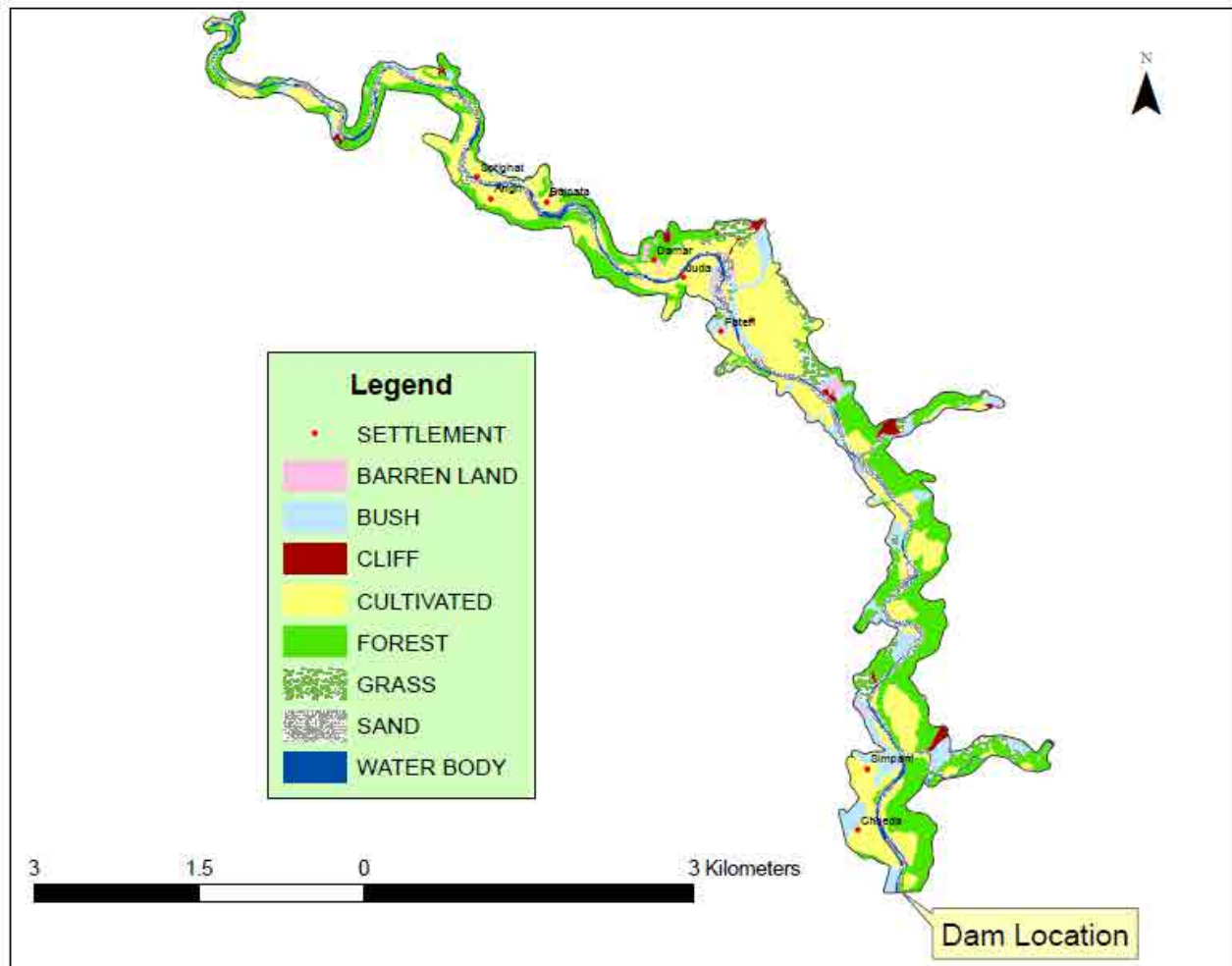
#### 6.3.1 Building Structures

Nos. of building as per the Satellite Image	386
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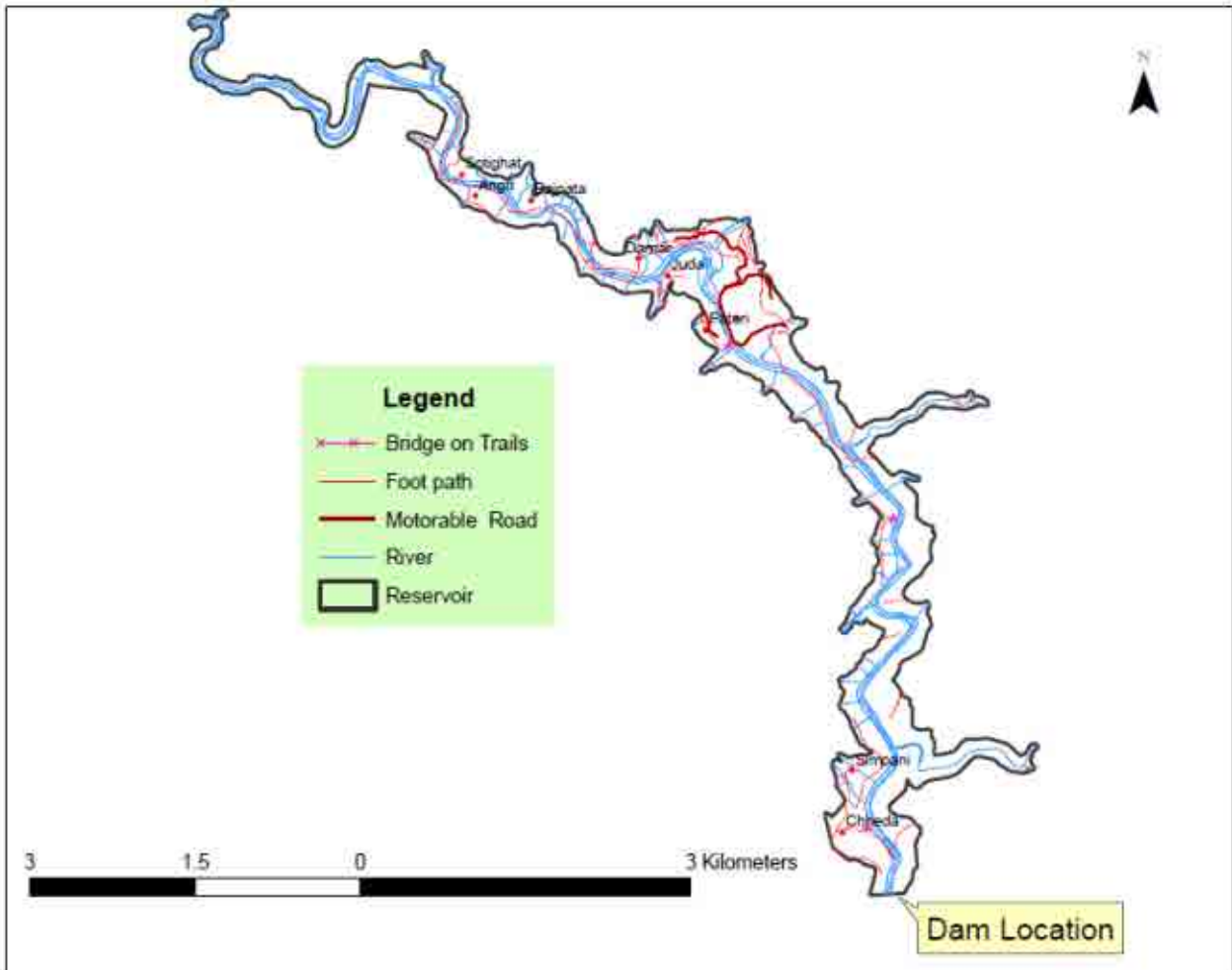
### 6.3.2 Land use

S.N.	Land Use Class	Land Use Satellite Image (2010), Km <sup>2</sup>	Percentage
1	FOREST	1.872281	32.9626
2	BUSH	0.507464	8.9342
3	SAND	0.505328	8.8966
4	CULTIVATED	2.044143	35.9884
5	CLIFF	0.086412	1.5213
6	WATER	0.29715	5.2315
7	GRASS LAND	0.302993	5.3343
8	BARREN LAND	0.070038	1.233
	<b>TOTAL</b>	<b>5.68</b>	<b>100</b>



### 6.3.3 Infrastructures

Infrastructures	Nos. / Length
Total Nos. of Bridge on motorable road	0
Total Nos. of bridge on trail	3
Total Nos. of fords	0
Gravel road (m)	3324
Paved Road (Highway) (m)	0
Main Trail (m)	0
Foot path (m)	19519



## References

1. Bibhuti Ranjan Jha, 2006; *Fish Ecological Studies and its application in assessing Ecological Integrity of Rivers in Nepal*; Thesis Submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in The Department of Biological Sciences and Environmental Science, School of Science, Kathmandu University, Dhulikhel, Nepal, January 2006
2. CBS (2002), *Population Census 2001, National Report*, Kathmandu: Central Bureau of Statistics / UNFPA
3. CBS, 2012; *National Population and Housing Census 2011 (Village Development Committee/Municipalities), Government of Nepal*, National Planning Commission Secretariate, Central Bureau of Statistics, Kathmandu, Nepal, November 2012.
4. Disaster Preparedness Network, Nepal, 2009; *Nepal Disaster Report: The hazardscape and vulnerabilities*, Ministry of Home Affairs, Nepal Disaster Preparedness Network, Nepal with support from with support from European Commission for Humanitarian Aid Department, United Nations Development Nepal and Oxfam Nepal
5. IUCN, 2011; *The Status of Nepal's Mammals: The National Red List Series*
6. NARMSAP, 2002; *Forest and Vegetation Types of Nepal*, TISC Document Series No 105, GoN / MOFSC / NARMSAP, 1-179.
7. Petr, T, 2002; *Cold water fish and fisheries in countries of the high mountain arc of Asia (Hindu Kush-Pamir-Karakoram-Himalayas) A review*, Symposium on coldwater fish species in the trans-Himalayan region. 10-14 July 2001. Kathmandu, Nepal
8. Rajbansi K.J, 1982; *A General Bibliography on Fish and Fisheries of Nepal*, Royal Nepal Academy, Kamaladi, Kathmandu, Nepal.
9. Rajbansi K.J, 2002; *Zoogeographical distribution and the status of cold water fishes of Nepal*. Paper presented in symposium on coldwater fish species in the trans-himalayan region. 10-14 July 2001. Kathmandu, Nepal
10. Shrestha et.al, 2012; *Fishes of Nepal: Mapping distributions based on voucher specimens*, Emporia State Research Studies Vol. 48, no. 2, p. 14-21 (2012)
11. Shrestha, J. (1995); *Enumeration of the Fishes of Nepal*, Bio-diversity Profiles Project, Publication No. 10, Department of National Parks and wildlife Conservation, Ministry of Forest & Soil Conservation, GoN, Kathmandu, Nepal.
12. Shrestha, T. K., 2008; *Icology of Nepal A study of Fishes of the Himalayan Waters*
13. Stainton, J.D.A., 1972; *Forests of Nepal*, John Murray, London.



## Photographs



House type of chedaghat



Interacting with local on the way



Interview with fisherman (Kadkura, Pyuthan)



Irrigation canal at Chedaghat



Local women fishing at Angri



Man working at Mill



Newly constructed water tank at Damar



Rice and oil mill at Durbang

# Appendixes

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**Appendix 1: Districts, VDCs and Settlements and Population under the Storage Project**

Region / District	VDCs	Settlements	Ward Number	Number of Households	Population
<b>A. Western Development Region</b>					
Arghakhanchi	Asurkot	Sotighat	2	9	19
		Bajhapata	2	5	10
	Khilji	Damar	5	19	50
		Durbang	4	45	314
	Dhanchaur	Badare	8	5	25
<b>Sub-total A</b>	<b>3</b>	<b>5</b>	<b>4</b>	<b>83</b>	<b>418</b>
<b>B. Mid Western Development Region</b>					
Pyuthan	Dangwang	Cheddaghat	9	24	300
		Chaklaghat	8	22	230
		juda	1	23	125
		Pateri	8	5	20
		Sajbot	1	18	110
		Angri	1	20	60
		Simpani	6	16	95
	Baraula	Kodkura	1	13	90
		Rakasha	1	5	45
<b>Sub-total B</b>	<b>2</b>	<b>9</b>	<b>4</b>	<b>146</b>	<b>1075</b>
<b>Total (A+B)</b>	<b>5</b>	<b>14</b>	<b>8</b>	<b>229</b>	<b>1493</b>

Source: NESS Field Survey, 2012

**Appendix 2: Ethnic / Caste Group of Population by Reservoir Area Settlements**

District/ VDC	Cluster	Number of Households by Ethnicity/Caste						
		Brahmin	Chhetri	Magar (Disadvantage Group)	Gurung (Disadvantage group)	Newar (Advanced group)	Kumal (Marginalized group)	Dalit
Pyuthan/ Dangwang	Cheddaghat	0	0	24	0	0	0	0
	Chaklaghat	0	0	22	0	0	0	0
	juda	9	6	8	0	0	0	0
	Pateri	5	0	0	0	0	0	0
	Sajbot	0	1	0	0	0	17	0
	Angri	12	0	0	0	0	5	3
	Simpani	4	0	12	0	0	0	0
Baraula	Kodkura	0	0	0	13	0	0	0
	Rakasha	0	0	0	5	0	0	0
Arghakhanchi/ Asurkot	Sotighat	7	0	2	0	0	0	0
	Bajhapata	5	0	0	0	0	0	0
Khilji	Damar	1	18	0	0	0	0	0
	Durbang	24	0	8	0	5	0	8
Dhanchaur	Badare	0	0	2	3	0	0	0
<b>Total</b>	<b>14</b>	<b>67</b>	<b>25</b>	<b>78</b>	<b>21</b>	<b>5</b>	<b>22</b>	<b>11</b>
<b>Total All Households : 229</b>								

Source: NESS Field Survey, 2012

**Appendix 3: Land Use Pattern in the Reservoir Area**

District	VDC	Cluster	Land Use Pattern (Ropani- One Ha=20 ropani)			
			Agriculture	pasture	forest	Total
Pyuthan	Dangwang	Cheddaghat	105	0	20	125
		Chaklaghat	90	0	10	100
		juda	200	0	0	200
		Pateri	20	0	0	20
		Sajbot	55	0	0	55
	Baraula	Angri	40	10	5	55
		Simpani	50	0	0	50
		Kodkura	30	0	0	30
		Rakasha	25	0	0	25
Arghakhanchi	Asurkot	Sotighat	45	0	5	50
		Bajhapata	25	10	5	40
	Khilji	Damar	130	0	20	150
		Durbang	580	0	10	590
	Dhanchaur	Badare	25	0	5	30
<b>Total</b>	<b>5</b>	<b>14</b>	<b>1420</b>	<b>20</b>	<b>80</b>	<b>1520</b>
<b>%</b>			<b>93.42</b>	<b>1.32</b>	<b>5.26</b>	<b>100</b>

Source: NESS Field Survey, 2012

**Appendix 4: Land Holding Size by Settlements of the Reservoir Area**

District	VDC	Cluster	Total and Average Holding Size of Agricultural Land (Ropani), One Ha=20 ropani			
			Khet	Pakho	Total	Average
A. Pyuthan	Dangwang	Cheddaghat	5	100	105	4.38
		Chaklaghat	40	50	90	4.09
		juda	200	0	200	8.70
		Pateri	20	0	20	4.00
		Sajbot	30	25	55	3.06
	Baraula	Angri	40	0	40	2.00
		Simpani	20	30	50	3.13
		Kodkura	0	30	30	2.31
		Rakasha	25	0	25	5.00
<b>Sub-total A</b>	<b>2</b>	<b>9</b>	<b>380</b>	<b>235</b>	<b>615</b>	<b>7.41</b>
B. Arghakhanchi	Asurkot	Sotighat	25	20	45	5.00
		Bajhapata	0	25	25	5.00
	Khilji	Damar	90	40	130	6.84
		Durbang	80	500	580	12.89
	Dhanchaur	Badare	5	20	25	5.00
<b>Sub-total B</b>	<b>3</b>	<b>5</b>	<b>200</b>	<b>605</b>	<b>805</b>	<b>5.51</b>
<b>Total</b>	<b>5</b>	<b>14</b>	<b>580</b>	<b>840</b>	<b>1420</b>	<b>6.20</b>

Source: NESS Field Survey, 2012

## Appendix 5 Area under different Crops and Production under different Crops

Table 1: Area under different Crops

District	VDC	Cluster	Total area under different Crops (Ropani), One Ha=20 ropani					
			Paddy	Maize	Wheat	Potato	Oilseeds	Vegetables
Pyuthan	Dangwang	Cheddaghat	2	100	50	0	5	2
		Chaklaghat	40	60	20	5		5
		juda	200	150	50	10		8
		Pateri	20	15	5	2		1
		Sajbot	30	40	15	0		
		Angri	40	20	20	2		1
		Simpani	20	40	10	3		5
	Baraula	Kodkura	0	30	25	0		2
		Rakasha	25	20	20	5		1
Arghakhanchi	Asurkot	Sotighat	25	40	10	2		1
		Bajhapata	0	20	10	0	2	1
	Khilji	Damar	90	50	70	5	2	2
		Durbang	80	400	150	20		
	Dhanchaur	Badare	5	25	0	0.5		0.5
<b>Total</b>	<b>5</b>	<b>14</b>	<b>577</b>	<b>1010</b>	<b>455</b>	<b>54.5</b>	<b>9</b>	<b>29.5</b>

Source: NESS Field Survey, 2012

Table 2: Production under different Crops

District	VDC	Cluster	Production under different Crops (Kg)					
			Paddy	Maize	Wheat	Potato	Oilseeds	Vegetables
Pyuthan	Dangwang	Cheddaghat	300	15750	2520	0	200	50
		Chaklaghat	4500	10080	1575	500		120
		juda	20000	18900	3780	800		500
		Pateri	1750	2520	378	150		100
		Sajbot	3500	6300	1260	0		
		Angri	3500	3150	945	100		50
		Simpani	3500	6930	12600	200		100
	Baraula	Kodkura	0	6300	1890	0		50
		Rakasha	2500	3780	1260	300		50
Arghakhanchi	Asurkot	Sotighat	2500	6300	756	200		50
		Bajhapata	0	3150	630	0	100	50
	Khilji	Damar	8500	7560	5040	400	50	100
		Durbang	9000	63000	10080	1500		
	Dhanchaur	Badare	500	4410	0	75		50
<b>Total</b>	<b>5</b>	<b>14</b>	<b>60050</b>	<b>158130</b>	<b>42714</b>	<b>4225</b>	<b>350</b>	<b>1270</b>

Source: NESS Field Survey, 2012

**Appendix 6: Festivals and Religious Sites**

District	VDC	Cluster	Major Festivals	Religious Sites / Cremation Ghats
Pyuthan	Dangwang	Cheddaghat	Dasain, Tihar, Tija, Majhe Sankarati,	Below settlement at Chejang
		Chaklaghat	Dasain, Tihar, Tija, Majhe Sankarati,	Near settlement
		juda	Dasain, Tihar, Tija, Majhe Sankarati,	Below settlement at Jhimruk river
		Pateri	Dasain, Tihar, Tija, Majhe Sankarati,	Below settlement
		Sajbot		Bank of Jhimruk river
		Angri	Dasain, Tihar, Tija, Majhe Sankarati,	Below settlement
		Simpani	Dasain, Tihar, Tija, Majhe Sankarati,	Below settlement
	Baraula	Kodkura	Dasain, Tihar, Tija, Majhe Sankarati,	Near bank of Jhimruk river
		Rakasha	Dasain, Tihar, Tija, Majhe Sankarati,	Below settlement
Arghakhanchi	Asurkot	Sotighat	Dasain, Tihar, Tija, Majhe Sankarati,	Below settlement
		Bajhapata	Dasain, Tihar, Tija, Majhe Sankarati,	Near settlement
	Khilji	Damar	Dasain, Tihar, Tija, Majhe Sankarati,	Below settlement
		Durbang	Dasain, Tihar, Tija, Majhe Sankarati	Below settlement / Newly Constructed Temple at the riverside
	Dhanchaur	Badare	Dasain, Tihar, Tija, Majhe Sankarati,	Near settlement at Chejang
<b>Total</b>			<b>Total</b>	

Source: NESS Field Survey, 2012

**Appendix 7: List of FGD Participants (LOWER JHIMRUK)  
District: Pyuthan and Argakhanchi**

S.N.	Name of Respondent	Address	Occupation
1	Umesh Gharti	Danwang-9, Cheddaghat	Foreign employment
2	Devi Ram Gharti	Danwang-9, Cheddaghat	Farmer
3	Sumanta Bdr. Ghartimagar	Danwang-8, Chaklaghat	Farmer / retired army
4	Om Bdr. Ghartimagar	Danwang-8, Chaklaghat	Farmer
5	Dhani Kata ghartimagar	Danwang-8, Chaklaghat	Housewife
6	Chandra Bdr. ghartimagar	Danwang-8, Chaklaghat	Farmer
7	Pratiman Thapa Magar	Danwang-8, Chaklaghat	Farmer
8	Drona Prashad Pandey	Danwang-1, Juda	Teacher (School principle)
9	Keshab Raj Acharya	Danwang-1, Juda	Teacher
10	Bali Ram Acharya	Danwang-1, Angri	Farmer
11	Parbat Acharya	Danwang-1, Angri	Housewife / farmer
12	Suntali Kumal	Danwang-1, Angri	Farmer / Housewife
13	Rem Bdr. Ghartimagar	Danwang-6, Simpani	Farmer
14	Jhabilal Ghartimagar	Danwang-6, Simpani	Retired army (India)
15	Aita Ghartimagar	Danwang-6, Simpani	Farmer
16	Num Bdr. Gurung	Baraula-1, Kodhkura	Farmer
17	Lil Bdr. Gurung	Baraula-1, Kodhkura	Farmer
18	Chabilal Gurung	Baraula-1, Kodhkura	Foreign employment
19	Kersingh Gurung	Baraula-1, Kodhkura	Foreign employment
20	Salika Devi Gurung	Baraula-1, Rakasha	Housewife
21	Kashi Ram Banjare	Asurkot-2, Sotighat	Farmer
22	Lem Kala Banjare	Asurkot-2, Sotighat	Farmer
23	Dina Ram Banjare	Asurkot-2, Sotighat	Farmer
24	Bali Ram Acharya	Asurkot-2, Bajpata	Farmer
25	Rabilal Belbase	Khilji-5, Damar	Farmer / Retired army
26	Dev Ram Belbase	Khilji-5, Damar	Foreign employment
27	Gopal Belbase	Khilji-5, Damar	Student
28	Santa Belbase	Khilji-5, Damar	Farmer
29	Chuma kala Belbase	Khilji-5, Damar	Farmer
30	Hira Singh Resmi	Khilji-4, Durbang	Farmer
31	Sunil Panthi	Khilji-4, Durbang	Bussiness man
32	Maniram Panthi	Khilji-4, Durbang	Bussiness man
33	Thakur Shrestha	Khilji-4, Durbang	Retired army
34	Sarswoti Thedimagar	Dhanchaur-8, Badare	Farmer
35	Shyam Kala Themagar	Dhanchaur-8, Badare	Student
36	Bhim Bdr. Rajali	Dangbang-9, Chhede	Farmer
37	Khim Bdr. Ranamagar	Nuwakot-8, Ghorakhori	Agriculture
38	Rem Bdr. Ghartimagar	Nuwakot-8, Salyandhara	Farmer
39	Kumari Baral	Khilji-4, Durbang	Agriculture
40	Num Bdr. Gurung	Baraula-1, Kadkura	Agriculture
41	Hari Bdr. Gharti	Bijuli-6, Aitar	Agriculture

**Appendix 8: Public Consultation Lower Jhimruk Project (Puythan and Arghakhachi Districts)**

Field visit to the Lower Jhimruk project site was made on 8<sup>th</sup> to 14<sup>th</sup> June 2012. The objective of the visit was to collect primary information on the social, socio-economic, cultural, forest resources, wildlife, disaster records and aquatic ecological aspects from the reservoir area and the key structural locations of the project.

Since the study period was limited, most of the information related to the above aspects was derived based on the public consultations and interviews with the key informants. The socio-economic information was solicited from the focus group discussions at various settlements within the reservoir area. Information on disaster, fishermen, and fish diversity is based on the key informant interviews, while information on the forest, floral and wildlife diversity is based on the direct observation and interviews with the key informants of the local area. Focus group consultation meetings were held at 12 sites within the reservoir area (Table 1), while 6 key informants were interviewed for in depth knowledgeable information (Table 2).

**Table 1: Participants of the Focus Group Discussion**

S.N.	NAME OF PARTICIPANTS	OCCUPATION/POSITION	LOCATION
<b>DANGWANG -9; CHEDDAGHAT</b>			
1	UMESH GHARTI	FOREIGN EMPLOYMENT	DANGWANG -9; CHEDDAGHAT
2	DEVIRAM GHARTI	FARMER	DANGWANG -9; CHEDDAGHAT
<b>DANGWANG – 8; CHAKLAGHAT</b>			
1	SUMANTA BHD GHARTIMAGAR	FARMER /RETIRED ARMY	DANGWANG – 8; CHAKLAGHAT
2	OM BHD GHARTIMAGAR	FARMER	DANGWANG – 8; CHAKLAGHAT
3	DHANI KATA GHARTIMAGAR	HOUSEWIFE	DANGWANG – 8; CHAKLAGHAT
4	CHANDRA BHD GHARTIMAGAR	FARMER	DANGWANG – 8; CHAKLAGHAT
5	PRATIMA THAPAMAGAR	FARMER	DANGWANG – 8; CHAKLAGHAT
<b>DANGWANG-1; JUDA</b>			
1	DRONA PRASHAD PANDEY	TEACHER (SCHOOL PRINCIPAL)	DANGWANG-1; JUDA
2	KESHAB RAJ ACHARYA	TEACHER	DANGWANG-1; JUDA
<b>DANGWANG-1; ANGRI</b>			
1	BALI RAM ACHARYA	FARMER	DANGWANG-1; ANGRI
2	PARBATI ACHARYA	HOUSEWIFE/ FARMER	DANGWANG-1; ANGRI
3	SUNTALI KUMAL	HOUSEWIFE/ FARMER	DANGWANG-1; ANGRI
<b>DANGWANG- 6; SIMPANI</b>			
1	RAM BHD GHARTIMAGAR	FARMER	DANGWANG- 6; SIMPANI
2	JHABILAL GHARTIMAGAR	RETIRED ARMY	DANGWANG- 6; SIMPANI
3	AITA SINGH GHARTIMAGAR	FARMER	DANGWANG- 6; SIMPANI
<b>BARAULA –1; KODHKURA</b>			
1	NUM BHD GURUNG	FARMER	BARAULA –1; KODHKURA
2	LIL BHD GURUNG	FARMER	BARAULA –1; KODHKURA
3	CHABILAL GURUNG	FOREIGN EMPLOYMENT	BARAULA –1; KODHKURA
4	KERSINGH GURUNG	FOREIGN EMPLOYMENT	BARAULA –1; KODHKURA
<b>BARAUALA– 1; RAKASHA</b>			



S.N.	NAME OF PARTICIPANTS	OCCUPATION/POSITION	LOCATION
1	BALLIKA DEVI GURUNG	HOUSEWIFE	BARAUALA- 1; RAKASHA
<b>ASURKOT -2; SOTIGHAT</b>			
1	KANSI RAM BANJARE	FARMER	ASURKOT -2; SOTIGHAT
2	HEM KALA BANJARE	FARMER	ASURKOT -2; SOTIGHAT
3	DINA RAM BANJARE	FARMER	ASURKOT -2; SOTIGHAT
<b>ASURKOT – 2; BAJHPATA</b>			
1	BALI RAM ACHARYA	FARMER	ASURKOT – 2; BAJHPATA
<b>KHILJI -5; DAMAR</b>			
1	RABILAL BELBASE	AGRICULTURE (RETIRED ARMY)	KHILJI -5; DAMAR
2	DEVI RAM BELBASE	FOREIGN EMPLOYMENT	KHILJI -5; DAMAR
3	GOPAL BELBASE	STUDENT	KHILJI -5; DAMAR
4	SANTA BELBASE	AGRICULTURE	KHILJI -5; DAMAR
5	CHUMA KALA BELBASE	AGRICULTURE	KHILJI -5; DAMAR
<b>KHILJI -4; DURBANG</b>			
1	HIRA SINGH RESMI	FARMER	KHILJI -4; DURBANG
2	SUNIL PANTHI	BUSINESSMAN	KHILJI -4; DURBANG
3	MANIRAM PANTHI	BUSINESSMAN	KHILJI -4; DURBANG
4	THAKUR SHRESTHA	RETIRED ARMY	KHILJI -4; DURBANG
<b>DHANCHUAR -8; BADARE</b>			
1	SARSWOTI THEDIMAGAR	FARMER	DHANCHUAR -8; BADARE
2	SHYAM KALA THEDIMAGAR	STUDENT	DHANCHUAR -8; BADARE

Table 2: Key Informant for Interview

S.N	NAME OF KEY INFORMANTS	OCCUPATION/POSITION	LOCATION
1	BHIM BDR. RAJALI	FARMING	DANGBANG-9, CHHEDE
2	KHIM BDR. RANAMAGAR	AGRICULTURE	NUWAKOT-8, GHORAKHORI
3	REM BDR. GHARTIMAGAR	FARMER	NUWAKOT-8, SALLYANDHARA
4	KUMARI BARAL	AGRICULTURE	KHILJI-4, DURBANG (ARGHA)
5	NUM BDR. GURUNG	AGRICULTURE	BARAULA-1, KADKURA (PYUTHAN)
6	HARI BDR. GHARTI	AGRICULTURE	BIJULI-6, AITAR (PYUTHAN)

To get the information from the project site's local communities the strategic approach taken was to aware people on the Nationwide Master Plan Study of the Storage Type Hydro-electric Projects before seeking information on the local environmental and social resources and the concerns of the people regarding the Lower Jhmruk Project.

It is therefore the field survey team, before initiating dialogue with the local communities described why the Nationwide Master Plan Study for Storage type hydroelectric project is needed? Who is undertaking the study? What will be the output of the study? In this process the team also highlighted on how this project in this area was selected for further study? And what the study team will like to get information from the local area communities not limiting to the social and environmental information but also the concerns of the people with regard to the project and their aspirations with the project if it is screened for further study and development.

This section describes the local people knowledge on the project apart from the concerns and aspirations of the people from the project.

For the overall development of the region and to ease the current electricity crisis, the communities were ready to support the project development. The major concern of the people is regarding the resettlement and rehabilitation. The concern was whether they will be resettled and rehabilitated in a nearby area. The other concern is the inundation of the forest area.

The local community aspiration is that the affected communities should get job opportunities in the project considering their contribution to the project. The community infrastructures such as schools, health posts, and road network are not adequate to meet the needs and aspired that the project will contribute significantly in the development of the community infrastructures. They also aspired to get skill trainings so as to maximize the benefit of the available job opportunities in the project

**Annex 19: Environmental Survey Report**  
**Madi Project (W-06)**

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## Introduction

Federal Democratic Republic of Nepal is rich in water resources, its potential water power is 83,000 MW and economically exploitable water power is 42,000 MW. However, as of 2011, the total generating capacity of the country is only about 718.62 MW. Of the total installed capacity 92% is from the hydroelectric power plants. In addition, since most of hydroelectric power plants are run-of-river type, their outputs decrease seriously in the dry seasons. Consequently, there is a rolling blackout of as long as 14 hours a day which poses many problems including affects in livelihood and industries which severely impact the national economy.

To cope with these situations, the government of Nepal has worked out “National Electricity Crisis Resolution Action Plan” and “10-Year Hydropower Development Task Force” at the end of 2008. The above action plan and task force recommended need of storage-type hydroelectric power plants able to supply sustainable electricity uninterruptedly even in dry seasons to solve current power shortage at an early date.

However, construction of storage-type hydroelectric power plants should be carried out systematically taking into consideration of various aspects including the overall water resource development policy of Nepal, hydrological and geological characteristics, environmental impact, etc. Therefore, the Government of Nepal has requested the Government of Japan to work out a nationwide master plan for storage-type hydroelectric power development.

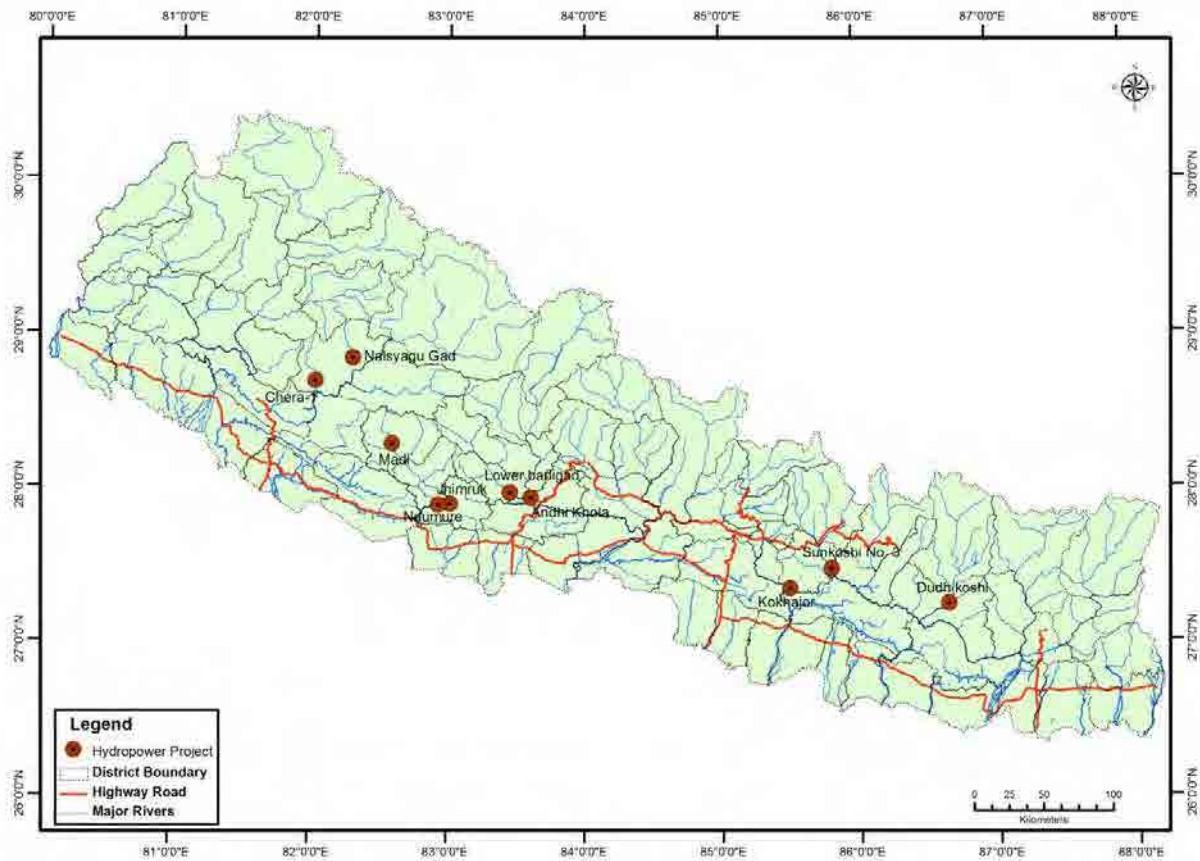
Electric Power Development Company Limited (J–Power) appointed by the JICA for the nationwide master plan study based on the desk level study in close association with NEA screened 10 candidate projects for the master plan study out of the list of 67 promising projects identified by NEA all over Nepal. **Table 1a and 1b** presents the salient features of the 10 promising projects screened for the master plan study, while **Figure 1** presents the location of the projects.

**Table 1a: Salient Features of Potential Projects**

No.	Project Name	Location (District)	Location of Dam Site		River	Installed Capacity (MW)	Catchment Area (km <sup>2</sup> )
			Longitude	Latitude			
E-01	Dudh Koshi	Okhaldhunga/Khotang Dist.	86° 39' 17.3	27° 15' 47.2	Dudh Koshi to Baikhu Khola	300.0	4100
E-06	Kokhajor-1	Sinchuli, Sindhupalchok	85° 29' 59.6	27° 22' 21.9	Kokhajor	111.5	281
E-17	Sun Koshi No.3, Kosi MP	Ramechhap, Kavre and Sindhupalanchok	85° 48' 14.3	27° 29' 50.5	Sun Koshi	536.0	5520
C-02	Lower Badigad	Gulmi	83° 27' 22.2	28° 0' 0.6	Badigad	180.3	2050
C-08	Andhi Khola	Syangja	83° 36' 30.6	27° 58' 2.6	Andhi Khola	180.0	475
W-02	Chera-1	Jajarkot	82° 1' 12.3	28° 42' 56.4	Chera	148.7	809
W-05	Lower Jhimruk	Argakhachi, Pyuthan	83° 1' 1	27° 55' 30.8	Jhimruk	142.5	995
W-06	Madi	Rolpa	82° 35' 15.5	28° 18' 48.5	Madi	199.8	674
W-23	Nalsyau Gad	Jajarkot	82° 17' 42.8	28° 52' 4.7	Nalsyau Gad	410.0	571
W-25	Naumure (W. Rapti)	Argakhanchi, Pyuthan	82° 55' 42.9	27° 55' 6.1	West Rapti	245.0	3430

**Table 1b: Salient Features of Potential Projects**

No.	Project Name	Dam Height (m)	Total Storage Volume (MCM)	Effective Storage Volume (MCM)	Reservoir Area (km <sup>2</sup> )	FSL (m)	MOL (m)	TWL (m)	Rated Gross Head (m)	Rated Power Discharge (m <sup>3</sup> /sec)
E-01	Dudh Koshi	180.0	687.40	442.10	11.05	580.0	530.00	303.35	275.0	136.00
E-06	Kokhajor-1	107.0	218.70	166.10	8.92	437.00	390.00	200.00	226.3	63.90
E-17	Sun Koshi No.3, Kosi MP	140.0	1,220.00	555.00	23.99	700.0	674.00	575.00	116.3	109.34
C-02	Lower Badigad	191.0	995.90	505.50	13.65	688.00	654.00	475.00	196.0	232.60
C-08	Andhi Khola	157.0	336.50	238.70	5.52	675.00	626.70	368.48	307.0	81.40
W-02	Chera-1	186.0	254.90	141.10	4.00	866.0	814.00	640.00	220.0	80.50
W-05	Lower Jhimruk	167.0	386.00	211.60	4.98	597.0	557.0	390.0	194.6	88.10
W-06	Madi	190.0	359.50	235.10	7.66	1,090	1,030.00	800.00	280.8	84.90
W-23	Nalsyau Gad	200.0	419.6	296.3	6.3	1,570.0	1,498.00	872.0	644.0	75.00
W-25	Naumure (W.Rapti)	190.0	1,021.00	580.00	19.76	517.0	474.00	358.00	162.6	185.60



**Figure 1: Ten Promising Sites Identified for Survey**

The NESS, a local consulting firm of Nepal was entrusted by J-Power for the required SEA field studies of the 10 candidate projects. As per the ToR of works, there are basically two types of surveys required namely; geological, geotechnical, construction material and seismicity study, and environmental and social study. This report deals with the field survey findings of social and environmental study on **Madi Project** identified as one of the candidate project in the western Nepal.

## 1 SOCIO-ECONOMIC ENVIRONMENT

The information regarding the social and economic conditions of the people in Nepal is available in the publications of the Central Bureau of Statistics. But such information is limited to administrative units such as VDCs, DDCs, Development Zones and at national level. As the candidate projects cross cut the administrative units, the available data on the social and economic concerns could not be used effectively to characterize the direct impact areas by the projects. To fill this gap field level studies on Socio-economic and Environmental Concerns<sup>1</sup> are conducted through participatory methods. The findings of the field surveys are presented in the section below.

### 1.1 Demographic Concerns

#### 1.1.1 VDCs, Settlements and Population

The proposed Madi Project is located in Rolpa district in the Western Development region of Nepal and covers 6 VDCs, 25 settlements, 15 wards and 336 households. The total population of the reservoir area is estimated to be 1757 with the average family size of 5.2 which is slightly higher than the national average family size (4.70) (Table 1 and Appendix 1). The project occupies 0.84% population of Rolpa district.

**Table 1: VDCS and Settlements and Population under the Storage Project, Rolpa**

S.N.	VDC	Settlement	HH	Population
1	Korchabang	Muguwang, Dharkhola, Nimri, Nepchabang, Kumbang (Simkhet)	17	85
2	Kotagaun	Kunga, Ramjagaun, Bhalama, Madichaur, Dhabang	285	680
3	Jamkot	Jamkot Madichaur, Malingbang, Mathla	119	536
4	Bhabang	Majabang, Dharamshaya, Khuringbang, Bharbang	12	61
5	Libang	Simalbang, Kharabang, Barbang	46	239
6	Hama	Risibang, Domo (Ghornga Bang)	9	41
		Lapchang / Pulbot	4	11
		Jhuringbang	7	55
		Sibang dhara	7	49
<b>Total</b>	<b>6</b>	<b>25</b>	<b>336</b>	<b>1757</b>

Source: NESS Field Survey, 2012

#### 1.1.2 Ethnicity/Caste

The population of the reservoir area is dominated by the disadvantage Adivasi/Janjati Magar groups (77%). Chhetri occupy the second largest population. Other caste/ethnic groups dwelling in the area in limited number include dalit and Brahmin (1% each) (Figure 1, **Appendix 1 2**).

<sup>1</sup> The findings are based on the NESS Rapid Field Survey Assessment (2012) using Focus Group Discussions (FGD) and Observation tools. Refer **Appendix 12** for the List of FGD participants.



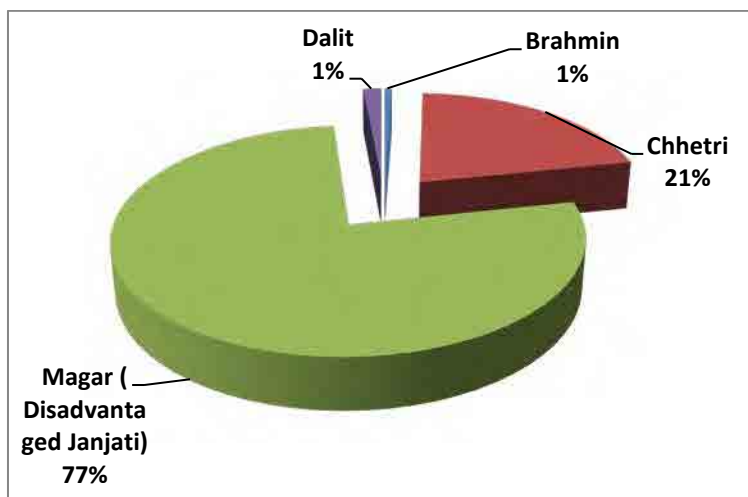


Figure1: Ethnic Composition of Reservoir Area Population

## 1.2 Economic Concern

### 1.2.1 Land Use Pattern and Land Holding Size

The total land area in the reservoir area is estimated to be 4528 ropanes (1 ropani=20 hectare), a large proportion of which is used for agriculture (81%), followed by pasture land (7%), other land (7%) and forest (5%). **Appendix 3** presents details on the land use pattern by each cluster of the VDC.

Land holding is one of the major indicators of the economic well being in the reservoir area as elsewhere in the country. The total agricultural land of the reservoir area is estimated to 4193 ropanies (210 hectare).

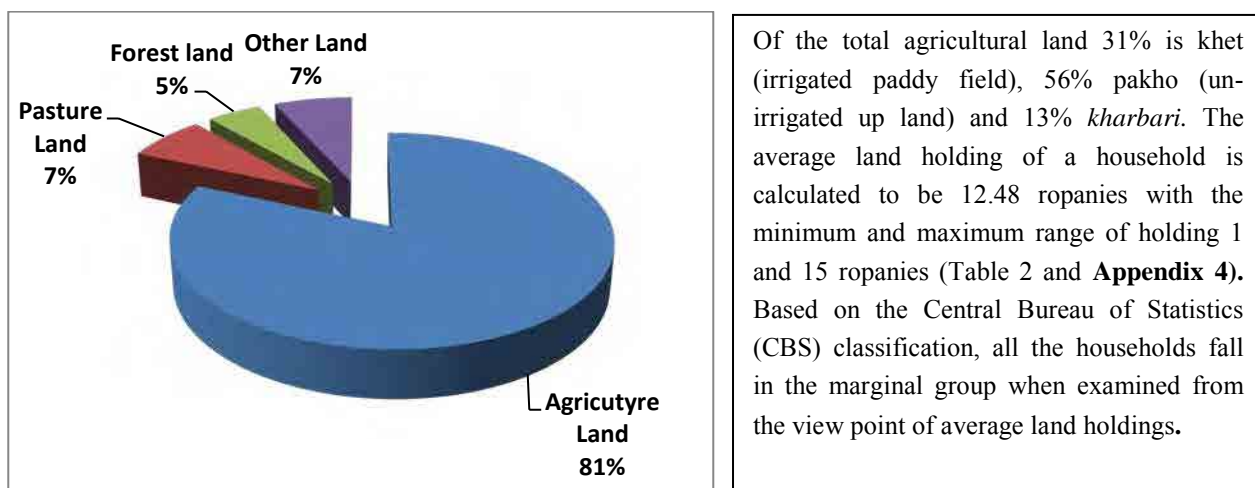


Figure 2: Land Use Pattern

**Table 2: Total and Average Land Holding Size (Ropani)**

Description	Total	%	Average/HH
Khet	1290	30.74	3.84
Pakho	2358	56.24	7.02
Other (Kharbari) <sup>2</sup>	545	13.00	1.62
<b>Total</b>	<b>4193</b>	<b>100</b>	<b>12.48</b>

Source: NESS Field Survey, 2012

The reservoir area is producing cereals such as paddy, maize, millet, wheat and cash crops such as potato, pulses, oilseeds and vegetables. Among the cereals, maize is grown in largest area (2313 ropanies) followed by wheat (1517 ropanies), paddy (1303 ropanies).

Among the cash crops, potato occupies the largest area (138 ropanies) followed by vegetables (119 ropanies) and oilseeds (17 ropanies) and pulses (8.5 ropanies). Unlike the area, the quantity of production is also highest for maize followed by paddy, wheat and millet. Among the cash crops, the production is recorded to be highest for vegetables followed by potato, oilseeds and pulses. The cropping intensity of the area is 129% (Table 3 and **Appendix 5**).

**Table 3: Crop Production and Yield**

S.N.	Crop	Area (Ropani)	Production (Kg)	Yield (Kg/Ropani)
1	Paddy	1303	235900	181.04
2	Maize	2313	551088	238.26
3	Millet	14	1454	103.86
4	Wheat	1517	229131	151.04
5	Potato	138	46900	339.85
6	Pulses	8.5	929.5	109.35
7	Oilseeds	16.5	12054	730.54
8	Vegetables	119	362500	3046.22
	<b>Cropping Intensity</b>		<b>129.48%</b>	

Source: NESS Field Survey, 2012

According to field study most of the productions are consumed locally. However, some settlements sale significant quantity of vegetables and potato in the district headquarter Libang (Table 4 and **Appendix 6**).

**Table 4: Sale of the Agricultural Produces**

Crop	Sale Quantity (Kg)	Price (Rrs/Kg)	Market
Maize	126	25	Village
Potato	132,400	30-35	Libang
Vegetables	185,700	27-45	Libang

Source: NESS Field Survey, 2012

### 1.2.2 Occupation

More than 90% population of the area is engaged in different occupations. A majority of the population (78%) are occupied in agriculture followed by wage labour (11%), foreign employment (7%) and services (4%) (Figure 3).

<sup>2</sup> Kharbari=land area used for growing grasses/pasture/thatch.

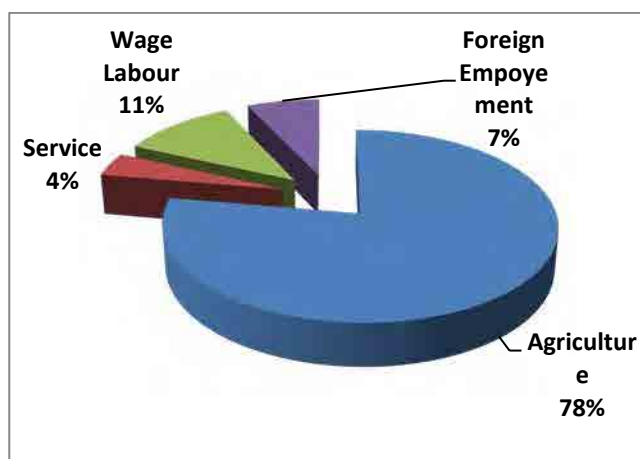


Figure 3: Occupation of Population

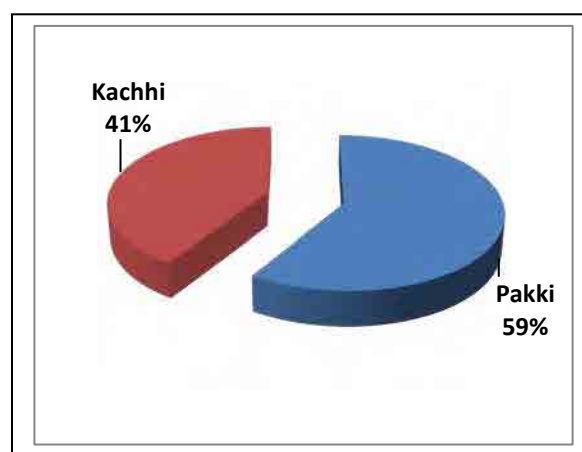


Figure 4: Types of Houses

### 1.2.3 Housing Type

Two types of houses are categorized in the reservoir area: i) Pakki house i.e permanent types of house built generally using cement and stone and roofed by using galvanized sheet (tin) or cemented and ii) kachhi house i.e built by using mud and stone and roofed using thatch.

A majority of the households (59%) are residing in pakki (permanent ) types of house and 41% in pakki (permanent ) types of house.

## 1.3 Service related Infrastructures

### 1.3.1 Road

Only 15 settlements out of 25 are facilitated with minimum length of gravel and paved types of road and the road length within these settlements is only 11.25 km. The entire 22 road is graveled. 6 suspension bridges constructed in different parts of the reservoir area are serving the area (**Appendix 7**).

### 1.3.2 Schools

One Lower Secondary and one Secondary School are set up in the reservoir area where 750 students are enrolled (Table 5).

Table 5: Number of Schools in the Reservoir Area

VDC	Cluster	Type of School	Number of Students
Kotagaun	Dhabang	Shree Nimna Madhaymik Bidhyalaya	250
Jamkot	Jamkot Madichaur	Baluday Madhyamik Bidhyala	500
<b>2</b>	<b>2</b>	<b>2</b>	<b>750</b>

Source: NESS Field Survey, 2012

### 1.3.3 Irrigation Infrastructure

Altogether 16 settlements of the reservoir area out of 25 have been operating irrigation schemes. The total irrigated command area is 1560 ropanies. The minimum and maximum irrigated command area ranges between 2 ropani (Jamkot VDC Malingbang Sichai) to 400 ropanies (Kotgaun VDC, Madichaur Sichai). Out of the 16 schemes five schemes irrigate area 200 ropanies and above (Figure 5 and **Appendix 8**).

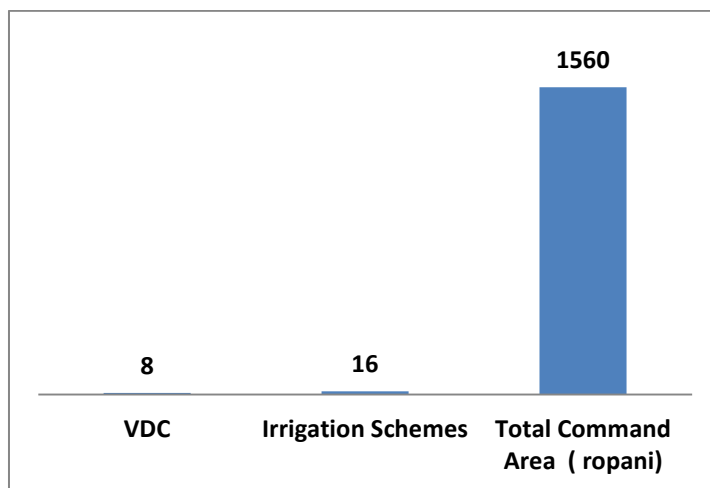


Figure 5: Number and Command of Irrigation Schemes

### 1.3.4 Drinking Water

Twenty two schemes with 212 numbers of taps are serving the reservoir area for drinking water. The minimum and maximum number of taps installed in each of the schemes ranges between 1 and 115 (Jamkot Madichaur of Jamkot VDC) (Figure 6 and Appendix 9).

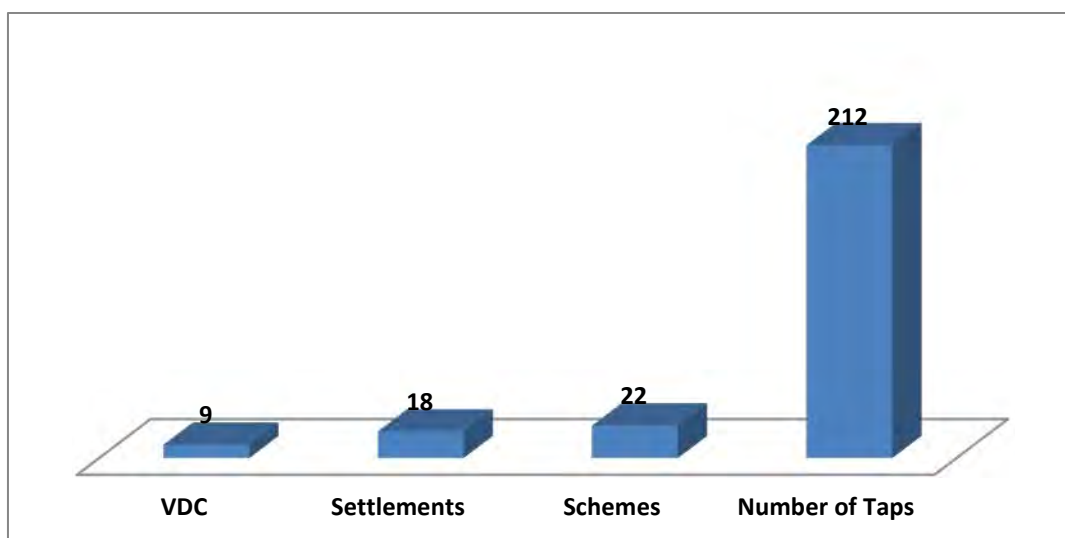


Figure 6: Number of drinking water Schemes in the Reservoir Area

### 1.3.5 Community Forest

The reservoir area enjoys the facilities of three community forests and 11 wetland and recreation centers as shown in Table 6.

**Table 6: Community Forests, Wetlands and Recreation Centers in the Reservoir Area**

S.N.	VDC	Settlement	Community Forests	Wetland / Recreation Centre
1	Korchabang	Nimri		Heltang
		Kumbang (Simkhet)	Purna hariyali	
		Kunga		NA
2	Kotagaun	Ramjagaun		Ramjagaun pahiro
		Bhalama		Bhalama
		Dhabang		Bagar
3	Libang	Simalbang	Brangang CF	Simalbang
		Kharabang		Dhansing pule
		Barbang	Barbang CF	Barbang
4	Hama	Risibang		Paibang
		Domoi (Ghornga Bang)		Akhale odhar
		Jhuringbang		jhakri khola
<b>Total</b>	<b>4</b>	<b>12</b>	<b>3</b>	<b>11</b>

Source: NESS Field Survey, 2012

### 1.3.6 Industries and Services

Three market centers, three service centers (one each for agriculture, livestock and security) are established in the reservoir area. Similarly two water mills (ghattas) are also operated. Each of the water mill is providing employments to two persons. None of the other cottage and small industries is reported in the area (Table 7).

**Table 7: Markets and Service Centers in the Project Area**

S.N.	VDC	Settlement	Market Centers	Service Centers	Water Mill
1	Kotgaun	Madichaur	Chowk bazar Madichaur	1 (Agriculture Centre) and 1 Scurrility Post	1
2	Jamkot	Jamkot Madichaur	New bazar	1 Livestock centre	1
		Lapchang/Pulbot	Near area (4 number)		
<b>Total</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>

Source: NESS Field Survey, 2012

### 1.3.7 Hydropower

Four micro hydropower schemes with the total capacity of 0.023 MW have been installed in the reservoir area. The capacity of these schemes varies between (5 kw to 11 kw) (Table 8).

**Table 8: Hydropower Schemes in the Reservoir Area**

S.N.	VDC	Settlement	Capacity	Name of the Scheme
1	Korchabang	Nirmi	0.011 MW	Nirmi Khola Laghu Jal Bidhukta
2	Bhabang	Majabang	0.005 MW	Majabang Laghu Jal Bidhukta
		Dharmasaya	0.007 MW	Dharmasaya Laghu Jal Bidhukta
3	Hama	Risibang	NA	Ungri Khola Laghu Jal Bidhukta
<b>Total</b>		<b>4</b>	<b>0.023 MW</b>	

Source: NESS Field Survey, 2012

## 1.4 Culture and Religious Site

The major festivals celebrated in the reservoir area are: *Dasain, Tihar, Tija, Majhe Sankarati*, which are based on Hindu tradition and culture. Each settlement has cremation ghat adjacent to river. Few Shiva and other temples are also set up in the settlements (**Appendix 10**).

## 1.5 Ongoing and Proposed Development Programmes

Two hydropowers and an irrigation scheme are reported to be planned in Bhabang VDC of the reservoir area. No any other specific development ongoing or proposed projects are reported in other settlements (Table 9).

**Table 9: Planned development Projects in the Reservoir Area**

VDC	Settlement	Proposed Programme
Bhabang	Khuringbang	Irrigation
	Majabang	Hydropower
	Dharmshaya	Hydropwer

Source: NESS Field Survey, 2012

## 1.6 Past Experience with community and their perception

The reservoir area people have not experience any types of conflict with regards to the development projects in the past. The people have perceived different positive and negative impacts from the project. Submerge of house and land and loss of their traditional property, failure of dam and difficulties in transportation are reported to be the major negative impacts perceived by the community. The communities have also expected different development activities from the project such as availability of electricity, industrial development, promotion of different development activities and availability of fishing in dam site with regards to the construction of storage types of the hydropower project (Table 10 and **Appendix 11**).

**Table 10: Perceived Impacts of the Storage Type Hydropower Project**

Positive impacts	Negative Impact
Availability of electricity	Loss of land , forest and house
Industry Establishment	Submerge of Land
Promotion of different Development Activities	Chances of flood at dam site
Availability of Fishing in dam	Failure of Dam
	Risk of transportation after dam construction

Source: NESS Field Survey, 2012

## 1.7 Disasters

Flood and landslides are reported to be the common natural disasters faced by the reservoir area each year.

## 2 DISASTER STUDY

There are no records of the disaster at the site specific level of the candidate project at the central level and district level offices of the government of Nepal. It is therefore, the disaster information is collected from the project site based on the key informant survey. The findings of the results are presented in the sections below.

### 2.1 Types of Disaster

Within the influence area of the Madi Project the flood and landslide disaster have been reported by the key informants. The earthquake as a disaster event is not in the memory of the local people.

#### 2.1.1 Flood

In the memory of the local people flood disaster is of common occurrence within the project site. Six flood events have a widespread damage of life and property. The cause of the floods as reported by the informants is the heavy precipitation in the catchment areas of the Madi river in the monsoon season. The loss of life and property caused by the flood events in the candidate reservoir area are presented below.

**a) Name of respondent: Hari Bahadur Gharti**      **Contact No:**      **Date:** 26/04/2069 B.S.  
**Age:** 52      **Occupation:** Agriculture      **Location:** Liwang-4, Dhansibang, Ralbang, TallaGaun and Khaibang

**i) Year of the occurrence:** 2061 B.S.  
**ii) Cause of the flood:** Heavy Precipitation

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~10 Ropani	~15 Ropani	25 Ropani
Life	X	X	X
Build properties	2houses	X	X
Crops	~Paddy, 20 muri	~Paddy, 30 muri	~Paddy, 15muri
Others	X	X	X

**b) Name of respondent: Champa Singh Thapa**      **Contact No:** 9844969303      **Date:** 26/04/2069 B.S.  
**Age:** 50      **Occupation:** Agriculture      **Location:** Liwang-3, Sigana and Barbang

**i) Year of the occurrence:** 2061 B.S.  
**ii) Cause of the flood:** Heavy Precipitation

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~45 Ropani	X	~35 Ropani
Life	X	X	X
Build properties	X	X	X
Crops	~Paddy, 120 muri	X	~Paddy, 100 muri
Others	X	X	X

**c) Name of respondent: Mangali Pun**      **Contact No:** 9847868078      **Date:** 27/04/2069 B.S.  
**Age:** 40      **Occupation:** Agriculture      **Location:** Liwang-3, Khadabang and Sibang

**i) Year of the occurrence:** 2058 B. S.  
**ii) Cause of the flood:** Heavy Precipitation

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~8 Ropanies	X	~15Ropanies
Life	X	X	X
Build properties	X	X	X
Crops	~Paddy, 25 muri	X	~Paddy, 40 muri
Others	X	X	X

**d) Name of respondent: Amar Raj B. K. Contact No: 9748547521 Date: 27/04/2069 B.S.**  
**Age: 70 Occupation: Agriculture Location: Kot Gaun-7, Koga and dhaga**

**i) Year of the occurrence: 2060 B.S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~10 Ropanis	~25 Ropanis	X
Life	X	X	X
Build properties	X	X	X
Crops	~Paddy, 25 muri	~Paddy, 60muri	X
Others	X	X	X

**e) Name of respondent: Lal Bdr. Gharti Magar Contact No: 9748511170 Date: 28/04/2069 B.S.**

**Age: 44 Occupation: Agriculture Location: Kot Gaun-1, Madi Chaur and Ramja**

**i) Year of the occurrence: 2055 B.S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~10 Ropanis	X	~30Ropanis
Life	X	X	X
Build properties	X	X	X
Crops	~Paddy, 30 muri	X	~Paddy,70 muri
Others	X	X	X

**f) Name of respondent: Siya Ram Gharti Contact No: X Date: 28/04/2069 B.S.**

**Age: 50 Occupation: Agriculture Location: Korchawang-6, Tallo Sarigadanda**

**i) Year of the occurrence: 2055 B.S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~12 Ropanis	X	X
Life	X	X	X
Build properties	2 houses1-Ghatta	X	X
Crops	~Paddy, 30 muri	X	X
Others	3 Cattles	X	X

**g) Name of respondent: Purna Oli Contact No: 9847896565 Date: 28/04/2069 B.S.**

**Age: 45 Occupation: Agriculture Location: Kot Gaun-8, Dangbang**

**i) Year of the occurrence: 2018 B.S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~20Ropanis	~28 Ropanis	~5 Ropanis
Life	2	X	X
Build properties	2 houses	X	X
Crops	~Paddy, 50 muri	~Paddy,60muri	~Paddy,15muri
Others	2 Cattles	X	X

**h) Name of respondent: Chandra Bdr. Buda Contact No: 9847881633 Date: 28/04/2069 B.S.**

**Age: 45 Occupation: Agriculture Location: Bhawang-1, Majbang**

**i) Year of the occurrence: 2055 B.S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**



Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~25Ropanies	X	X
Life	X	X	X
Build properties	1 house	X	X
Crops	~Paddy, 55 muri	X	X
Others	X	X	X

**i) Name of respondent: Lil Bdr. Gharti**      **Contact No: X**      **Date: 28/04/2069 B.S.**  
**Age: 63**      **Occupation: Agriculture**      **Location: Jankot-2, Mathala**

**i.) Year of the occurrence: 2061 B.S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~5Ropanies	X	X
Life	X	X	X
Build properties	1 House	X	X
Crops	~Paddy, 15 muri	X	X
Others	2 Cattles	X	X

**j) Name of respondent: Tirtha Man Pun**      **Contact No:9847842768**      **Date: 29/04/2069 B.S.**  
**Age: 68**      **Occupation: Agriculture**      **Location: Junkot-1, Madichaur and dangdung**

**i) Year of the occurrence: 2057 B.S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~20Ropanies	X	~10 Ropanies
Life	X	X	X
Build properties	X	X	X
Crops	~Paddy, 60 muri	X	~Paddy, 30 muri
Others	X	X	X

**k) Name of respondent: Kharka Bdr. Gharti Magar**      **Contact No:9847863995**      **Date: 29/04/2069 B.S.**  
**Age: 54**      **Occupation: Agriculture**      **Location: Hwama-9, Risbang, Wajha, Baischaur and Risbang Dhuri**

**i) Year of the occurrence: 2023 B.S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~15Ropanies	X	~25Ropanies
Life	X	X	X
Build properties	2 houses	X	X
Crops	~Paddy, 20 muri	X	~Paddy, 60 muri
Others	X	X	X

**l) Name of respondent: Pahal Sing Budha Magar**      **Contact No: 9748529205**      **Date: 30/04/2069 B.S.**

**Age: 42**      **Occupation: Agriculture**      **Location: Hwama-3&4, Garpa**

**i) Year of the occurrence: 2060 B.S.**

**ii) Cause of the flood: Heavy Precipitation**

**iii) Affects of the flood event:**

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~40Ropanies	X	X
Life	2	X	X
Build properties	7 houses & 1 mill	X	X
Crops	~Paddy, 70 muri	X	X
Others	4 Cattles	X	X

## 2.1.2 Landslide

Landslide events are relatively rare in the influence area of candidate project. Ten major landslide events is reported from the area after heavy precipitation in the monsoon season with the loss of life and property. Table below presents the details of the landslide event as reported by the key informants.

### a) Name of respondent: Hari Bahadur Gharti

Year	Location	Cause	Affected Fields	
2045 B.S.	Liwang-4, Dhansibang,	Heavy Precipitation	Affected Area	Dhansibang,
			Loss of life	X
			Loss of Build	X
			Loss of Crops	Paddy
			Loss of Land	15 Ropanies

### b) Name of respondent: Champa Singh Thapa

Year	Location	Cause	Affected Fields	
2060 B.S.	Liwang-3, Sigana and Barbang	Heavy Precipitation	Affected Area	Barbang
			Loss of life	10
			Loss of Build	25 houses
			Loss of Crops	Maize
			Loss of Land	60 Ropanies

### c) Name of respondent: Amar Raj B. K.

Year	Location	Cause	Affected Fields	
2063 B.S.	Kot Gaun-7, Koga	Heavy Precipitation	Affected Area	Koga vir
			Loss of life	X
			Loss of Build	X
			Loss of Crops	Maize
			Loss of Land	10 Ropanies

### d) Name of respondent: Viu Ram Batha(Magar)

Year	Location	Cause	Affected Fields	
2060 B.S.	Korchawang-9, Tallo Lapchun	Heavy Precipitation	Affected Area	Tallo Lapchun
			Loss of life	X
			Loss of Build	2 Houses
			Loss of Crops	Maize
			Loss of Land	15 Ropanies

### e) Name of respondent: Siya Ram Gharti

Year	Location	Cause	Affected Fields	
2043 B.S.	Korchawang-6, Tallo Sarigadanda	Heavy Precipitation	Affected Area	Tallo Sarigadanda
			Loss of life	X
			Loss of Build	3 houses
			Loss of Crops	Paddy
			Loss of Land	9 Ropanies

### f) Name of respondent: Chandra Bdr. Buda

Year	Location	Cause	Affected Fields	
2055 B. S.	Bhawang-1, Majbang	Heavy Precipitation	Affected Area	Majbang
			Loss of life	X
			Loss of Build	X
			Loss of Crops	Maize
			Loss of Land	25 Ropanies

**g) Name of respondent: Tirtha Man Pun**

i)

Year	Location	Cause	Affected Fields	
2054 B.S.	Junkot-1, Madichaur and dangdung	Heavy Precipitation	Affected Area	dangdung
			Loss of life	X
			Loss of Build	2 houses
			Loss of Crops	Maize
			Loss of Land	5 Ropanies

ii)

Year	Location	Cause	Affected Fields	
2040 B.S.	Junkot-1, dangdung	Heavy Precipitation	Affected Area	dangdung
			Loss of life	X
			Loss of Build	X
			Loss of Crops	Maize
			Loss of Land	10Ropanies

iii)

Year	Location	Cause	Affected Fields	
2066 B. S.	Junkot-1, dangdung	Heavy Precipitation	Affected Area	dangdung
			Loss of life	X
			Loss of Build	X
			Loss of Crops	Maize
			Loss of Land	4 Ropanies

**h) Name of respondent: Kharka Bdr. Gharti Magar**

Year	Location	Cause	Affected Fields	
1994 B.S.	Hwama-9, Wajha	Heavy Precipitation	Affected Area	Wajha
			Loss of life	X
			Loss of Build	3 Cattles Shed
			Loss of Crops	Maize
			Loss of Land	10 Ropani

**i) Name of respondent: Pahal Sing Budha Magar**

i)

Year	Location	Cause	Affected Fields	
2038 B.S.	Hwama-3,Garpa	Heavy Precipitation	Affected Area	Garpa
			Loss of life	X
			Loss of Build	3 houses
			Loss of Crops	Maize
			Loss of Land	25 Ropanies

ii)

Year	Location	Cause	Affected Fields	
2040 B.S.	Hwama-3,Garpa	Heavy Precipitation	Affected Area	Garpa Forest
			Loss of life	X
			Loss of Build	2 houses
			Loss of Crops	Forest Area
			Loss of Land	40 Ropanies

**2.1.3 Earthquake**

In the memory of the local people, the candidate project site communities have not experienced earthquake causing loss of life and property.

### 3 FLORAL STUDY

Though the floral information at the regional level is available, there is no published literature on the site specific level of the candidate project at the central and district level offices of the government of Nepal. It is therefore, candidate project site is visited by the biological study team to gather information based on direct observation and through the participatory methods with the local key informants. Findings of the field study are presented in sections below.

#### 3.1 Vegetation Diversity

The information on the vegetation diversity is gathered from the direct observation by the members of biology study team during site visit. Besides, information is also collected from the key informants of the local area through interviews and focus group discussions with the local community forest user groups.

The candidate project site is rich in floral diversity. About 74 plant species were recorded through direct observation and interviews with the key informants. The list of plant species is presented in the table below.

S.N.	Local Name	Scientific Name
1	Vindi	<i>Abelmoschus esculentus</i>
2	Khayer	<i>Acacia catechu</i>
3	Chiuri	<i>Aesandra butyracea</i>
4	Utis	<i>Alnus nepalensis</i>
5	Tite pati	<i>Artemisia indika</i>
6	Kurilo	<i>Asparagus racemosus</i>
7	Seto Koiralo	<i>Bahauinia verigata</i>
8	Bans	<i>Bambusa tulda</i>
9	Tanki	<i>Bauhinia purpuria</i>
10	Rato Koiralo	<i>Bauhiniya purpurea</i>
11	Paiyu	<i>Betula alnoides</i>
12	Simal	<i>Bombax ceiba</i>
13	Katus	<i>Castanopsis indica</i>
14	Dalchini	<i>Cinnamomu zeylanicum</i>
15	Batul pate	<i>Cissampeios pareino</i>
16	Kagati	<i>Citrus aurantifolia</i>
17	Vogate	<i>Citrus maxima</i>
18	Besar	<i>Curcuma angustifolia</i>
19	Sissoo	<i>Dalbergia sissoo</i>
20	Githa	<i>Dioscorea bulbifera</i>
21	Vyakur	<i>Dioscorea deltoidea</i>
22	Tidu	<i>Diospyros malabarica</i>
23	Mehal	<i>Docynia Indica</i>
24	Pani nyuro	<i>Dryopteris cochleata</i>
25	Phaledo	<i>Erythrina arborescens</i>
26	Banmara	<i>Eupatorium adenoforum</i>
27	Bar	<i>Ficus bengalensis</i>
28	Pakhuri	<i>Ficus glaberrima</i>
29	Kavro	<i>Ficus lacor</i>
30	Peepal	<i>Ficus religiosa</i>
31	Khanayu	<i>Ficus semicordata</i>
32	Sisnu	<i>Girardinea diversifolia</i>
33	Vimal	<i>Grewia optiva</i>
34	Jau	<i>Hordeum vulgare</i>
35	Areli	<i>Hypericum cordifolium</i>
36	Okher	<i>Juglans regia</i>
37	Dabdabe	<i>Lannea coromandelica</i>

S.N.	Local Name	Scientific Name
38	Kutmiro	<i>Litsea monopetala</i>
39	Mauwa	<i>Madhuka longifolia</i>
40	Sindure	<i>Mallotus philippensis</i>
41	Amp	<i>Mangifera indica</i>
42	Bbari phul	<i>Mantha arbensis</i>
43	Champ	<i>Michelia champaca</i>
44	Kimbu	<i>Morus alba</i>
45	Kimu	<i>Morus nigra</i>
46	Kera	<i>Musa paradisiaca</i>
47	Kafal	<i>Myrica esculenta</i>
48	Sajeevan	<i>Origanum vulgare</i>
49	Dhan	<i>Oryza sativa</i>
50	Amla	<i>Phyllanthus emblica</i>
51	Sallo	<i>Pinus roxburghii</i>
52	Aaru	<i>Prunus persica</i>
53	Belauti	<i>Psidium guajava</i>
54	Anar	<i>Punica granatum</i>
55	Aiselu	<i>Pyrus pashia</i>
56	Lali Guras	<i>Rhododendron arboreum</i>
57	Valayo	<i>Rhus javanica</i>
58	Ritho	<i>Sapindus mukorosi</i>
59	Chilaune	<i>Schima wallichii</i>
60	Sal	<i>Shorea robusta</i>
61	Aalu	<i>Solanum tuberosum</i>
62	Jamuno	<i>Syzygium cumini</i>
63	Jamun	<i>Syzygium cumini</i>
64	Imili	<i>Tamarindus indica</i>
65	Saj	<i>Terminalia alata</i>
66	Kaulo	<i>Terminalia arjuna</i>
67	Barro	<i>Terminalia bellirica</i>
68	Harro	<i>Terminalia chebula</i>
69	Ankhitare	<i>Trichilia connaroides</i>
70	Gahaun	<i>Triticum aestivum</i>
71	Bodi	<i>Vigna unguiculata</i>
72	Timur	<i>Xanthoxylum armatum</i>
73	Ketuki	<i>Yucca smalliana</i>
74	Makai	<i>Zea mays</i>

### 3.2 Forest Types

The candidate project site is characterized by, hill sal forest and *Pinus roxburghii* forest. The reservoir site is dominated by hill sal forest and *Pinus roxburghii* forest while higher altitudes of the influence area has *Pinus roxburghii* forest. Table below presents the forest types and associated species in the reservoir area and outside reservoir area.

Local (Within Reservoir)	Regional (Out of the reservoir)
Pine forest and Hill sal forest as dominant forest type. dominant species are <i>Pinus roxburghii</i> and <i>shorea robusta</i>	Pine forest is dominant forest

### 3.3 Forest as per Forest Classification (Community Forest, Government Forest, Leasehold Forest, Private Forest, Religious Forest etc.)

The forests of the candidate project influence area are the government and community forests. The community forest are managed by the local community forest user groups within the framework of the community forest management plan approved by the district forest offices, while the government managed forest is managed by the district forest office. The reservoir occupied area has 24 community forests. The name of the community forests, dominant species of plants and the location of the forests in the local administrative zone (VDCs) is presented in the tables below for the reservoir area and outside the reservoir area.

#### Local Area (Within the reservoir)

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C./Ward No.
1	Community	Reugha C.F.	<i>Lannea coromandelica</i>	Liwang-3
2	Community	Khulkhuleni Mahila C.F.	<i>Lannea coromandelica</i>	Liwang-4
3	Community	Jharana Mahila C.F.	<i>Lannea coromandelica</i>	Liwang-4
4	Community	Baranjhang Mahila C.F.	<i>Lannea coromandelica</i>	Liwang-3
5	Community	Saunepani C.F.	<i>Shorea robusta</i>	Kotgaun-7
6	Community	Hanaibang C.F.	<i>Shorea robusta</i>	Kotgaun-7
7	Community	Viuribang C.F.	<i>Aesandra butyracea</i>	Kotgaun-7
8	Community	Karinga C.F.	<i>Pinus roxburghii</i>	Kotgaun-1
9	Community	Sallaghari C.F.	<i>Pinus roxburghii</i>	Kotgaun-8
10	Community	Purnahariyali C.F.	<i>Pinus roxburghii</i>	Korchawang-5
11	Community	Bijailibang C.F.	<i>Pinus roxburghii</i>	Korchawang-9
12	Community	Salleri C.F.	<i>Pinus roxburghii</i>	Korchawang-9
13	Community	Laliguras Dhanchhare C.F.	<i>Rhododendron arboeium</i>	Korchawang-6
14	Community	Dangdung C.F.	<i>Shorea robusta</i>	Jankot-1
15	Community	Salghari C.F.	<i>Shorea robusta</i>	Jankot-1
16	Community	Chiuri Samrakshan C.F.	<i>Aesandra butyracea</i>	Jankot-3
17	Community	Raniban Salghari C. F.	<i>Shorea robusta</i>	Hwama-9
18	Community	Sunaulogaira Mahila C.F.	<i>Shorea robusta</i>	Hwama-9
20	Community	Lamidanda C.F.	<i>Pinus roxburghii</i>	Hwama-9
21	Community	Garpa C.F.	<i>Pinus roxburghii</i>	Hwama-3&4
22	Community	Khaireni Mahila C.F.	<i>Aesandra butyracea</i>	Hwama-3&4
23	Community	Dhanmuda Khaireni C.F.	<i>Pinus roxburghii</i>	Hwama-3&4
24	Community	Rimandhung C.F.	<i>Pinus roxburghii</i>	Bhawang-1

#### Regional Area (Outside the reservoir)

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C./Ward No.
1	Community	Mulpani Mahila C.F.	<i>Pinus roxburghii</i>	Liwang-3&4
2	Community	Yeklecharan C.F.	<i>Aesandra butyracea</i>	Liwang-5
3	Community	Mandalip C.F.	<i>Pinus roxburghii</i>	Jankot -2
4	Government	Laliguras C.F.	<i>Rhododendron arboeium</i>	Jankot-7
5	Community	Siddhartha C.F.	<i>Pinus roxburghii</i>	Jankot-5
6	Community	Singkung Palpa C.F.	<i>Alnus nepalensis</i>	Hwama-2
7	Community	Jharbang C.F.	<i>Alnus nepalensis</i>	Hwama-2
8	Community	Richekhola C.F.	<i>Alnus nepalensis</i>	Hwama-4
9	Government	Puwa Gaira C.F.	<i>Shorea robusta</i>	Bhawang-3

### 3.4 Forest Plot Analysis

For the analysis of the forest status and characteristics 4 sample plots were measured within the reservoir area of the candidate project. The sample plots measured has a size of 25 x 25 meter. The detail of the sample plot measurements is presented in the tables below.

**a) Forest: Viuribang community Forest**

**Location:** Kotgaun-7, Koga (Dam Site)

**G.P.S.** 28.19270N, 082.35365E

**Altitude:** 1039m

S.N.	Tree Species	DBH(cm)	Height ft.(approx)
1	<i>Aesandra butyracea</i>	170	50
2	<i>Sapium insigne</i>	110	38
3	<i>Aesandra butyracea</i>	98	46
4	<i>Aesandra butyracea</i>	148	42
5	<i>Sapium insigne</i>	78	33
6	<i>Erythrina arborescens</i>	42	17
7	<i>Aesandra butyracea</i>	115	40
8	<i>Erythrina arborescens</i>	96	45
9	<i>Doispyros malabarica</i>	68	39
10	<i>Aesandra butyracea</i>	125	42
11	<i>Doispyros malabarica</i>	75	38
12	<i>Aesandra butyracea</i>	95	30

**Herbs and Shrubs:** Banko (*Arisaema tortuosum*), Githa (*Dioscorea bulbifere*), Timur (*Xanthoxylum amartum*), Batul pate (*Cissampeios pareino*), Dhairo (*woodfordia furticosa*), Banmara (*Eupatorium adenoforum*).

**Forest Density:** total no of tree/area of the quadrate=192 Trees/hector area

**Dominant species:** *Aesandra butyracea*=50%

**Crown coverage of the forest:** 15%

**b) Forest: Garpa community Forest**

**Location:** Hwama-3&4 Garpa

**G.P. S.** N-28.19265, E-082.37325

**Altitude:** 1127m

S.N.	Tree Species	DBH(cm)	Height ft.(aprox)
1	<i>Pinus roxburghii</i>	77	35
2	<i>Pinus roxburghii</i>	83	39
3	<i>Aesandra butyracea</i>	92	25
4	<i>Pinus roxburghii</i>	69	42
5	<i>Pinus roxburghii</i>	74	38
6	<i>Aesandra butyracea</i>	66	30
7	<i>Doispyros malabarica</i>	110	40
8	<i>Pinus roxburghii</i>	76	46
9	<i>Doispyros malabarica</i>	58	36
10	<i>Pinus roxburghii</i>	70	42
11	<i>Pinus roxburghii</i>	54	43
12	<i>Pinus roxburghii</i>	63	38
13	<i>Litsea monopetala</i>	42	22
14	<i>Litsea monopetala</i>	53	25

**Herbs and Shrubs:** Banmara (*Eupatorium adenoforum*), Githa (*Dioscorea bulbifere*), Bans (*Bambusa tulda*), Areli (*Hypericum cordifolium*), Aiselu (*Pyrys pashia*)

**Forest Density:** total no of tree/area of the quadrate=220Trees/hector area

**Dominant species:** Pine=58%

**Crown coverage of the forest:** 15%

**c) Forest: Bijailibang community Forest**

**Location:** Korchawang-9, Tallolapchun

**G.P .S.** N-28.22776, E-082.32972

**Altitude:** 1140m

S.N.	Tree Species	DBH (cm)	Height (ft)
1	<i>Pinus roxburghii</i>	67	28
2	<i>Pinus roxburghii</i>	75	33
3	<i>Pinus roxburghii</i>	63	39
4	<i>Termenalia alata</i>	90	40
5	<i>Aesandra butyracea</i>	160	24
6	<i>Termenalia alata</i>	125	38

S.N.	Tree Species	DBH (cm)	Height (ft)
7	<i>Bauhinia purpuria</i>	58	21
8	<i>Bombax ceiba</i>	135	42
9	<i>Aesandra butyracea</i>	93	25
10	<i>Shorea robusta</i>	86	31
11	<i>Pinus roxburghii</i>	77	28
12	<i>Shorea robusta</i>	68	28
13	<i>Aesandra butyracea</i>	98	23
14	<i>Pinus roxburghii</i>	76	35
15	<i>Doispyros malabarica</i>	69	30
<b>Herbs and Shrubs:</b> Kurilo ( <i>Asparagus racemosus</i> ), Dhairo ( <i>woodfordia furticosa</i> ), Banko ( <i>Arisaema tortuosum</i> ), Pyakso ( <i>Gonatanthus pumilus</i> ), Khar ( <i>Themenda trianda</i> ),			

**Forest Density:** total no of tree/area of the quadrate=240 Trees/hector area

**Dominant Species:** Pine=33%

**Crown coverage of the forest:** 15%

#### d) Forest: Lamidanda Community Forest

**Location:** Hwama-9, Risbang

**G.P.S.** N-28.20465, E-082.36212

**Altitude:** 1105m

S.N.	Tree Species	DBH(cm)	Height ft.(aprox)
1	<i>Acacia catechu</i>	43	19
2	<i>Pinus roxburghii</i>	46	22
3	<i>Dalbergia sissoo</i>	38	15
4	<i>Acacia catechu</i>	37	21
5	<i>Pinus roxburghii</i>	46	28
6	<i>Pinus roxburghii</i>	41	25
7	<i>Pinus roxburghii</i>	54	26
8	<i>Dalbergia sissoo</i>	53	27
9	<i>Pinus roxburghii</i>	52	24
10	<i>Aesandra butyracea</i>	78	20
11	<i>Pinus roxburghii</i>	68	29
12	<i>Aesandra butyracea</i>	70	24
13	<i>Pinus roxburghii</i>	62	31
14	<i>Pinus roxburghii</i>	57	28
15	<i>Acacia catechu</i>	50	22
16	<i>Dalbergia sissoo</i>	48	23
<b>Herbs and Shrubs:</b> Khar ( <i>Themenda trianda</i> ), Areli ( <i>Hypericum cordifolium</i> ), Banko ( <i>Arisaema tortuosum</i> ), Bans ( <i>Bambusa tulda</i> ), Batul pate ( <i>Cissampeios pareino</i> ).			

**Forest Density:** total no of tree/area of the quadrate=250 Trees/hector area.

**Dominant Species:** Pine=50%

**Crown coverage of the forest:** 18%



### 3.5 Public Dependency on the Forest

The forests of the candidate project site provide a range of goods and services to the local communities. The local community extracts followings resources from the forest areas to support their livelihood.

- Fodder.
- Timber for domestic purpose as well as supplying out of village.
- Firewood.
- Grazing domestic animal.
- Medicine.
- Agricultural implements.
- Ornamental.
- Religious.
- Edibles, etc.

### 3.6 Floral Species of the Conservation Significance

Of the recorded floral species only 6 species have been categorized under the protection lists of the government of Nepal and CITES. However, none of the floral species have been listed in the IUCN red list. The table below presents the list of the protected species.

S.N.	Local Name	Scientific Name	Status			Source		
			IUCN	GON	CITES	Site survey	Hearing survey	Literature survey
1	Khayer	<i>Acacia catechu</i>		P		Confirmed at site		
2	Simal	<i>Bombax ceiba</i>		P		Confirmed at site		
3	Vyakur	<i>Dioscorea deltoidea</i>			II		Hearing at Risbang, Korchawang, Garpa	
4	Okher	<i>Juglans regia</i>		P			Hearing at Risbang, Korchawang, Garpa	
5	Champ	<i>Michelia champaca</i>		P			Hearing at Risbang, Korchawang, Garpa	
6	Sal	<i>Shorea robusta</i>		P		Confirmed at site		

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## 4 FAUNAL STUDY (WILDLIFE)

Information on the wildlife of the candidate project site is scarce in the published literatures. It is therefore site investigations are conducted to gather information through direct observation and the participatory methods with the local communities and the key informants. The findings of the filed investigations are presented in section hereunder.

### 4.1 Wildlife Diversity

Information on wildlife diversity is gathered through direct observation and participatory methods which included focus group discussion with the local communities and key informant surveys.

#### a) Mammals

A total of 18 mammalian species were recorded from the focus group discussion and key informant surveys. Of the total reported species 6 mammalian species were directly observed by the field biological team. The details of the mammalian species and habitat types are presented in the table below.

S.N.	Consultation	Observation	Common Name	Scientific Name
1	Jackal	-	Golden Jackal	<i>Canis aureus</i>
2	Nepte Chamero	-	Greater Short-nosed Fruit Bat	<i>Cynopterus sphinx</i>
3	Wild cat	-	Jungle Cat	<i>Felis chaus</i>
4	Mongoose	Mongoose	Small Indian Mongoose	<i>Herpestes auropunctatus</i>
5	Porcupine	-	Indian Crested Porcupine	<i>Hystrix indica</i>
6	Kharayo	-	Indian Hare	<i>Lepus nigricollis</i>
7	Kalo Oonth	-	Eurasian Otter	<i>Lutra lutra</i>
8	Pahare Bandar	-	Assamese Macaque	<i>Macaca assamensis</i>
9	Rato Bandar	Rato Bandar	Rhesus Macaque	<i>Macaca mulatta</i>
10	Malsapro	Malsapro	Yellow -throated Marten	<i>Martes flavigula</i>
11	Ratuwa	-	Barking Deer	<i>Muntiacus muntjak</i>
12	Ghoral	-	Common Ghoral	<i>Naemorhedus goral</i>
13	Chituwa	-	Leopard	<i>Panthera pardus</i>
14	Squirrel	-	Red Giant Flying Squirrel	<i>Petaurista petaurista</i>
15	House Rat	House Rat	House Rat	<i>Rattus rattus</i>
16	Langur	Langur	Nepal Grey Langur	<i>Semnopithecus schistaceus</i>
17	Pudke Chhuchundro	Pudke Chhuchundro	Eurasian Pigmy Shrew	<i>Sorex minutus</i>
18	Rato Phyauro	-	Red Fox	<i>Vulpes vulpes</i>

#### b) Birds

A total of 29 bird species are reported by the local communities and key informants. Of the total reported species 13 species are directly observed by the field biological team. Table below presents list of the reported and observed species in the candidate project influence area.

S.N.	Consultation	Observation	Common Name	Scientific Name
1	Ban Baj	-	Eurasian Sparrowhawk	<i>Accipiter nisus</i>
2	Gauthali	Gauthali	House Swift	<i>Apus affinis</i>
3	Hapsilo	-	Eurasian Eagle Owl	<i>Bubo bubo</i>
4	Cheer	-	Cheer Pheasant	<i>Catreus wallichii</i>
5	Pigeon	Pigeon	Rock Pigeon	<i>Columba livia</i>
6	Dhobeni	Dhobeni	Oriental Magpie Robin	<i>Copsychus Sacularis</i>
7	Kag	Crow	House Crow	<i>Corvus splendens</i>
8	Battai	-	Blue-breasted Quail	<i>Coturnix chinensis</i>

S.N.	Consultation	Observation	Common Name	Scientific Name
9	Kafal Pakyo	-	Indian Cuckoo	<i>Cuculus micropterus</i>
10	Kokale	Kokale	Grey Treepie	<i>Dendrocitta formosae</i>
11	Chibe	Chibe	Black Drongo	<i>Dicrurus macrocercus</i>
12	Shahi Baj	-	Peregrine Falcon	<i>Falco peregrines</i>
13	Kalo Titra	-	Black Francolin	<i>Francolinus francolinus</i>
14	Kingfisher	-	White-throated Kingfisher	<i>Halcyon smyrnensis</i>
15	Cockoo	-	Common Hawk Cuckoo	<i>Hierococcyx varius</i>
16	Bhadari	-	Long-tail Shrike	<i>Lanius schach</i>
17	Kalij	Kalij	Kalij Pheasant	<i>Lophura leucomelanos</i>
18	Barbet	-	Blue-throated Barbet	<i>Megalaima asiatica</i>
19	Bakulla	Egret	Intermediate Egret	<i>Mesophoyx intermedia</i>
20	Vangera	Sparrow	Eurasian Tree Sparrow	<i>Passer montanus</i>
21	Rani Chari	Rani Chari	Scarlet Minivet	<i>Pericrototus flammeus</i>
22	Woodpecker	-	Streak-throated Woodpecker	<i>Picus xanthopygaeus</i>
23	Parakeet	-	Rose-ranged Parakeet	<i>Psittacula krameri</i>
24	Jurelo	Jurelo	Red-vented Bulbul	<i>Pycnonotus cafer</i>
25	Vulture	-	Red headed Vulture	<i>Sarcogyps calvus</i>
26	Dove	Dove	Spotted Dove	<i>Streptopelia chinensis</i>
27	Tame Dhukur	Tame Dhukur	Oriental Turtle Dove	<i>Streptopelia orientalis</i>
28	Kande Vyakur	-	Spiny Babbler	<i>Turdoides nipalensis</i>
29	Lampuchhre	-	Yellow-billed Blue Magpie	<i>Urocissa flavirostris</i>

### c) Herpetofauna

The key informants and the local community reported a total of 9 herpetofauna species from the reservoir area. Of the total reported 3 of the species are observed by the field study team. Details of the herpetofauna species and their habitat types are presented in the table below.

S.N.	Consultation	Observation	Common Name	Scientific Name
1	Pit Viper	-	Himalayan Pit Viper	<i>Agkistrodon himalayanus</i>
2	Bufo	-	Black Spined Toad	<i>Bufo melanostictus</i>
3	Bufo	Bufo	Southern Hill Toad	<i>Bufo microtympanus</i>
4	Bufo	Bufo	Marble Toad	<i>Bufo stomaticus</i>
5	Krait	-	Common Karait	<i>Bungarus caeruleus</i>
6	Lizard	-	Garden Lizard	<i>Calotes versicolor</i>
7	Frog	Frog	Indian Bull Frog	<i>Rana tigrina</i>
8	Hariyo Sap	-	Green Viper	<i>Trimeresurus gramineus</i>
9	Sun Gohoro	-	Yellow Monitor Lizard	<i>Varanus flavescens</i>

## 4.2 Habitat Type in the Reservoir Area

The wildlife habitat of the reservoir area has the following characteristics.

S.N.	Common Name	Scientific Name	Habitat
1	Assamese Macaque	<i>Macaca assamensis</i>	Rocky hill area, forest.
2	Rhesus Macaque	<i>Macaca mulatta</i>	Cultivated, non-cultivated land, forest .
3	Nepal Grey Langur	<i>Semnopithecus schistaceus</i>	Non-cultivated land and cliff of hill, etc.
4	Yellow - throated Marten	<i>Martes flavigula</i>	Forest and nearby area, etc.
5	Small Indian Mongoose	<i>Herpestes auropunctatus</i>	Bushy places nearby settlement areas, crops field, canals, rivers and thin forest, etc.
6	Indian Crested Porcupine	<i>Hystrix indica</i>	Maize field, shady places, burrows, etc.
7	Indian Hare	<i>Lepus nigricollis</i>	Open busy area and grass land.
8	Greater Short - nosed Fruit Bat	<i>Cynopterus sphinx</i>	Caves and fruits plants.
9	Eurasian Otter	<i>Lutra lutra</i>	Lakes and ponds.

S.N.	Common Name	Scientific Name	Habitat
10	Eurasian Pigmy Shrew	<i>Sorex minutus</i>	Mainly in the thickest bushy area.

### 4.3 Migratory Corridor

The area is seasonally used as feeding habitat by the wildlife of the area and is not reported to be a migratory corridor and shows following characteristics.

- Ghorals seem in winter months at the top of mountain.
- Occasionally, Leopard lives in forest as well as enters the human settlement area.
- Monkeys like Rhesus, Assamese and Langurs visit in human's crop land, mostly in summer season.
- Avian fauna like Parrots, rock pigeon, Lampuchhre etc. come in winter season for feeding

### 4.4 Wild Animals of Conservation Significance

The reported wildlife of the candidate project site are cross checked with the protected wildlife lists of the government of Nepal, IUCN red book and the CITES Appendices. The lists of the wildlife which fall in the protection category of the government of Nepal, IUCN red book and the CITES Appendices are presented in the sections below.

#### a) Mammals

Of the reported species of mammal, 8 of the species are listed under the protection category of either government of Nepal or IUCN red list or under CITES Appendices. Of the recorded species 1 is listed under government of Nepal protection list, 4 under IUCN red list and 7 under CITES Appendices. Table below presents the species and thier protection category under various protection lists.

S.N.	Local Name	Common Name	Scientific Name	Status			Sources		
				IUCN	CITES	GON	Site survey	Hearing survey	Literature survey
1	Jackal	Golden Jackal	<i>Canis aureus</i>		III			Hearing at Risbang, Korchawang, Garpa	
2	Mongoose	Small Indian Mongoose	<i>Herpestes auropunctatus</i>		III		Confirmed at site		
3	Kalo Oonth	Eurasian Otter	<i>Lutra lutra</i>	NT	I			Hearing at Risbang, Korchawang, Garpa	
4	Pahare Bandar	Assamese Macaque	<i>Macaca assamensis</i>	NT		P		Hearing at Risbang, Korchawang, Garpa	
5	Ghoral	Common Ghoral	<i>Naemorhedus goral</i>	NT	I			Hearing at Risbang, Korchawang, Garpa	
6	Chitwara	Leopard	<i>Panthera pardus</i>	NT	I			Hearing at Risbang, Korchawang, Garpa	
7	Langur	Nepal Grey Langur	<i>Semnopithecus schistaceus</i>		I			Hearing at Risbang, Korchawang, Garpa	

S.N.	Local Name	Common Name	Scientific Name	Status			Sources		
				IUCN	CITES	GON	Site survey	Hearing survey	Literature survey
8	Rato Phyauro	Red Fox	<i>Vulpes vulpes</i>		III			Hearing at Risbang, Korchawang, Garpa	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I ( are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (re species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III ( are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

### b) Birds

Of the recorded avian species I is listed under the protection category of government of Nepal, and in the CITES Appendices. Table below presents the details of the protected species and the protection category as per the government of Nepal and CITES Appendices.

S.N.	Local Name	Common name	Scientific name	IUCN	CITES	GON
1	Cheer	Cheer Pheasant	<i>Catreus wallichii</i>		I	P

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I ( are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (re species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III ( are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

### c) Herpetofauna

One of the herpetofauna species out of the recorded species are listed as protection category species of government of Nepal and CITES Appendices. Table below presents the details of the protection category under various protection lists.

S.N.	Local Name	Common name	Scientific name	IUCN	CITES	GON
1	Sun Gohoro	Yellow Moniter Lizard	<i>Varanus flavescens</i>		II	P

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I ( are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (re species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III ( are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## 5 FISHERY STUDY

There is scanty information in the fish diversity, fishermen, fish market, and cost of fish in the candidate project site at the central and district level offices. To fill the data gap fish related information was gathered from the field surveys using a checklist. The fish survey is based on the participatory method and key informant survey methods along the influence area of the candidate project. The findings of the field survey are presented in the sections below.

### 5.1 Fishermen and their Occupational /Social/Economic Status and Fish Market, Availability and Cost

Participatory and key informant interviews reported nearly 39 part time and 61 occasional or recreational fishermen in the limits of the reservoir area. Majority of the fishermen belong to Gharti, and Magar ethnic group with a low social and economic status among the other communities.

About 25% of the fish caught by the fishermen is sold in the fish market, while rest is consumed by the fishermen family. There are altogether 3 fish markets in the nearby areas. Every day about 3 to 5 kg of fish is sold in each of the fish markets. Average cost of the fish in the market varies between 300 rupees.

Table below presents the details of information on the fishermen, their fishing status, economic and social status, fish market and availability of fish in the fish market and the average cost of the fish in the different parts of the reservoir area of the candidate project.

a.) Village/Tole: Liwang-3, Sigana and Barbang  
Name of the respondent: Champa Singh Thapa

Date: 27/03/2069 B.S.  
Age: 50

#### Fishermen

Presence of fisherman in the village						Yes
If yes no. of fishermen						15
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	-	-	4+4	Chhetri & Gharti	3+4	Magar & Chhetri
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Gharti & Magar	Chhetri	-	Gharti & Magar	Chhetri	-

Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs

Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell

#### Fish Market, Fish Availability and Cost

Name of the Market/s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Liwang Bazar	No	5	Fresh: 300 & Dried: 1000

**b) Village / Tole: Liwang-3, Khadabang and Sibang**  
**Name of the respondent: Anil Gharti Magar**

**Date: 27/03/2069 B.S.**  
**Age: 32**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						5
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	-	-	1+4	Chhetri & Gharti	-	-
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Gharti & Magar	-	-	Gharti & Magar	-	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs  
 Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Liwang Bazar	No	5	Fresh: 300 & Dried: 1000

**c) Village / Tole: Kotgaun-1, Madichaur+Ramja**  
**Name of the respondent: Tara Pd. Gharti Magar**

**Date: 28/03/2069 B.S.**  
**Age: 28**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						25
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	-	-	10	Gharti Magar	15	Gharti Magar
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	-	Gharti Magar	-		Gharti & Magar	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs  
 Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Madi Bazar	No	2	Fresh: 300 & Dried: 7000

**d) Village / Tole: Korchawang-5, Talloghapa+Nirmi**  
**Name of the respondent: Hasta Bir Pun**

**Date: 28/03/2069 B.S.**  
**Age: 40**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						15
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	-	-	-	-	10+5	Gharti Magar, Pun
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	-	Gharti Magar, Pun	-		Gharti Magar, Pun	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*  
*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market/s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Nirmi Bazar	No	2	Fresh: 350

**e) Village / Tole: Korchawang-9, Tallo Lapchun**  
**Name of the respondent: Viu Ram Batha**

**Date: 28/04/2069 B.S.**  
**Age: 55**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						15
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	-	-	4+1	Magar, Dalit	8+2	Magar, Dalit
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Dalit	Magar	-		Gharti Magar, Pun	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*  
*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market/s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Nirmi Bazar	No	2	Fresh: 350

**f) Village / Tole: Jankot-1, Madichaur+Dangdung**  
**Name of the respondent: Thirtha Man Pun**

**Date: 29/04/2069 B.S.**  
**Age: 68**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						5
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	-	-	3+2	Gharti, Magar	-	-
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	-	Gharti, Magar	-	Gharti, Magar	-	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*  
*Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*



**Fish Market, Fish Availability and Cost**

Name of the Market/s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Madi Bazar	Yes	2	Fresh: 350

**g) Village / Tole: Hwama-9, Risbang+Risbang Dhuri**  
**Name of the respondent: Kharka Bdr. Gharti Magar**

**Date: 29/04/2069 B.S.**  
**Age: 68**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						7
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
-	-	-	4+2	GhartiMagar, Pun Magar	3+1	Gharti Magar, Pun Magar
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	-	Gharti Magar, Pun Magar	-	Gharti Magar, Pun Magar	-	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs  
 Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Madi Bazar	Yes	3	Fresh: 350

**h) Village / Tole: Hwama-3&4, Garpa**  
**Name of the respondent: Pahal Sing Buda Magar**

**Date: 30/04/2069 B.S.**  
**Age: 68**

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						10
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
-	-	-	-	-	6+4	Thapa Magar, Roka Magar
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	-	Gharti Magar, Pun Magar	-	-	Thapa Magar, Roka Magar	-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs  
 Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
No Market	-	-	-

## 5.2 Fishing Season, Fish Catch, and Use of Caught Fish

Fishing in the river is carried out during the pre-monsoon and post monsoon seasons. Normally in the cold winter months (December - February) and monsoon months (June - September) fishing by the local fishermen is a rare activity. On an average daily catch of the fish by the occupational fishermen ranges between 0.5 to 1 kg with a maximum of 5 kg. Nearly 25% of the fish caught is sold in the nearby fish market. On an average the part time fishermen earn about 7000 rupees annually. According to the local fishermen the fish population in the candidate project sites is declining over the years due to illegal fishing practices.

The tables below present the details of the fishing season, fish catch, types of fish available, annual income of the fishermen etc. based on the key informant survey in different location of the candidate project sites.

**a) Location:** Dhansi Khola

**Date:** 26/04/2069 B.S.

**Name of the fisherman:** Bir Bdr. Buda

**Age:** 63

**Address:** Liwang-3, Sigana and Barbang

<b>Fishing detail</b>	Fishing season:	All months			
	Fishing days/week:	3-4 days/ week			
	Maximum catch/day:	3.5 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	1.5 kg			
<b>using way</b>	All consumed at home	At home	1KG	Average cost	Income last year
		In market	Yes	300/kg	3000/-

**Name of stream:** Dhansi Khola

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Buduna, Fageta, Gadela, Asla, Katle, Kapre, Bam, Cholki, Rem, Kalmuda.	Buduna, Asla, Katle	*		
		Due to blasting, Poisoning		

**b) Location:** Dhansi Khola

**Date:** 26/04/2069 B.S.

**Name of the fisherman:** Khir Pd.Gharti

**Age:** 56

**Address:** Liwang-3, Sigana and Barbang.

<b>Fishing detail</b>	Fishing season:	All months			
	Fishing days/week:	3-4 days/ week			
	Maximum catch/day:	2 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	1.5 kg			
<b>using way</b>	All consumed	At home	1KG	Average cost	Income last year
		In market	Yes	300/kg	20000/-

**Name of stream:** Dhansi Khola

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Buduna, Fageta, Gadela, Asla, Katle, Kapre, Bam, Cholki, Rem, Kalmuda etc.	Buduna, Asla, Katle etc.	*		
		Due to blasting, Poisoning.		

c) **Location:** Dhansi Khola

**Date:** 27/04/2069 B.S.

**Name of the fisherman:** Anil Gharti Maga

**Age:** 32

**Address:** Liwang-3, Khadabang and Sibang

<b>Fishing detail</b>	Fishing season:	All months			
	Fishing days/week:	3-4 days/ week			
	Maximum catch/day:	5 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	2 kg			
<b>using way</b>	All consumed	At home	1KG	Average cost	Income last year
		In market	2 kg	350/kg	8000/-

**Name of stream:** Dhansi Khola

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Buduna, Fageta, Gadela, Asla, Katle, Kapre, Bam, Cholki, Rem, Kalmuda	Buduna, Asla, Katle	*		
		Due to blasting , Poisoning		

d) **Location:** Dhansi Khola and Madi Khola

**Date:** 27/04/2069 B.S.

**Name of the fisherman:** Ram Bdr. Oli

**Age:** 35

**Address:** Liwang-3, Khadabang and Sibang

<b>Fishing detail</b>	Fishing season:	All months			
	Fishing days/week:	3-4 days/ week			
	Maximum catch/day:	3 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	1 kg			
<b>using way</b>	All consumed at home	At home	1KG	Average cost	Income last year
		In market	2 kg	350/kg	4000/-

**Name of stream:** Dhansi Khola and Madi Khola

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Buduna, Fageta, Gadela, Asla, Katle, Kapre, Bam, Cholki, Rem, Kalmuda.	Buduna, Asla, Katle	*		
		Due to blasting, Poisoning.		

e) **Location:** Madi Khola

**Date:** 28/04/2069 B.S.

**Name of the fisherman:** Tara Pd. Gharti Magar

**Age:** 28

**Address:** Kotgaun-1, Madi Bazar

<b>Fishing detail</b>	Fishing season:	All months (except Mangsir-Magh)			
	Fishing days/week:	3-4 days/week			
	Maximum catch/day:	2 kg			
	Minimum catch/day:	1/2 kg			
	Average catch/day:	1 kg			
<b>using way</b>	All consumed	At home	1/2KG	Average cost	Income last year
		In market	1 kg	300/kg	5000/-

**Name of stream:** Madi Khola

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Buduna, Fageta, Gadela, Asla, Katle, Kapre, Bam, Cholki, Rem, Kalmuda, Gonch.	Buduna, Asla, Katle	*		
		Due to blasting , Poisoning		

**f) Location:** Madi Khola

**Date:** 28/04/2069 B.S.

**Name of the fisherman:** Hasta Bir Pun

**Age:** 40

**Address:** Korchawang-5, Nirmi

<b>Fishing detail</b>	Fishing season:	All months (except Mangsir-Magh)			
	Fishing days/week:	4-5days/ week			
	Maximum catch/day:	3 kg			
	Minimum catch/day:	0.5kg			
	Average catch/day:	1 kg			
<b>using way</b>	All consumed	At home	1KG	Average cost	Income last year
		In market	1 kg	350/kg	6000/-

**Name of stream:** Madi Khola

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Buduna, Fageta, Gadela, Asla, Katle, Kapre, Bam, Cholki, Rem, Kalmuda, Gonch	Buduna, Asla, Katle	*		
		Due to blasting, Poisoning		

**g) Location:** Madi Khola

**Date:** 28/04/2069 B.S.

**Name of the fisherman:** Til Bdr. Buda

**Age:** 22

**Address:** Korchawang-5, Nirmi

<b>Fishing detail</b>	Fishing season:	All months (except Mangsir-Magh)			
	Fishing days/week:	4-5 days/ week			
	Maximum catch/day:	2 kg			
	Minimum catch/day:	0.5 kg			
	Average catch/day:	1 kg			
<b>using way</b>	All consumed	At home	1KG	Average cost	Income last year
		In market	1 kg	350/kg	5000/-

**Name of stream:** Madi Khola

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Buduna, Fageta, Gadela, Asla, Katle, Kapre, Bam, Cholki, Rem, Kalmuda,	Buduna, Asla, Katle	*		
		Due to blasting, Poisoning.		

**h) Location:** Madi Khola

**Date:** 28/04/2069 B.S.

**Name of the fisherman:** Bar Man Pun

**Age:** 45

**Address:** Jankot-1, Madichaur

<b>Fishing detail</b>	Fishing season:	All months (except Mangsir-Magh)			
	Fishing days/week:	4-5 days/ week			
	Maximum catch/day:	1.5 kg			
	Minimum catch/day:	0.5 kg			
	Average catch/day:	1 kg			
<b>using way</b>	All consumed	At home	All Consumed	Average cost	Income last year
		In market	-	-	-

**Name of stream:** Madi Khola

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Buduna, Fageta, Gadela, Asla, Katle, Kapre, Bam, Cholki, Rem, Kalmuda,	Buduna, Asla, Katle	*		
		Due to blasting, Poisoning.		

**i) Location:** Madi Khola

**Date:** 28/04/2069 B.S.

**Name of the fisherman:** Anil Gharti Magar

**Age:** 31

**Address:** Hwama-9, Risbang

<b>Fishing detail</b>	Fishing season:	All months (except Mangsir-Magh)			
	Fishing days/week:	4-5 days/ week			
	Maximum catch/day:	2 kg			
	Minimum catch/day:	0.5 kg			
	Average catch/day:	1 kg			
<b>using way</b>	All consumed	At home	½ kg	Average cost	Income last year
		In market	1 kg	300	4000

**Name of stream:** Madi Khola

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Buduna, Fageta, Gadela, Asla, Katle, Kapre, Bam, Cholki, Rem, Kalmuda	Buduna, Asla, Katle	*		
		Due to blasting, Poisoning		

**j) Location:** Dhansi Khola

**Date:** 28/04/2069 B.S.

**Name of the fisherman:** Sur Bir Roka Magar

**Age:** 29

**Address:** Hwama-3, Garpa

<b>Fishing detail</b>	Fishing season:	All months (except Mangsir-Magh)			
	Fishing days/week:	4-5 days/ week			
	Maximum catch/day:	2 kg			
	Minimum catch/day:	0.5 kg			
	Average catch/day:	1 kg			
<b>using way</b>	All consumed	At home	All consumed	Average cost	Income last year
		In market	-	-	-

### Fish detail of the catchment stream or river

**Name of stream:** Dhansi Khola

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Buduna, Fageta, Gadela, Asla, Katle, Kapre, Bam, Cholki, Rem, Kalmuda	Buduna, Asla, Katle	*		
		Due to blasting, Poisoning		

## 5.3 Fish Diversity

A total of 8 fish species is reported by the local fishermen during the key informant survey. The lists of the fish species reported in the candidate project site is presented in the table below.

S.N.	Consultation	Observation	Common Name	Scientific Name
1	Gouch	-	Gouch	<i>Bagarius bagarius</i>
2	Fageta		Fageta	<i>Barilius barilius</i>
3	Buduna		Buduna	<i>Garra gotyla gotyla</i>
4	Kapre	-	Kapre	<i>Glyptorhorax annandalei</i>
5	Bam		Spiny Eel	<i>Mastacembelus armatus</i>
6	Gadela		Gadela	<i>Nemacheilu botia</i>
7	Katle	Katle	Katle	<i>Neolissochilus hexagonolepis</i>
8	Asla		Asla	<i>Schizothorax richardsoni</i>

### 5.4 List of Fish Species of Conservation Significance

Of the 8 reported fish species 3 of the fish species are listed in the IUCN red list. Table below presents the list of the fish species of conservation significance.

S.N .	Local Name	Scientific Name	Status			Site survey	Hearing survey	Literature survey
			IUCN	CITES	GON			
1	Gouch	<i>Bagarius bagarius</i>	NT				Hearing at barbang, Libang, sibang, Kot gaon, Ramja etc.	
2	Katle	<i>Neolissochilus hexagonolepis</i>	NT				Hearing at barbang, Libang, sibang, Kot gaon, Ramja etc.	
3	Asla	<i>Schizothorax richardsoni</i>	VU				Hearing at barbang, Libang, sibang, Kot gaon, Ramja etc.	

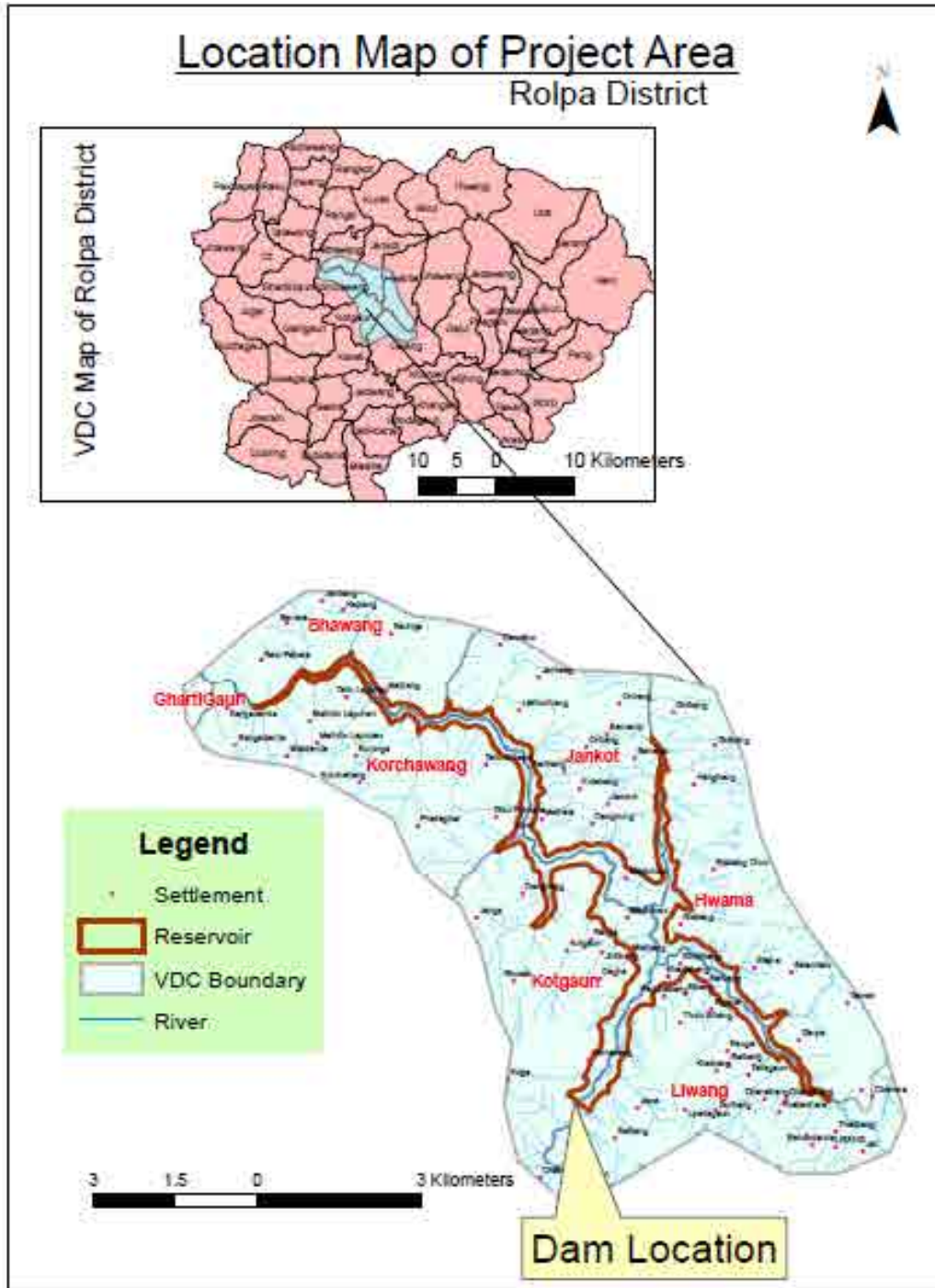
**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I ( are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (re species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III ( are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## 6 Topographic Map and Satellite Imagery Study

### 6.1 Project Location

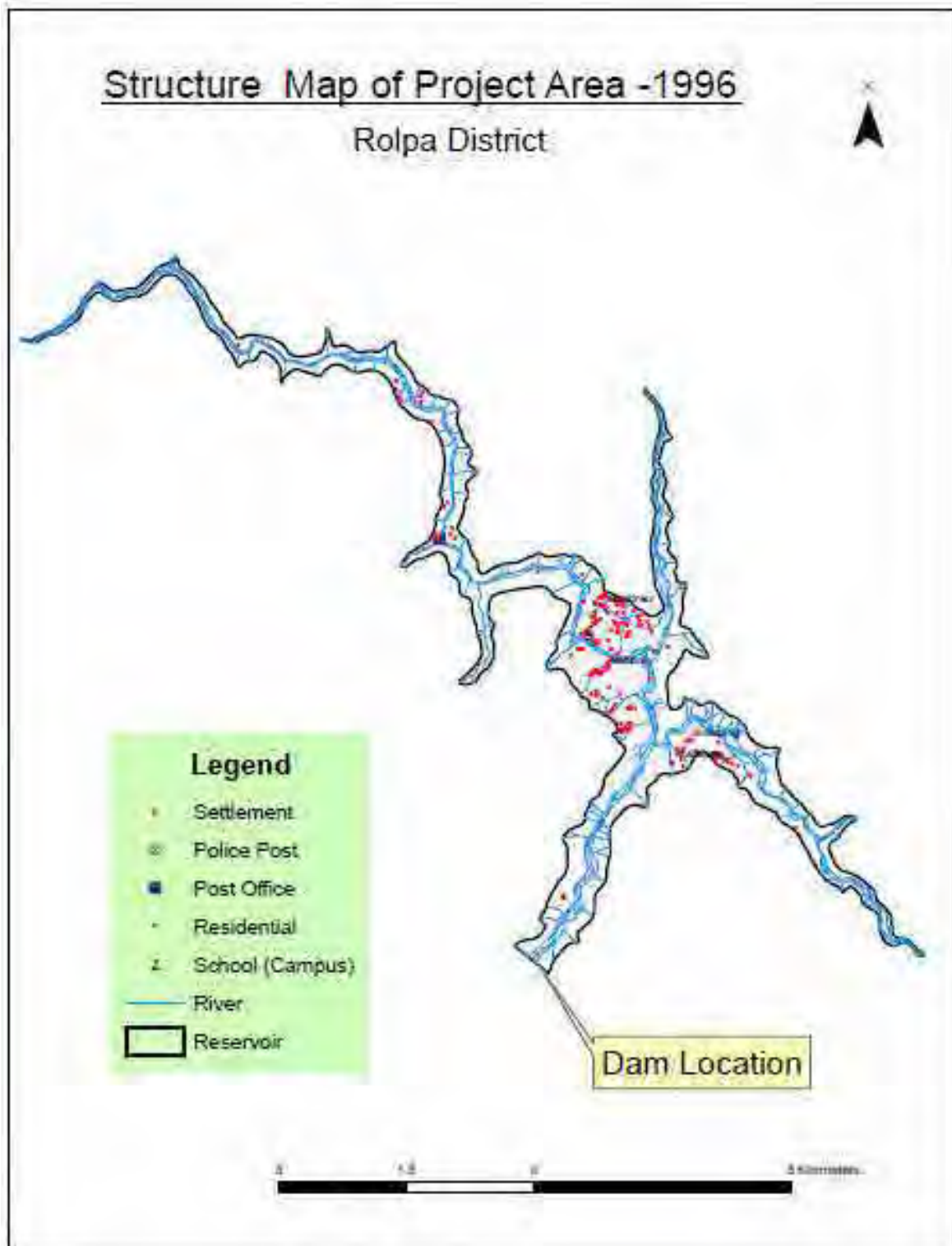


### 6.2 Topographic Maps

For this study, topographical maps of the scale of 1: 25000 prepared by the Government of Nepal, Survey Department (1996) has been used for the analysis of land cover, and built structures, after digitizing. All data used for the topographic map study were projected to the Universal Transverse Mercator (UTM) projection system that is World Geodetic System 1984 for the analysis of topographic maps. The analysis results are presented in the table and maps below.

### 6.2.1 Built Structures

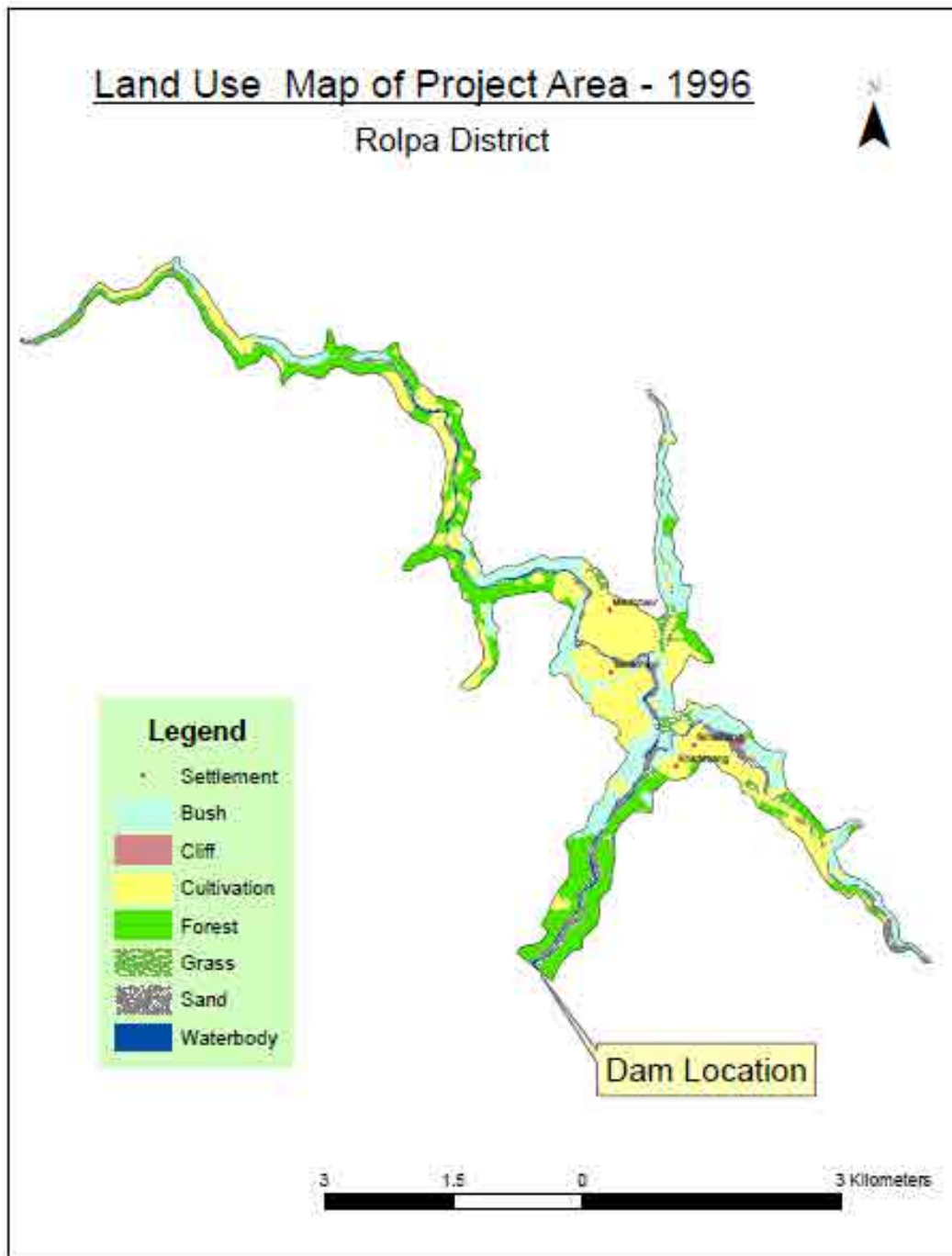
Nos. of building as per the Topographic maps	165
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### 6.2.2 Land Use

S.N.	Land Use Class	Land Use Topographic Maps (1996), Km <sup>2</sup>	Percentage
1	FOREST	2.137646	27.92483344
2	BUSH	1.638043	21.39834095
3	SAND	0.692816	9.050502939
4	CULTIVATED	2.662872	34.78604833
5	CLIFF	0.013116	1.713389941
6	WATER	0.338151	4.417387329
7	GRASS LAND	0.172869	2.25824951
8	BARRENLAND		
	<b>TOTAL</b>	<b>7.655</b>	<b>100</b>



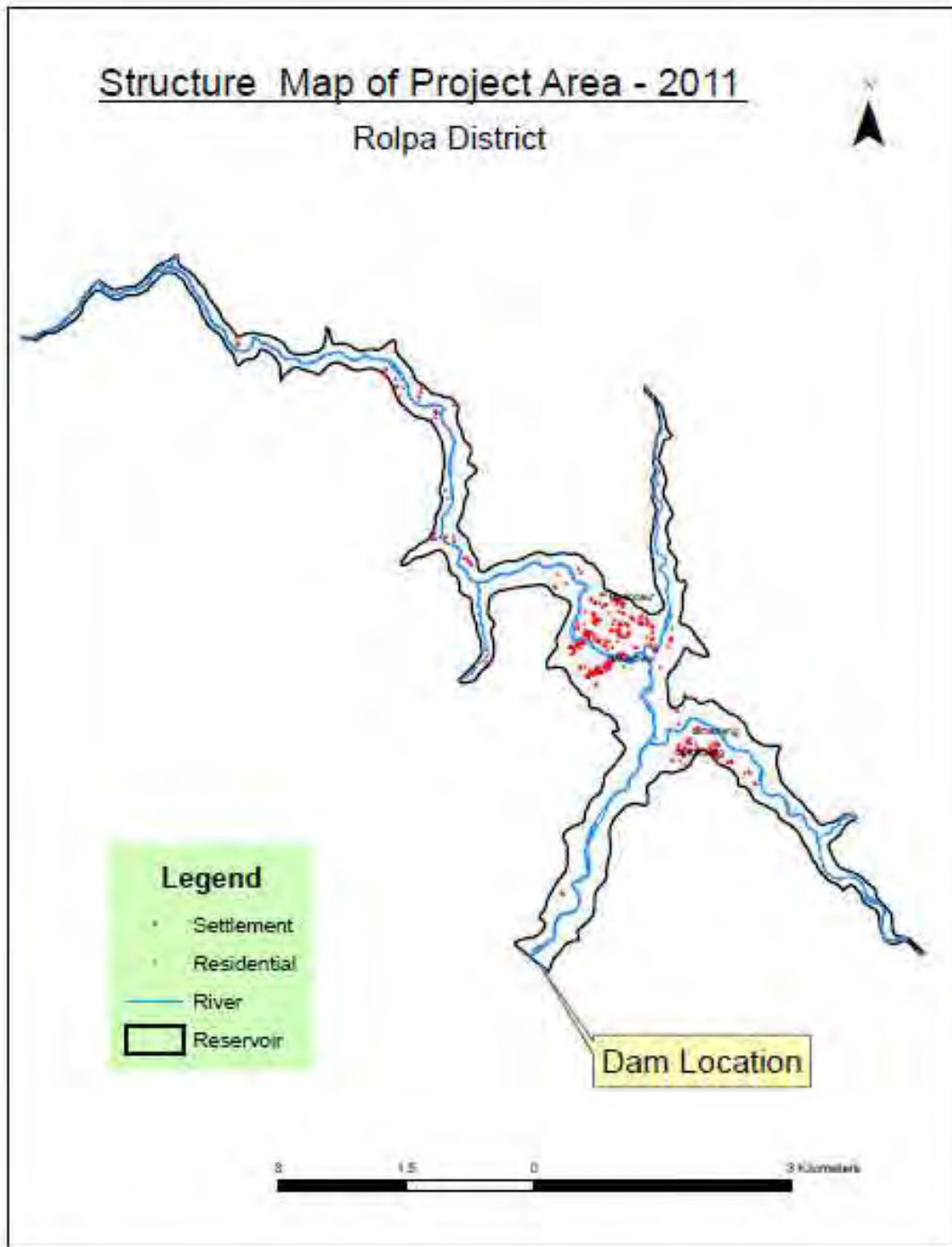
### 6.3 Satellite Image Maps

The Arc GIS 9.3 has been used for the analysis of image. World view 1 image of 2011 has been used for the land use and other parameters such as built structures, road networks, bridges etc. analysis of the area.

The analysis results are presented in tables and Map below.

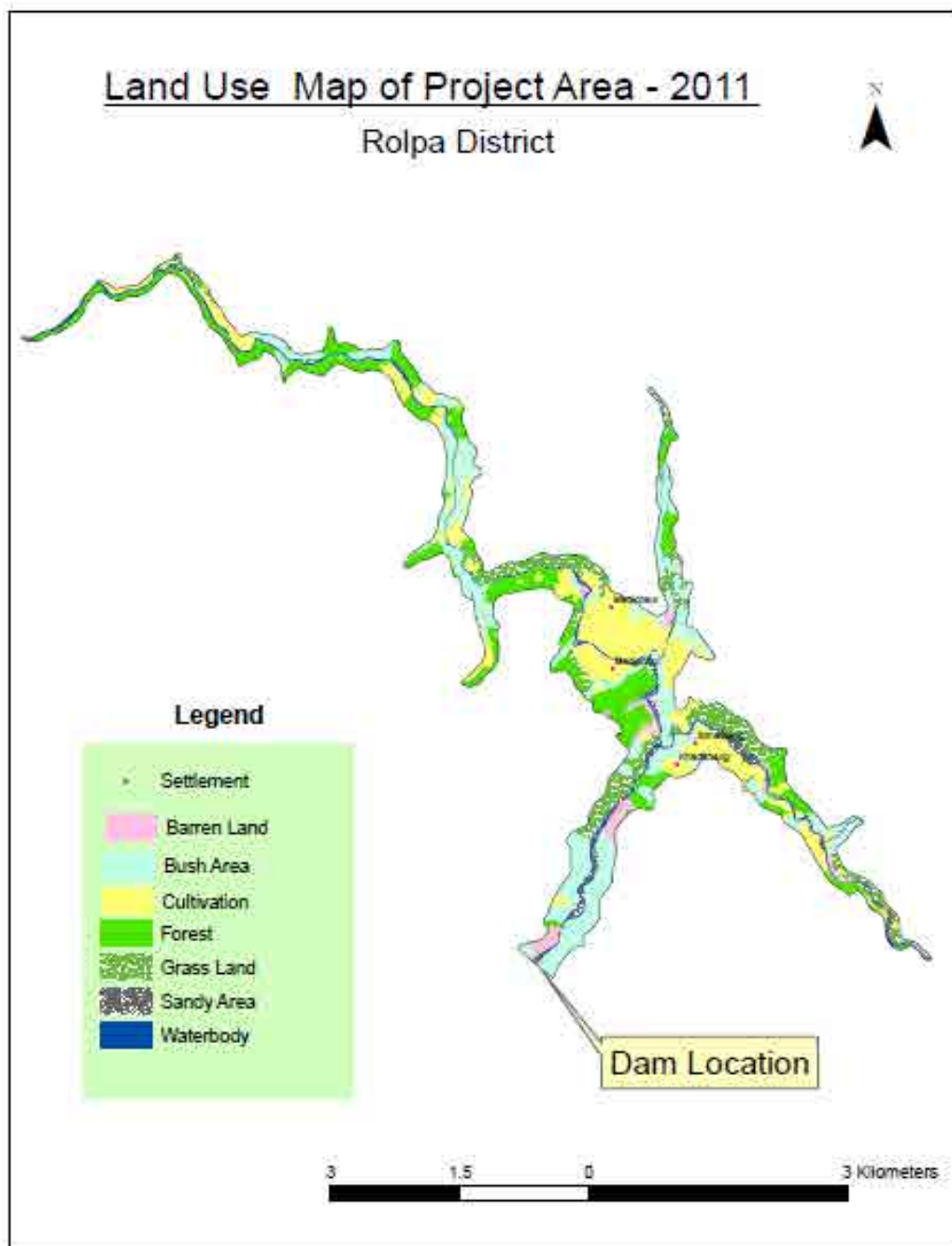
#### 6.3.1 Building Structures

Nos. of building as per the Satellite Image	318
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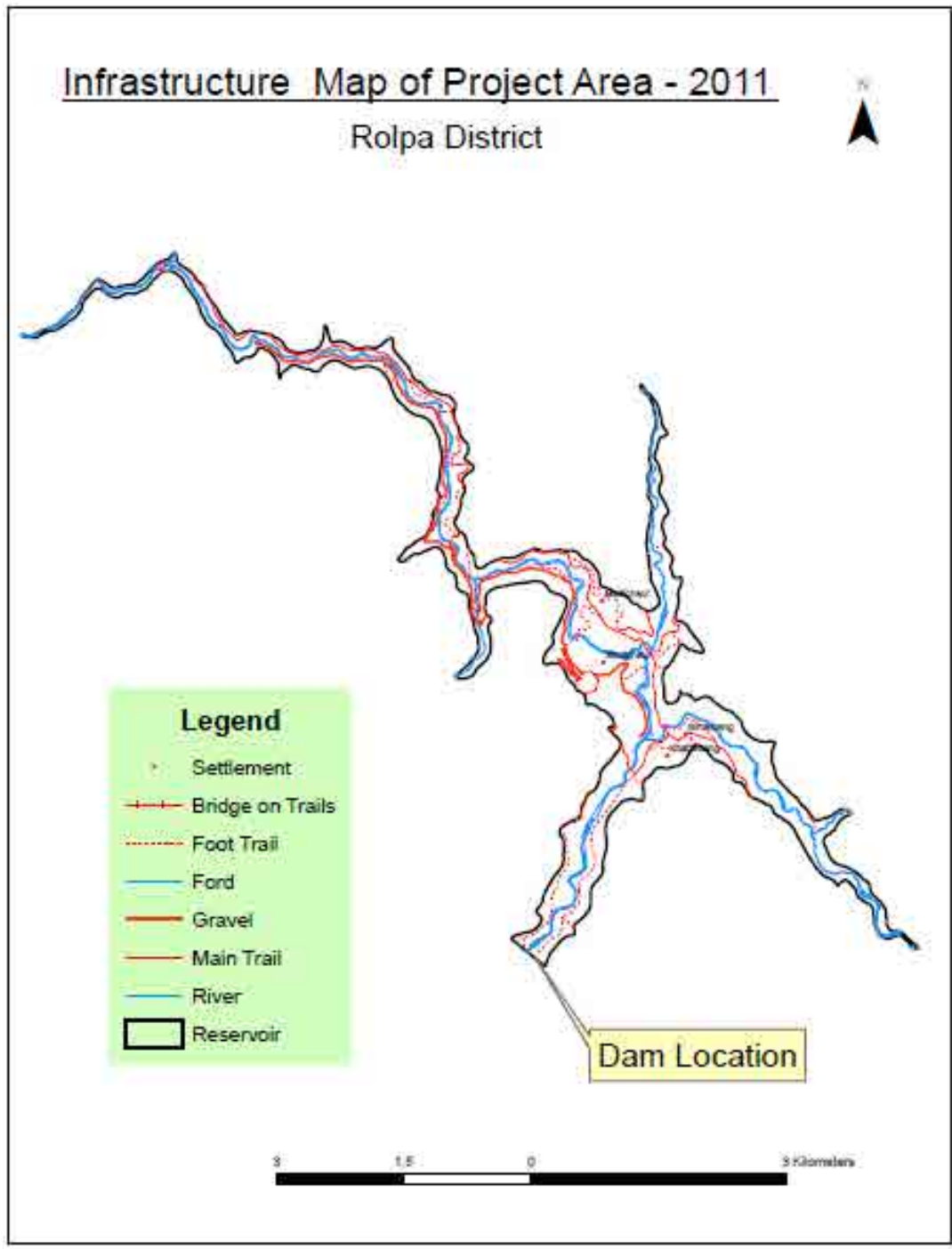
### 6.3.2 Land use

S.N.	Land Use Class	Land Use Satellite Image (2011), Km <sup>2</sup>	Percentage
1	FOREST	1.640028	21.42427172
2	BUSH	2.01902	26.37517962
3	SAND	0.40606	5.304506858
4	CULTIVATED	1.9168	25.03984324
5	CLIFF		
6	WATER	0.376793	4.922181581
7	GRASS LAND	1.038471	13.5659177
8	BARRENLAND	0.258588	3.378027433
	<b>TOTAL</b>	<b>7.655</b>	<b>100</b>



### 6.3.3 Infrastructures

Infrastructures	Nos. / Length
Total Nos. of bridge on motorable road	0
Total Nos. of bridge on trail	6
Total Nos. of fords	2
Gravel road (m)	11246
Paved road (highway) (m)	0
Main trail (m)	13636
Foot path (m)	14633



## References

1. Bibhuti Ranjan Jha, 2006; *Fish Ecological Studies and its application in assessing Ecological Integrity of Rivers in Nepal*; Thesis Submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in The Department of Biological Sciences and Environmental Science, School of Science, Kathmandu University, Dhulikhel, Nepal, January 2006
2. CBS (2002), *Population Census 2001, National Report*, Kathmandu: Central Bureau of Statistics / UNFPA
3. CBS, 2012; *National Population and Housing Census 2011 (Village Development Committee / Municipalities)*, Government of Nepal, National Planning Commission Secretariate, Central Bureau of Statistics, Kathmandu, Nepal, November 2012.
4. Disaster Preparedness Network, Nepal, 2009; *Nepal Disaster Report: The hazardscape and vulnerabilities*, Ministry of Home Affairs, Nepal Disaster Preparedness Network, Nepal with support from with support from European Commission for Humanitarian Aid Department, United Nations Development Nepal and Oxfam Nepal
5. IUCN, 2011; *The Status of Nepal's Mammals: The National Red List Series*
6. NARMSAP, 2002; *Forest and Vegetation Types of Nepal*, TISC Document Series No 105, GoN / MOFSC / NARMSAP, 1-179.
7. Petr, T, 2002; *Cold water fish and fisheries in countries of the high mountain arc of Asia (Hindu Kush-Pamir-Karakoram-Himalayas) A review*, Symposium on coldwater fish species in the trans-Himalayan region. 10-14 July 2001. Kathmandu, Nepal
8. Rajbansi K.J, 1982; *A General Bibliography on Fish and Fisheries of Nepal*, Royal Nepal Academy, Kamaladi, Kathmandu, Nepal.
9. Rajbansi K.J, 2002; *Zoogeographical distribution and the status of cold water fishes of Nepal*. Paper presented in symposium on coldwater fish species in the trans-himalayan region. 10-14 July 2001, Kathmandu, Nepal
10. Shrestha et.al, 2012; *Fishes of Nepal: Mapping distributions based on voucher specimens*, Emporia State Research Studies Vol. 48, no. 2, p. 14-21 (2012)
11. Shrestha, J. (1995); *Enumeration of the Fishes of Nepal*, Bio-diversity Profiles Project, Publication No. 10, Department of National Parks and wildlife Conservation, Ministry of Forest & Soil Conservation, GoN, Kathmandu, Nepal.
12. Shrestha, T. K., 2008; *Icology of Nepal A study of Fishes of the Himalayan Waters*
13. Stainton, J.D.A., 1972; *Forests of Nepal*, John Murray, London.

## Photographs



Fish pool and pig farming at Jangkot VDC-1



Houses with their fish farming at the edge of Hungri Khola



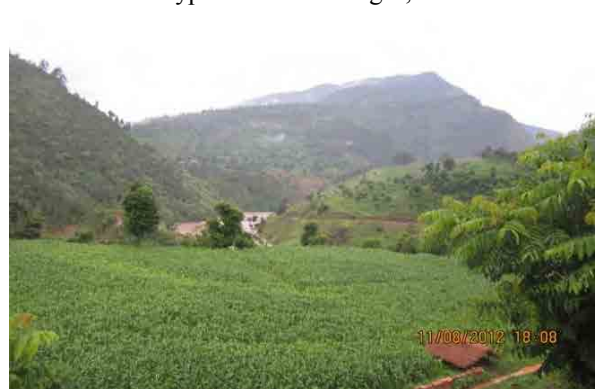
Interview with local people ta Hwama-3, Garpa



House type at Korchawang-9, Pulbot



Korchawang-9, water mill near Madi River



Maize field of Madi chaur



Skin of ratuwa at Hwama-3, Garpa.



Stadium at Kotgaun VDC-1, Madichuar

# Appendixes

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**Appendix 1: Districts, VDCS and Settlements and Population under the Storage Project, Rolpa**

S.N.	VDC	Settlement	Ward No.	HH	Population
1	Korchabang	Muguwang	5	4	18
2		Dharkhola	9	1	12
3		Nimri	5	7	22
4		Nepchabang	5	1	9
5		Kumbang (Simkhet)	5	4	24
6	Kotagaun	Kunga	7	4	4
7		Ramjagaun	1	3	12
8		Bhalama	1	1	6
9		Madichaur	1	65	400
10		Dhabang	9	42	258
11	Jamkot	Jamkot Madichaur	1	111	515
12		Malingbang	2	2	15
13		Mathla	2	6	6
14	Bhabang	Majabang	1	3	10
15		Dharamshaya	9	3	19
16		Khuringbang	8	3	16
17		Bharbang	1	3	16
18	Libang	Simalbang	3	15	92
19		Kharabang	3	18	96
20		Barbang	3	13	51
21	Hama	Risibang	9	5	20
22		Domoi (Ghornga Bang)	3	4	21
23	Parchabang	Lapchang / Pulbot	9	4	11
24	Reuka	Jhuringbang	3	7	55
25	Kareli	Sibang dhara	1	7	49
<b>Total</b>	<b>9</b>	<b>25</b>	<b>15</b>	<b>336</b>	<b>1757</b>

Source: NESS Field Survey, 2012



**Appendix 2: Ethnic / Caste Group of Population by Reservoir Area Settlements**

VDC	Settlement	Ward No.	HH	Brahmin	Chhetri	Magar (Disadvantaged Janajati)	Dalit
Korchabang	Muguwang	5	4	0	0	4	0
	Dharkhola	9	1	0	0	1	0
	Nimri	5	7	0	0	7	0
	Nepchabang	5	1	0	0	1	0
	Kumbang (Simkhet)	5	4	0	0	4	0
Kotagaun	Kunga	7	4	0	4	0	0
	Ramjagaun	1	3	0	0	3	0
	Bhalama	1	1	0	1	0	0
	Madichaur	1	65	2	1	62	0
	Dhabang	9	42	0	42	0	0
Jamkot	Jamkot Madichaur	1	111	0	10	97	4
	Malingbang	2	2	0	0	2	0
	Mathla	2	6	0	0	6	0
Bhabang	Majabang	1	3	0	0	3	0
	Dharamshaya	9	3	0	0	3	0
	Khuringbang	8	3	0	0	3	0
	Bharbang	1	3	0	0	3	0
Libang	Simalbang	3	15	0	5	10	0
	Kharabang	3	18	0	0	18	0
	Barbang	3	13	0	1	12	0
Hama	Risibang	9	5	0	0	4	1
	Domoi (Ghornga Bang)	3	4	0	0	4	0
Parchabang	Lapchang / Pulbot	9	4	0	0	4	0
Reuka	Jhuringbang	3	7	0	0	7	0
Kareli	Sibang dhara	1	7	0	7	0	0
<b>Total</b>			<b>336</b>	<b>2</b>	<b>71</b>	<b>258</b>	<b>5</b>
<b>%</b>				<b>0.6</b>	<b>21.1</b>	<b>76.8</b>	<b>1.5</b>

Source: NESS Field Survey, 2012

**Appendix 3: Land Use Pattern in the Reservoir Area**

VDC	Settlement	Ward No.	Landuse Area (Ropani-)1 Ropani=20 Ropani				Total
			Agriculture	pasture	forest	other	
Korchabang	Muguwang	5	40	0	1	0	41
	Dharkhola	9	4	0	0	0	4
	Nimri	5	25	4	4	0	33
	Nepchabang	5	8	2	2	0	12
	Kumbang (Simkhet)	5	143	0	7	0	150
Kotagaun	Kunga	7	50	0	100	0	150
	Ramjagaun	1	20	2	4	0	26
	Bhalama	1	13	2	2	0	17
	Madichaur	1	400	0	0	6	406
	Dhabang	9	630	200	0	30	860
Jamkot	Jamkot						
	Madichaur	1	500	0	50	0	550
	Malingbang	2	15	4	6	0	25
	Mathla	2	30	3	7	0	40
Bhabang	Majabang	1	75	0	1	30	106
	Dharamshaya	9	8	2	2	0	12
	Khuringbang	8	18	4	2	0	24
	Bharbang	1	80	0	0	200	280
Libang	Simalbang	3	302	30	0	0	332
	Kharabang	3	450	20	0	0	470
	Barbang	3	405	20	20	0	445
Hama	Risibang	9	200	2	2	0	204
	Domoi (Ghornga Bang)	3	30	4	0	0	34
Parchabang	Lapchang / Pulbot	9	11	0	1	0	12
Reuka	Jhuringbang	3	150	10	0	0	160
Kareli	Sibang Dhara	1	85	7	3	40	135
<b>Total</b>			<b>3692</b>	<b>316</b>	<b>214</b>	<b>306</b>	<b>4528</b>
<b>%</b>			<b>81.54</b>	<b>6.98</b>	<b>4.73</b>	<b>6.76</b>	<b>100</b>

Source: NESS Field Survey, 2012

**Appendix 4: Land Holding Size by Settlements of the Reservoir Area**

VDC	Settlement	Ward No.	Land use Area ( Ropani-)1 Ropani=20 Ropani				Av Holding / HH
			Khet	Bari	Others (Kharbari)	Total	
Korchabang	Muguwang	5					
	Dharkhola	9	40	0	0	40	0.12
	Nimri	5	4	0	0	4	0.01
	Nepchabang	5	17	4	4	25	0.07
	Kumbang (Simkhet)	5	0	8	0	8	0.02
Kotagaun	Kunga	7	3	140	7	150	0.45
	Ramjagaun	1	50	0	100	150	0.45
	Bhalama	1	3	15	2	20	0.06
	Madichaur	1	0	13	0	13	0.04
	Dhabang	9	98	295	0	393	1.17
Jamkot	Jamkot Madichaur	1	250	350	30	630	1.88
	Malingbang	2	200	300	50	550	1.64
	Mathla	2	2	13	0	15	0.04
Bhabang	Majabang	1	0	30	10	40	0.12
	Dharamshaya	9	2	73	30	105	0.31
	Khuringbang	8	2	6	0	8	0.02
	Bharbang	1	0	16	2	18	0.05
Libang	Simalbang	3	20	60	200	280	0.83
	Kharabang	3	2	300	30	332	0.99
	Barbang	3	200	250	20	470	1.40
Hama	Risibang	9	5	400	20	425	1.26
	Domoi (Ghornga Bang)	3	150	50	0	200	0.60
Parchabang	Lapchang / Pulbot	9	25	5	0	30	0.09
Reuka	Jhuringbang	3	7	5	0	12	0.04
Kareli	Sibang dhara	1	150	0	0	150	0.45
<b>Total</b>			<b>60</b>	<b>25</b>	<b>40</b>	<b>125</b>	<b>0.37</b>
%			1290	2358	545	4193.0	12.48

Source: NESS Field Survey, 2012

**Appendix 5: Area under different Crops and Production under different Crops**  
**Table 1: Area under different Crops**

VDC	Settlement	Ward No.	Area under different crops (Ropani-)1 Ropani=20 Ropani							
			Paddy	Maize	Millet	Wheat	Potato	Pulses	Oilseeds	Vegetables
Korchabang	Muguwang	5	40			20	1	0.5		0.5
	Dharkhola	9	4		4					
	Nimri	5	17				1			1
	Nepchabang	5		8		6				
	Kumbang (Simkhet)	5	3	140		100				
Kotagaun	Kunga	7	50		10	40				
	Ramjagaun	1	3	15		10			0.5	
	Bhalama	1		8		8				0.5
	Madichaur	1	100	300		240	5			7
	Dhabang	9	250	350		200	15			2
Jamkot	Jamkot Madichaur	1	200	300		100	40		14	50
	Malingbang	2	2	13		10				
	Mathla	2	30			20				15
Bhabang	Majabang	1		73		50	15	2	2	
	Dharamshaya	9		4						0.5
	Khuringbang	8		12		8	1			0.5
	Bharbang	1		60		40				
Libang	Simalbang	3	2	300		200				20
	Kharabang	3	200	250		100	10			6
	Barbang	3	5	400		200	50			
Hama	Risibang	9	150	50		100				5
	Domoi (Ghornga Bang)	3	25	5		15		2		5
Parchabang	Lapchang/Pulbot	9	12					4		3
Reuka	Jhuringbang	3	150							
Kareli	Sibang dhara	1	60	25		50				3
<b>Total</b>			<b>1303</b>	<b>2313</b>	<b>14</b>	<b>1517</b>	<b>138</b>	<b>8.5</b>	<b>16.5</b>	<b>119</b>

Source: NESS Field Survey, 2012

**Table 2: Production under different Crops**

VDC	Settlement	Ward No.	Production under different crops (Kg)							
			Paddy	Maize	Millet	Wheat	Potato	Pulses	Oilseeds	Vegetables
Korchabang	Muguwang	5	1500			630	1000	71.5		400
	Dharkhola	9	500							
	Nimri	5	2000		727		200			400
	Nepchabang	5		630		315				
	Kumbang (Simkhet)	5	750	31500		18900				
Kotagaun	Kunga	7	7500			3150				
	Ramjagaun	1	300	1386	727	945			176.4	
	Bhalama	1		1260		756				100
	Madichaur	1	20000	88200		50400	2500			135000
	Dhabang	9	60000	150000		63000	10000			1000
Jamkot	Jamkot Madichaur	1	50000	75000		31500	20000		11760	100000
	Malingbang	2	350	1575		630				
	Mathla	2	3000			1575				20000
Bhabang	Majabang	1		12600		6300	3000	286	117.6	
	Dharamshaya	9		252						1000
	Khuringbang	8		1575		630	200			100
	Bharbang	1		5040		1260				
Libang	Simalbang	3	200	75600		18900				20000
	Kharabang	3	20000	63000		12600	5000			70000
	Barbang	3	200	25200		6300	5000			
Hama	Risibang	9	20000	12600		3150				10000
	Domoi (Ghornga Bang)	3	3500	630		1890		286		2500
Parchabang	Lapchang/Pulbot	9	1100					286		2000
Reuka	Jhuringbang	3	10000							
Kareli	Sibang dhara	1	35000	5040		6300				1500
<b>Total</b>			<b>235900</b>	<b>551088</b>	<b>1454</b>	<b>229131</b>	<b>46900</b>	<b>929.5</b>	<b>12054</b>	<b>364000</b>

Source: NESS Field Survey, 2012

**Appendix 6: Sale of Agricultural Produces**

VDC	Settlement	Ward No.	Sale detail			
			crop name	quantity (kg)	value	place of sale
Korchabang	Muguwang	5		0	0	
	Dharkhola	9		0	0	
	Nimri	5	potato	400	30/kg	Libang
	Nepchabang	5	maize	126	25/kg	village
	Kumbang (Simkhet)	5		0		
Kotagaun	Kunga	7		0	0	
	Ramjagaun	1		0	0	
	Bhalama	1		0	0	
	Madichaur	1	potato	130000	35/kg	Libang
	Dhabang	9		0	0	
Jamkot	Jamkot Madichaur	1	vegetable	100000	35/kg	Libang
	Malingbang	2		0	0	
	Mathla	2	vegetable	10000	35/kg	Libang
Bhabang	Majabang	1		0	0	
	Dharamshaya	9		0	0	
	Khuringbang	8		0	0	
	Bharbang	1		0	0	
Libang	Simalbang	3	vegetable	15000	27/kg	Libang
	Kharabang	3	vegetable	50000	40/kg	Libang
	Barbang	3		0	0	
Hama	Risibang	9	vegetable	9000	45/kg	libang
	Domoi(Ghornga Bang)	3	vegetable	1700	45/kg	Libang
Parchabang	Lapchang/Pulbot	9		0	0	
Reuka	Jhuringbang	3		0	0	
Kareli	Sibang dhara	1	potato	2000	30/kg	Libang

Source: NESS Field Survey, 2012

**Appendix 7: Road and Suspension Bridge**

S.N.	VDC	Cluser	Road Type	Length (Km)	Name	Suspension Bridge
1	Korchabang	Muguwang	graveled	0.5 km	Libang-Gartigaun	
2		Nimri	graveled	0.5 km	Libang-Gartigaun	
3		Nepchabang	graveled	0.25 m	Libang-Gartigaun	
4		Kumbang (simkhet)	graveled	0.5 km	Libang-Gartigaun	Gartigaon
5	Kotagaun	Ramjagaun	graveled	0.5 km	Libang-Gartigaun	
6		Bhalama	graveled	0.5 km	Libang-Gartigaun	
7		Madichaur	graveled	1.5 km	Link road Madichaur	Napapue bridge
8		Dhabang				Kotgaun-Libang
9	Jamkot	Jamkot madichaur	graveled	0.5 km	New road	
10		Mathla				Nimare pul
11	Libang	Simalbang	graveled	0.5 km	Khara Bato	
12		Kharabang	graveled	1 km	Kharanbang	
13	Hama	Risibang				Hungry khola pul
14	Parchabang	Lapchang/Pulbot	graveled	5 km	Madichaur to Pulbot	Pulbot bridge
<b>Total</b>	<b>6</b>	<b>14</b>	<b>11</b>	<b>11.25</b>		<b>6</b>

Source: NESS Field Survey, 2012

**Appendix 8: Irrigation Infrastructures in the Reservoir Area**

S.N.	VDC	Settlement	Name of the scheme	Command area (Ropani)
1	Korchabang	Muguwang	Muguwang Sichai	40
2		Dharkhola	Dharkhola sichai	4
3		Nimri	Nimri khola Sichai	25
4	Kotagaun	Kunga	Punga khola Sichai	50
5		Ramjagaun	Madichaur Sichai	3
6		Madichaur	Maddichaur sinchai	400
7		Dhabang	Bagar sinchai	250
8	Jamkot	Jamkot Madichaur	Hungry khola Sichai	200
9		Malingbang	Malingbang Sichai	2
10	Bhabang	Dharamshaya	Dharamshaya Sichai	4
11		Khuringbang	Khuringbang Sichai	15
12	Libang	Simalbang	Brangang khola Sichai	250
13		Kharabang	Dhanse khola Sichai	200
14	Hama	Domoi (Ghornga Bang)	Akhare odhar Sichai	25
15	Parchabang	Lapchang / Pulbot	Pulbot kula Sichai	7
16	Kareli	Sibang Dhara	Simkhet kulo Sichai	85
<b>Total</b>	<b>8</b>	<b>16</b>	<b>16</b>	<b>1560</b>

Source: NESS Field Survey, 2012

**Appendix 9: Settlements having Drinking Water Scheme**

S.N.	VDC	Settlement	Name of the Scheme	Number of Taps
1	Korchabang	Muguwang	Muguwang	3
2		Nimri	Nimri	2
3		Nepchabang	Nepchabang	1
4	Kotagaun	Kunga	Kunga	4
5		Bhalama	Danbang	1
6		Madichaur	Rimsak	5
7		Dhabang	Ranai Khola	16
8	Jamkot	Jamkot Madichaur	Jamkot Madichaur	115
9		Malingbang	Malingbang	2
10		Mathla	Mathla	3
11	Bhabang	Khuringbang	Khuringbang (2 Schemes)	2
12		Bharbang	Bharbang	1
13	Libang	Simalbang	Brangang Khola	19
14		Kharabang	Rimal Khola	14
15		Barbang	Rimal Khola	13
	Bhabang	Dharamshaya	Dharamshaya (2 schemes)	NA
16	Hama	Risibang	Sarkang Khola	2
17	Parchabang	Lapchang / Pulbot	Lapchang / Pulbot (2 Schemes)	2
18	Kareli	Sibang Dhara	Sibang dhara	7
<b>Total</b>	<b>9</b>	<b>18</b>	<b>22</b>	<b>212</b>

Source: NESS Field Survey, 2012

**Appendix 10: Festivals and Religious Sites in the Reservoir Area**

S.N.	VDC	Settlement	Festivals	Religious Sites
1	Korchabang	Muguwang	Dasain, Tihar, Tija, Majhe Sankarati	no such site
2		Dharkhola	Dasain, Tihar, Tija, Majhe Sankarati	no such site
3		Nimri	Dasain, Tihar, Tija, Majhe Sankarati,	no such site
4		Nepchabang	Dasain, Tihar, Tija, Majhe Sankarati,	no such site
5		Kumbang (Simkhet)	Dasain, Tihar, Tija, Majhe Sankarati	no such site
6	Kotagaun	Kunga	Dasain, Tihar, Tija, Majhe Sankarati	no such site
7		Ramjagaun	Dasain, Tihar, Tija, Majhe Sankarati	no such site
8		Bhalama	Dasain, Tihar, Tija, Majhe Sankarati	no such site
9		Madichaur	Dasain, Tihar, Tija, Majhe Sankarati	Mahadev mandir
10		Dhabang	Dasain, Tihar, Tija, Majhe Sankarati	in the village Bagar khet
11	Jamkot	Jamkot Madichaur	Dasain, Tihar, Tija, Majhe Sankarati	Mahadev mandir
12		Malingbang	Dasain, Tihar, Tija, Majhe Sankarati	no such site
13		Mathla	Dasain, Tihar, Tija, Majhe Sankarati	no such site
14	Bhabang	Majabang	Dasain, Tihar, Tija, Majhe Sankarati	Deutipula mandir
15		Dharamshaya	Dasain, Tihar, Tija, Majhe Sankarati	Mandali ghar
16		Khuringbang	Dasain, Tihar, Tija, Majhe Sankarati	no such site
17		Bharbang	Dasain, Tihar, Tija, Majhe Sankarati	Puja done near river site in Dashain
18	Libang	Simalbang	Dasain, Tihar, Tija, Majhe Sankarati,	Madhurama
19		Kharabang	Dasain, Tihar, Tija, Majhe Sankarati	no such site
20		Barbang	Dasain, Tihar, Tija, Majhe Sankarati	no such site
21	Hama	Risibang	Dasain, Tihar, Tija, Majhe Sankarati	no such site
22		Domoi (Ghornga Bang)	Dasain, Tihar, Tija, Majhe Sankarati	no such site
23	Parchabang	Lapchang / Pulbot	Dasain, Tihar, Tija, Majhe Sankarati	Kulpuja done near river
24	Reuka	Jhuringbang	Dasain, Tihar, Tija, Majhe Sankarati	no such site
25	Kareli	Sibang dhara	Dasain, Tihar, Tija, Majhe Sankarati	no such site
<b>Total</b>	<b>9</b>	<b>25</b>		

Source: NESS Field Survey, 2012



**Appendix 11: People's Perception on the Storage type Hydropower Project**

S.N.	VDC	Settlement	Positive impact	Negative impact
1	Korchabang	Muguwang	electricity	loss of land
2		Dharkhola	NA	loss of land
3		Nimri	electricity	loss of land
4		Nepchabang	electricity and flow of industry	loss of land
5		Kumbang (Simkhet)	infrastructure development	loss of land and forest
6	Kotagaun	Kunga	irrigation	loss of land
7		Ramjagaun	NA	NA
8		Bhalama	electricity	NA
9		Madichaur	NA	NA
10		Dhabang	electricity	loss of land
11	Jamkot	Jamkot Madichaur	industry establishment	submerged of land
12		Malingbang	electricity	chances of flood at dam site
13		Mathla	NA	NA
14	Bhabang	Majabang	development	loss of land and house
15		Dharamshaya	development	failure of dam
16		Khuringbang	electricity	failure of dam
17		Bharbang	electricity	loss of house and land
18	Libang	Simalbang	development	chances of flood at dam site
19		Kharabang	NA	loss of land
20		Barbang	development	loss of land
21	Hama	Risibang	electricity	submerged of land
22		Domoi (Ghornga Bang)	availability of fishing in dam	risk of transportation after dam construction
23	Parchabang	Lapchang / Pulbot	electricity	NA
24	Reuka	Jhuringbang	development	submerged of land
25	Kareli	Sibang Dhara	availability of fishing in dam	submerged of land
<b>Total</b>	<b>9</b>	<b>25</b>		

Source: NESS Field Survey, 2012

**Appendix 12: List of FGD Participants (MADI)**

**District: Rolpa**

S.N.	Name of Respondent	Address	Occupation
1	Hasta Bir Pun	Korchabang-5, Mugubang	Agriculture
2	Kirna Man Pun	Korchabang-5, Mugubang	Agriculture
3	Bal Prasad Garti	Korchabang-5, Mugubang	Agriculture
4	Buddhi Batha Magar	Korchabang-9, Dharkhola	NA
5	Parjit Batha Magar	Korchabang-9, Dharkhola	NA
6	Kumal Singh	Korchabang-5, Nirmi	NA
7	Purna Singh	Korchabang-5, Nirmi	NA
8	Share Singh	Korchabang-5, Nirmi	NA
9	Bharat Singh	Korchabang-5, Nirmi	NA
10	Dubi Sara	Korchabang-5, Nirmi	NA
11	Dev Bdr. Pun Magar	Korchabang-5, Kumbang (Simkhet)	Agriculture
12	Masta Bdr. Batha	Korchabang-5, Kumbang (Simkhet)	Agriculture
13	Man Bdr. Pun Magar	Korchabang-5, Kumbang (Simkhet)	Agriculture
14	Deepak Pun	Korchabang-5, Kumbang (Simkhet)	Agriculture
15	Deuchan Pun	Korchabang-5, Nepchabang	Agriculture
16	Gomane Khatri	Kotagaun-7, Kunga	Farmer
17	Khatku Khatri	Kotagaun-7, kunga	Farmer
18	Chandri Khatri	Kotagaun-7, Kunga	Farmer
19	Khadka Singh Khatri	Kotagaun-7, Kunga	Farmer
20	Narsingh Khatri	Kotagaun-7, Kunga	Farmer
21	Shiva Khatri	Kotagaun-1, Bhalama	Agriculture
22	Lal Bdr. Gharti Magar	Kotagaun-1, Madichaur	Madichaur
23	Surrendra Gharti Magar	Kotagaun-1, Madichaur	Social worker/farmer
24	Som Bdr. Gharti Magar	Kotagaun-1, Madichaur	Social worker
25	Om Prasad Gharti Magar	Kotagaun-1, Madichaur	NA
26	Maniram Gharti Magar	Kotagaun-1, Madichaur	NA
27	Mohan Bikram Gharti	Kotagaun-1, Madichaur	NA
28	Shiva Kumar Acharya	Kotagaun-1, Madichaur	NA
29	Thaman Khatri	Kotagaun-9, Dhabang	Agriculture
30	Rupai Khadka	Kotagaun-9, Dhabang	Agriculture
31	Om Prakash Khadka	Kotagaun-9, Dhabang	Agriculture
32	Purne Khadka	Kotagaun-9, Dhabang	Agriculture
33	Bal Bdr. Khartri	Kotagaun-9, Dhabang	Agriculture
34	Nanda Kumar Pun	Jamkot-1, Madichaur	Agriculture
35	Naumali Pun	Jamkot-1, Madichaur	Business
36	Mohan Mali Oli	Jamkot-1, Madichaur	Agriculture
37	Naumali Gharti Magar	Jamkot-1, Madichaur	NA
38	Malamaya Pun Magar	Jamkot-1, Madichaur	NA
39	Jut Prasad Pun	Jamkot-2, Maling Bang	Agriculture
40	Kulase Pun	Jamkot-2, Maling Bang	Agriculture
41	Luthar Singh	Jamokot-2, Mathla	Agriculture
42	Shera Singh	Jamokot-2, Mathla	Agriculture
43	Jal Singh	Jamokot-2, Mathla	Agriculture
44	Herka Singh	Jamokot-2, Mathla	Agriculture
45	Jokhu Pun	Jamokot-2, Mathla	Agriculture
46	Ramu Bhuddha	Bhabang-1, Majhabang	Agriculture
47	Bir Bdr. Budhha	Bhabang-1, Majhabang	Agriculture
48	Hem Bdr. Buddha	Bhabang-1, Majhabang	Agriculture
49	Jab Bdr. Buddha	Bhabang-1, Majhabang	Agriculture
50	Hastantra Buddha	Bhabang-1, Majhabang	Agriculture
51	Kasiram Buddha	Bhabang-1, Majhabang	Agriculture
52	Manish Buddha	Bhabang-1, Majhabang	Agriculture
53	Rudhara Buddha	Bhabang-1, Majhabang	Agriculture
54	Bhatra Buddha	Bhabang-1, Majhabang	Agriculture
55	Anish Buddha	Bhabang-1, Majhabang	Agriculture

S.N.	Name of Respondent	Address	Occupation
56	Sumila Buddha	Bhabang-1, Majhabang	Agriculture
57	Gopal Gharti	Bhabang-9, Dharamshaya	Business
58	Ramal Buddha	Bhabang-9, Dharamshaya	Agriculture
59	Amar Buddha	Bhabang-9, Dharamshaya	Agriculture
60	Nara Bdr. Buddha	Bhabang-8, Khuribang	Agriculture
61	Bhim Bdr. Buddha	Bhabang-8, Khuribang	Agriculture
62	Bir Banu Buddha	Bhabang-8, Khuribang	Agriculture
63	Mabindra Buddha	Bhabang-8, Khuribang	Agriculture
64	Chandra Bar Buddha	Bhawang-1, Bharbang	Agriculture
65	Khum Bdr. Buddha	Bhawang-1, Bharbang	Agriculture
66	Pura Bdr. Buddha	Bhawang-1, Bharbang	Agriculture
67	Aita Ram Buddha	Libang-3, Simalbang	Agriculture
68	Dipa Buddha	Libang-3, Simalbang	Agriculture
69	Indra Dangi	Libang-3, Simalbang	Agriculture
70	Krishna Dangi	Libang-3, Simalbang	Agriculture
71	Khadka Dangi	Libang-3, Simalbang	Agriculture
72	Jit Bdr. Pun	Libang-3, Kharbang	Agriculture
73	Bimala Pun	Libang-3, Kharbang	Agriculture
74	Som Bdr. Pun	Libang-3, Kharbang	Agriculture
75	Janak Garti	Libang-3, Kharbang	Agriculture
76	Kilsan Pun	Libang-3, Kharbang	Agriculture
77	Birmaya Buddha	Libang-3, Barbang	Agriculture
78	Chandra Mala Buddha	Libang-3, Barbang	Agriculture
79	Ram Sari Thapa	Libang-3, Barbang	Agriculture
80	Amar Buddha	Libang-3, Barbang	Agriculture
81	Harka Buddha	Libang-3, Barbang	Agriculture
82	Basmati Thapa Magar	Libang-3, Barbang	Agriculture
83	Jun Kumara Buddha	Libang-3, Barbang	Agriculture
84	Baisa Buddha Magar	Libang-3, Barbang	Agriculture
85	Lalita Bdr. Pun	Hwama-9, Rishibang	Business
86	Prasad Gharti	Hwama-9, Rishibang	Agriculture
87	Aitaram Pun	Hwama-9, Rishibang	Agriculture
88	Thamare BK	Hwama-9, Rishibang	Agriculture
89	Jit Bhd Buddha	Hwama-3, Domo	Agriculture
90	Jas Bir Buddha	Hwama-3, Domo	Agriculture
91	Rabila Buddha	Hwama-3, Domo	Agriculture
92	Chuman Thapa	Hwama-3, Domo	Agriculture
93	Pun Ram Thapa	Hwama-3, Domo	Agriculture
94	Sudaha Batha	Parchabang-9, Lapchang	Agriculture
95	Gorinda Batha	Parchabang-9, Lapchang	Agriculture
96	Man Bdr. Batha	Parchabang-9, Lapchang	Agriculture
97	Vinod Ram Batha	Parchabang-9, Lapchang	Agriculture
98	Jokha batha	Parchabang-9, Lapchang	Agriculture
99	Musta Bdr.	Parchabang-9, Lapchang	Agriculture
100	Chana Bdr. Gharti	Reuka-3, Jhuribang	Agriculture
101	Sarbajti Gharti	Reuka-3, Jhuribang	Agriculture
102	Surya Lal Gharti	Reuka-3, Jhuribang	Agriculture
103	Khadka Lal Gharti	Reuka-3, Jhuribang	Agriculture
104	Dil Bdr. khadka	Kareli-1, Sibang Dhara	NA
105	Jit Ram khadka	Kareli-1, Sibang Dhara	NA

S.N.	Name of Respondent	Address	Occupation
106	Sher Bdr. khadka	Kareli-1, Sibang Dhara	NA
107	Gaure Khadka	Kareli-1, Sibang Dhara	NA
108	Rane Khadka	Kareli-1, Sibang Dhara	NA
109	Hari Bahadur Gharti	Liwang-4, Dhansibang	Agriculture
110	Champa Singh Thapa	Liwang-3, Sigana and Barbang	Agriculture
111	Mangali Pun	Liwang-3, Khadabang	Agriculture
112	Amar Raj B. K	Kot Gaun-7, Koga	Agriculture
113	Lal Bdr. Gharti Magar	Kot Gaun-1, Madi Chaur	Agriculture
114	Hasta Bir Pun	Korchawang-5, Tallo Ghapa	Agriculture
115	Viu Ram Batha (Magar)	Viu Ram Batha (Magar)	Agriculture
116	Siya Ram Gharti	Korchawang-6, Tallo Sarigadanda	Agriculture
117	Purna Oli	Kot Gaun-8, Dangbang	Agriculture
118	Chandra Bdr. Buda	Bhawang-1, Majbang	Agriculture
119	Lil Bdr. Gharti	Jankot-2, Mathala	Agriculture
120	Tirtha Man Pun	Junkot-1, Madichaur	Agriculture
121	Dhan Bdr. Buda	Jankot-3, Banahar	Agriculture
122	Kharka Bdr. Gharti Magar	Hwama-9, Risbang	Agriculture
123	Shyam Bdr. Pun	Hwama-2, Hangbang	Agriculture
124	Pahal Sing Budha Magar	Hwama-3&4, Garpa	Agriculture
125	Bir Bdr. Buda	Liwang-3, Sigana	Fisherman
126	Khira Pd. Gharti	Liwang-3, Sigana	Fisherman
127	Anil Gharti Magar	Liwang-3, Khadabang	Fisherman
128	Ram Bdr. Oli	Liwang-3, Khadabang	Fisherman
129	Tara Pd. Gharti Magar	Kotgaun-1, Madi Bazar	Fisherman
130	Hasta Bir Pun	Korchawang-5, Nirmi	Fisherman
131	Til Bdr. Buda	Korchawang-5, Nirmi	Fisherman
132	Bar Man Pun	Jankot-1, Madichaur	Fisherman
133	Anil Gharti Magar	Hwama-9, Risbang	Fisherman
134	Sur Bir Roka Magar	Hwama-3, Garpa	Fisherman

Source: NESS Field Survey, 2012

**Appendix 13: Public Consultation Madi Project (Rolpa District)**

Field visit to the Madi project site was made on 8<sup>th</sup> to 14<sup>th</sup> June 2012. The objective of the visit was to collect primary information on the social, socio-economic, cultural, forest resources, wildlife, disaster records and aquatic ecological aspects from the reservoir area and the key structural locations of the project.

Since the study period was limited, most of the information related to the above aspects was derived based on the public consultations and interviews with the key informants. The socio-economic information was solicited from the focus group discussions at various settlements within the reservoir area. Information on disaster, fishermen, and fish diversity is based on the key informant interviews, while information on the forest, floral and wildlife diversity is based on the direct observation and interviews with the key informants. Focus group consultation meetings were held at 25 sites within the reservoir area (Table 1), while 22 key informants were interviewed for in depth knowledgeable information (Table 2).

**Table 1: Participants of the Focus Group Discussion**

S.N.	NAME OF PARTICIPANTS	OCCUPATION / POSITION	LOCATION
<b>KORCHABANG-5; MUGUBANG</b>			
1	HASTA BIR PUN	AGRICULTURE	KORCHABANG-5; MUGUBANG
2	KIRNAMAN PUN	AGRICULTURE	KORCHABANG-5; MUGUBANG
3	BAL PRASHAD GHARTI	AGRICULTURE	KORCHABANG-5; MUGUBANG
<b>KORCHABANG -9; DHARA KHOLA</b>			
1	BUDDHI BATHA MAGAR	AGRICULTURE	KORCHABANG-9; DHARA KHOLA
2	PARJIT BATHA MAGAR	AGRICULTURE	KORCHABANG-9; DHARA KHOLA
<b>KORCHABANG-5; NIMRI</b>			
1	KUMAR SINGH	AGRICULTURE	KORCHABANG-5; NIMRI
2	PURNA SINGH	AGRICULTURE	KORCHABANG-5; NIMRI
3	SHERE SINGH	AGRICULTURE	KORCHABANG-5; NIMRI
4	BHARAT SINGH	AGRICULTURE	KORCHABANG-5; NIMRI
5	DUBI SINGH	AGRICULTURE	KORCHABANG-5; NIMRI
<b>KORCHABANG-5; NEPCHABANG</b>			
1	DEUCHAN PUN	AGRICULTURE	KORCHABANG-5; NEPCHABANG
<b>KORCHABANG-5; KUMBANG</b>			
1	DEV BDR PUN MAGAR	AGRICULTURE	KORCHABANG-5; KUMBANG
2	MASTA BDR BATHA	AGRICULTURE	KORCHABANG-5; KUMBANG
3	MAN BDR PUN MAGAR	AGRICULTURE	KORCHABANG-5; KUMBANG
4	DIPAK PUN	AGRICULTURE	KORCHABANG-5; KUMBANG
<b>KOTGAUN-7; KUNGA</b>			
1	GOMANE KHATRI	AGRICULTURE	KOTGAUN-7; KUNGA
2	KHATKU KHATRI	AGRICULTURE	KOTGAUN-7; KUNGA
3	CHANDRI KHATRI	AGRICULTURE	KOTGAUN-7; KUNGA
4	KHADGA SINGH	AGRICULTURE	KOTGAUN-7; KUNGA
5	NARSINGH KHATRI	AGRICULTURE	KOTGAUN-7; KUNGA
<b>KOTGAUN-1; RAMJA GAUN</b>			
1	PARSA RAMAJAGAUN	AGRICULTURE	KOTGAUN- 1; RAMJA GAUN
2	TIKA RAMAJAGAUN	AGRICULTURE	KOTGAUN- 1; RAMJA GAUN
3	LAAN RAMAJAGAUN	AGRICULTURE	KOTGAUN- 1; RAMJA GAUN
<b>KOTGAUN-1; BHALAMA</b>			
1	SHIVA KHATRI	AGRICULTURE	KOTGAUN-1; BHALAMA

S.N.	NAME OF PARTICIPANTS	OCCUPATION / POSITION	LOCATION
<b>KOTAGAUN -1; MADICHAUR</b>			
1	LAL BDR GHARTIMAGAR	AGRICULTURE	KOTAGAUN-1; MADICHAUR
2	SURRENDRA GHARTIMAGAR	AGRICULTURE	KOTAGAUN-1; MADICHAUR
3	SOM BDR GHARTIMAGAR	AGRICULTURE	KOTAGAUN-1; MADICHAUR
4	OM PRASHAD GHARTI MAGAR	AGRICULTURE	KOTAGAUN-1; MADICHAUR
5	NANI RAM GHARTI	AGRICULTURE	KOTAGAUN-1; MADICHAUR
6	MOHAN BIKRAM GHARTI	AGRICULTURE	KOTAGAUN-1; MADICHAUR
7	SHIVA KUMAR ACHARYA	AGRICULTURE	KOTAGAUN-1; MADICHAUR
<b>KOTGAUN-9; DHABANG</b>			
1	THAMAN KHATRI	FARMER	KOTGAUN-9; DHABANG
2	RUPAI KHADKA	FARMER	KOTGAUN-9; DHABANG
3	OM PRAKASH KHADKA	FARMER	KOTGAUN-9; DHABANG
4	PURNE KHADKA	FARMER	KOTGAUN-9; DHABANG
5	BAL BDR KHATRI	FARMER	KOTGAUN-9; DHABANG
<b>JAMKOTA-1; MADICHAUR</b>			
1	NANDA KUMAR PUN	AGRICULTURE	JAMKOTA-1; MADICHAUR
2	NAUMALI PUN	BUSINESS	JAMKOTA-1; MADICHAUR
3	MOHAN MALI OLI	AGRICULTURE	JAMKOTA-1; MADICHAUR
4	NAUMALI GHARTIMAGAR	AGRICULTURE	JAMKOTA-1; MADICHAUR
5	MALAMAYA PUN MAGAR	AGRICULTURE	JAMKOTA-1; MADICHAUR
<b>JAMKOT-2; MULINGBANG</b>			
1	JUT PRASHAD PUN	AGRICULTURE	JAMKOT- 2; MULINGBANG
2	KULASE PUN	AGRICULTURE	JAMKOT- 2; MULINGBANG
<b>JAMKOT-2; MATHALA</b>			
1	LUDHAR SINGH	AGRICULTURE	JAMKOT-2; MATHALA
2	SHERA SINGH	AGRICULTURE	JAMKOT-2; MATHALA
3	JAL SINGH	AGRICULTURE	JAMKOT-2; MATHALA
4	HERKA SINGH	AGRICULTURE	JAMKOT-2; MATHALA
5	JOKHU PUN	AGRICULTURE	JAMKOT-2; MATHALA
<b>BHABANG-1; MAJABANG</b>			
1	RAMU BUDHA	AGRICULTURE	BHABANG-1; MAJABANG
2	BIR BDR BUDHA	AGRICULTURE	BHABANG-1; MAJABANG
3	HEM BDR BUDHA	AGRICULTURE	BHABANG-1; MAJABANG
4	JAG BDR BUDHA	AGRICULTURE	BHABANG-1; MAJABANG
5	HASTANTRA BUDHA	AGRICULTURE	BHABANG-1; MAJABANG
6	KASIRAM BUDHA	AGRICULTURE	BHABANG-1; MAJABANG
7	MANISH BUDHA	AGRICULTURE	BHABANG-1; MAJABANG
8	RUDHARA BUDHA	AGRICULTURE	BHABANG-1; MAJABANG
9	BHATRA BUDHA	AGRICULTURE	BHABANG-1; MAJABANG
10	ANISH BUDHA	AGRICULTURE	BHABANG-1; MAJABANG
<b>BHABANG-9; DHARAMSHAYA</b>			
1	GOPAL GHARTI	BUSINESS	BHABANG-9; DHARAMSHAYA
2	RAMAL BUDHA	AGRICULTURE	BHABANG-9; DHARAMSHAYA
3	AMAR BUDHA	AGRICULTURE	BHABANG-9; DHARAMSHAYA
<b>BHABANG-8; KHURINBANG</b>			
1	NARA BDR BUDHA	AGRICULTURE	BHABANG-8; KHURINBANG
2	BHIM BDR BUDHA	AGRICULTURE	BHABANG-8; KHURINBANG

S.N.	NAME OF PARTICIPANTS	OCCUPATION / POSITION	LOCATION
3	BIR BHANU BUDHA	AGRICULTURE	BHABANG-8; KHURINBANG
4	MABNDRA BUDHA	AGRICULTURE	BHABANG-8; KHURINBANG
<b>BHAWANG-1; BHARBANG</b>			
1	CHANDRA BDR BUDHA	AGRICULTURE	BHAWANG-1; BHARBANG
2	KHUM BDR BUDHA	AGRICULTURE	BHAWANG-1; BHARBANG
3	RUPA BUDHA	AGRICULTURE	BHAWANG-1; BHARBANG
<b>LIBANG-3, SIMALBANG</b>			
1	AAITA BUDHA	AGRICULTURE	LIBANG-3, SIMALBANG
2	DIPA BUDHA	AGRICULTURE	LIBANG-3, SIMALBANG
3	INDRA DANGI	AGRICULTURE	LIBANG-3, SIMALBANG
4	KRISHNA DANGI	AGRICULTURE	LIBANG-3, SIMALBANG
5	KHADKA DANGI	AGRICULTURE	LIBANG-3, SIMALBANG
<b>LIBANG-3; KHARBANG</b>			
1	JITA BDR PUN	AGRICULTURE	LIBANG-3; KHARBANG
2	BIMALA PUN	AGRICULTURE	LIBANG-3; KHARBANG
3	SON BDR PUN	AGRICULTURE	LIBANG-3; KHARBANG
4	JANE GHARTI	AGRICULTURE	LIBANG-3; KHARBANG
5	KILSARI PUN	AGRICULTURE	LIBANG-3; KHARBANG
<b>LINBANG -3; BARBANG</b>			
1	BIRMAYA BUDHA	AGRICULTURE	LINBANG-3; BARBANG
2	CHANDRA MALA BUDHA	AGRICULTURE	LINBANG-3; BARBANG
3	RAM SARI THAPA	AGRICULTURE	LINBANG-3; BARBANG
4	AMAR BUDHA	AGRICULTURE	LINBANG-3; BARBANG
5	HARKA BUDHA	AGRICULTURE	LINBANG-3; BARBANG
6	BASMATI THAPA MAGAR	AGRICULTURE	LINBANG-3; BARBANG
7	JUN KUMARA BUDHA	AGRICULTURE	LINBANG-3; BARBANG
8	BAISA BUDHA MAGAR	AGRICULTURE	LINBANG-3; BARBANG
<b>HWAMA-9; RISIBANG</b>			
1	LALITA BDR PUN	BUSINESS	HWAMA-9; RISIBANG
2	PRASHAD GHARTI	AGRICULTURE	HWAMA-9; RISIBANG
3	AITA RAM PUN	AGRICULTURE	HWAMA-9; RISIBANG
4	THAMARE BI KA	AGRICULTURE	HWAMA-9; RISIBANG
<b>HWAMA-3; DOMOI</b>			
1	JIT BDR BUDHA	FARMER	HWAMA-3; DOMOI
2	JAS BIR BUDHA	FARMER	HWAMA-3; DOMOI
3	RABILA BUDHA	FARMER	HWAMA-3; DOMOI
4	CHUMAN THAPA	FARMER	HWAMA-3; DOMOI
5	PUN RAM THAPA	FARMER	HWAMA-3; DOMOI
<b>PARCHABANG - 9; LAPCHANG</b>			
1	SUDHAHA MAGAR	AGRICULTURE	PARCHABANG-9; LAPCHANG
2	GOVINDA MAGAR	BUSINESS	PARCHABANG-9; LAPCHANG
3	MAN BDR MAGAR	AGRICULTURE	PARCHABANG-9; LAPCHANG
4	NIM RAM MAGAR	AGRICULTURE	PARCHABANG-9; LAPCHANG
5	JOKHA MAAR	AGRICULTURE	PARCHABANG-9; LAPCHANG
6	MASTA BDR MAGAR		PARCHABANG-9; LAPCHANG
<b>REUKA-3; JHURIBANG</b>			
1	CHAMA BDR GHARTI	AGRICULTURE	REUKA-3; JHURIBANG
2	SARBAJTI MAGAR	AGRICULTURE	REUKA-3; JHURIBANG
3	SURYA LAL MAGAR	AGRICULTURE	REUKA-3; JHURIBANG

S.N.	NAME OF PARTICIPANTS	OCCUPATION / POSITION	LOCATION
4	MALANG MAGAR	AGRICULTURE	REUKA-3; JHURIBANG
5	KHADKA LAL MAGAR	AGRICULTURE	REUKA-3; JHURIBANG
<b>KARELI-1; SIBANG DHARA</b>			
1	DIL BDR KHADKA	AGRICULTURE	KARELI-1; SIBANG DHARA
2	JIT RAM KHADKA	AGRICULTURE	KARELI-1; SIBANG DHARA
3	SHER BDR KHADKA	AGRICULTURE	KARELI-1; SIBANG DHARA
4	GAURE KHADKA	AGRICULTURE	KARELI-1; SIBANG DHARA
5	RANE KHADKA	AGRICULTURE	KARELI-1; SIBANG DHARA

**Table 2: Key Informant for Interview**

S.N.	NAME OF KEY INFORMANTS	OCCUPATION / POSITION	LOCATION
1	HARI BAHADUR GHARTI	AGRICULTURE	LIWANG-4
2	CHAMPA SINGH THAPA	AGRICULTURE	LIWANG-3, SIGANA AND BARBANG
3	MANGALI PUN	AGRICULTURE	LIWANG-3, KHADABANG AND SIBANG
4	AMAR RAJ B. K.	AGRICULTURE	KOT GAUN-7, KOGA AND DHAGA
5	LAL BDR. GHARTI MAGAR	AGRICULTURE	KOT GAUN-1, MADI CHAUR AND RAMJA
6	SIYA RAM GHARTI	AGRICULTURE	KORCHAWANG-6, TALLO SARIGADANDA
7	PURNA OLI	AGRICULTURE	KOT GAUN-8, DANGBANG .
8	CHANDRA BDR. BUDA	AGRICULTURE	BHAWANG-1, MAJBANG
9	LIL BDR. GHARTI	AGRICULTURE	JANKOT-2, MATHALA
10	TIRTHA MAN PUN	AGRICULTURE	JUNKOT-1, MADICHAUR AND DANGDUNG
11	KHARKA BDR. GHARTI MAGAR	AGRICULTURE	HWAMA-9, RISBANG, WAJHA, BAISCHAUR AND RISBANG DHURI
12	PAHAL SING BUDHA MAGAR	AGRICULTURE	HWAMA-3&4, GARPA
13	VIU RAM BATHA(MAGAR	FISHERMAN	KORCHAWANG-9, TALLO LAPCHUN
14	ANIL GHARTI MAGAR	FISHERMAN	LIWANG-3, KHADABANG AND SIBANG
15	TARA PD. GHARTI MAGAR	FISHERMAN	: KOTGAUN-1, MADICHAUR+ RAMJA
16	HASTA BIR PUN	FISHERMAN	KORCHAWANG-5, TALLOGHAPA+ NIRMI
17	BIR BDR. BUD	FISHERMAN	LIWANG-3, SIGANA AND BARBANG
18	KHIR PD.GHARTI	FISHERMAN	LIWANG-3, SIGANA AND BARBANG.
19	RAM BDR. OLI	FISHERMAN	LIWANG-3, KHADABANG AND SIBANG
20	TIL BDR. BUDA	FISHERMAN	KORCHAWANG-5, NIRMI
21	BAR MAN PUN	FISHERMAN	JANKOT-1, MADICHAUR
22	SUR BIR ROKA MAGAR	FISHERMAN	HWAMA-3, GARPA

To get the information from the project site's local communities the strategic approach taken was to aware people on the Nationwide Master Plan Study of the Storage Type Hydro-electric Projects before seeking information on the local environmental and social resources and the concerns of the people regarding the Madi project.

It is therefore the field survey team, before initiating dialogue with the local communities described why the Nationwide Master Plan Study for Storage type hydroelectric project is needed? Who is undertaking



the study? What will be the output of the study? In this process the team also highlighted on how this project in this area was selected for further study? And what the study team will like to get information from the local area communities not limiting to the social and environmental information but also the concerns of the people with regard to the project and their aspirations with the project if it is screened for further study and development.

This section describes the local people knowledge on the project apart from the concerns and aspirations of the people from the project.

The local people have a little knowledge on the project. The local people thanked the study team for giving some level of information on the project progress.

The local people are concerned on their future prospects if the project is developed. Many of the people located in the reservoir have all their property (land and building) within the reservoir area only. The land and the property is the only source of their livelihood. Though the people were not against the project development would want a proper resettlement and rehabilitation to sustain their livelihood. The other concern of the local people is the road network developed within the reservoir area. The road infrastructure provide means of connectivity with the district and the capital. As the entire network falls within the reservoir area, they were eager to know whether the project reestablish these road network as a part of the project.

They believe that the project will open the door of social and economic development not only for the local area but also to the entire region. Their aspiration with the project is the employment of the local people in the project and a host of the community development issues such as water supply, electrification, road network development, enhancement of educational institutions and health institutions.

**Annex 20: Environmental Survey Report**  
**Nalsyau Gad Project (W-23)**

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## INTRODUCTION

Federal Democratic Republic of Nepal is rich in water resources, its potential water power is 83,000 MW and economically exploitable water power is 42,000 MW. However, as of 2011, the total generating capacity of the country is only about 718.62 MW. Of the total installed capacity 92% is from the hydroelectric power plants. In addition, since most of hydroelectric power plants are run-of-river type, their output decreases seriously in the dry seasons. Consequently, there is a rolling blackout of as long as 14 hours a day which poses many problems including affects in livelihood and industries which severely impact the national economy.

To cope with these situations, the government of Nepal has worked out “National Electricity Crisis Resolution Action Plan” and “10-Year Hydropower Development Task Force” at the end of 2008. The above action plan and task force recommended need of storage-type hydroelectric power plants able to supply sustainable electricity uninterruptedly even in dry seasons to solve current power shortage at an early date.

However, construction of storage-type hydroelectric power plants should be carried out systematically taking into consideration of various aspects including the overall water resource development policy of Nepal, hydrological and geological characteristics, environmental impact, etc. Therefore, the Government of Nepal has requested the Government of Japan to work out a nationwide master plan for storage-type hydroelectric power development.

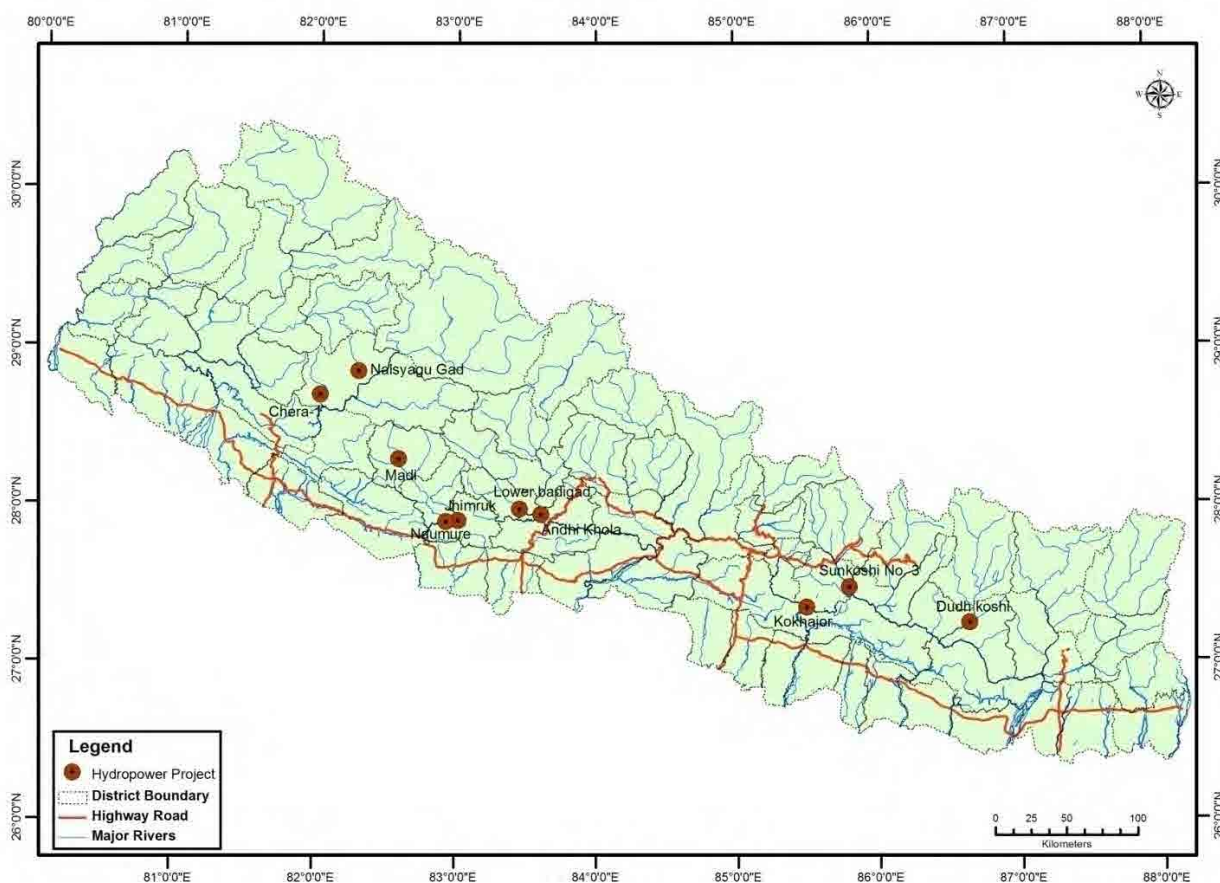
Electric Power Development Company Limited (J-Power) appointed by the JICA for the nationwide master plan study based on the desk level study in close association with NEA screened 10 candidate projects for the master plan study out of the list of 67 promising projects identified by NEA all over Nepal. *Table 1a and 1b* presents the salient features of the 10 promising projects screened for the master plan study, while *Figure 1* presents the location of the projects.

**Table 1a: Salient Features of Potential Projects**

No.	Project Name	Location (District)	Location of Dam Site		River	Installed Capacity (MW)	Catchment Area (km <sup>2</sup> )
			Longitude	Latitude			
E-01	Dudh Koshi	Okhaldhunga/Khotang Dist.	86° 39' 17.3	27° 15' 47.2	Dudh Koshi to Baikhu Khola	300.0	4100
E-06	Kokhajor-1	Sinchuli, Sindhupalchok	85° 29' 59.6	27° 22' 21.9	Kokhajor	111.5	281
E-17	Sun Koshi No. 3, Kosi MP	Ramechhap, Kavre and Sindhupalanchok	85° 48' 14.3	27° 29' 50.5	Sun Koshi	536.0	5520
C-02	Lower Badigad	Gulmi	83° 27' 22.2	28° 0' 0.6	Badigad	180.3	2050
C-08	Andhi Khola	Syangja	83° 36' 30.6	27° 58' 2.6	Andhi Khola	180.0	475
W-02	Chera-1	Jajarkot	82° 1' 12.3	28° 42' 56.4	Chera	148.7	809
W-05	Lower Jhimruk	Argkhachi, Pyuthan	83° 1' 1	27° 55' 30.8	Jhimruk	142.5	995
W-06	Madi	Rolpa	82° 35' 15.5	28° 18' 48.5	Madi	199.8	674
W-23	Nalsyau Gad	Jajarkot	82° 17' 42.8	28° 52' 4.7	Nalsyau Gad	410.0	571
W-25	Naumure (W. Rapti)	Argakhanchi, Pyuthan	82° 55' 42.9	27° 55' 6.1	West Rapti	245.0	3430

**Table 1b: Salient Features of Potential Projects**

No.	Project Name	Dam Height (m)	Total Storage Volume (MCM)	Effective Storage Volume (MCM)	Reservoir Area (km <sup>2</sup> )	FSL (m)	MOL (m)	TWL (m)	Rated Gross Head (m)	Rated Power Discharge (m <sup>3</sup> /sec)
E-01	Dudh Koshi	180.0	687.40	442.10	11.05	580.0	530.00	303.35	275.0	136.00
E-06	Kokhajor-1	107.0	218.70	166.10	8.92	437.00	390.00	200.00	226.3	63.90
E-17	Sun Koshi No.3, Kosi MP	140.0	1,220.00	555.00	23.99	700.0	674.00	575.00	116.3	109.34
C-02	Lower Badigad	191.0	995.90	505.50	13.65	688.00	654.00	475.00	196.0	232.60
C-08	Andhi Khola	157.0	336.50	238.70	5.52	675.00	626.70	368.48	307.0	81.40
W-02	Chera-1	186.0	254.90	141.10	4.00	866.0	814.00	640.00	220.0	80.50
W-05	Lower Jhimruk	167.0	386.00	211.60	4.98	597.0	557.0	390.0	194.6	88.10
W-06	Madi	190.0	359.50	235.10	7.66	1,090	1,030.00	800.00	280.8	84.90
W-23	Nalsyau Gad	200.0	419.6	296.3	6.3	1,570.0	1,498.00	872.0	644.0	75.00
W-25	Naumure (W.Rapti)	190.0	1,021.00	580.00	19.76	517.0	474.00	358.00	162.6	185.60



**Figure 1: Ten Promising Sites Identified for Survey**

The NESS, a local consulting firm of Nepal was entrusted by J-Power for the required SEA field studies of the 10 candidate projects. As per the ToR of works, there are basically two types of surveys required namely; geological, geotechnical, construction material and seismicity study, and environmental and social study. This report deals with the field survey findings of social and environmental study on **Nalsyau Gad Project** identified as one of the candidate project in the western Nepal.

## 1 SOCIO-ECONOMIC ENVIRONMENT

The information regarding the social and economic conditions of the people in Nepal is available in the publications of the Central Bureau of Statistics. But such information is limited to administrative units such as VDCs, DDCs, Development Zones and at national level. As the candidate projects cross cut the administrative units, the available data on the social and economic concerns could not be used effectively to characterize the direct impact areas by the projects. To fill this gap field level studies on Socio-economic and Environmental Concerns<sup>1</sup> are conducted through participatory methods. The findings of the field surveys are presented in the section below.

### 1.1 Demographic Concerns

#### 1.1.1 VDCs, Settlements and Population

The proposed Nalsyau Gad Project is located in Jajarkot district in the Mid-Western Development region of Nepal and covers 5 VDCs, 6 settlements, >4 wards and 124 households. The total population of the reservoir area is estimated to be 751 with the average family size of 6.06 which is significantly higher than the national average family size (4.7) (2011 Census estimate) (Table 2). The reservoir area occupies 0.56% of the total population of Jajarkot district<sup>2</sup>.

**Table 2: VDCS and Settlements and Population under the Storage Project, Jajarkot**

S.N.	VDC	Settlement	Ward Number	Households	Population
1	Nayakbada	Kauli Bazar	5	15	73
		Karki Jule		17	85
2	Sakala	Ragaryam	8	70	455
		Sagla	8	61	359
		Chhutipalti (Jugena)	2	20	142
		Sepukhola Gau	2	62	380
		Lamatara	9	15	59
3	Ramidanda				
4	Rokayagaon	Limsa		3	21
<b>Total</b>	<b>4</b>	<b>8</b>	<b>4</b>	<b>263</b>	<b>1584</b>

Source: NESS Field Survey, 2012

#### 1.1.2 Ethnicity/Caste

The population of the reservoir area is dominated by the Thakuri (upper caste) representing 45% of the total reservoir area population followed by Brahmin (18%), Chhetri (15%). Nearly quarter of population is Dalit (21.77%) (Table 3).

**Table 3: Ethnic Composition of Reservoir Area Population**

S.N.	VDC	Settlement	Brahmin	Chhetri	Thakuri	Dalit
1	Nayakbada	Kauli Bazar	3	9	2	1
		Karki Jule	2	9	3	3
2	Sakala	Ragaryam	35	8	21	6
		Sagla	3	5	35	18
		Chhutipalti (Jugena)	0	4	3	13
		Sepukhola Gau	0	5	49	8
		Lamatara	0	3	6	6
7	Ramidanda					
8	Rokayagaon	Limsa	2	0	1	0
<b>Total</b>	<b>4</b>	<b>8</b>	<b>45</b>	<b>43</b>	<b>120</b>	<b>55</b>
<b>%</b>			<b>17</b>	<b>16</b>	<b>46</b>	<b>21</b>

Source: NESS Field Survey, 2012

<sup>1</sup> The findings are based on the NESS Rapid Field Survey Assessment (2012) using Focus Group Discussions (FGD) and Observation tools. Refer Appendix 3 for the List of FGD participants.

<sup>2</sup> The total population of Jajarkot district according to preliminary estimate of CBS Census 2011 is estimated to be 134,868.

## 1.2 Economic Concern

### 1.2.1 Land Use Pattern<sup>3</sup> and Land Holding Size

The total land area in the reservoir area is estimated to be 366 ropanies (1 ropani=20 hectare), a large proportion of which is used for agriculture (97%) followed by forest (3%) (Table 4).

**Table 4: Land Use Pattern of the Reservoir Area**

S.N.	VDC	Settlement	Agriculture	Forest	Total
1	Nayakbada	Kauli Bazar	1	0	1
2	Sakala	Ragaryam	80	10	90
3		Sagla	110	0	110
4		Chhutipalti(Jugena)	15	0	15
5		Sepukhola gau	60	0	60
6		Lamatara	90	0	90
<b>Total</b>	<b>2</b>	<b>6</b>	<b>356</b>	<b>10</b>	<b>366</b>
<b>%</b>			<b>97.27</b>	<b>2.73</b>	<b>100</b>

Source: NESS Field Survey, 2012

The total agricultural land of the reservoir area is estimated to be 356 ropanies. Of the total agricultural land 85% is *khet* (irrigated paddy field) and 15% *pakho* (un-irrigated up land). The average land holding of a household is calculated to be 2.9 ropanies with the minimum and maximum range of holding size of 0.1 and 18.0 ropanies (Table 5). All the households of the reservoir area, except five households of Lamtara. Sakala VDC fall in the marginal category while the five households fall in small to medium farmers group, based on the<sup>4</sup>, Central Bureau of Statistics (CBS) land holding classification.

**Table 5: Land Use Pattern of the Reservoir Area**

S.N.	VDC	Settlement	Khet	Pakho	Total	Av. Holding size
1	Nayakbada	Kauli Bazar	0	1	1	0.1
2	Sakala	Ragaryam	60	20	80	2.0
3		Sagla	110	0	110	7.3
4		Chhutipalti (Jugena)	13	2	15	1.7
5		Sepukhola gau	40	20	60	1.3
6		Lamatara	80	10	90	18.0
<b>Total</b>	<b>2</b>	<b>6</b>	<b>303</b>	<b>53</b>	<b>356</b>	<b>2.9</b>
<b>%</b>			<b>85.11</b>	<b>14.89</b>	<b>100</b>	

Source: NESS Field Survey, 2012

The reservoir area is producing cereals such as paddy, maize, millet, wheat and cash crops such as potato, oilseeds and vegetables. Among the cereals, paddy is grown in the largest area (303 ropanies) followed by maize (195 ropanies), wheat (160 ropanies) and millet (20 ropanies). Similarly, among the cash crops, potato occupy the largest area (45 ropanies) followed by vegetables (15 ropanies) and oilseeds (6 ropanies). The quantity of production is recorded highest for maize followed by paddy, wheat and millet. Among the cash crops, the production is recorded to be highest for potato followed by oilseeds and vegetables. The cropping intensity of the area is 210% (Table 6 and Appendix 1).

<sup>3</sup> The Land Use Pattern mentioned here may not match with the GIS map presented elsewhere as this information is based on the tentative estimation of the communities.

<sup>4</sup> According to CBS, a households holding < 15 ropani of land is classified as marginal farmer, holding 15-135 ropanies as small to medium farmers and holding > 135 ropani as large farmers.



**Table 6: Crop Production and Yield**

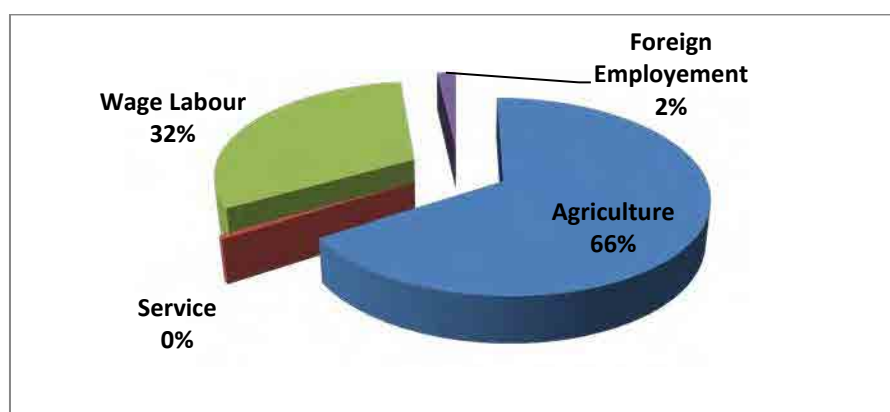
S.N.	Crop	Area (Ropani)	Production (Kg)	Yield (Kg/Ropani)
1	Paddy	303	31750	104.79
2	Maize	195	36660	187.52
3	Millet	20	1000	50.00
4	Wheat	160	10236	63.78
5	Potato	45	4195	92.20
6	Oilseeds	6	410	68.33
7	Vegetables	15	1190	76.77
	<b>Cropping Intensity</b>		<b>209.83%</b>	

Source: NESS Field Survey, 2012

According to field study most of the productions are consumed locally.

### 1.2.2 Occupation

Almost 70% population of the area is economically active and involved in different occupations. Of the working population, 66% are engaged in agriculture followed by wage labour (32%), foreign employment (2%) and services (1%) (Figure 2 and Appendix 2).



**Figure 2: Occupational Status of Reservoir Area Population**

### 1.2.3 Housing Type

Two types of houses are categorized in the reservoir area: i) Pakki house i.e permanent types of house built generally using cement and stone and roofed by using galvanized sheet ii) or cemented and iii) kachhi house i.e built by using mud and stone and roofed using thatch.

Nearly 60% of the are residing in pakki (permanent) types of house and remaining percent in kacchi (temporary) types of house (Table 7).

**Table 7: House Types**

S.N.	VDC	Settlement	House Types		
			Kachha	Pakka	Total
1	Nayakbada	Kauli Bazar	6	9	15
			7	10	17
2	Sakala	Ragaryam	14	56	70
3		Sagla	25	36	61
4		Chhutipalti (Jugena)	16	4	20
5		Sepukhola gau	42	20	62
6		Lamatara	2	13	15

S.N.	VDC	Settlement	House Types		
			Kachha	Pakka	Total
	Ramidanda				
	Rokayagaon	Limsa		3	3
<b>Total</b>			<b>112</b>	<b>151</b>	<b>263</b>
<b>%</b>			<b>42.5856</b>	<b>57.4144</b>	<b>100</b>

Source: NESS Field Survey, 2012

### 1.3 Service related Infrastructures

#### 1.3.1 Roads and Bridges

The reservoir area has no access of any types of motorable roads two suspension bridges are constructed in Kauli Bazar of Nayakbada VDC and in Sepukhola Gaun of Sakala VDC.

**Table 8: Infrastructures and Services in the Reservoir Area**

S.N.	VDC	Settlement	Infrastructure and Services				
			Suspension Bridge	Market	Community Forests	Water Turbine	
						Number	Water Source
1	Nayakbada	Kauli Bazar	Kauli Bazar bridge	Kauli Bazar	Chachaur CF	0	0
2	Sakala	Ragaryam			Tharmare CF	5	Ghatte khola
3		Sagla		0		0	0
4		Chhutipalti (Jugena)		0	Sepukhola Dandagaun Ban CF	0	0
5		Sepukhola Gau	Sepukhola Gau Bridge	0	Chochera CF	15	Kuleni
6		Lamatara		0		0	
<b>Total</b>	<b>2</b>	<b>6</b>	<b>2</b>	<b>1</b>	<b>4</b>	<b>20</b>	<b>2</b>

Source: NESS Field Survey, 2012

#### 1.3.2 Schools

Two lower secondary level schools are proving the educational services in the reservoir area where 850 students are enrolled (**Table 9**).

**Table 9: Number of Schools and Students**

S.N.	VDC	Settlements	Number	Students
1	Sakala	Sagla	Dependra lower secondary school	350
2		Sepukhola gau	Bishow LSS	500
<b>Total</b>	<b>2</b>	<b>6</b>	<b>2</b>	<b>850</b>

Source: NESS Field Survey, 2012

#### 1.3.3 Industries and Services

There are no any specific commercial industries in the reservoir area. However, the people of Kauli Bazar of Nayakbada VDC make *Bakral* from the goat wool for personal uses. Twenty water turbines are operated diverting the water of Ghatte khola and Kuleni for grain processing purpose

Four Community Forests are managed by the reservoir area communities.

There are no any systematic drinking water and irrigation schemes operated in the reservoir area. Kaula bazaar serves as a major market centre of the reservoir area (**Table 8**).

There are no other and services centre such as agriculture, l livestock etc. in the reservoir area.

#### 1.4 Culture and Religious Site

The major festivals celebrated in the reservoir area are: *Dasain, Tihar, Tija, Majhe Sankranti*, which are based on Hindu tradition and culture. Each of the settlements has their cremation *ghat* near the river or the settlements (**Table 10**).

**Table 10: Cultural Sites and Festivals**

S.N.	VDC	Settlement	Main festival	Any festivals of Janajatis	Religious site / Cremation ghats at the river
1	Nayakbada	Kauli Bazar	Dashain, Tihar, Teej, Maghe Sankranti	no distinct festivals	Dobhan (kauli)
2	Sakala	Ragaryam	Dashain, Tihar, Teej, Maghe Sankranti	no distinct festivals	near Kapti (riverside)
3		Sagla	Dashain, Tihar, Teej, Maghe Sankranti	no distinct festivals	near river
4		Chuttipalti (Jugena)	Dashain, Tihar, Teej, Maghe Sankranti	no distinct festivals	below settlement
5		Sepukhola Khola	Dashain, Tihar, Teej, Maghe Sankranti	no distinct festivals	Bank of river
6		Lamatara	Dashain, Tihar, Teej, Maghe Sankranti	no distinct festivals	below settlement

Source: NESS Field Survey, 2012

#### 1.5 Ongoing and Proposed Development Programmes

Construction of a suspension bridge in Ragaryam of Sakala VDC and water mill in Kauli Bazar of Nayakbada are under way. Besides, these two schemes there are no any other ongoing and proposed development programmes in the reservoir area.

#### 1.6 Past Experience with community and their perception

The reservoir area people have not experience any types of conflict with regards to the development projects in the past as there are no such large scale development projects implemented in the past. The people have perceived different positive and negative impacts from the storage type hydropower project. Submerge of house and land, loss of their traditional property, losses of houses etc. are reported to be the major negative impacts perceived by the community. The communities have also expected different development activities from the project such as availability of electricity, infrastructure development and employment (**Table 11**).

**Table 11: Perceived Impacts of the Storage Type Hydropower Project**

S.N.	VDC	Settlement	Positive Impact	Negative Impact
1	Nayakbada	Kauli bazar	electricity, development	submerge of house and land
2	Sakala	Ragaryam	electricity	loss of land and house
3		Sagla	availability of electricity	submerge of house and land
4		Chuttipalti (Jugena)	infrastructure development, job opportunity	loss of land
5		Sepukhola Khola	available of electricity	loss of land
6		Lamatara	electricity, job opportunity	loss of land ,submerge of land and house

Source: NESS Field Survey, 2012

## 1.7 Disasters

Flood and landslides are reported to be the common natural disasters faced by the reservoir area each year. However, the area has not recorded serious losses due to such disasters in the recent years.

## 2 DISASTER STUDY

There are no records of the disaster at the site specific level of the candidate project at the central level and district level offices of the government of Nepal. It is therefore, the disaster information is collected from the project site based on the key informant survey. The findings of the results are presented in the sections below.

### 2.1 Types of Disaster

Within the influence area of the Nalsyau Gad Project, the flood and landslide disaster have been reported by the key informants. The earthquake as a disaster event is not in the memory of the local people.

#### 2.1.1 Flood

In the memory of the local people flood disaster is of common occurrence within the project site. Four flood events have a widespread damage of life and property. The cause of the floods as reported by the informants is the heavy precipitation in the catchment areas of the Nalsyau Gad in the monsoon season. The loss of life and property caused by the flood events in the candidate reservoir area are presented below.

**a) Name of respondent: Lal Bahadur Bohara**

Age: 61

Occupation: Business

Location: Kauli, Nayak Bada-5

i) Year of the occurrence: 2068 B.S.

ii) Cause of the flood: Heavy Precipitation

iii) Affects of the flood event:

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~ 6 rpns	~4 rpns, Kauli	~6 rpns, kauli
Life(Human)	2 injured	-	1 injured
Build properties	1 ghatta	-	-
Crops	~Paddy 10 muri	~Paddy,8 muri	~Paddy,12 muri
Others(cattle)	2	1	-

**b) Name of respondent: Prithabi Bahadur Mahat**

Age: 56

Occupation: Agriculture

Location: Sakala-7, Khari

i) Year of the occurrence: 2064 B.S.

ii) Cause of the flood: Heavy Precipitation

iii) Affects of the flood event:

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~15 rpns	~10 rpns	~10 rpns,
Life	-	-	-
Build properties	-	2 ghatta	1 Cattle Sheds(goth)
Crops	~Paddy , 25 muri	~Paddy,15 muri	~Paddy,20 muri
Others	-	-	-

**c) Name of respondent: Bhim Prasad Upadhaya**

Age: 47

Occupation: Agriculture

Location: sakala-8 Ragrem

i) Year of the occurrence: 2067 B.S.

ii) Cause of the flood: Heavy Precipitation

iii) Affects of the flood event:

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~ 8 rpns	~6rpns, Kauli	~5 rpns, kauli
Life	-	-	-
Build properties	4 ghatta	-	-
Crops	~Paddy 20 muri	~Paddy,15 muri	~Paddy,15 muri
Others	-	-	-

**d) Name of respondent: Mana Kumari Bhandari**

Age: 50 Occupation: Agriculture

Location: Sakala-1 Andheri khola

i) Year of the occurrence: 2051 B.S.

ii) Cause of the flood: Heavy Precipitation & Debris flow

iii) Affects of the flood event:

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~3rpns	~4 rpns	~6rpns,
Life	-	-	-
Build properties	2 ghatta, 1 house,	4 ghatta,3house	-
Crops	~Paddy , 10 muri	~Paddy,2o muri	~Paddy,15 muri
Others	-	-	-

**e) Name of respondent: Bhadra bahadur Khatri**

Age: 51 Occupation: Agriculture

Location: Sakala -1 Laikham

i) Year of the occurrence: 2051 B.S.

ii) Cause of the flood: Heavy Precipitation & Debris flow

iii) Affects of the flood event:

Loss or Damages	Local Area	Upstream Area	Downstream Area
Land	~4rpns	~5 rpns	~3 rpns,
Life	-	-	-
Build properties	4 ghatta, 5 house,	5 ghatta,3house	1 ghatta,1 Cattle Sheds
Crops	~Paddy, 15 muri	~Paddy,3o muri	~Paddy,15 muri
Others	Mass fish killing nearly 50 kg	Mass fish killing nearly 100 kg	Mass fish filling nearly 50 kg

### 2.1.2 Landslide

Landslide events are relatively high in the influence area of candidate project. Five major landslide is reported from the area since last 18 years after heavy precipitation in the monsoon season with the loss of life and property. Table below presents the details of the landslide event as reported by the key informants.

**a) Name of Respondent: Lal bahadur Bohara**

Age: 61

Year	Location	Cause	Affected Fields	
2068 B.S.	Nayakbada-5 Kauli	Heavy Precipitation	Affected Area	kauli
			Loss of life (Men)	2 injured
			Loss of Build	X
			Loss of Crops	45 muri ,Paddy
			Loss of land	7ropanis
			Loss of cattle (other)	3

**b) Name of Respondent: Prithabi Bahadur Mahat**

Age: 56

Year	Location	Cause	Affected Fields	
2064 B.S.	Sakala-7 Khari	Heavy Precipitation	Affected Area	Khari ,sakala-7
			Loss of life (Men)	-
			Loss of Build	10 ghatta
			Loss of Crops	200 muri ,Paddy
			Loss of land	40 ropanis
			Loss of cattle (other)	1o

**c) Name of Respondent: Bhim Prasad Upadhaya**

**Age: 47**

Year	Location	Cause	Affected Fields	
			Affected Area	
2067 B.S.	Sakala-8 ,Ragrem	Heavy Precipitation	Affected Area	Ragrem, Libate
			Loss of life (Men)	-
			Loss of Build	-
			Loss of Crops	90 muri ,Paddy
			Loss of land	17ropanis
		Loss of cattle (other)	15	

**d) Name of Respondent: Dan Bhadur Sahi**

**Age: 54, (Sakala-2 Sepukhola) :**

Year	Location	Cause	Affected Fields	
			Affected Area	
2052 B.S.	Sepukhola Sakala-2	Heavy Precipitation in sepukhola	Affected Area	Sakala-2, kolyani
			Loss of life (Men)	-
			Loss of Build	2 ghatta
			Loss of Crops	4omuri ,Paddy
			Loss of land	15 ropanis
		Loss of cattle (other)	-	

*It is the place where Sepu khola meets in the Narsygu ghad. Flood on Sepu Khola caused damage nearly 1 km from the confluence in Narsygu ghad)*

**e) Name of Respondent: Mana kumari Bhandari**

**Age: 50**

Year	Location	Cause	Affected Fields	
			Affected Area	
2051 B.S.	Sakala- 1 ,Andherikhola	Heavy Precipitation	Affected Area	Laikham
			Loss of life (Men)	
			Loss of Build	1 ghatta
			Loss of Crops	50 muri ,Paddy
			Loss of land	8ropanis
		Loss of cattle (other)	-	

**Water use in downstream area: Ghatta**

### 2.1.3 Earthquake

In the memory of the local people the candidate project site communities have experienced an earthquake disaster some 20 years back when nearly 50 house structures were cracked but no loss of life was recorded.

Year	Loss of life	Loss of Build Structures
2049 B.S.	-	50 house cracked

### 3 FLORAL STUDY

Though the floral information at the regional level is available, there is no published literature on the site specific level of the candidate project at the central and district level offices of the government of Nepal. It is therefore, candidate project site is visited by the biological study team to gather information based on direct observation and through the participatory methods with the local key informants. Findings of the field study are presented in sections below.

#### 3.1 Vegetation Diversity

The information on the vegetation diversity is gathered from the direct observation by the members of biology study team during site visit. Besides, information is also collected from the key informants of the local area through interviews and focus group discussions with the local community forest user groups.

The candidate project site is rich in floral diversity. About 59 plant species were recorded through direct observation and interviews with the key informants. The list of plant species is presented in the table below.

S.N.	Local Name	Common Name	Scientific Name
1	khari	European nettle wood	<i>Celtis australis</i>
2	Batul pate	Fals pareiria	<i>Cissampeios Pareina</i>
3	Githo	Air potato	<i>Dioscorea bulbifera</i>
4	Kode Ihar	Goos grass	<i>Eleusine indica</i>
5	Babio	Sabai grass	<i>Eulaliopsis binata</i>
6	Bhimal		<i>Grewia optiva</i>
7	Kaiyo		<i>Luculia gratissima</i>
8	Mahuwa	Indian butter	<i>Madhuka longifolia</i>
9	Khirro	Tallow tree	<i>Sapium insigne</i>
10	Khar	Riugrass	<i>Themenda trianda</i>
11	Kurilo	Wild sparagus	<i>Achyranthes</i>
12	Chiuri	Nepal butter fruit	<i>Aesandra Butyracea</i>
13	Tite Pati		<i>Artemisia</i>
14	Koiralo	White bauhinia	<i>Bahunia veriegata</i>
15	Chutra	Barberry	<i>Barberis aristata</i>
16	Simal	Simal tree	<i>Bombax ceiba</i>
17	Bhango	Hemp	<i>Cannabis sativa</i>
18	Dubo	Bermuda grass	<i>Cynodon dactylon</i>
19	Dhatura		<i>Datura Stramonium</i>
20	Mehal		<i>Docynia indica</i>
21	Banmara		<i>Eupatorium adenoforum</i>
22	Gular	Fig	<i>Ficus racemos</i>
23	Pyakso		<i>Gonatanthus pumilus</i>
24	Bilaune		<i>Maesa indica</i>
25	Bakaino	Chinese berry	<i>Melia azederach</i>
26	Sallo	Pine tree	<i>Pinus roxburghii</i>
27	Aainselu	Golden evergreen raspberry	<i>Rubus ellipticus</i>
28	Toona		<i>Toona ciliate</i>
29	Sishnu	Stinging nettle	<i>Utrica dioca</i>
30	Dhairo		<i>Wood fordia</i>
31	Bhir Dhairo	Fire flambes	<i>Wood fordia fruticosa</i>
32	Ketuki	Century plant	<i>Yucca smalliana</i>
33	Timur	Nepal pepper	<i>Zanthoxylum armatum</i>
34	Lade		
35	Harre		
36	kade garul		

S.N.	Local Name	Common Name	Scientific Name
37	Sagino		
38	Dhogro		
39	Khari		
40	Garul		
41	Paringlo		
42	Seto Gauto		
43	Ban angur		
44	Nilo Kanthi		
45	Dade Jhar		
46	Kadelo		
47	Aeralu		
48	Silpu		
49	Dalugo		
50	Bhatkota		
51	Chalne sishnu		
52	Bhor		
53	Sara		
54	Badre		
55	Sungabha		
56	Gade kafal		
57	Dharsu		
58	Muni		
59	Glaino		

### 3.2 Forest Types

The candidate project site is characterized by the *Pinus roxburgii* forest. The reservoir site is dominated by *Pinus roxburgii* forest while higher altitudes of the influence area has *castonopsis - schima forest*. Table below presents the forest types and associated species in the reservoir area and outside reservoir area.

Local (Within Reservoir)	Regional (Out of the reservoir)
Pine forest, <i>Pinus roxburgii</i> as dominant species with association of <i>Bombax ceiba</i>	>1500m castonopsis - schima forest with castonopsis and schima as dominant species

### 3.3 Forest as per Forest Classification (Community Forest, Government Forest, Leasehold Forest, Private Forest, Religious Forest etc.)

The forests of the candidate project influence area are the community forests. The community forest are managed by the local community forest user groups within the framework of the community forest management plan approved by the district forest offices. The reservoir occupied area has 9 community forests. The name of the community forests, dominant species of plants and the location of the forests in the local administrative zone (VDCs) is presented in the tables below for the reservoir area.

#### Local Area (Within the reservoir)

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C.
1	community	Aireni pakha C. F.	Pine	Sakala -1
2	community	Lekha Chaur C. F.	Khari	Sakala-9
3	community	Laligurs C. F.	Khari	Sakala -4
4	community	Sepu Khola C. F.	Khari	Sakala-2
5	community	Dhanka Chaur C. F.	Khari	Nayakbada 5,6
6	community	Tharmare C. F.	Khari	Sakala-8
7	community	Hiupakhi C. F.	Khari	Sakala-7
8	community	khoriTakuri C. F.	Khari	Ramidada-1
9	community	Ughu Dunga Pari Kalna C. F.	Khari	Ramidada-2



### 3.4 Forest Plot Analysis

For the analysis of the forest status and characteristics 3 sample plots were measured within the reservoir area of the candidate project. The sample plots measured has a size of 25 x 25 meter. The detail of the sample plot measurements is presented in the tables below.

#### Quadrat No.1

##### a) Forest: Laksa ban

Location: Sakala V.D.C-7

S.N.	Tree Species	Frequency	DBH (cm)	Height (approx.)	Crown Coverage
1	Simal	5	43	18m	50%
2	Simal		35.7	15m	
3	Simal		39.8	16m	
4	Simal		38.2	14m	
5	Simal		40	17m	
6	Sallo	2	30.2	14m	
7	Sallo		43	18m	
8	Dhogro	3	11.8	8m	
9	Dhogro		35	14m	
10	Dhogro		35	14m	
11	Kadegaral	1	19.7	15m	
12	Paraino	1	18.4	14m	
13	Machaino	3	22.7	13m	
14	Machaino		28	14m	
15	Machaino		25.2	12m	
16	Toona	1	44.6	22m	
17	Hare	2	30.2-34.5	10m	
18	Lade	1	32.6	13m	
19	Khirro	1	21.4	9m	
20	Khari	2	44.2	22m	
21	Total No of t=	22	43.9		

**Forest Density:** total no of tree/ area of the quadrat=352 Trees/hector area

**Dominant species:** Bombax ceiba = 23%

**Crown coverage of the forest:** 25%

#### Quadrat No.2

##### b) Laksa Ban , SaKala VDC -1

GPS: 0626581 E, 3194521 N

Altitude: 1415 m

S.N.	Tree Species	Frequency	DBH (cm)	Height (m)	Crown Coverage
1	Khirro	4	15.7,13.3,17.2,11.9	14m,12 m,13 m,10 m	50%
2	Dhogro	1	44.3	12m	
3	Khari	6	23.6,27.0,9.0,14.0,17.0,16.5	14m,15m,13 m,11m 10m,12 m	
4	Kadegarual	1	14	10m	
5	Forkegurual	1	6	8m	
6	Dotkuna	1	11	4m	
7	kuraino	3	9.0,5.3,8.6	7m,6m,8m	
8	Chotra	2	5.0,5.7	5m,6 m	
9	Toona	2	30.2,27.0,	23m,21m	
10	Paringlo	2	6.0,8.2	8m,7 m	
11	Gara	4	6.6,9.2,14.0,12.4,	7m,6m,8m,6m	

**Forest Density:** total no of tree/area of the quadrat=432 Trees/hector area

**Dominant species:** Celtis australis=23%

**Crown coverage of the forest:** 28%

### Quadrante No-3

#### C. Airen Pakha Community Forest SaKala -1

GPS: 0626581 E, 3194521 N

Altitude: 1415 m

S.N.	Tree Species	Frequency	DBH (cm)	Height (m)	Crown Coverage
1	Sallo (Pinus)	1	23.9	15m	40%
2	Sallo (Pinus)	1	43	18m	
3	Sallo (Pinus)	1	44.6	19m	
4	Sallo (Pinus)	1	44.6	19m	
5	Sallo (Pinus)	1	43	18m	
6	Sallo (Pinus)	1	19	12m	
7	Sallo (Pinus)	1	22.3	16m	
8	Sallo (Pinus)	1	16.4	13m	
9	Sallo (Pinus)	1	15.3	12m	
10	Sallo (Pinus)	1	62.1	22m	
11	Sallo (Pinus)	1	30.3	16m	

**Forest Density:** total no of tree/area of the quadrante=176 Trees/hector area

**Dominant species:** *Celtis australis*=100%

**Crown coverage of the forest:** 15%

### 3.5 Public Dependency on the Forest

The forests of the candidate project site provide a range of goods and services to the local communities. The local community extracts followings resources from the forest areas to support their livelihood.

- Fodder
- Firewood
- Woods
- Food
- Medicine
- Paper industry (tara paper Industry Nayak bada 5, Tek Bahadur Singh)

### 3.6 Floral Species of the Conservation Significance

Of the recorded floral species only 1 species have been categorized under the protection lists of the government of Nepal. However, none of the floral species have been listed in the IUCN red list and CITES. The table below presents the list of the protected species.

S.N.	Local Name	Common Name	Scientific Name	Status			Site survey	Hearing survey	Literature survey
				IUCN	CITES	GON			
1	Simal	Simal tree	<i>Bombax ceiba</i>			P	Confirmed at site		

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## 4 FAUNAL STUDY (WILDLIFE)

Information on the wildlife of the candidate project site is scarce in the published literatures. It is therefore site investigations are conducted to gather information through direct observation and the participatory methods with the local communities and the key informants. The findings of the filed investigations are presented in section hereunder.

### 4.1 Wildlife Diversity

Information on wildlife diversity is gathered through direct observation and participatory methods which included focus group discussion with the local communities and key informant surveys.

#### a) Mammal

A total of 11 mammalian species were recorded from the focus group discussion and key informant surveys. The details of the mammalian species and habitat types are presented in the table below.

S.N.	Local Name	Common Name	Scientific Name	Location
1	Ban birolo	Wild cat	<i>Felis chaus</i>	
2	Nyuri	Small Indian mongoose	<i>Herpestes auropantatus</i>	
3	Dumsi	Porcupin	<i>Hystrix indica</i>	
4	Ott	Otter	<i>Lutra lutra</i>	
5	Rato Badar	Rhesus mokey	<i>Macca mullata</i>	V.D.C Sakala W.N.2 Sepakhola
6	Ratuva	Barkingdcer	<i>Muntiacus muntjak</i>	In all forest
7	Ghoral	horal	<i>Nimorhidus ghoral</i>	
8	Bag	Tiger	<i>Panthera pardus</i>	
9	Ban badel	Wild boar	<i>Sus salvinus</i>	
10	Bhalu	Bear	<i>Ursus thibetanus</i>	
11	Fauro	Fox	<i>Vulpus bengalensis</i>	

#### b) Birds

A total of 13 bird species are reported by the local communities and key informants. Table below presents list of the reported and observed species in the candidate project influence area.

S.N.	Local Name	Common Name	Scientific Name	Location
1	Ban baj	Hawk	<i>Accipter nisus</i>	
2	Mayana	Common mayana	<i>Acridothre stristis</i>	
3	Kauwa	Crow	<i>Carvus spendus</i>	
4	titra	Black patrige	<i>Francolinus francolinus</i>	
5	kali	Pheasant	<i>Lophura leucomelanos</i>	
6	Bhangera	House sparrow	<i>Passer domestica</i>	
7	Jaleva	Great cormorant	<i>Phalacrocorax carbo</i>	Upstream side sakal V.D.C W.N.3 reservoir area
8	Suga	Parrot	<i>Psittacula krameri</i>	
9	Juralo	Red-Vented Bulbul	<i>Pycnonotus cafer</i>	
10	Chil	Kite	<i>Spilornis cheela</i>	Kauli
11	Dhukur	Spotted dove	<i>Streptoplia chinensis</i>	All reservoir area
12	Gidd	Vultur	<i>Tragos calvus</i>	
13	Chakhura			

#### c) Herpetofauana

The key informants and the local community reported a total of 8 herpetofauna species from the reservoir area. Details of the herpetofauna species and their habitat types are presented in the table below.

S.N.	Local Name	Common Name	Scientific Name	Location
1	Mausuli	Rock agama	Agma tuberculati	V.D.C. Reservoir area
2	Sunaulo Pa	Cascade frog	Amolops afganus	
3	Kori Bhayagut	Common toad	Bufo melanostieuts	Kauli
4	Krait	Common Krait	Bungarus caeruleus	
5	Chheparo	Garden Lizard	Catotes versicolor	Cultivated area
6	Sun gohoro	Yellow monitor Lizard	Varanus flavescens	
7	Harino Kano	Green snake		
8	Yalma			

## 4.2 Habitat Type in the Reservoir Area

The wildlife habitat of the reservoir area has the following characteristics.

- Mostly the forests are sparsely distributed and open type.
- Frequently the site covered by forests are fragmented by human settlements and cultivation.
- Such type of forest is suitable habitat for monkeys such as *Macaca mulata* and *Macaca assamensis*
- Fragmented by different settlements and fields
- Degraded and disturbed by fodder collection and cattle grazing
- The reservoir site at the best could represent the feeding habitat for some of the wildlife

## 4.3 Migratory Corridor

The area is seasonally used as feeding habitat by the wildlife of the area and is not reported to be a migratory corridor.

## 4.4 Wild Animals of Conservation Significance

The reported wildlife of the candidate project site are cross checked with the protected wildlife lists of the government of Nepal, IUCN red book and the CITES Appendices. The lists of the wildlife which fall in the protection category of the government of Nepal, IUCN red book and the CITES Appendices are presented in the sections below.

### a) Mammal

Of the reported species of mammal, 6 of the species are listed under the protection category of either IUCN red list or under CITES Appendices. Of the recorded species 4 are listed under IUCN red list and 6 under CITES Appendices. Table below presents the species and their protection category under various protection lists.

S.N.	Local Name	Common Name	Scientific Name	Status			Sources		
				IUCN	CITES	GON	Site survey	Hearing survey	Literature survey
1	Nyuri	Small Indian mongoose	<i>Herpestes auropantatus</i>		III		Confirmed at site	Hearing at Sakala, Nayakbada and Ramidanda	
2	Ott	Otter	<i>Lutra lutra</i>	NT	I			Hearing at Sakala, Nayakbada and Ramidanda	
3	Ghoral	ghoral	<i>Nimorhidus ghoral</i>	NT	I			Hearing at Sakala, Nayakbada and Ramidanda	
4	Bag	Tiger	<i>Panthera pardus</i>	NT	I			Hearing at Sakala, Nayakbada and Ramidanda	
5	Bhalu	Bear	<i>Ursus thibetanus</i>	VU	I			Hearing at Sakala, Nayakbada and Ramidanda	
6	Fauro	Fox	<i>Vulpus bengalensis</i>		III			Hearing at Sakala, Nayakbada and Ramidanda	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## b) Birds

Of the recorded avian species none are listed under the protection category of government of Nepal, IUCN red list and in the CITES Appendices.

## c) Herpetofauna

One of the herpetofauna species out of the recorded species is listed as protection category species of government of Nepal and CITES. Table below presents the details of the protection category under various protection lists.

S.N.	Local Name	Common Name	Scientific Name	Status			Site survey	Hearing survey	Literature survey
				IUCN	CITES	GON			
1	Sun Gohoro	Yellow monitor Lizard	<i>Varanus flavescens</i>		I	P		Hearing at Sakala, Nayakbada and Ramidanda	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## 5 FISHERY STUDY

There is scanty information in the fish diversity, fishermen, fish market, and cost of fish in the candidate project site at the central and district level offices. To fill the data gap fish related information was gathered from the field surveys using a checklist. The fish survey is based on the participatory method and key informant survey methods along the influence area of the candidate project. The findings of the field survey are presented in the sections below.

### 5.1 Fishermen and their Occupational /Social/Economic Status and Fish Market, Availability and Cost

Participatory and key informant interviews reported nearly 12 occupational, 45 part time and 58 occasional recreational fishermen in the limits of the reservoir area. Majority of the fishermen belong to Chettri ethnic group with a moderate social and economic status among the other communities.

About 65% of the fish caught by the fishermen is sold in the fish market, while rest is consumed by the fishermen family. There are altogether 3 fish markets in the nearby areas. Every day about 2 to 5 kg of fish is sold in each of the fish markets. Average cost of the fish in the market varies between 200 rupees.

Table below presents the details of information on the fishermen, their fishing status, economic and social status, fish market and availability of fish in the fish market and the average cost of the fish in the different parts of the reservoir area of the candidate project.

#### a) Village/Tole: Nayakbada-5, Kauli

Name of the respondent: Dhana Bahadur Budha

Age: 45

##### Fishermen

Presence of fisherman in the village						Yes
If yes no. of fishermen						50
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	5	Chettri	20	Chettri	25	Chettri
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	chettri	-	-	Chettri	-	-

Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs

Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell.

##### Fish Market, Fish Availability and Cost

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Kauli Bajar	Yes	2 kg	Wet Rs200 & dry Rs 800

#### b) Village / Tole: Sakala-2, Jamechaur

Name of the respondent: Gopal Bahadur Bhudha

Age: 45

##### Fishermen

Presence of fisherman in the village						Yes
If yes no. of fishermen						30
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	4	Chettri	10	Chettri	16	Chettri
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Chettri	-	-	Chettri	-	-

Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs  
 Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell.

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Sepukhola	Yes	4 kg	Rs 200 (Wet)-Rs 800 (dry)

**c) Village / Tole: Sakala-1, Laikham**

Name of the respondent: Sher Bahadur Singh

Age: 44

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						35
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	3	Chetri	15	Chetri	17	Chetri
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	Chetri			Chetri		

Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs  
 Low=Not enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell.

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Laikham	Yes	5 kg	Rs 200 (Wet)-Rs 800 (dry)

**5.2 Fishing Season, Fish Catch, and Use of Caught Fish**

Fishing in the river is carried out during the pre-monsoon and post monsoon seasons. Normally in the cold winter months (December - February) and monsoon months (June - September) fishing by the local fishermen is a rare activity. On an average daily catch of the fish by the occupational fishermen ranges between 0.5 kg to 1.5 kg with a maximum of 5kg. Nearly 65% of the fish caught is sold in the nearby fish market. On an average the part time fishermen earn about 20000 rupees annually. According to the local fishermen the fish population in the candidate project sites is declining over the years due to illegal fishing practices.

The tables below present the details of the fishing season, fish catch, types of fish available, annual income of the fishermen etc. based on the key informant survey in different location of the candidate project sites.

**a) Location: in the catchment**

Name of the fisherman: Gopal Bhadur Budha Age: 45 Address: Sakala-2, Jamechaur

Fishing detail	Fishing season:	All months			
	Fishing days/week:	5 days / week			
	Maximum catch/day:	5 kg			
	Minimum catch/day:	0.5 kg			
	Average catch/day:	1 kg			
using way	All consumed	At home	0.5 kg	Average cost	Income last year
		In market	4 kg	Rs 200/kg	Rs 30,000

**Name of stream: Nalsyau Gad**

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Asala, Bhudhuno, and Kabre	Asala	*		
		Number of Fisherman increased and due to poisoning, blasting.		

a) **Location:** in the catchment

**Name of the fisherman:** Kali Bahadur Budha **Age:** 40 **Address:** Sakala-2, jamechaur

<b>Fishing detail</b>	Fishing season:	All months			
	Fishing days/week:	5 days / week			
	Maximum catch/day:	5 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	1.5 kg			
<b>using way</b>	All consumed	At home	1 kg	Average cost	Income last year
		In market	4 kg	Rs. 200	Rs. 25000

**Name of river:** Nalsayan gad

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Asala, Budhuno, kabre	Asala	*	-	-
		Number of Fisherman increased and due to poisoning, blasting.		

c) **Location:** in the catchment

**Name of the fisherman:** Dil Bahadur Sahi **Age:** 30 Sakala-2 Jugena

<b>Fishing detail</b>	Fishing season:	All season except shrawan And Bhadra			
	Fishing days/week:	4 days / week			
	Maximum catch/day:	3 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	1-2 kg			
<b>using way</b>	All consumed	At home	1 kg	Average cost	Income last year
		In market	2 kg	Rs 200	Rs 15000

**Name of river:** Nalsyau Gad

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Asala, Budhuno, Kabre	Asala	*		
		Fisherman increased in upstream and downstream and different ways of catching e.g. blasting, poisoning electricity & Trapping		

d) **Location:** in the catchment

**Name of the fisherman:** Purna Bahadur Nepali **Age:** 41 **Address:** Sakala-2, Jugena

<b>Fishing detail</b>	Fishing season:	All months Except Shrawan And Bhadra			
	Fishing days/week:	4 days / week			
	Maximum catch/day:	6 kg			
	Minimum catch/day:	1 kg			
	Average catch/day:	2-3 kg			
<b>using way</b>	All consumed	At home	1 kg	Average cost	Income last year
		In market	5 kg	Rs 200	Rs 25000

**Name of stream:** Nalsayan gad river

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Asala, budhuno & Kabre	Asala	*	-	-
		Fisherman increased in upstream and downstream and different ways of catching e.g. Blasting, poisoning electricity & Trapping.		



e) **Location:** in the catchment

**Name of the fisherman:** Ser bahadur Singh      **Age:** 44      **Address:** Sakala-1, Laikham

<b>Fishing detail</b>	Fishing season:	All months except shrawan & bhadra			
	Fishing days/week:	3 days/ week			
	Maximum catch/day:	5 kg			
	Minimum catch/day:	0.5 kg			
	Average catch/day:	2 kg			
<b>using way</b>	All consumed	At home	1 kg	Average cost	Income last year
		In market	4 kg	Rs 200	Rs 20000

**Name of stream:** Nalsyau gad

Name of fish	Found abundance in	Trend of fish availability		
		Decreasing	Same as before	Increasing
Asala, Budhuno, Tate (Low population) and Kabre	Asala	*		
		<b>Reason of that availability trend</b>	Fisherman increased and different ways of catching e.g. Blasting, poisoning electricity & Trapping.	

### 5.3 Fish Diversity

A total of 8 fish species is reported by the local fishermen during the key informant survey. The lists of the fish species reported in the candidate project site is presented in the table below.

S.N.	Local Name	Common Name	Scientific Name
1	Asla	-	<i>Schizothorax richardsoni</i>
2	Kabre	-	
3	Budhuno	-	<i>Garra gotyla gotyla</i>
4	Tate	-	
5	Katla		<i>Neolissochilus hexagonolepis</i>
6	Buchhe Asala		<i>Schizothorax progastus</i>
7	Gurdi		
8	Faketa		<i>Barilius barilius</i>

### 5.4 List of Fish Species of Conservation Significance

Of the 8 reported fish species 2 of the fish species are listed in the IUCN red list. Table below presents the list of the fish species of conservation significance.

S.N.	Local Name	Common Name	Scientific Name	Status			Site survey	Hearing survey	Literature survey
				IUCN	CITES	GON			
1	Asla	Snow trout	<i>Schizothorax richardsoni</i>	VU				Hearing at Kaluli, Laikham, Jamechaour, Jugena	
2	Katla		<i>Neolissochilus hexagonolepis</i>	NT				Hearing at Kaluli, Laikham, Jamechaour, Jugena	

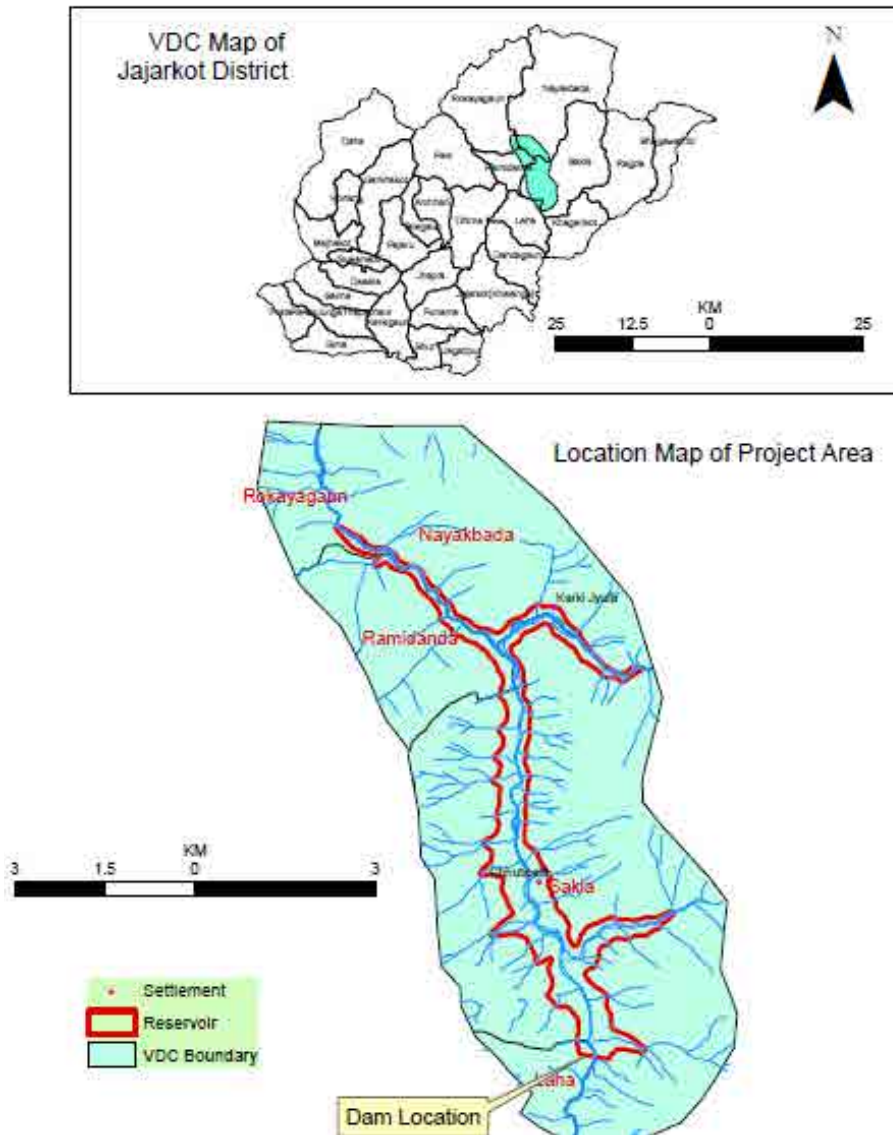
**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## 6 Topographic Map and Satellite Imagery Study

### 6.1 Project Location

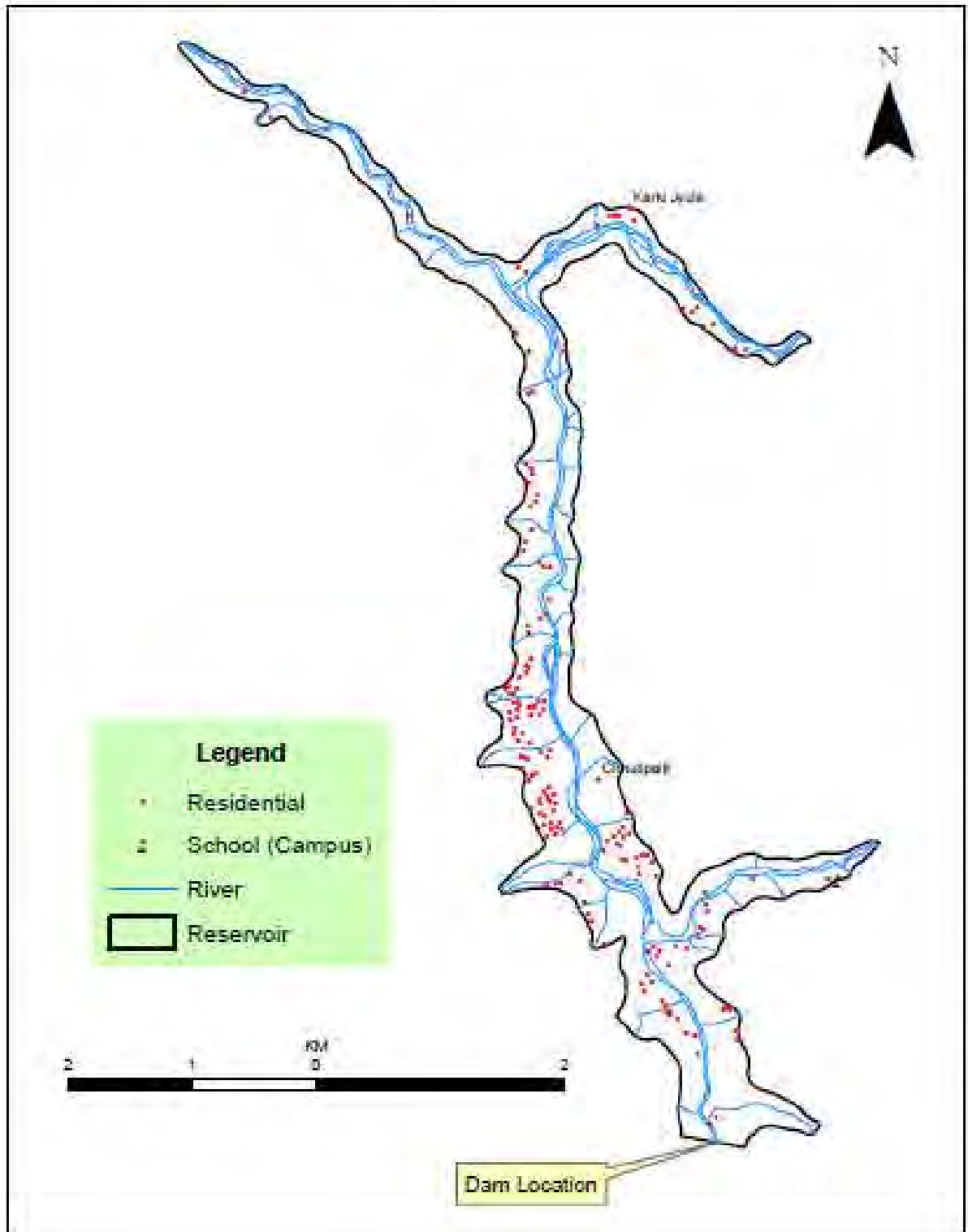


### 6.2 Topographic Maps

For this study, topographical maps of the scale of 1: 25000 prepared by the Government of Nepal, Survey Department (1996) has been used for the analysis of land cover, and built structures, after digitizing. All data used for the topographic map study were projected to the Universal Transverse Mercator (UTM) projection system that is World Geodetic System 1984 for the analysis of topographic maps. The analysis results are presented in the table and maps below.

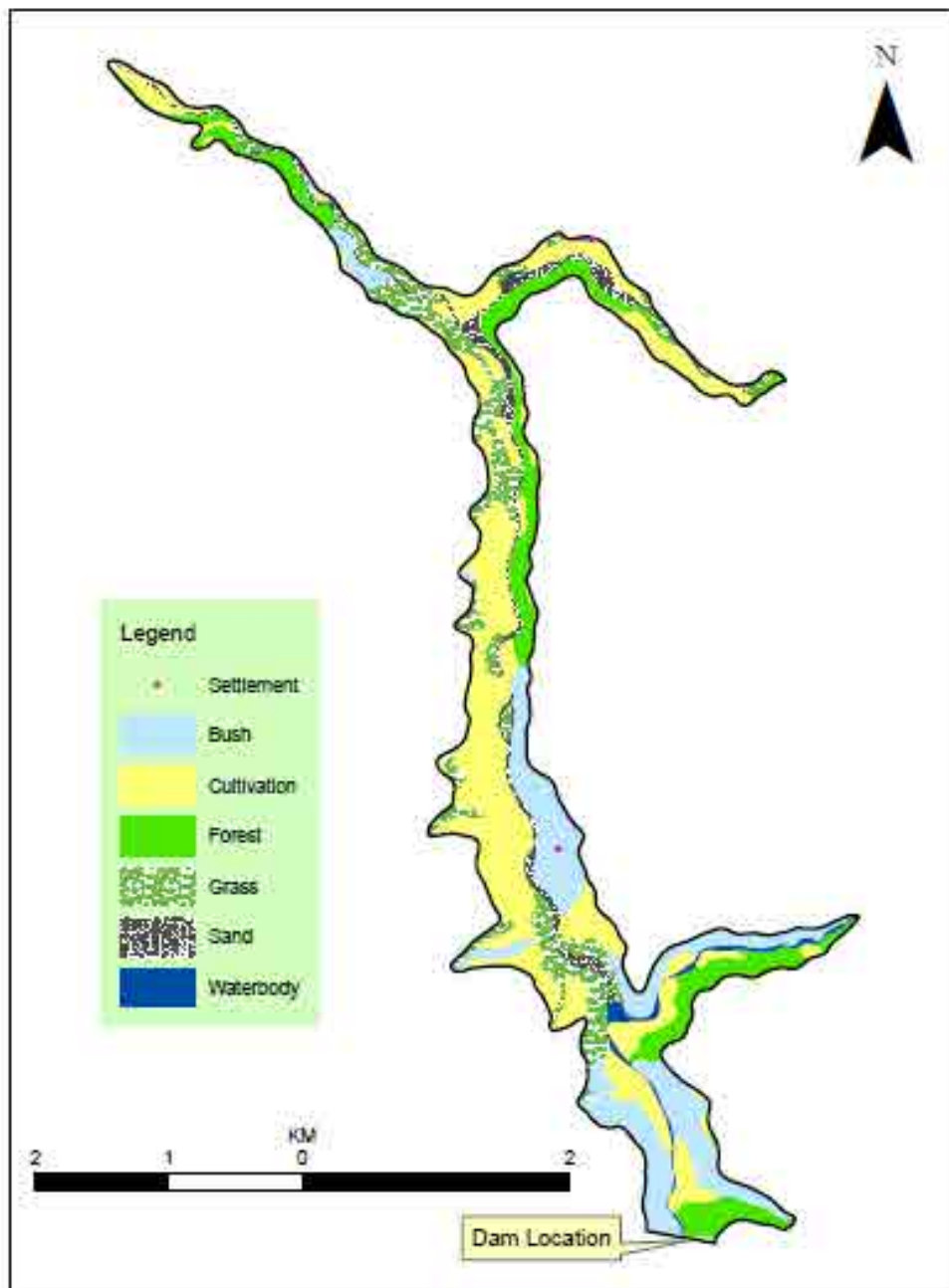
### 6.2.1 Built Structures

Nos. of building as per the Topographic maps	168
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### 6.2.2 Land Use

S.N.	Land Use Class	Land Use Satellite Image (1996), Km <sup>2</sup>	Percentage
1	FOREST	1.013	16.240
2	BUSH	1.325	21.235
3	SAND	0.533	8.548
4	CULTIVATED	2.282	36.564
5	CLIFF	0.141	2.252
6	WATER	0.000	0.000
7	GRASS LAND	0.949	15.201
8	BARRAN LAND	0.000	0.000
	<b>Total</b>	<b>6.240</b>	<b>100.000</b>

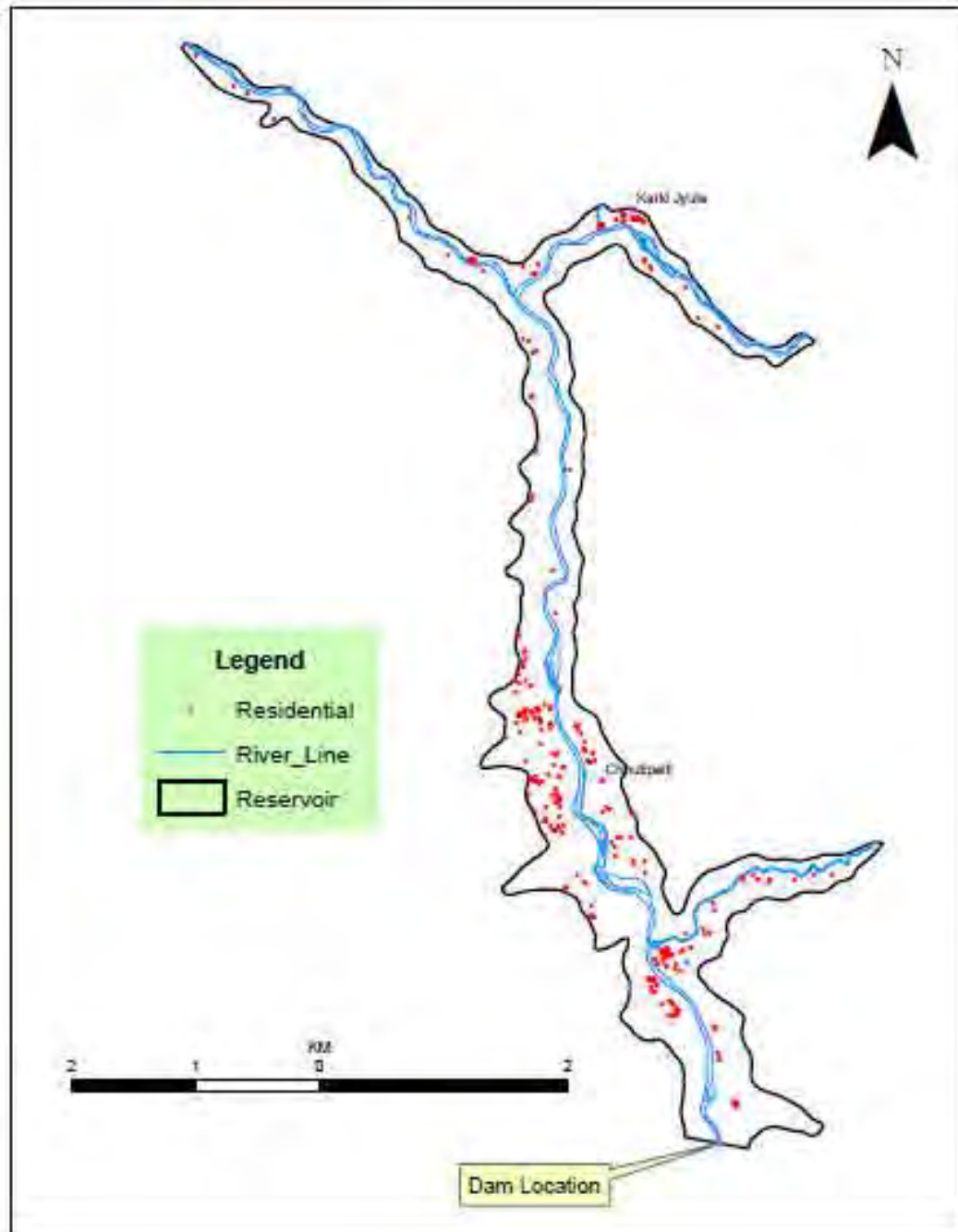


### 6.3 Satellite Image Maps

The Arc GIS 9.3 has been used for the analysis of image. World view 1 image of 2010 has been used for the land use and other parameters such as built structures, road networks, bridges etc. analysis of the area. The analysis results are presented in tables and Map below.

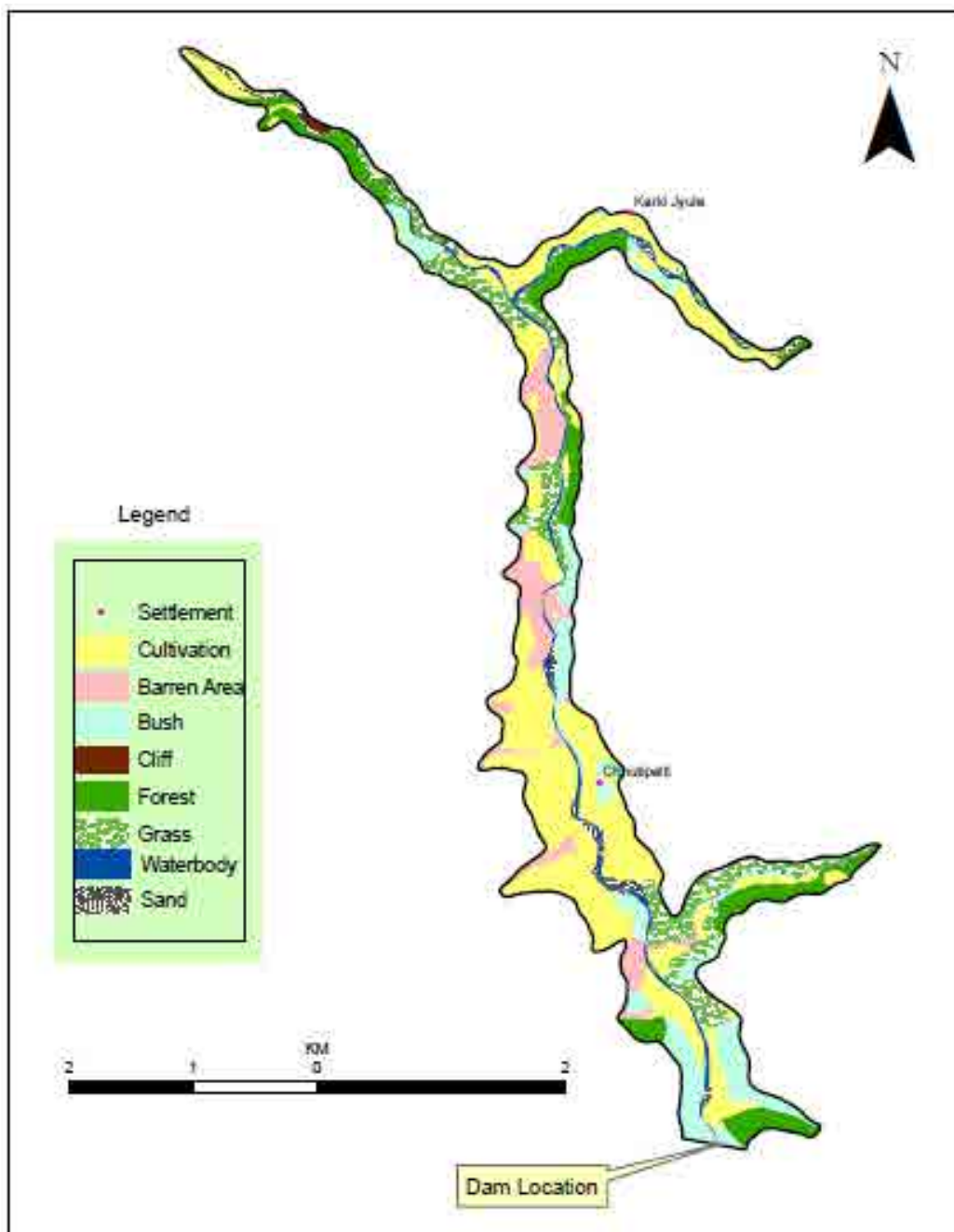
#### 6.3.1 Building Structures

Nos. of building as per the Satellite Image	263
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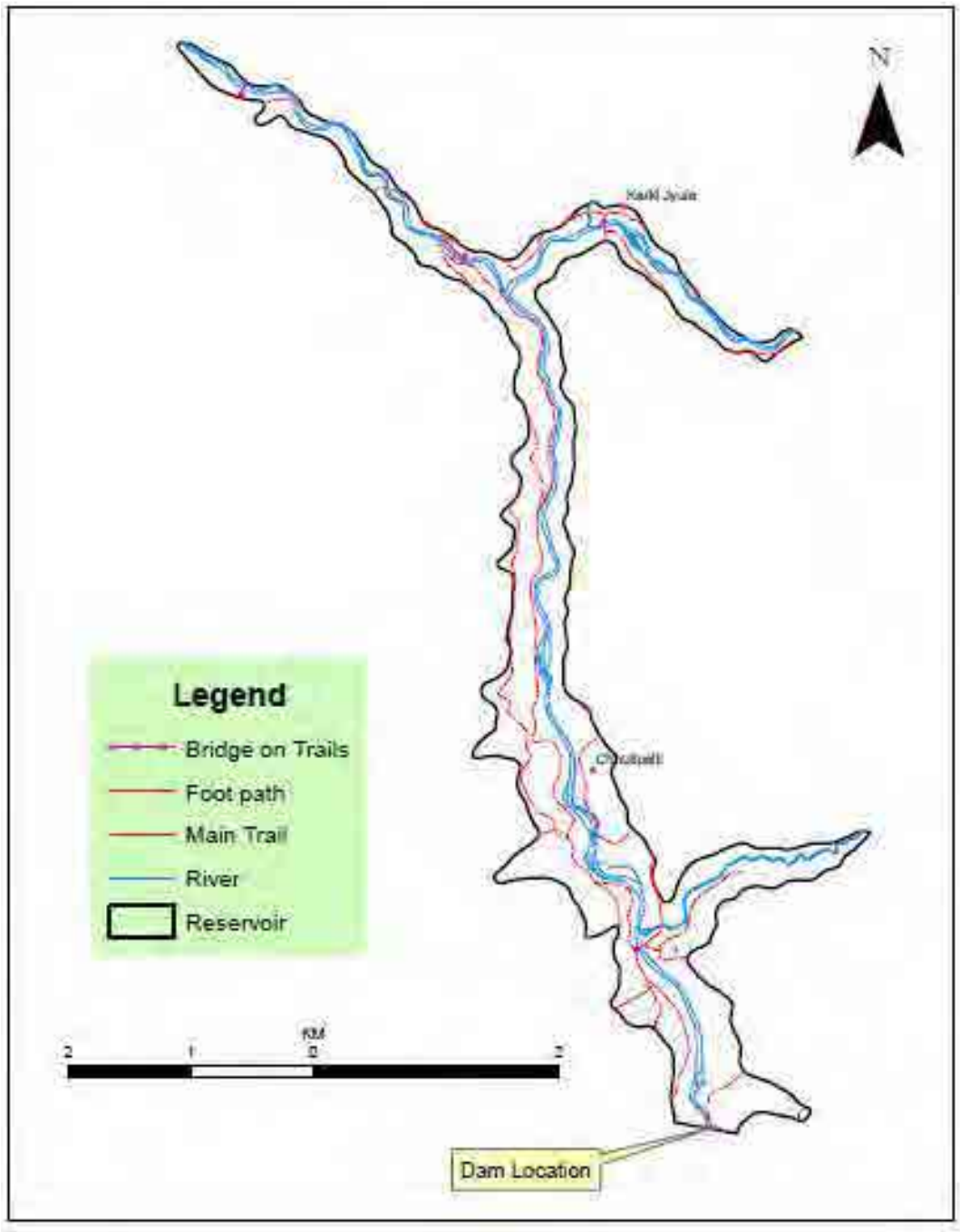
### 6.3.2 Land use

S.N.	Land Use Class	Land Use Topographic Maps (2010), Km <sup>2</sup>	Percentage
1	FOREST	0.761	12.188
2	BUSH	0.890	14.269
3	SAND	0.183	2.927
4	CULTIVATED	2.538	40.681
5	CLIFF	0.363	5.815
6	WATER	0.021	0.339
7	GRASS LAND	0.901	14.439
8	BARREN LAND	0.590	9.462
	<b>Total</b>	<b>6.24</b>	<b>100</b>



### 6.3.3 Infrastructures

Infrastructures	Nos. / Length
Total Nos. of bridge on motorable road	0
Total Nos. of bridge on trail	4
Total Nos. of fords	2
Gravel road (m)	0
Paved road (Highway) (m)	0
Main trail (m)	1970
Foot path (m)	20922



## References

1. Bibhuti Ranjan Jha, 2006; *Fish Ecological Studies and its application in assessing Ecological Integrity of Rivers in Nepal*; Thesis Submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in The Department of Biological Sciences and Environmental Science, School of Science, Kathmandu University, Dhulikhel, Nepal, January 2006
2. CBS (2002), *Population Census 2001, National Report*, Kathmandu: Central Bureau of Statistics / UNFPA
3. CBS, 2012; *National Population and Housing Census 2011 (Village Development Committee / Municipalities)*, Government of Nepal, National Planning Commission Secretariate, Central Bureau of Statistics, Kathmandu, Nepal, November 2012.
4. Disaster Preparedness Network, Nepal, 2009; *Nepal Disaster Report: The hazardscape and vulnerabilities*, Ministry of Home Affairs, Nepal Disaster Preparedness Network, Nepal with support from with support from European Commission for Humanitarian Aid Department, United Nations Development Nepal and Oxfam Nepal
5. IUCN, 2011; *The Status of Nepal's Mammals: The National Red List Series*
6. NARMSAP, 2002; *Forest and Vegetation Types of Nepal*, TISC Document Series No 105, GoN / MOFSC / NARMSAP, 1-179.
7. Petr, T, 2002; *Cold water fish and fisheries in countries of the high mountain arc of Asia (Hindu Kush-Pamir-Karakoram-Himalayas) A review*, Symposium on coldwater fish species in the trans-Himalayan region. 10-14 July 2001. Kathmandu, Nepal
8. Rajbansi K.J, 1982; *A General Bibliography on Fish and Fisheries of Nepal*, Royal Nepal Academy, Kamaladi, Kathmandu, Nepal.
9. Rajbansi K.J, 2002; *Zoogeographical distribution and the status of cold water fishes of Nepal*. Paper presented in symposium on coldwater fish species in the trans-himalayan region. 10-14 July 2001. Kathmandu, Nepal
10. Shrestha et.al, 2012; *Fishes of Nepal: Mapping distributions based on voucher specimens*, Emporia State Research Studies Vol. 48, no. 2, p. 14-21 (2012)
11. Shrestha, J. (1995); *Enumeration of the Fishes of Nepal*, Bio-diversity Profiles Project, Publication No. 10, Department of National Parks and wildlife Conservation, Ministry of Forest & Soil Conservation, GoN, Kathmandu, Nepal.
12. Shrestha, T. K., 2008; *Icology of Nepal A study of Fishes of the Himalayan Waters*
13. Stainton, J.D.A., 1972; *Forests of Nepal*, John Murray, London.



## Photographs



Consulting with local people in Kauli bazar



District veterinary office



House type in Sagla



Landslide at Sakala



Sampling in the forest



Top view of Sepukhola settlement



Interviewing local on the way



Women at Nursery at dam site

# Appendixes

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Appendix 1: Area (ropani) and Production (Kg) under different crops of the reservoir area

VDC / Settlement	Paddy		Maize		Millet		Wheat		Potato		Oilseeds		Vegetable	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Nayakba / da Kauli Bazar	0	0	0.5	120	0	0	0.5	30	0.5	45	0	0	0.5	40
Sakala / Ragaryam	60	7500	50	11340	5	200	60	2520	10	850	1	60	2	100
Sagla	110	11000	80	12600	5	300	20	1575	10	1000	5	350	4	500
Chhutipalti (Jugena)	13	1250	15	2520	0	0	10	756	5	400	0	0	2	100
Sepukhola gau	40	4500	30	6300	5	200	20	1575	10	900	0	0	5	300
Lamatara	80	7500	20	3780	5	300	50	3780	10	1000	0	0	2	150
<b>Total</b>	<b>303</b>	<b>31750</b>	<b>195.5</b>	<b>36660</b>	<b>20</b>	<b>1000</b>	<b>160.5</b>	<b>10236</b>	<b>45.5</b>	<b>4195</b>	<b>6</b>	<b>410</b>	<b>15.5</b>	<b>1190</b>
<b>Cropping Intensity 209.83%</b>														

Source: NESS Field Survey, 2012

**Appendix 2: Occupation of the Reservoir Area Population**

S.N.	VDC	Settlement	Agriculture	Service	Wage labor	Foreign employment
1	Nayakbada	Kauli Bazar	10	1	15	0
2	Sakala	Ragaryam	120	0	60	0
3		Sagla	40	0	15	0
4		Chhutipalti (Jugena)	30	1	15	0
5		Sepukhola Gau	120	0	50	8
6		Lamatara	10	1	3	1
<b>Total</b>	<b>2</b>	<b>6</b>	<b>330</b>	<b>3</b>	<b>158</b>	<b>9</b>
<b>%</b>			<b>66.00</b>	<b>0.60</b>	<b>31.60</b>	<b>1.80</b>

Source: NESS Field Survey, 2012

**Appendix 3: List of FGD Participants (NALSIAU GAD)  
District: Jajarkot**

S.N.	Name of Respondent	Address	Occupation
1	Bhakta Bdr. Basnet	Nayakbada-5, Kauli Bazar	Farmer
2	Gorakh Bdr. Thapa	Nayakbada-5, Kauli Bazar	Business
3	Dil Bhd Sahi	Nayakbada-5, Kauli Bazar	Agriculture
4	Lal bhd Bohara	Nayakbada-5, Kauli Bazar	Business
5	Kabindra Poudyal	Sakala-8, Ragaryam	Student
6	Hasta Bdr. Singh	Sakala-8, Ragaryam	Agriculture
7	Sari Ram Gautam	Sakala-8, Ragaryam	Business
8	Sasi Ram Gautam	Sakala-8, Sagla	Business
9	Hari Prasad sharma	Sakala-8, Sagla	Student
10	Bhim Prasad upadhya	Sakala-8, Sagla	Agriculture
11	Dan Bdr. Shahi	Sakala-2, Sepukhola Gau	Businessman
12	Pratap Singh	Sakala-2, Sepukhola Gau	Student
13	Kamal Singh	Sakala-2, Sepukhola Gau	Agriculture
14	Kamal Raj Singh	Sakala-9,Lamatar	Foreign employment
15	Bhim Bdr. buda	Sakala-9,Lamatar	Agriculture
16	Lal Bahadur Bohara	Kauli, Nayak Bada-5	Business
17	Prithabi Bahadur Mahat	Sakala-7 ,Khari	Agriculture
18	Bhim Prasad Upadhaya	Sakala-8 Ragrem	Agriculture
19	Mana Kumari Bhandari	Sakala-1 Andheri Khola	Agriculture
20	Bhadra Bahadur Khatri	Sakala-1 Laikham	Agriculture
21	Dhana Bahadur Budha	Nayakbada-5 , Kauli	Fishermen
22	Gopal Bahadur Bhudha	Sakala-2, Jamechaur	Fishermen
23	Sher Bahadur Singh	Sakala-1, Laikham	Fishermen
24	Kali Bahadur Budha	Sakala-2, Jamechaur	Fishermen
25	Dil Bahadur Sahi	Sakala-2 Jugena	Fishermen
26	Purna Bahadur Nepali	Sakala-2, Jugena	Fishermen

**Appendix 4: Public Consultation Nalsyau Gad Project (Jajarkot District)**

Field visit to the Nalsyau Gad Project site was made on 14<sup>th</sup> to 29<sup>th</sup> July 2012. The objective of the visit was to collect primary information on the social, socio-economic, cultural, forest resources, wildlife, disaster records and aquatic ecological aspects from the reservoir area and the key structural locations of the project.

Since the study period was limited, most of the information related to the above aspects was derived based on the public consultations and interviews with the key informants. The socio-economic information was solicited from the focus group discussions at various settlements within the reservoir area. Information on disaster, fishermen, and fish diversity is based on the key informant interviews, while information on the forest, floral and wildlife diversity is based on the direct observation and interviews with the key informants of the local area. Focus group consultation meetings were held at 6 sites within the reservoir area (Table 1), while 12 key informants were interviewed for in depth knowledgeable information (Table 2).

**Table 1: Participants of the Focus Group Discussion**

S.N	Name of Participants	Occupation/Position	
<b>A.</b>	<b>Kauli bazaar</b>		
1	Bhakta Bhd Basnet	Agriculture	Nayakbada – 5, Kauli bazaar
2	Gorak bhd Thapa	Business	Nayakbada – 5, Kauli bazaar
3	Dil bhd Sahi	Agriculture	Nayakbada – 5, Kauli bazaar
4	Lal bhd bohara	Business	Nayakbada – 5, Kauli bazaar
<b>B</b>	<b>Ragaryam</b>		
1	Kabindra Poudel	Student	Sakala - 8 Ragaryam
2	Hasta bhd Singh	Agriculture	Sakala - 8 Ragaryam
3	Sari ram Gautam	Business	Sakala - 8 Ragaryam
<b>C</b>	<b>Sagla</b>		
1	Sasi ram Gautam	Business	Sakala -8, Sagla
2	Hari prashad Sharma	Student	Sakala -8, Sagla
3	Bhim Prashad Upadhya	Farmer	Sakala -8, Sagla
<b>C</b>	<b>Jugena</b>		
1	Hasta bhd Singh	Farmer	Sakala -2, Chhutipalti (Jugena)
2	Sasi ram Gautam	Business	Sakala -2, Chhutipalti (Jugena)
<b>D</b>	<b>Sepukhola gau</b>		
1	Dan Bd. Shahi	Businessman	Sakala -2, Sepukhola gau
2	Pratap singh	Student	Sakala -2, Sepukhola gau
3	Kamal Singh	Agriculture	Sakala -2, Sepukhola gau
<b>E</b>	<b>Lamatara</b>		
1	Kamal raj Singh	Foreign employment	Sakala -9, Lamatara
2	Bhim Bhd Budha	Farmer	Sakala -9, Lamatara

Source: Field Survey 2012

**Table 2: Key Informant for Interview**

S.N	Name of Respondent	Occupation/Position	Location
1	Lal Bahadur Bohara	Business	Kauli, Nayak Bada-5
2	Bhim Prasad Upadhaya	Agriculture	sakala-8 Ragrem
3	Mana Kumari Bhandari	Agriculture	Sakala -1 Andheri khola
4	Prithabi Bahadur Mahat	Agriculture	Sakala -7 ,Khari
5	Bhadra bahadur Khatri	Agriculture	Sakala -1 Laikham

S.N	Name of Respondent	Occupation/Position	Location
6	Dan Bhadur Sahi		Sakala-2 Sepukhola
7	Dhana Bahadur Budha	Fishermen	Nayakbada-5 , Kauli
8	Gopal Bahadur Bhudha	Fishermen	Sakala-2 , Jamechaur
9	Sher Bahadur Singh	Fishermen	Sakala-1 , Laikham
10	Kali Bahadur Budha	Fishermen	Sakala- 2, jamechaur
11	Dil Bahadur Sahi	Fishermen	Sakala -2 Jugena
12	Purna Bahadur Nepali	Fishermen	Sakala-2, Jugena

Source: Field Survey 2012

To solicit the information from the project site's local communities the strategic approach taken was to aware people on the Nationwide Master Plan Study of the Storage Type Hydro-electric Projects before seeking information on the local environmental and social resources and the concerns of the people regarding the Nalsyau Gad Project.

It is therefore the field survey team, before initiating dialogue with the local communities described why the Nationwide Master Plan Study for Storage type hydroelectric project is needed? Who is undertaking the study? What will be the output of the study? In this process the team also highlighted on how this project in this area was selected for further study? And what the study team will like to get information from the local area communities not limiting to the social and environmental information but also the concerns of the people with regard to the project and their aspirations with the project if it is screened for further study and development.

This section describes the local people knowledge on the project apart from the concerns and aspirations of the people from the project.

The local people have heard about the project since 10 to 12 years. They did not have the detail knowledge about the project key structural location and the level of water inundating their land and built property. The local people aspired that the project officials should provide information on the project as the study progress to make them aware on the projects likely impacts and thanked the study team for giving some level of information on the project progress.

The local people are concerned on their future prospects if the project is developed. A number of questions were asked with the field team. Few examples of the questions are:

- Will the project provide them compensation of the land and built property?
- Will the project provide them relocation and resettlement?
- What will be the mode of compensation?
- Will the compensated money or property will be sufficient to sustain their livelihood?
- Will the local people get job opportunities in the project?
- Will the energy generated from the project also be distributed to the local surrounding areas etc?

Despite many difficult questions, the local people are happy to learn that the project development in the area is under progress. Given the appropriate measures of resettlement and rehabilitation, the affected people have no objection to the project development. They believe that the project will open the door of social and economic development not only for the local area but also to the entire region. Their aspiration with the project is the employment of the local people in the project and a host of the community development issues such as water supply, electrification, road network development, enhancement of educational institutions and health institutions.

**Annex 21: Environmental Survey Report**  
**Naumure Project (W-25)**

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## INTRODUCTION

Federal Democratic Republic of Nepal is rich in water resources, its potential water power is 83,000 MW and economically exploitable water power is 42,000 MW. However, as of 2011, the total generating capacity of the country is only about 718.62 MW. Of the total installed capacity 92% is from the hydroelectric power plants. In addition, since most of hydroelectric power plants are run-of-river type, their output decreases seriously in the dry seasons. Consequently, there is a rolling blackout of as long as 14 hours a day which poses many problems including affects in livelihood and industries which severely impact the national economy.

To cope with these situations, the government of Nepal has worked out “National Electricity Crisis Resolution Action Plan” and “10-Year Hydropower Development Task Force” at the end of 2008. The above action plan and task force recommended need of storage-type hydroelectric power plants able to supply sustainable electricity uninterruptedly even in dry seasons to solve current power shortage at an early date.

However, construction of storage-type hydroelectric power plants should be carried out systematically taking into consideration of various aspects including the overall water resource development policy of Nepal, hydrological and geological characteristics, environmental impact, etc. Therefore, the Government of Nepal has requested the Government of Japan to work out a nationwide master plan for storage-type hydroelectric power development.

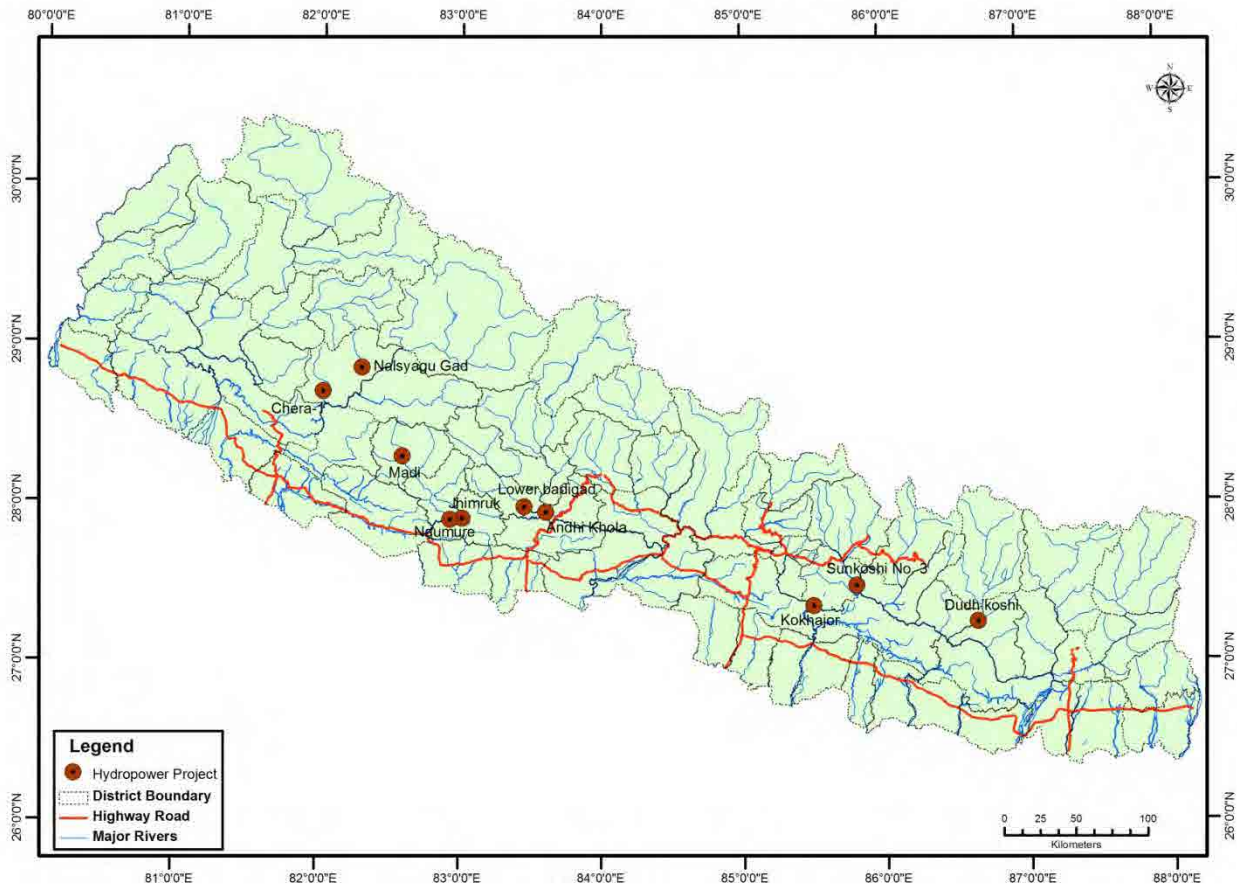
Electric Power Development Company Limited (J–Power) appointed by the JICA for the nationwide master plan study based on the desk level study in close association with NEA screened 10 candidate projects for the master plan study out of the list of 67 promising projects identified by NEA all over Nepal. **Table 1a and 1b** presents the salient features of the 10 promising projects screened for the master plan study, while **Figure 1** presents the location of the projects.

**Table 1a: Salient Features of Potential Projects**

No.	Project Name	Location (District)	Location of Dam Site		River	Installed Capacity (MW)	Catchment Area (km <sup>2</sup> )
			Longitude	Latitude			
E-01	Dudh Koshi	Okhaldhunga/Khotang Dist.	86° 39' 17.3	27° 15' 47.2	Dudh Koshi to Baiku Khola	300.0	4100
E-06	Kokhajor-1	Sinchuli, Sindhupalchok	85° 29' 59.6	27° 22' 21.9	Kokhajor	111.5	281
E-17	Sun Koshi No.3, Kosi MP	Ramechhap, Kavre and Sindhupalanchok	85° 48' 14.3	27° 29' 50.5	Sun Koshi	536.0	5520
C-02	Lower Badigad	Gulmi	83° 27' 22.2	28° 0' 0.6	Badigad	180.3	2050
C-08	Andhi Khola	Syangja	83° 36' 30.6	27° 58' 2.6	Andhi Khola	180.0	475
W-02	Chera-1	Jajarkot	82° 1' 12.3	28° 42' 56.4	Chera	148.7	809
W-05	Lower Jhimruk	Argakhachi, Pyuthan	83° 1' 1	27° 55' 30.8	Jhimruk	142.5	995
W-06	Madi	Rolpa	82° 35' 15.5	28° 18' 48.5	Madi	199.8	674
W-23	Nalsyau Gad	Jajarkot	82° 17' 42.8	28° 52' 4.7	Nalsyau Gad	410.0	571
W-25	Naumure (W. Rapti)	Argakhanchi, Pyuthan	82° 55' 42.9	27° 55' 6.1	West Rapti	245.0	3430

**Table 1b: Salient Features of Potential Projects**

No.	Project Name	Dam Height (m)	Total Storage Volume (MCM)	Effective Storage Volume (MCM)	Reservoir Area (km <sup>2</sup> )	FSL (m)	MOL (m)	TWL (m)	Rated Gross Head (m)	Rated Power Discharge (m <sup>3</sup> /sec)
E-01	Dudh Koshi	180.0	687.40	442.10	11.05	580.0	530.00	303.35	275.0	136.00
E-06	Kokhajor-1	107.0	218.70	166.10	8.92	437.00	390.00	200.00	226.3	63.90
E-17	Sun Koshi No.3, Kosi MP	140.0	1,220.00	555.00	23.99	700.0	674.00	575.00	116.3	109.34
C-02	Lower Badigad	191.0	995.90	505.50	13.65	688.00	654.00	475.00	196.0	232.60
C-08	Andhi Khola	157.0	336.50	238.70	5.52	675.00	626.70	368.48	307.0	81.40
W-02	Chera-1	186.0	254.90	141.10	4.00	866.0	814.00	640.00	220.0	80.50
W-05	Lower Jhimruk	167.0	386.00	211.60	4.98	597.0	557.0	390.0	194.6	88.10
W-06	Madi	190.0	359.50	235.10	7.66	1,090	1,030.00	800.00	280.8	84.90
W-23	Nalsyau Gad	200.0	419.6	296.3	6.3	1,570.0	1,498.00	872.0	644.0	75.00
W-25	Naumure (W.Rapti)	190.0	1,021.00	580.00	19.76	517.0	474.00	358.00	162.6	185.60



**Figure 1: Ten Promising Sites Identified for Survey**

The NESS, a local consulting firm of Nepal was entrusted by J-Power for the required SEA field studies of the 10 candidate projects. As per the ToR of works, there are basically two types of surveys required namely; geological, geotechnical, construction material and seismicity study, and environmental and social study. This report deals with the field survey findings of social and environmental study on **Naumure Project** identified as one of the candidate project in the western Nepal.

## 1 Socio-Economic Environment

The information regarding the social and economic conditions of the people in Nepal is available in the publications of the Central Bureau of Statistics. But such information is limited to administrative units such as VDCs, DDCs, Development Zones and at national level. As the candidate projects cross cut the administrative units, the available data on the social and economic concerns could not be used effectively to characterize the direct impact areas by the projects. To fill this gap field level studies on Socio-economic and Environmental Concerns<sup>1</sup> are conducted through participatory methods. The findings of the field surveys are presented in the section below.

### 1.1 Demographic Concerns

#### 1.1.1 VDCs, Settlements and Population

The proposed Naumure Project covers two districts from each of the development regions of Nepal i.e. Argakhanchi district from Western Development Region and Pyuthan from the Mid Western Development Region of Nepal and covers 15 VDCs, 31 settlements and 456 households. The total population of the reservoir area is estimated to be 3268 with the average family size of 7.2 which is significantly higher than the national average family size according to 2011 Census (4.7) (Table 1 and **Appendix 1**). The reservoir area occupies 0.78% population of the project districts<sup>2</sup>.

**Table 1: Districts, VDCS and Settlements and Population under Naumure Project**

S.N.	District	VDC	Settlement	HH	Population
1	Argkhanchi	Jaluke	Tarule(chyaun khola), Kalleri (Amilye Chaur), Takura, Siyala (Tallo and upallo Siyala), Hadye, Satighat, Timale, Naumure (Tallo Naumure)	91	616
		Asurkot			
		Khilji			
		Nuwakot			
		Dhanchaur			
2	Pyuthan	Jukena			
		Dangwang	Majhi Damar, Dabar, Kudule, Besi (Sallikot Besi), Kalikath	151	1010
		Hansapur	Dumai, Bange Besi (Tallo Bange), Panaha, Tallo Baike	68	543
		Baraula	Lami Damar, Lede, Khal Kamere, Chheun Kamere, Chidi Damar	74	532
		Pakala	Naughat, Khara, Khasre, Mitha bagar	45	334
		Dhuwang	Bokse, Chokte, Lami Khewa	9	73
		Dhungegadhi	Kudule, Sajampur	18	160
		Nayagaun			
		Ramdi			
Tiram					
<b>Total</b>	<b>2</b>	<b>8</b>	<b>31</b>	<b>456</b>	<b>3268</b>

Source: NESS Field Survey, 2012

<sup>1</sup> The findings are based on the NESS Rapid Field Survey Assessment (2012) using Focus Group Discussions (FGD) and Observation tools. Refer **Appendix 16** for the List of FGD participants.

<sup>2</sup> The total population of Argkhanchi and Pyuthan districts according to preliminary estimate of CBS Census 2011 is estimated to be 208,391 and 212,484 respectively.

### 1.1.2 Ethnicity / Caste

The population of the reservoir area is dominated by the disadvantage Adivasi/Janjati Magar groups (75%). Brahmin occupy the second largest population (14%). Other caste/ethnic groups dwelling in the area in limited number include Dalit (8%), Gurung (disadvantaged Janjati) (2%) and Chhetri (1%) (Figure 1 and Appendix 2).

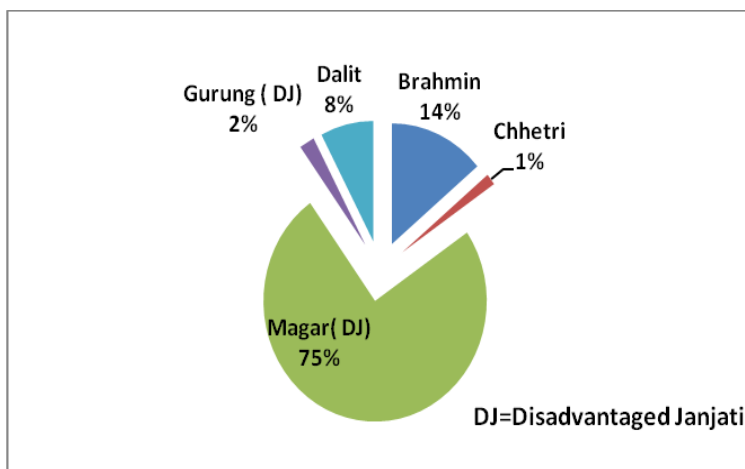


Figure1: Ethnic Composition of Reservoir Area Population

## 1.2 Economic Concern

### 1.2.1 Land Use Pattern and Land Holding Size

The total land area in the reservoir area is estimated to be 7/756 ropanies (1 ropani=20 hectare), i) a large proportion of which is used for agriculture (81%), followed by *kharbari* (15%) and pasture (4%) (Figure 2). The reservoir area has no forest area within the inundated area. Appendix 3 presents details on the land use pattern by each cluster of the VDC. Land holding is one of the major indicators of the economic well being in the reservoir area as elsewhere in the country. The total agricultural land of the reservoir area is estimated to 6325 ropanies.

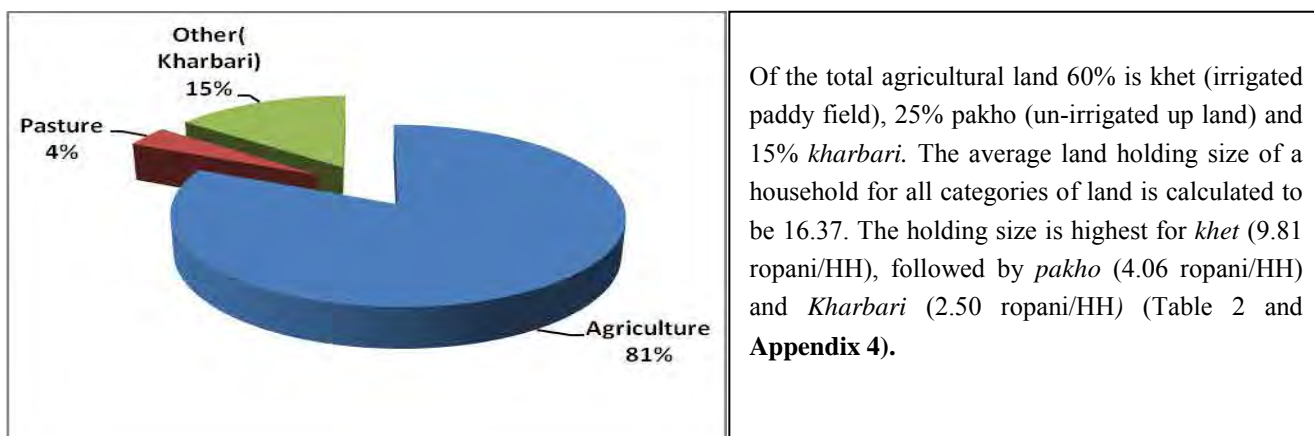


Figure 2: Land Use Pattern

**Table 2: Total and Average Land Holding Size (Ropani)**

Description	Total	%	Average/HH
Khet	4473	59.91	9.81
Pakho	1852	24.81	4.06
Other (Kharbari) <sup>3</sup>	1141	15.28	2.50
<b>Total</b>	<b>7466</b>	<b>100</b>	<b>16.37</b>

Source: NESS Field Survey, 2012

Based on the Central Bureau of Statistics (CBS) classification, 55% of the households fall in the marginal group, 33% in small to medium group and 12% landless / tenants; when examined from the view point of average land holding size (Table 3).

**Table 3: Economic Classification based on Land Holding**

Economic Category	Number of Households	%
Marginal	249	54.61
Small to Medium	153	33.55
Landless/Tenant	54	11.84
<b>Total</b>	<b>456</b>	<b>100.00</b>

Source: NESS Field Survey, 2012

The reservoir area is producing cereals such as paddy, maize, millet, wheat and cash crops such as potato, pulses and oilseeds. Vegetables are grown in very tiny patches for self consumption. Among the cereals wheat occupies the largest area (4385 ropanies) followed by paddy (4350 ropanies) and maize (4056 ropanies).

Among the cash crops, oilseeds occupies the largest area (377 ropanies) followed by pulses (237 ropanies). Potato is grown in very small area (9 65 ropanies). The volume of production is recorded to be highest for paddy followed by maize and wheat. Among the cash crops, the production is found greater for potato and oilseeds. The cropping intensity of the area is 217% (Table 4 and **Appendix 5**).

**Table 4: Crop Production and Yield**

S.N.	Crop	Area (Ropani)	Production (Muri)	Yield (Muri/Ropani)
1	Paddy	4350	17486	4.02
2	Maize	4056	8512	2.10
3	Millet	242	460	1.90
4	Wheat	4385	6551	1.49
5	Potato	65	170 (Quintal)	2.6 Quintal
6	Pulses	237	141	0.59
7	Oilseeds	377	293	0.78
	<b>Cropping Intensity</b>		<b>216.8%</b>	

Source: NESS Field Survey, 2012

Some settlements sale significant quantity of cereals and potato within the village, although, the major shares of crop production are consumed locally. The detail of the crop sold and process are given in Table 5 and **Appendix 6**.

**Table 5: Sale of the Agricultural Produces**

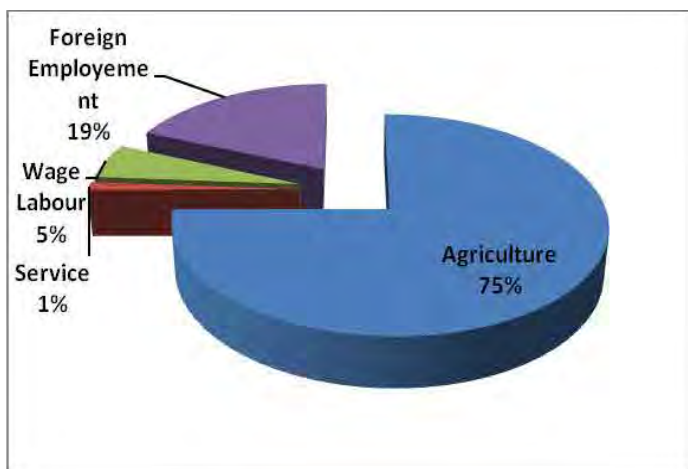
Crop	Sale Quantity (Muri)	Price (Rs/Muri)	Market
Paddy	925	1000	Within the Village
Maize	290	1500-1600	Within the Village
Wheat	265	1000	Within the Village
Potato	1 Quintal	2000	Within the Village

Source: NESS Field Survey, 2012

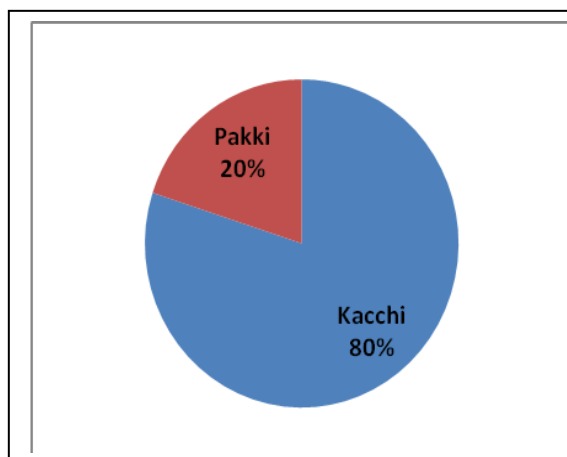
<sup>3</sup> Kharbari=land area used for growing grasses/pasture/thatch.

### 1.2.2 Occupation

Almost 50% population of the area is engaged in different occupations. Of the total employed population, three quarter (75%) are engaged in agriculture followed by foreign employment (19%), wage labour (5%), and services (1%). Among the foreign employers majority are working in India and few of them are in other countries such as Mayasia, Qatar, Saudi Arabia, Dubai etc. (Figure 3 and **Appendix 7**).



**Figure 3: Occupation of Population**



**Figure 4: Types of Houses**

### 1.2.3 Housing Type

Two types of houses are categorized in the reservoir area: i) Pakki house i.e permanent types of house built generally using mud/or/and cement and stone and roofed by using galvanized sheet (tin) or cemented and ii) kachhi house i.e built by using mud and stone and roofed using thatch.

A majority of the households (80%) are residing in kachhi (temporary) types of house and 20% in pakki (permanent) types of house (Figure 4 and **Appendix 8**).

## 1.3 Service Related Infrastructures

### 1.3.1 Road

Only 10 settlements out of 31 are facilitated with kachhi (fair weather) types of road and the total road length within these settlements is 3.4 km. 11 suspension bridges constructed in different parts of the reservoir area are serving the area (Figure 5 and **Appendix 9**).

### 1.3.2 Schools

Only five primary level schools are set up in the reservoir area where 353 students are enrolled. Of the total students, 53.5% are girls and 47.5% are boys (Table 6).

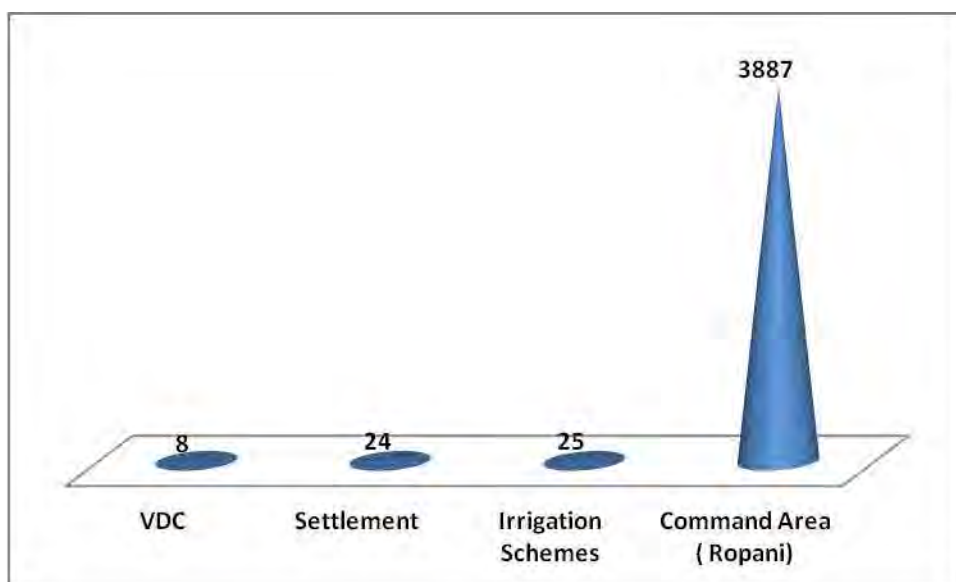
**Table 6: Existence of Schools in the Reservoir Area**

S.N.	District / VDC	Settlement	Schools and students			
			School Type and Name	Number of Students		
				Boys	Girs	Total
1	A. Arghakhanchi / Jaluke	Hadye	Dharmawati Primary School	40	50	90
2	B. Pyuthan Dangwang	Majhi Damar	Jana Priya Primary School	28	17	45
3	Hansapur	Dumai	Rapti Primary School	24	36	60
4		Bange Besi (Tallo Bange)	Sangham Primary School	12	16	28
5	Baraula	Lami Damar	Maandabi Primary School	60	70	130
	<b>Total</b>	<b>5</b>	<b>5</b>	<b>164</b>	<b>189</b>	<b>353</b>
	<b>%</b>			<b>46.5</b>	<b>53.5</b>	<b>100</b>

Source: NESS Field Survey, 2012

### 1.3.3 Irrigation Infrastructure

Altogether 24 settlements of the reservoir area out of 31 have been operating 25 irrigation schemes and many and of them are traditionally built by local farmers mobilizing their resources. The total irrigated command area is 3887 ropanies. The minimum and maximum irrigated command area ranges between 35 ropani (Naughat Traditional Sichai, Pakala VDC, Pyuthan disdtrict) to 725 ropanies (Panaha Traditional Sichai, Hanspur VDC , Pyuthan district) (Figure 5 and **Appendix 11**).

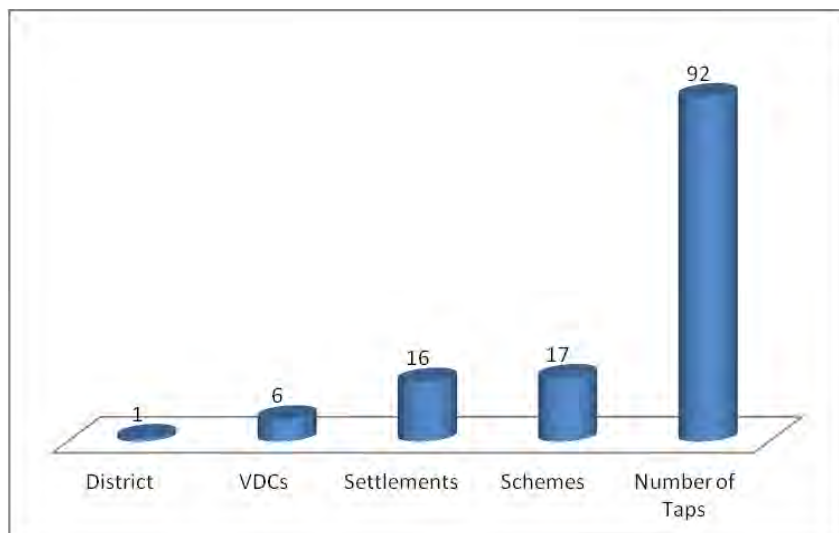


**Figure 5: Number and Command of Irrigation Schemes**

### 1.3.4 Drinking Water

Seventeen schemes with 92 numbers of taps are serving the reservoir area for drinking water. The minimum and maximum number of taps installed in each of the schemes ranges between 1 and 12. These schemes are constructed with the support of Drinking Water Supply Corporation, Poverty Alleviation Fund, western Water Soppo Scheme, etc. No water supply schemes are reported within the induaded area of Arghakhanchi district and all the 17 schemes are located in Pyuthan district (Figure 6 and **Appendix 12**).





**Figure 6: Number of drinking water Schemes in the Reservoir Area**

### 1.3.5 Community Forest

Altogether 21 Community Forests are reported in Pyuthan district alone, while Airbati temple located in Besi of Dangwang VDC is treated as holy and place of recreation and people from different VDCs of the district visit this place (**Appendix 13**).

### 1.3.6 Industries and Services

The reservoir area do not possesses any types of industries including hydropower or services within the inundated area. Few settlements prepare Mandal as per their need, occasionally. Two village shops and one medical shop are being operated in Maji Damar of Dangwang VDC, Pyuthan. No service centers related to agriculture, livestock and security exist in the reservoir area.

## 1.4 Culture and Religious Site

The major festivals celebrated in the reservoir area are: *Dasain, Tihar, Tija, Majhe Sankarati*, which are based on Hindu tradition and culture. Airbati temple located in Dangwang VDC of Pyuthan district and Bhumithan temple located in Jalike VDC of Arghkhanch district are popular both for religious and recreation purposes. Altogether eight major recreation ghat are reported in the area among which Airbati Ghat of Arghkhanch and Naughat of Pyuthan are mostly used by the majority of the settlements (**Appendix 14**).

## 1.5 Ongoing and Proposed Development Programmes

There are three major development projects planned in the project besides what are mentioned about the ongoing/ completed number of irrigation, sanitation and poverty alleviation projects (Table 7).

**Table 7: Planned development Projects in the Reservoir Area**

District/VDC	Settlement	Proposed Programme
Pyuthan / Dangwang	Majhi damar	Community Forest Promotion
Hanspur	Tallo Baike	Tallo Pani Khola Irrigation Project
Baraula	Lami Damar	Alternative Energy Programme

Source: NESS Field Survey, 2012

## 1.6 Past Experience with Community and Their Perception

The reservoir area people have not experience any types of conflict with regards to the development projects in the past. The people have perceived different positive and negative impacts from the project. Submerge of house and land, loss of agricultural land and negative effect on livelihoods are perceived as the major negative impacts by the community. The communities have also expected different development activities from the project such as availability of electricity and promotion of different development activities from the construction of storage types of the hydropower project (Table 8 and **Appendix 15**).

**Table 8: Perceived Impacts of the Storage Type Hydropower Project**

Positive impacts	Negative Impact
Availability of electricity	Become homeless and landless
Promotion of different Development Activities	Submerge of land and house
	Negative effect on livelihoods
	Loss of agricultural land
	No benefit to all villagers

Source: NESS Field Survey, 2012

## 1.7 Disasters

Flood, landslides and fires are reported to be the common natural disasters faced by the reservoir area each year. Four settlements of the area have experience such disasters within last four years with damages of house, land and irrigation canal (Table 9 and **Appendix 16**).

**Table 9: Occurrences of Disasters**

S.N.	District	VDC	Settlement	Type	occurrence	Magnitude of damage
1	Arghakh anchi	Jaluke	Siyala (Tallo and upallo Siyala)	Fire (14 th Falgun 2065)	once	5 HHs were destroyed.
2	Pyuthan	Dang wang	Dabar	Small scale landslide before 2 years	once	Destroyed irrigation Canal
3		Hansa pur	Bange Besi (Tallo Bange)	flood in Madi river (2066, Asar 30)	once	flooded and sweep away 30 Ropanies of Agricultural land
4		Pakla	Khara	Small scale landslide (2065)	once	Swept away 4 Ropanies of Agricultural land

Source: NESS Field Survey, 2012

## 2 DISASTER STUDY

There are no records of the disaster at the site specific level of the candidate project at the central level and district level offices of the government of Nepal. It is therefore, the disaster information is collected from the project site based on the key informant survey. The findings of the results are presented in the sections below.

### 2.1 Types of Disaster

Within the influence area of the Naumure storage type hydroelectric project disaster eents like floods, land slides and earthquake were not experienced by the communities in their memories.

### 2.1.1 Flood

The informants have no memory of disasterous flood events involving loss of life and property in their memory. The information below provides the lists of individuals consulted for the flood events in the candidate reservoir area.

**a) Name of respondent: ISWOR THAPA** **Date:** 25/04/2069 B.S.  
**Age:** 40 **Occupation:** FARMING/BUSINESS **Location:** DEVISTHAN-1, NAYAGAO  
 i) Year of the occurrence: No disastrous flood in the memorable past

**b) Name of respondent: DEVI RAM RANA** **Date:** 26/04/2069 B.S.  
**Age:** 52 **Occupation:** Agriculture **Location:** YEKCHOTE-7, RAMDI  
 i) Year of the occurrence: No disastrous flood in the memorable past

**c) Name of respondent: DAL BAHADUR BOHORA** **Date:** 26/04/2069 B.S.  
**Age:** 50 **Occupation:** Agriculture **Location:** SIMALCHOUR-4, TIRAM  
 i) Year of the occurrence: No disastrous flood in the memorable past

**d) Name of respondent: SOM BDR THAPA** **Date:** 27/04/2069 B.S.  
**Age:** 52 **Occupation:** Agriculture **Location:** BAINKE-9, HAMAPUR  
 i) Year of the occurrence: No disastrous flood in the memorable past

**e) Name of respondent: RAN BDR BIRKAJA MAGAR** **Date:** 28/04/2069 B.S.  
**Age:** 40 **Occupation:** Agriculture **Location:** SALLIKOT BESI-3, DANBANG  
 i) Year of the occurrence: No disastrous flood in the memorable past

**f) Name of respondent: JOG BDR SARU MAGAR** **Date:** 28/04/2069 B.S.  
**Age:** 40 **Occupation:** Agriculture **Location:** JALUKE-7, ARGHAKHANCHI  
 i) Year of the occurrence: No disastrous flood in the memorable past

### 2.1.2 Landslide

The informants have no memory of disasterous landslide events involving loss of life and property in their memory. The information below provides the lists of individuals consulted for the landslide events in the candidate reservoir area.

**a) Name of respondent: PHARSA RAM PULAMI MAGAR** **Date:** 29/04/2069 B.S.  
**Age:** 33 **Occupation:** Farming **Location:** Lamidamar-3, Baroula  
 No landslide in memorable past

**b) Name of respondent: KHUM PRASAD AACHARYA** **Date:** 30/04/2069 B.S.  
**Age:** 46 **Occupation:** Farming **Location:** Majhidamar-2, Danbang  
 No major landslide in memorable past

### 2.1.3 Earthquake

The informants have no memory of disasterous earthquake events involving loss of life and property in their memory. The information below provides the lists of individuals consulted for the earthquake events in the candidate reservoir area.

**Respondents:**

- a) Iswor Thapa, Devisthan-1, Nayagao, Pyuthan
  - b) Devi Ram Rana, Yekchote-7, Ramdi, Pyuthan
  - c) Ran Bdr Birkaja Magar, Sallikot Bensi-3, Danbang, Pyuthan
  - d) Jog Bdr Saru magar, Jaluke-7, Arghakhanchi
- No major earthquake in memorable past

**3 FLORAL STUDY**

Though the floral information at the regional level is available, there is no published literature on the site specific level of the candidate project at the central and district level offices of the government of Nepal. It is therefore, candidate project site is visited by the biological study team to gather information based on direct observation and through the participatory methods with the local key informants. Findings of the field study are presented in sections below.

**3.1 Vegetation Diversity**

The information on the vegetation diversity is gathered from the direct observation by the members of biology study team during site visit. Besides, information is also collected from the key informants of the local area through interviews and focus group discussions with the local community forest user groups.

The candidate project site is rich in floral diversity. About 55 plant species were recorded through direct observation and interviews with the key informants. The list of plant species is presented in the table below.

S.N.	Local Name	Common Name	Scientific Name
1	Dabdabey		<i>Lannea coromandelica</i>
2	Khayer	Cuth tree	<i>Acacia catechu</i>
3	Karam	Yellow teak	<i>Adina cardifolia</i>
4	Bell	Wood Apple	<i>Aegle marmelos</i>
5	Chiuri	Nepal butter fruit	<i>Aesandra butyracea</i>
6	Siris	Tee-coma	<i>Albezia sps.</i>
7	Vorla	Camel’s footclimber	<i>Bauhinia vahlii</i>
8	Pakhanbet	Rock Foil	<i>Berginia ciliate</i>
9	Simal	Silk cotton tree	<i>Bombax ceiba</i>
10	Vutuko ( Palas)	Bengal Kino Tree	<i>Butea monosperma</i>
11	Rajbrichha	Cassia pods	<i>Cassia fistula</i>
12	Sinkauli	Garlic pear	<i>Cinnamomum glanduliferum</i>
13	Dhurseta(Dhusure)		<i>Colebrookea oppositifolia</i>
14	Sandan	Sandan	<i>Desmodium oojeinense</i>
15	Githe tarul	Air potato	<i>Dioscorea bulbifera</i>
16	Unyoo	Eadible fern	<i>Dryopteris cochleata</i>
17	Mouwa		<i>Engelhardia spicata</i>
18	Bar	Banyan Tree	<i>Ficus bengalensis</i>
19	Kavro	Elephant Fig	<i>Ficus lacor</i>
20	Pipal	Pipal(Bio-Tree)	<i>Ficus religiosa</i>
21	Khamari	Malay bush beech	<i>Gmelina arborea</i>
22	Vimal	Bush	<i>Grewia optiva</i>
23	Bot dhayaro		<i>Lagerstroemia parviflora</i>
24	Rain	Kamala	<i>Mallotus philipensis</i>
25	Pudina	Peppermint	<i>Menthe arvensis</i>
26	Kafal	Bay berry	<i>Myrica esculenta</i>
27	Parijat	Night Jusmine	<i>Nyctanthes arbor</i>
28	Kaulo		<i>Persea odoratissima</i>

S.N.	Local Name	Common Name	Scientific Name
29	Amala	Emblic	<i>Phyllanthus emblica</i>
30	Khote Sallo	Pine	<i>Pinus roxburghii</i>
31	Rudilo		<i>Pogostmon bengalensis</i>
32	Sarpa Gandha		<i>Rawolfia serpentina</i>
33	Valayo	Chinese sunmac	<i>Rhus javanica</i>
34	Ritho	Soap –nut	<i>Sapindus mukorossi</i>
35	Khirro	Tallow tree	<i>Sapium insigne</i>
36	Sall	Sall tree	<i>Sorea robusta</i>
37	Debre lahara		<i>Spatholobus parviflorus</i>
38	Chiraito	Chiretta	<i>Swertia chirayita</i>
39	Jamun	Black berry	<i>Syzgium cumini</i>
40	Sajh	Laurel tree	<i>Terminalia alata</i>
41	Barro	Bedda Nuts	<i>Terminalia bellirica</i>
42	Harro	Black Myrobolon	<i>Terminalia chebula</i>
43	Tooni	Cedrela tree	<i>Toona ciliata</i>
44	Uttis	Nepal black ceder	<i>Ulnus nepalensis</i>
45	Sisnoo	Stinging nettle	<i>Urtica dioca</i>
46	Hadchur	Devils-fuge	<i>Viscum album Linn.</i>
47	Dhayaro	Fire flame bush	<i>Woodfordia fruticosa</i>
48	Bayer	Indian plum	<i>Zizypulus mauritiana</i>
49	Tidu		
50	Surai ( Gayo)		
51	Tilke		
52	Pepari(Badkoule)		
53	Khurkath		
54	Vaki Amilo		
55	Gunyelo		

### 3.2 Forest Types

The candidate project site is characterized by the, hill sal forest Table below presents the forest types and associated species in the reservoir area and outside reservoir area.

#### a) MADI KHOLA

Local (Within Reservoir)	Regional (Out of the Reservoir)
Mainly Hill sall forest dominated by <i>Shorea robusta</i> common associates are sanjh ( <i>Terminlia alata</i> ), Dhayero ( <i>Woodfordia fruticosa</i> ) and Sandan ( <i>Desmodium oojinense</i> )	Mainly hill sall forest ( <i>Shorea robusta</i> ) and Pine in some places.

#### b) JHIMRUK KHOLA

Local (Within Reservoir)	Regional (Out of the Reservoir)
Mainly hill sall forest dominated by <i>Shorea robusta</i> and associated with Karam ( <i>Adina cardifolia</i> )	Mostly the regional area are also Hill sall forest dominated by <i>shorea robusta</i>

### 3.3 Forest as per Forest Classification (Community Forest, Government Forest, Leasehold Forest, Private Forest, Religious Forest etc.)

The forests of the candidate project influence area are the government and community forests. The community forest are managed by the local community forest user groups within the framework of the community forest management plan approved by the district forest offices, while the government managed forest is managed by the district forest office. The reservoir occupied area has 26 community forests and 1

government managed forest. The name of the government and community forests, dominant species of plants and the location of the forests in the local administrative zone (VDCs) is presented in the tables below for the reservoir area and outside the reservoir area.

**a) MADI KHOLA**

**Local Area (Within the reservoir)**

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C./WARDS
1	Community	Vuwaneswori Co. Fo.	<i>Shorea robusta</i>	Nayagao-1
2	Community	Jyoti Co. Fo.	<i>Shorea robusta</i>	Ramdi-7,8
3	Community	Triveni Co. Fo.	<i>Shorea robusta</i>	Tiram -3
4	Community	Lisne Co. Fo.	<i>Shorea robusta</i>	Ramdi-7
5	Community	Shrimati Kanya Co. Fo.	<i>Shorea robusta</i>	Tiram -4
6	Community	Chihan Danda Co.Fo.	<i>Shorea robusta</i>	Dhuban-8
7	Community	Moti Kanya Co.Fo.	<i>Shorea robusta</i>	Tiram-5
8	Community	Dare Khaharekhola Co.Fo.	<i>Shorea robusta</i>	Tiram-5
9	Community	Gadi Co.Fo.	<i>Shorea robusta</i>	Dhungegadi-1,2,3
10	Community	Madan Co.Fo.	<i>Shorea robusta</i>	Dhubang-7
11	Community	Solighopte Co.Fo.	<i>Shorea robusta</i>	Hamsapur-9
12	Community	Rani Aanp Co. Fo.	<i>Shorea robusta</i>	Hamsapur-7
13	Community	Salla Chour Co.Fo.	<i>Shorea robusta</i>	Pakala-6
14	Community	Dansingh Co.Fo.	<i>Shorea robusta</i>	Pakala-6
15	Community	Ramche Co.Fo.	<i>Shorea robusta</i>	Pakala-7
16	Community	Amar Co.Fo.	<i>Shorea robusta</i>	Hamsapur-4,5
17	Community	Daha Pokhari Co.Fo.	<i>Shorea robusta</i>	Baroula-4
18	Community	Dhanoure Co. Fo.	<i>Shorea robusta</i>	Hamsapur-1,2,3
19	Community	Baghkhori and Sat Taale Co.Fo.	<i>Shorea robusta</i>	Baroula-3
20	Community	Airawati Co.Fo.	<i>Shorea robusta</i>	Danbang-3
21	Community	Airawati Co.Fo.	<i>Shorea robusta</i>	Hamsapur-1

**Regional Area (Outside the reservoir)**

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C./WARDS
1	Community	Vuwaneswori Co. Fo.	<i>Shorea robusta</i>	Nayagao-1
2	Community	Jyoti Co. Fo.	<i>Shorea robusta</i>	Ramdi-7,8
3	Community	Triveni Co. Fo.	<i>Shorea robusta</i>	Tiram -3
4	Community	Lisne Co. Fo.	<i>Shorea robusta</i>	Ramdi-7
5	Community	Shrimati Kanya Co. Fo.	<i>Shorea robusta</i>	Tiram -4
6	Community	Chihan Danda Co.Fo.	<i>Shorea robusta</i>	Dhuban-8
7	Community	Moti Kanya Co.Fo.	<i>Shorea robusta</i>	Tiram-5
8	Community	Dare Khaharekhola Co.Fo.	<i>Shorea robusta</i>	Tiram-5
9	Community	Gadi Co.Fo.	<i>Shorea robusta</i>	Dhungegadi-1, 2, 3
10	Community	Madan Co. Fo.	<i>Shorea robusta</i>	Dhubang-7
11	Community	Solighopte Co. Fo.	<i>Shorea robusta</i>	Hamsapur-9
12	Community	Rani Aanp Co. Fo.	<i>Shorea robusta</i>	Hamsapur-7
13	Community	Salla Chour Co. Fo.	<i>Shorea robusta</i>	Pakala-6
14	Community	Dansingh Co. Fo.	<i>Shorea robusta</i>	Pakala-6
15	Community	Ramche Co. Fo.	<i>Shorea robusta</i>	Pakala-7
16	Community	Amar Co. Fo.	<i>Shorea robusta</i>	Hamsapur-4, 5
17	Community	Daha Pokhari Co. Fo.	<i>Shorea robusta</i>	Baroula-4
18	Community	Dhanoure Co. Fo.	<i>Shorea robusta</i>	Hamsapur-1, 2, 3
19	Community	Baghkhori and Sat Taale Co.Fo.	<i>Shorea robusta</i>	Baroula-3
20	Community	Airawati Co. Fo.	<i>Shorea robusta</i>	Danbang-3
21	Community	Airawati Co. Fo.	<i>Shorea robusta</i>	Hamsapur-1

**b) JHIMRUK KHOLA**
**Local Area (Within the reservoir)**

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C.
1	Community	Naumure Co.Fo.	<i>Shorea robusta</i>	Jaluke-2, Argha
2	Community	Proposed for Co.Fo.	<i>Shorea robusta</i>	Jaluke-7, Argha
3	Community	Mangrakot Kalleri Co.Fo.	<i>Shorea robusta</i>	Jaluke-8, Argha
4	Community	Dobata Co.Fo.	<i>Shorea robusta</i>	Danbang-4
5	Community	Kala Thum Hariyali Co.Fo.	<i>Shorea robusta</i>	Danbang-2
6	National	National Forest	<i>Sparse sal mixed forest</i>	Jaluke, Bandre

**Regional Area (Outside the reservoir)**

S.N.	Ownership	Name of the forest	Dominant Species	V.D.C.
1	community	Naumure Co.Fo.	<i>Shorea robusta</i>	Jaluke-2, Argha
2	community	Proposed for Co.Fo.	<i>Shorea robusta</i>	Jaluke-7, Argha
3	community	Mangrakot Kalleri Co.Fo.	<i>Shorea robusta</i>	Jaluke-8, Argha
4	community	Dobata Co.Fo.	<i>Shorea robusta</i>	Danbang-4
5	community	Kala Thum Hariyali Co.Fo.	<i>Shorea robusta</i>	Danbang-2
6	National	National Forest	<i>Sparse sal mixed forest</i>	Jaluke, Bandre

**3.4 Forest Plot Analysis**

For the analysis of the forest status and characteristics 6 sample plots were measured within the reservoir area of the candidate project. The sample plots measured has a size of 25 x 25 meter. The detail of the sample plot measurements is presented in the tables below.

**FOREST PLOT ANALYSIS (25X25m<sup>2</sup>)**
**a) MADI KHOLA**

**i) Forest:** Lisne Co. Fo.

**Location:** Yekchote-7, Ramdi

**G.P.S.** 03-81-200E,31-01-950N

**Altitude:**550m

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Ht (approx.)
1	Sal	Hill Sal	<i>Shorea robusta</i>	80	15
2	Sal	Hill Sal	<i>Shorea robusta</i>	50	10
3	Sal	Hill Sal	<i>Shorea robusta</i>	90	15
4	Sal	Hill Sal	<i>Shorea robusta</i>	120	18
5	Sal	Hill Sal	<i>Shorea robusta</i>	50	12
6	Sal	Hill Sal	<i>Shorea robusta</i>	60	12
7	Sal	Hill Sal	<i>Shorea robusta</i>	45	10
8	Sal	Hill Sal	<i>Shorea robusta</i>	65	12
9	Sal	Hill Sal	<i>Shorea robusta</i>	60	12
10	Sal	Hill Sal	<i>Shorea robusta</i>	30	5
11	Sal	Hill Sal	<i>Shorea robusta</i>	50	8
12	Sal	Hill Sal	<i>Shorea robusta</i>	55	10
13	Sal	Hill Sal	<i>Shorea robusta</i>	60	9
14	Sal	Hill Sal	<i>Shorea robusta</i>	80	12
15	Sal	Hill Sal	<i>Shorea robusta</i>	65	10
16	Sal	Hill Sal	<i>Shorea robusta</i>	60	12
17	Sal	Hill Sal	<i>Shorea robusta</i>	55	10
18	Sal	Hill Sal	<i>Shorea robusta</i>	60	12
19	Sal	Hill Sal	<i>Shorea robusta</i>	70	10
20	Sal	Hill Sal	<i>Shorea robusta</i>	55	10
21	Sal	Hill Sal	<i>Shorea robusta</i>	35	8

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Ht (approx.)
22	Sal	Hill Sal	<i>Shorea robusta</i>	50	8
23	Sal	Hill Sal	<i>Shorea robusta</i>	30	8
24	Sal	Hill Sal	<i>Shorea robusta</i>	80	12
25	Sal	Hill Sal	<i>Shorea robusta</i>	70	10
26	Sal	Hill Sal	<i>Shorea robusta</i>	60	10
27	Sal	Hill Sal	<i>Shorea robusta</i>	65	11
28	Sal	Hill Sal	<i>Shorea robusta</i>	68	12
29	Sal	Hill Sal	<i>Shorea robusta</i>	30	8
30	Sal	Hill Sal	<i>Shorea robusta</i>	60	12
31	Sal	Hill Sal	<i>Shorea robusta</i>	55	9
32	Sal	Hill Sal	<i>Shorea robusta</i>	50	8
33	Sal	Hill Sal	<i>Shorea robusta</i>	85	12
34	Sal	Hill Sal	<i>Shorea robusta</i>	45	8
35	Sallo	Chir pine	<i>Pinus roxburgii</i>	60	12
36	Sallo	Chir pine	<i>Pinus roxburgii</i>	60	10
37	Sallo	Chir pine	<i>Pinus roxburgii</i>	120	12
<i>Shorea robusta-34, Pinus roxburgii-3</i>					

**Forest Density:** (total no of tree/area of the quadrat) x 10000 per hector=(37/625)X10000 per Hector=592/Hector

**Dominant species:** Sall=34/37X100%=91.89%

**Crown coverage of the forest:** 25%

**Note:** Other important flora species found in the quadrat are Thakal, Galeni (*Leea macrophylla*)

**ii) Forest:** Triveni Co.Fo.

**Location:** Near Arung Basti, V.D.C.-Tiram-3

**G.P.S.** 03-81-060E,31-02-180N

**Altitude:**556m

S.N.	Local Name	Common Name	Scientific Name	DBH(cm)	Height (aprox)
1	Sal	Hill Sal	<i>Shorea robusta</i>	25	5
2	Sal	Hill Sal	<i>Shorea robusta</i>	20	3
3	Sal	Hill Sal	<i>Shorea robusta</i>	40	8
4	Sal	Hill Sal	<i>Shorea robusta</i>	45	8
5	Sal	Hill Sal	<i>Shorea robusta</i>	50	10
6	Sal	Hill Sal	<i>Shorea robusta</i>	50	10
7	Sal	Hill Sal	<i>Shorea robusta</i>	30	8
8	Sal	Hill Sal	<i>Shorea robusta</i>	35	8
9	Sal	Hill Sal	<i>Shorea robusta</i>	50	10
10	Sal	Hill Sal	<i>Shorea robusta</i>	60	10
11	Sal	Hill Sal	<i>Shorea robusta</i>	60	10
12	Sal	Hill Sal	<i>Shorea robusta</i>	65	11
13	Sal	Hill Sal	<i>Shorea robusta</i>	25	6
14	Sal	Hill Sal	<i>Shorea robusta</i>	60	10
15	Sal	Hill Sal	<i>Shorea robusta</i>	50	8
16	Sal	Hill Sal	<i>Shorea robusta</i>	30	6
17	Sal	Hill Sal	<i>Shorea robusta</i>	30	6
18	Sal	Hill Sal	<i>Shorea robusta</i>	50	8
19	Sal	Hill Sal	<i>Shorea robusta</i>	60	11
20	Sal	Hill Sal	<i>Shorea robusta</i>	50	8
21	Sal	Hill Sal	<i>Shorea robusta</i>	70	12
22	Sal	Hill Sal	<i>Shorea robusta</i>	60	10
23	Sal	Hill Sal	<i>Shorea robusta</i>	40	8
24	Sal	Hill Sal	<i>Shorea robusta</i>	120	15
25	Sal	Hill Sal	<i>Shorea robusta</i>	60	8
26	Sal	Hill Sal	<i>Shorea robusta</i>	70	9
27	Sal	Hill Sal	<i>Shorea robusta</i>	35	6
28	Sal	Hill Sal	<i>Shorea robusta</i>	45	8
29	Sal	Hill Sal	<i>Shorea robusta</i>	30	5
30	Sal	Hill Sal	<i>Shorea robusta</i>	50	8
31	Sal	Hill Sal	<i>Shorea robusta</i>	60	9



S.N.	Local Name	Common Name	Scientific Name	DBH(cm)	Height (aprox)
32	Sal	Hill Sal	<i>Shorea robusta</i>	40	8
33	Sal	Hill Sal	<i>Shorea robusta</i>	50	9
34	Sal	Hill Sal	<i>Shorea robusta</i>	70	8
35	Sal	Hill Sal	<i>Shorea robusta</i>	60	8
36	Sal	Hill Sal	<i>Shorea robusta</i>	70	9
37	Sal	Hill Sal	<i>Shorea robusta</i>	30	6
38	Sal	Hill Sal	<i>Shorea robusta</i>	60	8
39	Sal	Hill Sal	<i>Shorea robusta</i>	60	8
40	Sallo	Chir Pine	<i>Pinus roxburgii</i>	140	25
41	Khirro			30	4
<i>Sal-39, Sallo-1, Khirro-1</i>					

**Forest Density** (total no of tree/area of the quadrate)X10000 per hector=41/625X10000 per Hector=656/Hector

**Dominant species**=Hill Sal (*Shorea robusta*)=(39/41)X100%=95.12%

**Crown coverage of the forest:** 45%

**Note:** Valayo, Dhayero, Fadel, Pyari, Amala, Tilke, Vakiamilo

**iii) Forest:** Shree Mati Kanya co. Fo.

**Location:** Thakleni-4, V.D.C.-Tiram

**G.P.S** 03-82-192E,30-99-900N

**Altitude:** 515m

S.N.	Local Name	Common Name	Scientific Name	DBH(cm)	Ht (aprox.)
1	Sall	Hill Sal	<i>Shorea robusta</i>	50	8
2	Sall	Hill Sal	<i>Shorea robusta</i>	40	7
3	Sall	Hill Sal	<i>Shorea robusta</i>	50	8
4	Sall	Hill Sal	<i>Shorea robusta</i>	30	7
5	Sall	Hill Sal	<i>Shorea robusta</i>	40	7
6	Sall	Hill Sal	<i>Shorea robusta</i>	60	9
7	Sall	Hill Sal	<i>Shorea robusta</i>	50	8
8	Sall	Hill Sal	<i>Shorea robusta</i>	55	7
9	Sall	Hill Sal	<i>Shorea robusta</i>	45	7
10	Sall	Hill Sal	<i>Shorea robusta</i>	50	8
11	Sall	Hill Sal	<i>Shorea robusta</i>	80	9
12	Sall	Hill Sal	<i>Shorea robusta</i>	60	8
13	Sall	Hill Sal	<i>Shorea robusta</i>	35	6
14	Sall	Hill Sal	<i>Shorea robusta</i>	40	7
15	Sall	Hill Sal	<i>Shorea robusta</i>	70	8
16	Sall	Hill Sal	<i>Shorea robusta</i>	60	8
17	Sall	Hill Sal	<i>Shorea robusta</i>	40	7
18	Sall	Hill Sal	<i>Shorea robusta</i>	80	8
19	Sall	Hill Sal	<i>Shorea robusta</i>	50	7
20	Sall	Hill Sal	<i>Shorea robusta</i>	90	10
21	Sall	Hill Sal	<i>Shorea robusta</i>	60	8
22	Sall	Hill Sal	<i>Shorea robusta</i>	40	7
23	Sall	Hill Sal	<i>Shorea robusta</i>	40	6
24	Sall	Hill Sal	<i>Shorea robusta</i>	30	5
25	Sall	Hill Sal	<i>Shorea robusta</i>	40	7
26	Sall	Hill Sal	<i>Shorea robusta</i>	50	8
27	Sall	Hill Sal	<i>Shorea robusta</i>	50	7
28	Sall	Hill Sal	<i>Shorea robusta</i>	70	8
29	Sall	Hill Sal	<i>Shorea robusta</i>	90	10
30	Sall	Hill Sal	<i>Shorea robusta</i>	40	6
31	Sall	Hill Sal	<i>Shorea robusta</i>	50	7
32	Sall	Hill Sal	<i>Shorea robusta</i>	40	6
33	Sall	Hill Sal	<i>Shorea robusta</i>	50	7
34	Sall	Hill Sal	<i>Shorea robusta</i>	40	6
35	Sall	Hill Sal	<i>Shorea robusta</i>	50	7
36	Chiuri			200	15
37	Khirro			50	4

S.N.	Local Name	Common Name	Scientific Name	DBH(cm)	Ht (approx.)
38	Khirro			50	4
39	Khirro			180	20
40	Khirro			30	3
41	Bot dhayero			40	4 cut
<i>Hill Sal-35, Khirro-4, Botdhayero-1, Chiuri-1</i>					

**Forest Density:** total no of tree/area of the quadrate=41/625X10000 per Hector=656 trees/hector

**Dominant species**=Sall Tree=(35/41) X100%=85.37%

**Crown coverage of the forest:** 35%

**Note:** Raino, Fadel, Thakal, Debre, Bankhu, Galeni, Githe Tarul

**iv) Forest:** Solighopte Co. Fo.

**Location:** Near Bainke-9, V.D.C.-Hamsapur

**G.P.S** 03-86-550E, 30-94-600N

**Altitude:** 664m

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Ht (approx.)
1	Sall	Hill Sal	<i>Shorea robusta</i>	90	15
2	Sall	Hill Sal	<i>Shorea robusta</i>	120	25
3	Sall	Hill Sal	<i>Shorea robusta</i>	140	25
4	Sall	Hill Sal	<i>Shorea robusta</i>	120	25
5	Sall	Hill Sal	<i>Shorea robusta</i>	120	25
6	Sall	Hill Sal	<i>Shorea robusta</i>	120	25
7	Sall	Hill Sal	<i>Shorea robusta</i>	100	22
8	Sall	Hill Sal	<i>Shorea robusta</i>	90	20
9	Sall	Hill Sal	<i>Shorea robusta</i>	110	20
10	Sall	Hill Sal	<i>Shorea robusta</i>	120	23
11	Sall	Hill Sal	<i>Shorea robusta</i>	140	25
12	Sall	Hill Sal	<i>Shorea robusta</i>	80	18
13	Sall	Hill Sal	<i>Shorea robusta</i>	50	10
14	Sall	Hill Sal	<i>Shorea robusta</i>	70	13
15	Sall	Hill Sal	<i>Shorea robusta</i>	140	25
16	Sall	Hill Sal	<i>Shorea robusta</i>	80	10
17	Sall	Hill Sal	<i>Shorea robusta</i>	80	11
18	Sall	Hill Sal	<i>Shorea robusta</i>	110	15
19	Sall	Hill Sal	<i>Shorea robusta</i>	90	10
20	Sall	Hill Sal	<i>Shorea robusta</i>	140	25
21	Sall	Hill Sal	<i>Shorea robusta</i>	70	8
22	Sall	Hill Sal	<i>Shorea robusta</i>	50	8
23	Sall	Hill Sal	<i>Shorea robusta</i>	30	6
24	Sall	Hill Sal	<i>Shorea robusta</i>	100	20
25	Sanjh	Laurel tree	<i>Terminalia alata</i>	100	20
26	Sanjh	Laurel tree	<i>Terminalia alata</i>	90	18
27	Sanjh	Laurel tree	<i>Terminalia alata</i>	120	20
28	Sanjh	Laurel tree	<i>Terminalia alata</i>	90	18
29	Bot Dhayero		<i>Lagerstroemia parviflora</i>	90	15
30	Bot Dhayero		<i>Lagerstroemia parviflora</i>	20	5
31	Pyari			100	18
32	Pyari			90	14
33	Pyari			50	5
<b>24Hill Sal, 4Sanjh, 3Pyari, 2Bot Dhayero</b>					

**Forest Density:** total no of tree/area of the quadrate=(33/625)X10000 per Hector=528 trees/hector

**Dominant species** =Sall Tree=(24/33) X100%=72.73%

**Crown coverage of the forest:** 80%

**Note:** Raino, Malu, Bhalayo, Pepari, Fadel

**b) JHIMRUK KHOLA**

**i) Forest:** Kala Thum Hariyali Co.Fo

Location: Majhi Damar-2, V.D.C.-Danbang

G.P.S. 04-00-950E,30-90-600N

Altitude:487m

S.N.	Local Name	Common Name	Scientific Name	DBH (cm)	Ht (approx.)
1	Sall	Sall Tree	<i>Shorea robusta</i>	35	5
2	Sall	Sall Tree	<i>Shorea robusta</i>	50	7
3	Sall	Sall Tree	<i>Shorea robusta</i>	80	7
4	Sall	Sall Tree	<i>Shorea robusta</i>	50	6
5	Sall	Sall Tree	<i>Shorea robusta</i>	40	6
6	Sall	Sall Tree	<i>Shorea robusta</i>	30	5
7	Sall	Sall Tree	<i>Shorea robusta</i>	60	8
8	Sall	Sall Tree	<i>Shorea robusta</i>	35	5
9	Sall	Sall Tree	<i>Shorea robusta</i>	90	10
10	Sall	Sall Tree	<i>Shorea robusta</i>	80	9
11	Sall	Sall Tree	<i>Shorea robusta</i>	90	11
12	Sall	Sall Tree	<i>Shorea robusta</i>	100	9
13	Sall	Sall Tree	<i>Shorea robusta</i>	70	8
14	Sall	Sall Tree	<i>Shorea robusta</i>	70	8
15	Sall	Sall Tree	<i>Shorea robusta</i>	60	6
16	Sall	Sall Tree	<i>Shorea robusta</i>	30	5
17	Sall	Sall Tree	<i>Shorea robusta</i>	80	7
18	Sall	Sall Tree	<i>Shorea robusta</i>	35	5
19	Sall	Sall Tree	<i>Shorea robusta</i>	50	6
20	Sall	Sall Tree	<i>Shorea robusta</i>	60	5
21	Sall	Sall Tree	<i>Shorea robusta</i>	70	8
22	Sall	Sall Tree	<i>Shorea robusta</i>	30	5
23	Sall	Sall Tree	<i>Shorea robusta</i>	50	6
24	Sall	Sall Tree	<i>Shorea robusta</i>	70	8
25	Sall	Sall Tree	<i>Shorea robusta</i>	80	8
26	Sall	Sall Tree	<i>Shorea robusta</i>	80	7
27	Sall	Sall Tree	<i>Shorea robusta</i>	90	10
28	Sall	Sall Tree	<i>Shorea robusta</i>	100	11
29	Sall	Sall Tree	<i>Shorea robusta</i>	80	9
30	Sall	Sall Tree	<i>Shorea robusta</i>	85	9
31	Sall	Sall Tree	<i>Shorea robusta</i>	35	5
32	Sall	Sall Tree	<i>Shorea robusta</i>	60	7
33	Sall	Sall Tree	<i>Shorea robusta</i>	80	9
34	Sandan	Sandan	<i>Desmodium oojeinense</i>	50	4
35	Bot Dhayero		<i>Lagerstroemia parviflora</i>	80	5
36	Bot Dhayero		<i>Lagerstroemia parviflora</i>	30	3
37	Tilke			40	3
38	Tilke			40	3
39	Tilke			40	3
40	Sandan	Sandan	<i>Desmodium oojeinense</i>	40	2, cut
41	Chiuri	Nepal butter fruit	<i>Aesandra butyracea</i>	70	6
42	Sanjh	Laurel tree	<i>Terminalia alata</i>	80	9
43	Sanjh	Laurel tree	<i>Terminalia alata</i>	70	8
44	Fadil			30	5
45	Chiuri	Nepal butter fruit	<i>Aesandra butyracea</i>	60	5
46	Valayo	Chinese Summac	<i>Rhus javanica</i>	25	4
47	Bot Dhayero		<i>Lagerstroemia parviflora</i>	80	7
48	Karam	Yellow teak	<i>Adina cardifolia</i>	50	6
<i>Hill Sal-34, Bot Dhayero-3, Sanjh-2, Chiuri-2, Valayo-1, Karam-1, Tilke-3, Sandan-2</i>					

**Forest Density:** total no of tree/area of the quadrate=48/625x10000 per Hector=768/Hector

**Dominant Species of the quadrate,** Sall=34/48x100%=70.83%

**Crown coverage of the forest:** 20%

**ii) Forest: Gazi Damar Co.Fo.**

**Location:** Vurunge-6, V.D.C.-Danbang

**G.P.S.** 04-02-329E, 30-90-748N

**Altitude:** 504m

S.N.	Local Name	Common Name	Scientific Name	DBH(cm)	Ht (aprox)
1	Sal	Hill Sal	<i>Shorea robusta</i>	40	5
2	Sal	Hill Sal	<i>Shorea robusta</i>	40	5
3	Sal	Hill Sal	<i>Shorea robusta</i>	35	4
4	Sal	Hill Sal	<i>Shorea robusta</i>	35	3
5	Sal	Hill Sal	<i>Shorea robusta</i>	40	5
6	Sal	Hill Sal	<i>Shorea robusta</i>	40	5
7	Sal	Hill Sal	<i>Shorea robusta</i>	30	4
8	Sal	Hill Sal	<i>Shorea robusta</i>	25	3
9	Sal	Hill Sal	<i>Shorea robusta</i>	40	5
10	Sal	Hill Sal	<i>Shorea robusta</i>	40	5
11	Sal	Hill Sal	<i>Shorea robusta</i>	40	5
12	Sal	Hill Sal	<i>Shorea robusta</i>	40	5
13	Sal	Hill Sal	<i>Shorea robusta</i>	30	4
14	Sal	Hill Sal	<i>Shorea robusta</i>	30	4
15	Sal	Hill Sal	<i>Shorea robusta</i>	70	11
16	Sal	Hill Sal	<i>Shorea robusta</i>	100	18
17	Sal	Hill Sal	<i>Shorea robusta</i>	70	8
18	Sal	Hill Sal	<i>Shorea robusta</i>	40	5
19	Sal	Hill Sal	<i>Shorea robusta</i>	30	4
20	Sal	Hill Sal	<i>Shorea robusta</i>	60	8
21	Sal	Hill Sal	<i>Shorea robusta</i>	50	6
22	Sal	Hill Sal	<i>Shorea robusta</i>	30	4
23	Sal	Hill Sal	<i>Shorea robusta</i>	30	4
24	Sal	Hill Sal	<i>Shorea robusta</i>	120	18
25	Sal	Hill Sal	<i>Shorea robusta</i>	90	15
26	Sal	Hill Sal	<i>Shorea robusta</i>	60	7
27	Sal	Hill Sal	<i>Shorea robusta</i>	100	17
28	Karam			250	15
29	Pyari			80	7
30	Bot Dhayero			70	8
31	Bot Dhayero			60	7
32	Tilke			20	5
<i>Sal-27, Bot Dhayero-2, Pyari-1, Karam-1, Tilke-1</i>					

**Forest density:** =32/625X10000 per Hector, =512/Hector

**Dominant species of the quadrate:** Sall= 27/32X100%=84.38%

**Crown coverage of the forest:** 40%

**Note:** - pepari, Amala, Thakal, Maloo

### 3.5 Public Dependency on the Forest

The forests of the candidate project site provide a range of goods and services to the local communities. The local community extracts followings resources from the forest areas to support their livelihood.

- Fodder
- Firewood
- For thatch and other purposes as to make ceiling of local house mainly from Kachurani Co.Fo.
- Woods
- Vegetable like ramanta of fern, Bankhu etc.

- Medicine from tree like Khirro, Dabdabey, Pakhanbet etc.

The major ethnobotanical use of the forest resources practiced in the area is presented in the table below.

Local Area			Within Regional Area		
S.N.	Local Name	Uses	S.N.	Local Name	Uses
1	Sall	Wood	1	Sallo	Wood, Latex
2	Sanjh	Wood	2	Pakhanbed	Medicine
3	Simal	Wood	3		
4	Khamari	Wood	4		
5	Jamun	Fruits / Wood	5		
6	Timila	Fruit / Fodder	6		
7	Mouwa	Fodder			
8	Tidu	Fruit			
9	Sandan	Wood Plough			
10	Githi	Wood theki			
11	Bot dhayaro	Wood			
12	Dhayaro	Fodder			
13	Uttis	Wood			
14	Rain (Sindure)	Fodder			
15	Mallo (Vorla)	Roof, String			
16	Malyato	Fodder			
17	Gunyalo	Fodder			
18	Dabdabey	Fodder			
19	Kaulo	Medicine			
20	Sarpagndha	Medicine			
21	Pipal	Asthetic			
22	Amala	Medicine			
23	Tezpatta	Spice			
24	Chiuri	Ghee			
25	Bell	Med / Asthetic			
26	Khirro	Medicine			
28	Shiris	Fodder / Wood			
29	Mango	Fruit			
30	Kafal	Fruit			
31	Valayo	Medicine			
32	Piyari	Fruit / Fodder			
33	Vimal	Fruit			
34	Kavro	Fruit / Fodder			
35	Harro	Medicine			
36	Barro	Medicine			
37	Rajbrichha	Medicine			
38	Bakeina	Fruit / Fodder			
39	Kutmera	Fodder			
40	Tilke	Fodder / Firewood			
41	Surai (Gayo)	Fodder			
42	Pepari (Badkoule)	Fodder			
43	Biralelahara (Debre)	Fodder			
44	Galeni	Medicine			
45	Bhuletro				
46	Hadchur	Medicine			
47	Kag Chucho Lahara				
48	Dhurseta	Fodder			
49	Vutuka	Anti - landslide			
50	Parijat	Fragrant ,pooja			
51	Chiraito	Medicine			
52	Tote	Fodder (Ficus)			

### 3.6 Floral Species of the Conservation Significance

Of the recorded floral species only 4 species have been categorized under the protection lists of the government of Nepal and CITES. However, none of the floral species have been listed in the IUCN red list. The table below presents the list of the protected species.

S.N .	Local Name	Common Name	Scientific Name	Status			Site survey	Hearing survey	Literature survey
				IUCN	CITES	GON			
1	Khayer	Cuth tree	Acacia catechu			P		Hearing at Danbang, Argaha, Jaluke	
2	Simal	Silk cotton tree	Bombax ceiba			P		Hearing at Danbang, Argaha, Jaluke	
3	Sarpa Gandha		Rawolfia serpentina		II	P		Hearing at Danbang, Argaha, Jaluke	
4	Sall	Sall tree	Sorea robusta			P	Confirmed at site		

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## 4 FAUNAL STUDY (WILDLIFE)

Information on the wildlife of the candidate project site is scarce in the published literatures. It is therefore site investigations are conducted to gather information through direct observation and the participatory methods with the local communities and the key informants. The findings of the filed investigations are presented in section hereunder.

### 4.1 Wildlife Diversity

Information on wildlife diversity is gathered through direct observation and participatory methods which included focus group discussion with the local communities and key informant surveys.

#### a) Mammals

A total of 24 mammalian species were recorded from the focus group discussion and key informant surveys. Of the total reported species 5 mammalian species were directly observed by the field biological team. The details of the mammalian species and habitat types are presented in the table below.

S.N.	Consultation	Observed	Common name	Scientific Name
1	Lokharke (dhwansa)	*	Irrawaddy Squirrel	<i>Callosciurus pygerythrus</i>
2	Jackal		Golden Jackal	<i>Canis aureus</i>
3	Banbiralo		Wild cat	<i>Felis chaus</i>
4	Lokharke (dharke)		Northern palm Squirrel	<i>Funambulus pennanti</i>
5	Nyauri Muso	*	Common mongoose	<i>Herpetes edwardsi</i>
6	Bhede Bagh		Hyena	<i>Hyena hyena</i>
7	Udne Lokharke		Particolored flying squirrel	<i>Hylopetes alboniger</i>
8	Sara (dumsi)		Porcupine	<i>Hystrix indica</i>
9	Pakha Ott		Common otter	<i>Lutra lutra</i>
10	Pani Ot		Smooth coated otter	<i>Lutra perspicillata</i>
11	Kalgada Bandar		Assam Macaque	<i>Macaca assamensis</i>
12	Rato Bandar	*	Rhesus Monkey	<i>Macaca mulata</i>
13	Malsapro		Yellow throated martin	<i>Martef Flabigula</i>
14	Ban Chamero		Small bent wing bat	<i>Miniopterus pusillus</i>
15	Ratuwa		Barking Deer	<i>Muntiacus muntjak</i>
16	Dukure Muso		Eastern House Mouse	<i>Mus musculus</i>
17	Ghoral		Goral	<i>Naemorhed goral</i>
18	Kharayo		Rabbit	<i>Oryctolagus cuniculus</i>
19	Chituwa		Common leopard	<i>Panthera pardus</i>
20	Ghar Chamero	*	Least Pipistrelle	<i>Pipistrellus tenuis</i>
21	Langur (Guna)	*	Hanuman langur	<i>Presbytus entellus</i>
22	Chhuchundro		Ground Shrew	<i>Soriculus sps.</i>
23	Bandel		Wild Bore	<i>Sus scroffa</i>
24	Phyauro		Bengal fox	<i>Vulpus bengalensis</i>

#### b) Birds

A total of 49 bird species are reported by the local communities and key informants. Of the total reported species 30 species are directly observed by the field biological team. Table below presents list of the reported and observed species in the candidate project influence area.

S.N.	Consultation	observed	Common name	Scientific Name
1	Sari	*	Common maina	<i>Acredotheres tristis</i>
2	Chuinya		Upland Pipit	<i>Anthus Sylvanus</i>
3	Vudrung (Huchil)		Great horned owl	<i>Bubo bubo</i>
4	Oolloo		Owl	<i>Bubo zeylonensis</i>

S.N.	Consultation	observed	Common name	Scientific Name
5	Seto Bakulla	*	Cattle egret	<i>Bubulcus ibis</i>
6	Petkaile Koili		Plaintive Cuckoo	<i>Cacomantis merulinus</i>
7	Kaliz		Chir pheasant	<i>Catreus wallichii</i>
8		*	Orange-bellied Leafbird	<i>Chloropsis hardwickii</i>
9	Hile Gidha	*	Woolly-necked stork	<i>Ciconia episcopus</i>
10	Dhobi Chara	*	Oriental-magpi Robin	<i>Copsychus saularis</i>
11	Kalo Kag	*	Jungle Crow	<i>Corvus macrorhynchos</i>
12	Kag (house)	*	House Crow	<i>Corvus splendens</i>
13	Bhuputi Dove	*	Mountain imperial pigeon	<i>Dacula badia</i>
14	Kokale		Tree pie	<i>Dendrocitta vagabunda</i>
15		*	Spangled Drongo	<i>Dicrurus hottentottus</i>
16	Kalo Chibe	*	Black Drongo	<i>Dicrurus macrocercus</i>
17	Chiute Chara		Black-backed Forktail	<i>Enicurus immaculatus</i>
18	Kalo Titra	*	Black francolin	<i>Francolinus francolinus</i>
19	Luinche		Jungle fawl	<i>Gallus gallus</i>
20	Toriganda	*	White crested laughingthrush	<i>Garrulax leucolophus</i>
21		*	Long-tailed Sibia	<i>Heterophasia picaoides</i>
22	Bhadrayu	*	Long-tailed Shrike	<i>Lanius schach</i>
23	Kotero	*	Scaly-breasted Munia	<i>Lonchura sps.</i>
24	Chhirbire Matikore	*	Crested kingfisher	<i>Megaceryle lugubris</i>
25	Nyauli	*	Blue-eared barbet	<i>Megalaima australis</i>
26	Kuturke	*	Goldenthroated barbet	<i>Megalaima franklinii</i>
27	Chil	*	Black Kite	<i>Milvus migrans</i>
28	Kalchoda	*	Blue whistling thrush	<i>Myophonus caeruleus</i>
29	Seto Gidha		Egyptian vulture	Neophron Percnopterus
30	Sunchari		Golden Oriole	Oriolus oriolus
31	Vangero	*	House Sparrow	<i>Passer domesticus</i>
32	Jungali Vagero		Tree sparrow	Passer montanus
33	Mujur		Indian peafowl	<i>Pavo cristatus</i>
34	Rani chari		Scarlet minivet	<i>Pericrocotus flammeus</i>
35	Kalo Jalewa		Great Cormorant	<i>Phalacrocorax carbo</i>
36	Fisto		Leaf warbler	Phylloscopus schwarzi
37	Thulo Kathfora	*	Greyheaded woodpecker	<i>Picus canus</i>
38	Seto Jalewa		Great-crested Gerbe	<i>Podiceps cristatus</i>
39	Suga	*	Rose ringed parakeet	<i>Psittacula krameri</i>
40	Kalo Jureli	*	Red Vented Bulbul	<i>Pycnonotus cafer</i>
41	Khairo Jureli	*	Himalayan bulbul	<i>Pycnonotus leucogenys</i>
42		*	White-throated Fantail	<i>Rhipidura albicollis</i>
43		*	Common stonechat	S. toquata
44	Tame Dhukur	*	Spotted dove	<i>Streptopelia chinensis</i>
45	Kalo Gidha		Black vulture	Torgos calvus
46	Haleso	*	Yellowfooted greenp pigeon	<i>Treron phoenicoptera</i>
47	Fafare Chara		Hoopoe	<i>Upupa epops</i>
48	Lampuchhre	*	Redbilled Blue Magpi	<i>Urocissa erythrorynca</i>
49	Hutityau		Grey-headed lapwing	<i>Vanellus duvaucelii</i>

### c) Herpetofauna

The key informants and the local community reported a total of 17 herpetofauna species from the reservoir area. Of the total reported 5 of the species are observed by the field study team. Details of the herpetofauna species and their habitat types are presented in the table below.

S.N.	Consultation	observation	Common name	Scientific Name
1	Tiris Sarpa			<i>Amphisema stolata</i>
2	Khasre Vyaguto	*	Toad	<i>Bufo melanostictus</i>
3	Chheparo		Callotes	<i>Calotes versicolor</i>
4	Uduwa Sarpa		Flying snake	<i>Chrysopelia paradise</i>



S.N.	Consultation	observation	Common name	Scientific Name
5	Batasay Sarpa			<i>Dendrolethis tristis</i>
6	Pate Girgiti		Forest agma	<i>Japalura tricarnata</i>
7	Goraya Sarpa			<i>Lycodon aulicus</i>
8	Valemungro	*		<i>Mabuia carinata</i>
9	Sepe Sarpa		Cobra	<i>Naja naja</i>
10	Pani Sarpa	*		<i>Natrix piscator</i>
11	Dhamil Sarpa	*	Rat snake	<i>Ptyas mucosus</i>
12	Paha (Pahenlo pate)		Bull frog	<i>Rana carrasus</i>
13	Vyaguto	*	Frog	<i>Rana tigrina</i>
14	Hariyokano Sarpa		Green pit viper	<i>Trimeresurus albolabris</i>
15	Sun Gohoro		Yellow Monitor	<i>Varanus bengalensis</i>
16	Gohoro		Monitor lizard	<i>Varanus sps</i>
17	Chichinde Sarpa			<i>Xenochrophis sps</i>

#### 4.2 Habitat Type in the Reservoir Area

The wildlife habitat of the reservoir area has the following characteristics.

- Mostly the forests are sparsely distributed and open type.
- Frequently the site covered forests are fragmented by human settlements and cultivation.
- Some community forest are so called virgin like Airawati community forest of Hamsapur and Naumure which are dense
- As said public some forests (Jabune and Bangesal area) are permanent habitat of Peacock (*Pavo cristatus*) and Spotted Deer (*Axis axis*) is controversial.

#### 4.3 Migratory Corridor

The area is seasonally used as feeding habitat by the wildlife of the area and is not reported to be a migratory corridor and shows following characteristics.

- Wild Boar in winter comes to feed in the lower valley floor
- Jalewa (jall hans) comes in winter (January to late April) for feeding every year.
- Peacock basically seems to be migratory for summer (July to October) feeding as well as breeding
- Bengal tiger (*Panthera tigris*) is said to occasionally visits the valley side forest of the reservoir site from the Terai forest of the south.

#### 4.4 Wild Animals of Conservation Significance

The reported wildlife of the candidate project site are cross checked with the protected wildlife lists of the government of Nepal, IUCN red book and the CITES Appendices. The lists of the wildlife which fall in the protection category of the government of Nepal, IUCN red book and the CITES Appendices are presented in the sections below.

##### a) Mammal

Of the reported species of mammal, 9 of the species are listed under the protection category of either government of Nepal or IUCN red list or under CITES Appendices. Of the recorded species 2 are listed under government of Nepal protection list, 6 under IUCN red list and 6 under CITES Appendices. Table below presents the species and thier protection category under various protection lists.

S.N.	Local Name	Common Name	Scientific Name	Status			Sources		
				IUCN	CITES	GON	Site survey	Hearing survey	Literature survey
1	Jackal	Golden Jackal	<i>Canis aureus</i>		III			Hearing at Danbang, Argha, Jaluke	
2	Nyauri Muso	Common mongoose	<i>Herpetes edwardsi</i>		III	P	Confirmed at site		
3	Bhede Bagh	Hyena	<i>Hyena hyena</i>	NT				Hearing at Danbang, Argha, Jaluke	
4	Pakha Ott	Common otter	<i>Lutra lutra</i>	NT	I			Hearing at Danbang, Argha, Jaluke	
5	Pani Ot	Smooth coated otter	<i>Lutra perspicillata</i>	VU				Hearing at Danbang, Argha, Jaluke	
6	Kalgada Bandar	Assam Macaque	<i>Macaca assamensis</i>	NT		P		Hearing at Danbang, Argha, Jaluke	
7	Ghoral	Goral	<i>Naemorhed goral</i>	NT	I			Hearing at Danbang, Argha, Jaluke	
8	Chituwa	Common leopard	<i>Panthera pardus</i>	NT	I			Hearing at Danbang, Argha, Jaluke	
9	Phyauro	Bengal fox	<i>Vulpus bengalensis</i>		III			Hearing at Danbang, Argha, Jaluke	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I - Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## b) Birds

Of the recorded avian species 3 are listed under the protection category of government of Nepal, IUCN red list and in the CITES Appendices. Table below presents the details of the protected species and the protection category as per the government of Nepal and CITES Appendices.

S.N.	Local Name	Common Name	Scientific Name	Status			Sources		
				IUCN	CITES	GON	Site survey	Hearing survey	Literature survey
1	Kaliz	Chir pheasant	<i>Catreus wallichii</i>		I	P		Hearing at Danbang, Argha, Jaluke	
2	Kotero	Scaly-breasted Munia	<i>Lonchura sps.</i>		II		Confirmed at site		
3	Seto Gidha	Egyptian vulture	<i>Neophron percnopterus</i>	EN				Hearing at Danbang, Argha, Jaluke	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

**c) Herpetofauna**

Four of the herpetofauna species out of the recorded species are listed as protection category species of CITES Appendices. Table below presents the details of the protection category under various protection lists.

S.N.	Local Name	Common Name	Scientific Name	Status			Sources		
				IUCN	CITES	GON	Site survey	Hearing survey	Literature survey
1	Sepe Sarpa	Cobra	Naja naja		II			Hearing at Danbang, Argha, Jaluke	
2	Sun Gohoro	Yellow Monitor	Varanus bengalensis		II	P		Hearing at Danbang, Argha, Jaluke	
3	Gohoro	Monitor lizard	Varanus sps		II			Hearing at Danbang, Argha, Jaluke	
4	Chichinde Sarpa		Xenochrophis sps		III			Hearing at Danbang, Argha, Jaluke	

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

## 5 FISHERY STUDY

There is scanty information in the fish diversity, fishermen, fish market, and cost of fish in the candidate project site at the central and district level offices. To fill the data gap fish related information was gathered from the field surveys using a checklist. The fish survey is based on the participatory method and key informant survey methods along the influence area of the candidate project. The findings of the field survey are presented in the sections below.

### 5.1 Fishermen and their Occupational /Social/Economic Status and Fish Market, Availability and Cost

Participatory and key informant interviews reported nearly 43 part time fishermen in the limits of the reservoir area. Majority of the fishermen belong to Magar i ethnic group with a low social and economic status among the other communities.

About 50% of the fish caught by the fishermen is sold in the fish market, while rest is consumed by the fishermen family. There are altogether 2 fish markets in the nearby areas. Every day about 2 to 13 kg of fish is sold in each of the fish markets. Average cost of the fish in the market varies between 250 to 300 rupees.

Table below presents the details of information on the fishermen, their fishing status, economic and social status, fish market and availability of fish in the fish market and the average cost of the fish in the different parts of the reservoir area of the candidate project.

**a) Village / Tole:** Devasthan-1, Pyuthan (**Madi Khola**)  
**Name of the respondent:** ISWOR THAPA

**Date:** 26/04/2069 B.S.  
**Age:** 40

#### Fishermen

Presence of fisherman in the village						Yes
If yes no. of fishermen						10
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	0	0	10	Magar	0	0
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	X	Mgar	X	X	Magar	X-

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Nnot enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

#### Fish Market, Fish Availability and Cost

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Devasthan Bazar	Only in winter	13	300Rs/Kg

**b) Village / Tole:** Tiram-4, Simalchour and Thakleni (Madi Khola)

**Date:**

27/04/2069 B.S.

**Name of the respondent:** DAL BAHADUR BOHORA

**Age:**53

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						2+2
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	0	0	4	Magar	0	0
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	X	Magar	X	X	Magar	X

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Nnot enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Devisthan/Simalchour	Occasional	N/A	300 Rs/Kg

**c) Village / Tole:** Kamere-4,Baroula(Madi Khola)

**Date:** 20/04/2069 B.S.

**Name of the respondent:** BHIM BDR RAJKOTI

**Age:** 64

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						7
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	0	0	7	Magar	0	0
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	X	Magar	X	X	Magar	X

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Nnot enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Local village	Occasional	N/A	250Rs/Kg

**d) Village / Tole:** Lamidamar-3,Baroula(Madi Khola)

**Date:** 20/04/2069 B.S.

**Name of the respondent:** PHARSA RAM PULAMI

**Age:** 33

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						11
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	0	0	11	Magar	0	0
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	X	Magar	X	X	Magar	X

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Nnot enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Local village	occasional	N/A	250Rs Fresh And 550 Dry

e) **Village / Tole:** Kalikath-3, Danbang (**Madi Khola**)  
**Name of the respondent:** REM BDR MAGAR

**Date:**20/04/2069 B.S.  
**Age:** 49

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						5
Fishing Type	Occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	0	0	5	Magar	0	0
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	X	Magar	X	X	Magar	X

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Nnot enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Dumai or Badhdanda	Occasionally	N/A	300Rs/Kg

f) **Village / Tole:** Majhi Damar-2,Danbang & Amilchour (**Jhimruk Khola**)  
 20/04/2069 B.S.

**Date:**

**Name of the respondent:** KHUM PRASAD AACHARYA

**Age:** 46

**Fishermen**

Presence of fisherman in the village						Yes
If yes no. of fishermen						2+4=6
Fishing Type	occupational		Part time		Occasional	
	No.	Ethnicity	No.	Ethnicity	No.	Ethnicity
	0	0	6	Sarki, Magar	0	0
Status	Social Status			Economic Status		
	Low*	Medium*	High*	Low	Medium	High
	X	Sarki, Magar	X	X	Sarki, Magar	X

*Low\*=No jobs, No education, Medium\*=Education but no jobs, High\*=Both Education & jobs*

*Low=Nnot enough for hand to mouth, Medium=Fairly enough to hand to mouth, High=Surplus and save or sell*

**Fish Market, Fish Availability and Cost**

Name of the Market /s	Daily availability of the fish in that market		Average cost of fish Rs/Kg
	Daily availability	Amount Kg/day	
Jugena, Arghakhanchi	occasionally	N/A	300 fresh,600 dry

## 5.2 Fishing Season, Fish Catch, and Use of Caught Fish

Fishing in the river is carried out during the pre-monsoon and post monsoon seasons. Normally in the cold winter months (December - February) and monsoon months (June - September) fishing by the local fishermen is a rare activity. On an average daily catch of the fish by the part time fishermen is 1 kg with a maximum of 5 kg. Nearly 50% of the fish caught is sold in the nearby fish market. On an average the part time fishermen earn about 9000 rupees annually. According to the local fishermen the fish population in the candidate project sites is declining over the years due to illegal fishing practices.

The tables below present the details of the fishing season, fish catch, types of fish available, annual income of the fishermen etc. based on the key informant survey in different location of the candidate project sites.

### a) Location: in residence

Date: 26/04/2069 B.S.

Name of the fisherman: Dor Bahadur Yogi Age: 35

Address: Jaspur, Chakchake

Family: 2 parents, 2 children

Fishing detail	Fishing season:	All seasons but rainy season (July – Sep) is difficult			
	Fishing days/week:	6 days/ week			
	Maximum catch/day:	2 kg			
	Minimum catch/day:	1/4 kg			
	Average catch/day:	1 kg			
using way	Consume	At home	-	Average cost	Income last year
		In market	1 Kg	Rs.300/kg	No save

Name of stream: Maddi Khola

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Asala ( <i>Schizothorax progastus</i> ), Khashre ( <i>Barilius bendelisis</i> ), Buduno ( <i>Psilorynchus psudecheneis</i> ), Lohari Buduno ( <i>Gara annandelei</i> )	Buduno ( <i>Psilorynchus psudecheneis</i> ), Lohari Buduna ( <i>Gara annandelei</i> )	*		
		1. Due to increment of the amateur fishermen 2. Use of electric fishing in winter 3. Use of different means of fishing tools		

### b) Location: in the catchment (Madi Khola)

Date: 30/04/2069 B.S.

Name of the fisherman: REM BDR MAGAR

Age: 49

Address: Danbang-3, Kalikath

Fishing detail	Fishing season:	Mostly in all season but less in rainy season Asar-Bhadra			
	Fishing days/week:	4 days/ week			
	Maximum catch/day:	5 kg			
	Minimum catch/day:	1/2 kg			
	Average catch/day:	1 kg			
using way	All consumed	At home	Part	Average cost	Income last year
		In market	1 Kg	300 Rs/Kg	Rs. ~9000

Name of stream: Salma Khola

Name of fish	Found in abundance	Trend of fish availability		
		Decreasing	Same as before	Increasing
Masino ( <i>Schizothorax progastus</i> ), Khasre ( <i>Barilius bendelisis</i> ), Buduno ( <i>Psilorynchus psudecheneis</i> ), Panpa ( <i>Acrossocheilus hexagonolepis</i> ), Dhami ( <i>Glyptothorax alaknandi</i> )	Buduno ( <i>Psilorynchus psudecheneis</i> ) Khasre ( <i>Barilius bendelisis</i> )	*		
		1. Increase in number of fisherman 2. Use of different tools for fishing		

### 5.3 Fish Diversity

A total of 16 fish species is reported by the local fishermen during the key informant survey. The lists of the fish species reported in the candidate project site is presented in the table below.

S.N.	Local Name	Common Name	Scientific Name
1	Panpa	Copper Mahaseer	<i>Acrossocheilus hexagonolepis</i>
2	Tilouro		<i>Barilius barna</i>
3	Kharcho		<i>Barilius bendelisis</i>
4	Baghi		<i>Botia lohachata</i>
5	Lohari Buduno		<i>Garra annandelei</i>
6	Dhami		<i>Glyptothorax alaknandi</i>
7	Gardi		<i>Labeo dyochailus</i>
8	Naoor		<i>Lebio dero</i>
9	Rim (Bam)		<i>Mastacembalus armatus / punctatus</i>
10	Tite		<i>Psilorhynchus pseudechenensis</i>
11	Buduno	Stone Carp	<i>Psilorynchus psudecheneis</i>
12	Kande Sidre		<i>Puntius sarana</i>
13	Chepto		<i>Puntius ticto</i>
14	Masino	Point nosed snow trout	<i>Schizothorax progastus</i>
15	Sahar		<i>Tor tor</i>
16	Nakata		

### 5.4 List of Fish Species of Conservation Significance

Of the 16 reported fish species 2 of the fish species are listed in the IUCN red list. Table below presents the list of the fish species of conservation significance.

S.N.	Local Name	Common Name	Scientific Name	Status		
				IUCN	CITES	GOV
1	Panpa	Copper Mahaseer	<i>Acrossocheilus hexagonolepis</i>	NT		
2	Sahar		<i>Tor tor</i>	NT		

**IUCN Red List Categories:** Extinct (EX), Extinct In the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)

**GOV Categories:** P Protected by legislation

**CITES Categories:** I -Appendix I (are species that are threatened with extinction and are or may be affected by trade), II - Appendix II (are species that are not necessarily threatened with extinction, but may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with the survival of the species in the wild), and III - Appendix III (are species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species)

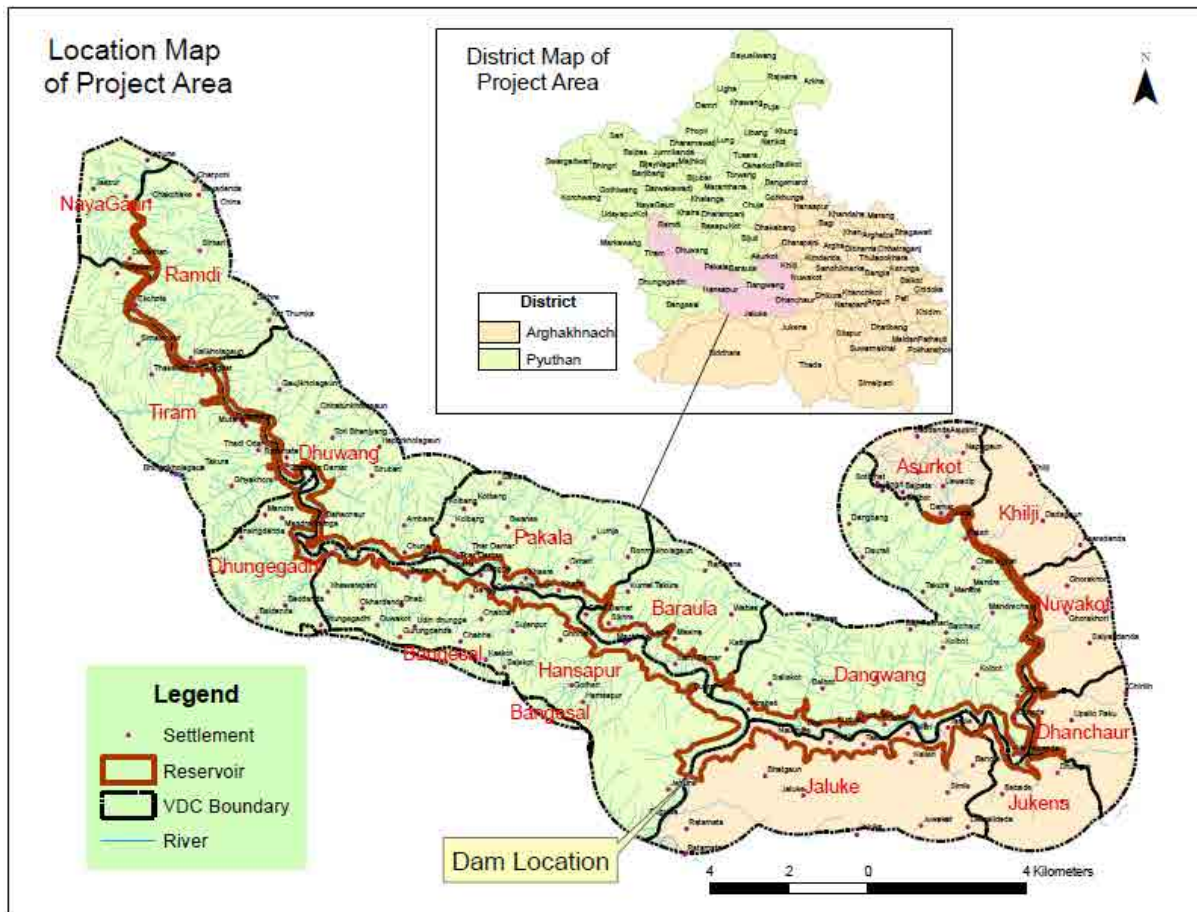


## 5.5 Name of the Fishermen Collected During the Survey

S.N.	NAME	ADDRESS
1	Dor Bdr Yogi	Chakchake, Jaspur
2	Shyam Bdr Yogi	Chakchake, Jaspur
3	Purna Bdr Thapa	Chakchake, Jaspur
4	Lal Bdr Pun Magar	Chakchake, Jaspur
5	Kaman Shing Haujali Magar	Chakchake, Jaspur
6	Khim Bdr Thapa Magar	Chakchake, Jaspur
7	Tek Bdr Thapa Magar	Simalchour, Tiram
8	Pam Bdr Thapa Magar	Simalchour, Tiram
9	Sintha Bdr Thapa	Thakleni, Tiram
10	Lok Bdr Thapa Magar	Thakleni, Tiram
11	Dil Bdr Magar	Kamere, Baroula
12	Krishna Bdr Magar	Kalikath, Danbang
13	Iswor Bdr Magar	Kalikath, Danbang
14	Kul Bdr Magar	Kalikath, Danbang
15	Ram Bdr Magar	Kalikath, Danbang
15	Nar Bdr Magar	Kalikath, Danbang
16	Dhobilal Aale Magar	Amilchour,

## 6 Topographic Map and Satellite Imagery Study

### 6.1 Project Location



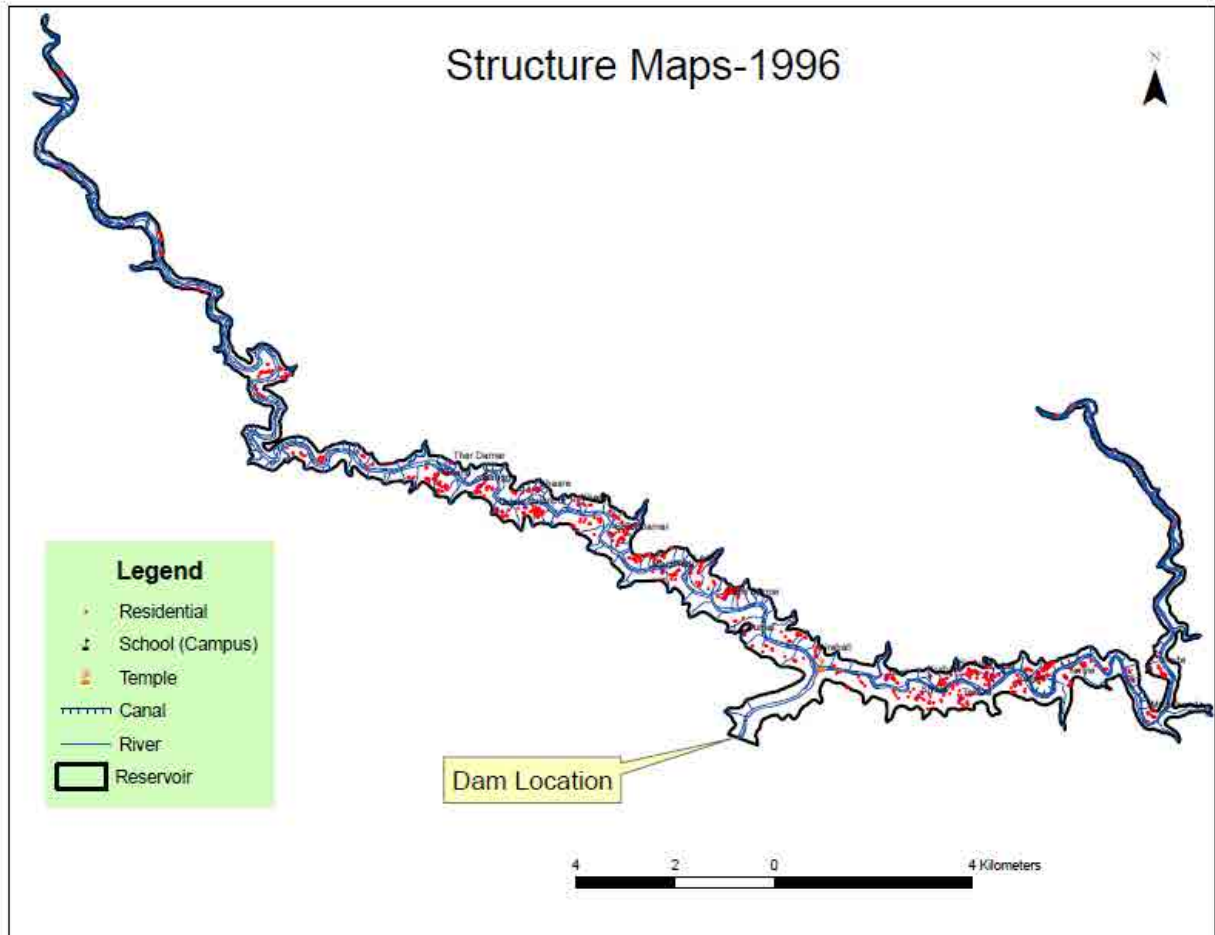
### 6.2 Topographic Maps

For this study, topographical maps of the scale of 1:25000 prepared by the Government of Nepal, Survey Department (1996) has been used for the analysis of land cover, and built structures, after digitizing. All data used for the topographic map study were projected to the Universal Transverse Mercator (UTM) projection system that is World Geodetic System 1984 for the analysis of topographic maps.

The analysis results are presented in the table and maps below.

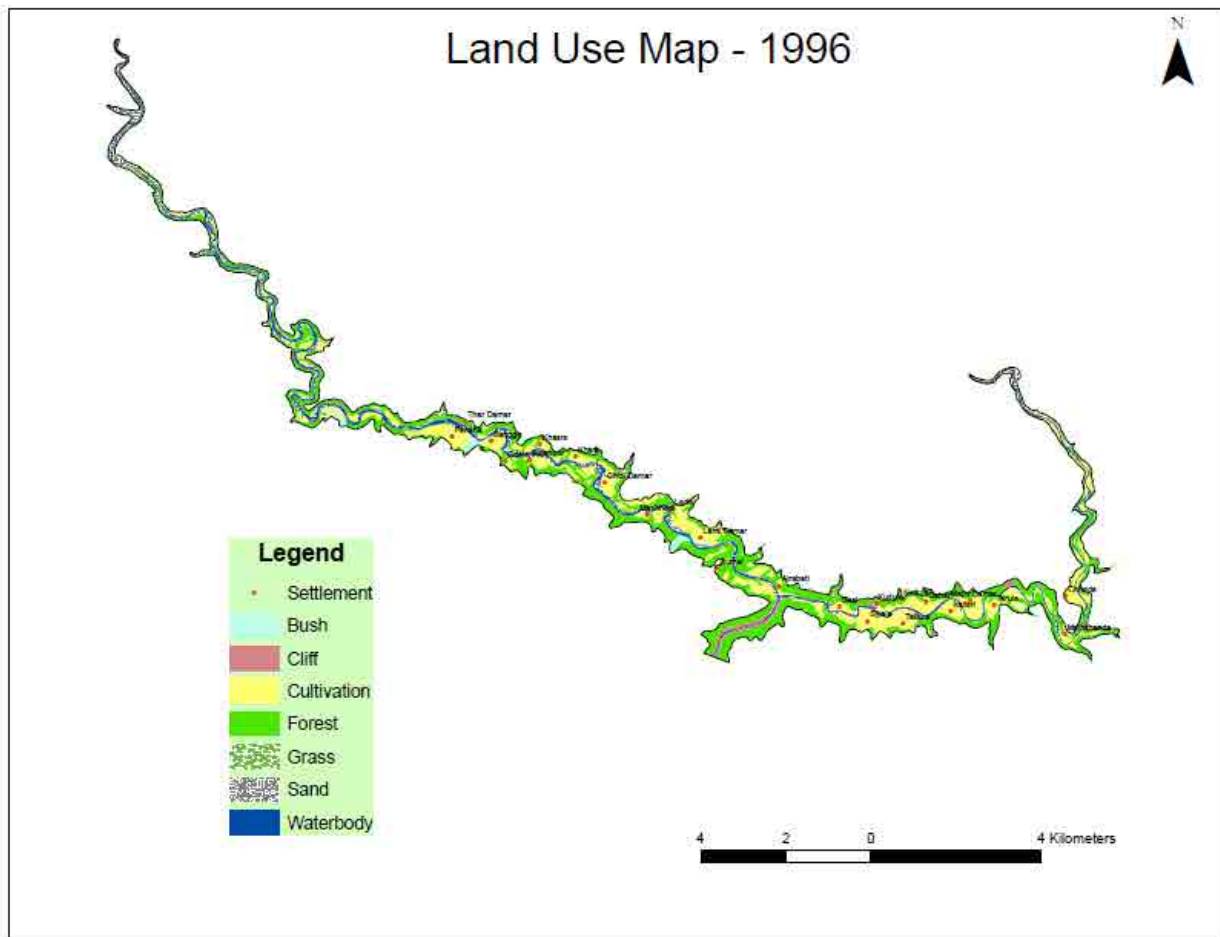
### 6.2.1 Built Structures

Nos. of building as per the Topographic maps	607
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### 6.2.2 Land Use

S.N	Land Use Class	Land Use Topographic Maps (1996), Km <sup>2</sup>	Percentage
1	FOREST	9.128107	46
2	BUSH	0.340341	1.7154
3	SAND	2.131569	10.7438
4	CULTIVATED	6.112702	30.81
5	CLIFF	0.237607	1.1976
6	WATER	1.886937	9.5108
7	GRASS LAND	0.002954	0.0149
8	BARREN LAND		
	<b>TOTAL</b>	<b>19.84</b>	<b>100</b>



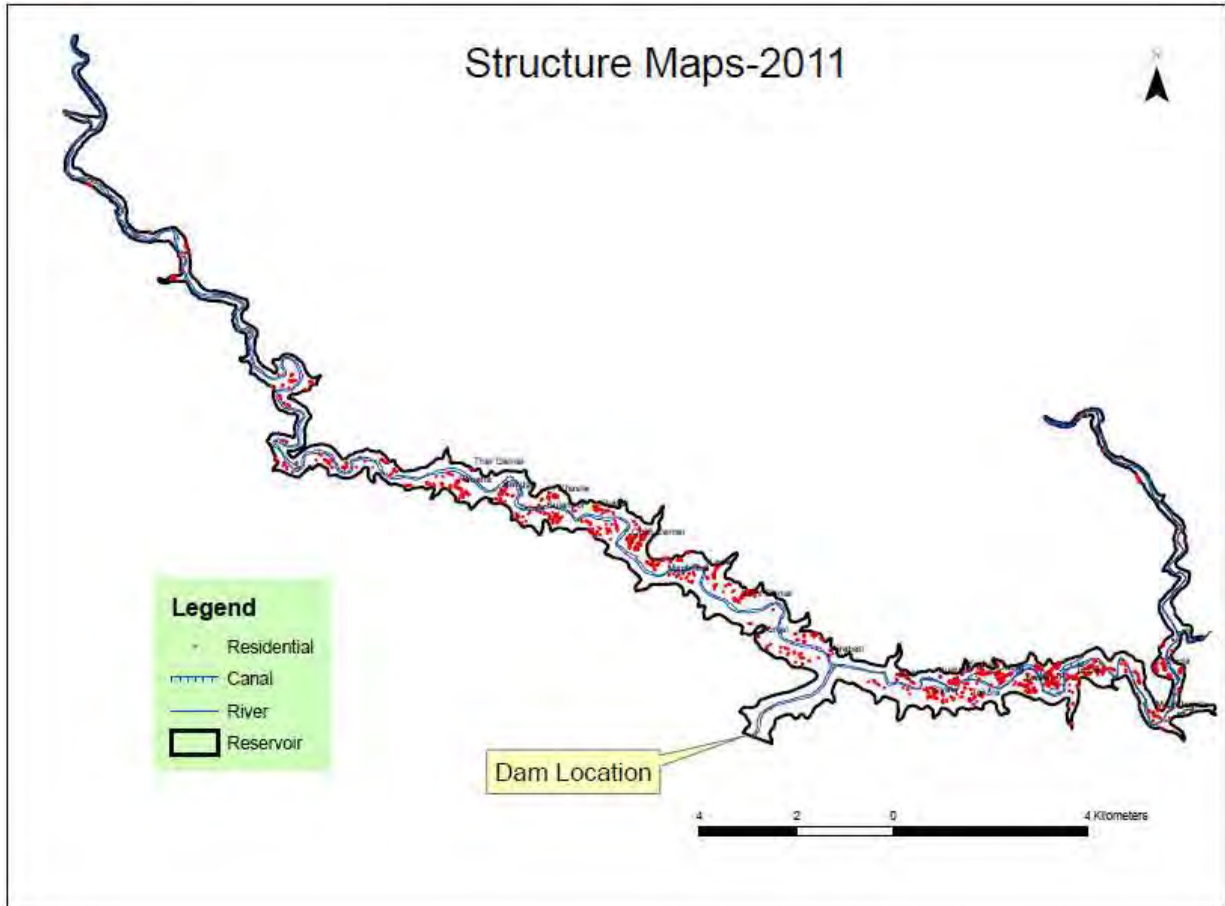
### 6.3 Satellite Image Maps

The Arc GIS 9.3 has been used for the analysis of image. Quickbird satellite image of 2011 has been used for the land use and other parameters such as built structures, road networks, bridges etc. analysis of the area.

The analysis results are presented in tables and Map below.

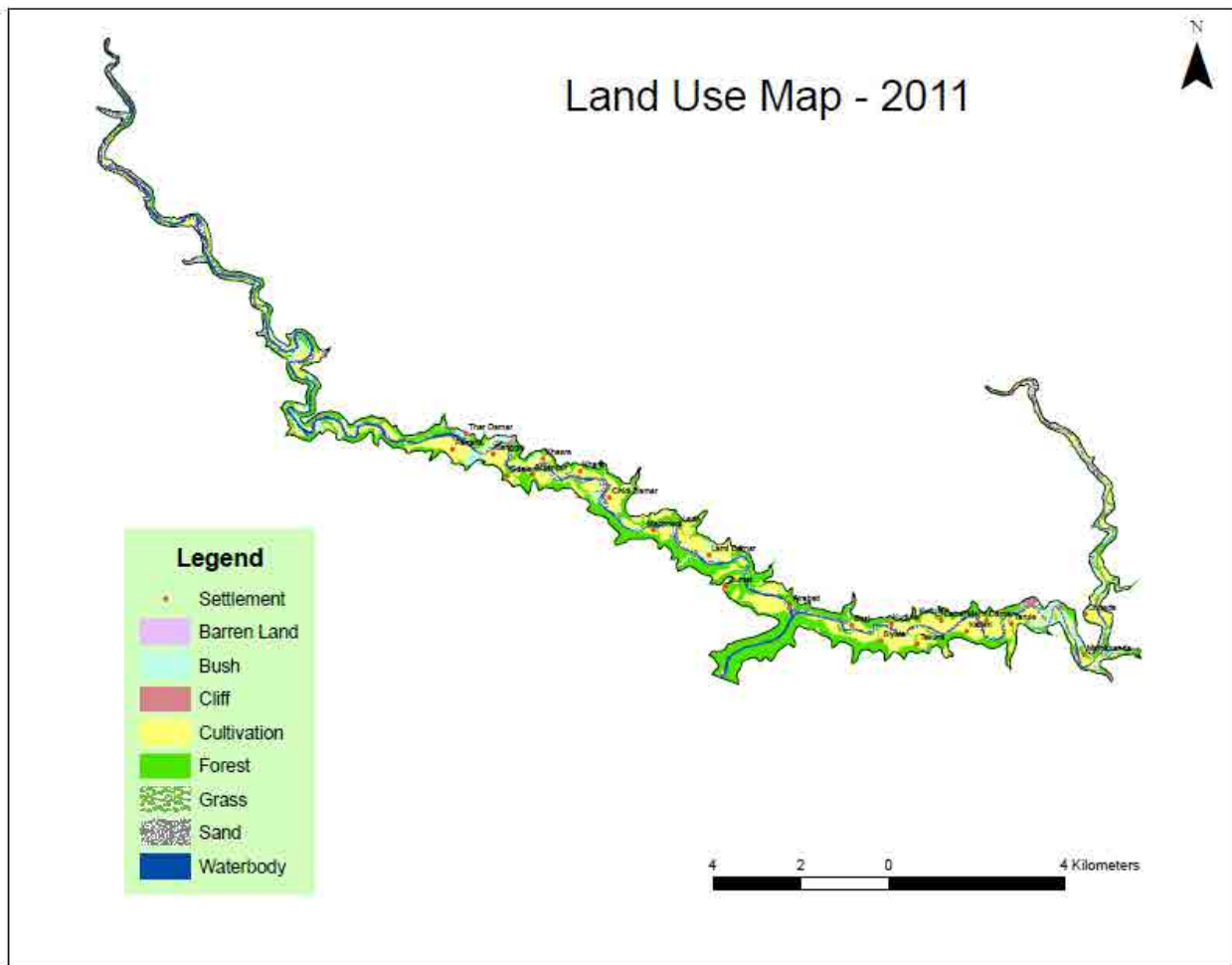
### 6.3.1 Building Structures

Nos. of building as per the Satellite Image	1192
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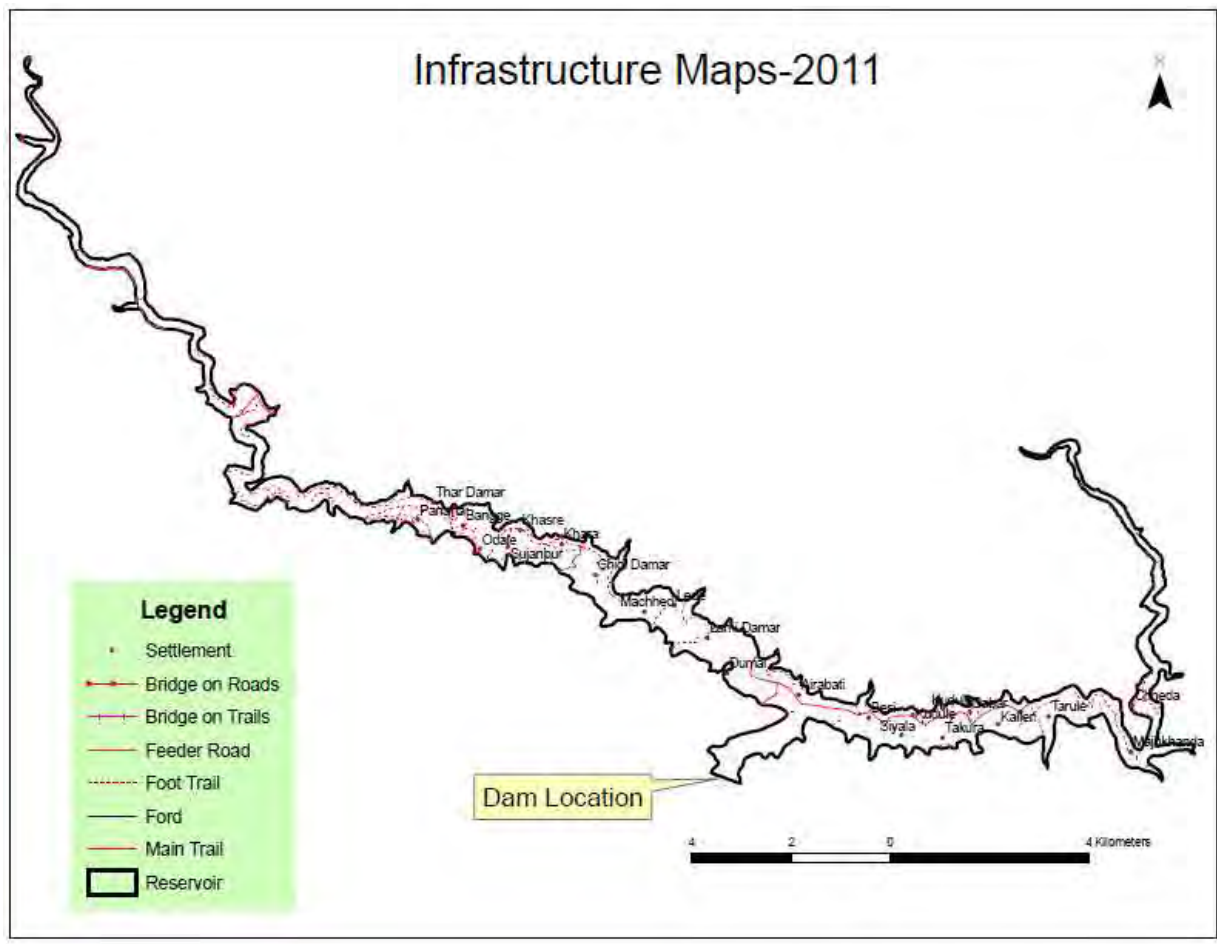
### 6.3.2 Land use

S.N.	Land Use Class	Land Use Satellite Image (2011), Km <sup>2</sup>	Percentage
1	FOREST	7.849894	39.5659
2	BUSH	1.224089	6.1698
3	SAND	2.278145	11.4826
4	CULTIVATED	6.114362	30.8184
5	CLIFF	0.146234	0.7371
6	WATER	1.812296	9.1346
7	GRASS LAND	0.382682	1.9288
8	BARREN LAND	0.031334	0.1579
	<b>TOTAL</b>	<b>19.84</b>	<b>100</b>



### 6.3.3 Infrastructures

Infrastructures	Nos. / Length
Total Nos. of bridge on motorable road	2
Total Nos. of bridge on trail	11
Total Nos of fords	5
Gravel road (m)	1830
Paved road (highway) (m)	0
Main trail (m)	9759
Foot path (m)	50515



## References

1. Bibhuti Ranjan Jha, 2006; *Fish Ecological Studies and its application in assessing Ecological Integrity of Rivers in Nepal*; Thesis Submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in The Department of Biological Sciences and Environmental Science, School of Science, Kathmandu University, Dhulikhel, Nepal, January 2006
2. CBS (2002), *Population Census 2001, National Report*, Kathmandu: Central Bureau of Statistics / UNFPA
3. CBS, 2012; *National Population and Housing Census 2011 (Village Development Committee / Municipalities)*, Government of Nepal, National Planning Commission Secretariate, Central Bureau of Statistics, Kathmandu, Nepal, November 2012.
4. Disaster Preparedness Network, Nepal, 2009; *Nepal Disaster Report: The hazardscape and vulnerabilities*, Ministry of Home Affairs, Nepal Disaster Preparedness Network, Nepal with support from with support from European Commission for Humanitarian Aid Department, United Nations Development Nepal and Oxfam Nepal
5. IUCN, 2011; *The Status of Nepal's Mammals: The National Red List Series*
6. NARMSAP, 2002; *Forest and Vegetation Types of Nepal*, TISC Document Series No 105, GoN / MOFSC / NARMSAP, 1-179.
7. Petr, T, 2002; *Cold water fish and fisheries in countries of the high mountain arc of Asia (Hindu Kush-Pamir-Karakoram-Himalayas) A review*, Symposium on coldwater fish species in the trans-Himalayan region. 10-14 July 2001. Kathmandu, Nepal
8. Rajbansi K.J, 1982; *A General Bibliography on Fish and Fisheries of Nepal*, Royal Nepal Academy, Kamaladi, Kathmandu, Nepal.
9. Rajbansi K.J, 2002; *Zoogeographical distribution and the status of cold water fishes of Nepal*. Paper presented in symposium on coldwater fish species in the trans-himalayan region. 10-14 July 2001, Kathmandu, Nepal
10. Shrestha et.al, 2012; *Fishes of Nepal: Mapping distributions based on voucher specimens*, Emporia State Research Studies Vol. 48, no. 2, p. 14-21 (2012)
11. Shrestha, J. (1995); *Enumeration of the Fishes of Nepal*, Bio-diversity Profiles Project, Publication No. 10, Department of National Parks and wildlife Conservation, Ministry of Forest & Soil Conservation, GoN, Kathmandu, Nepal.
12. Shrestha, T. K., 2008; *Icology of Nepal A study of Fishes of the Himalayan Waters*
13. Stainton, J.D.A., 1972; *Forests of Nepal*, John Murray, London.



## Photographs



Childrens collecting the dry leaves of chiuri



Extraction of oil from chiuri (Diploknema Butyracea)



Foddercollectio for cattle



Discussions with locals at Chidi Damar



Grinding seeds of Chiuri



House type at Chheun Kamere



Knitting and sewing training at Dhuban,Pyuthan



Local woman depends on forest for firewood (Ekchote, Pyuthan)

# Appendixes

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**Appendix 1: Districts, VDCS and Settlements and Population under the Storage Project, Rolpa**

S.N.	District	VDC	Settlement	Ward No.	HH	Population
1	Arghakhanchi	Jaluke	Tarule (Chyaun khola)	9	5	46
2			Kalleri (Amilye Chaur)	8	15	110
3			Takura	7	2	19
4			Siyala (Tallo and upallo Siyala)	7	33	245
5			Hadye	7	18	90
6			Satighat	7	7	47
7			Timale	7	7	34
8			Naumure (Tallo Naumure)	2	4	25
9	Pyuthan	Dangwang	Majhi Damar	2	28	180
10			Dabar	4	64	415
11			Kudule	4	19	160
12			Besi (Sallikot Besi)	3	24	170
13			Kalikath	3	16	85
14		Hansapur	Dumai	1	24	185
15			Bange Besi (Tallo Bange)	6	16	144
16			Panaha	7	20	152
17			Tallo Baike	9	8	62
18		Baraula	Lami Damar	3	26	170
19			Lede	3	5	45
20			Khal Kamere	4	7	45
21			Chheun Kamere	4	10	82
22			Chidi Damar	4	26	190
23		Pakala	Naughat	8	4	23
24			Khara	7	19	140
25			Khasre	7	19	143
26			Mitha bagar	7	3	28
27		Dhuwang	Bokse	7	5	40
28			Chokte	7	1	11
29			Lami Khewa	7	3	22
30		Dhungegadhi	Kudule	5	15	130
31			Sajanpur	5	3	30
<b>Total</b>	<b>2</b>	<b>7</b>	<b>31</b>		<b>456</b>	<b>3268</b>

Source: NESS Field Survey, 2012

**Appendix 2: Ethnic / Caste Group of Population by Reservoir area Settlements**

S.N	District	VDC	Settlement	Brahmin	Chhetri	Magar (DJ)	Gurung (DJ)	Dalit
1	Arghakhanchi	Jaluke	Tarule(chyaun khola)	2	1	2		0
2			Kalleri (Amilye Chaur)	0	0	15		0
3			Takura	0	0	2		0
4			Siyala (Tallo and upallo Siyala)	6	0	24		3
5			Hadye	0	0	18		0
6			Satighat	3	0	4		0
7			Timale	0	0	7		0
8			Naumure(Tallo Naumure)	0	0	4		0
9	Pyuthan	Dangwang	Majhi Damar	22	0	0		6
10			Dabar	17	0	35	2	10
11			Kudule	5	0	14		0
12			Besi (Sallikot Besi)	0	0	19		5
13			Kalikath	0	0	12	3	1
14		Hansapur	Dumai	1	0	21		2
15			Bange Besi (Tallo Bange)	0	0	16		0
16			Panaha	0	2	18		0
17			Tallo Baike	0	0	8		0
18		Baraula	Lami Damar	0	0	26		0
19			Lede	2	0	2	1	0
20			Khal Kamere	1	0	5		1
21			Chheun Kamere	0	0	7	1	2
22			Chidi Damar	1	3	15	2	5
23		Pakala	Naughat	3	0	0	1	0
24			Khara	0	0	19	0	0
25			Khasre	0	1	18		0
26			Mitha bagar	0	0	3		0
27		Dhuwang	Bokse	0	0	5		0
28			Chokte	0	0	1		0
29			Lami Khewa	0	0	3		0
30		Dhungegadhi	Kudule	0	0	15		0
31			Sajanpur	0	0	3		0
<b>Total</b>	<b>2</b>	<b>7</b>	<b>31</b>	<b>63</b>	<b>7</b>	<b>341</b>	<b>10</b>	<b>35</b>

DJ= Disadvantaged Janjati; Source: NESS Field Survey, 2012

**Appendix 3: Land Use Pattern in the Reservoir Area**

S.N.	District	VDC	Settlement	Agriculture	Pasture	Forest	Other (Karbari)	Total
1	Arghakhanchi	Jaluke	Tarule(chyaun khola)	43	0	0	6	49
2			Kalleri (Amilye Chaur)	100	0	0	0	100
3			Takura	59	10	0	27	96
4			Siyala (Tallo and upallo Siyala)	450	50	0	100	600
5			Hadye	175	0	0	100	275
6			Satighat	100	0	0	35	135
7			Timale	175	0	0	20	195
8			Naumure(Tallo Naumure)	61	0	0	0	61
9	Pyuthan	Dangwang	Majhi Damar	175	50	0	130	355
10			Dabar	363	0	0	125	488
11			Kudule	200	0	0	100	300
12			Besi (Sallikot Besi)	115	0	0	65	180
13			Kalikath	115	0	0	55	170
14		Hansapur	Dumai	350	0	0	140	490
15			Bange Besi (Tallo Bange)	350	0	0	20	370
16			Panaha	1100	0	0	0	1100
17			Tallo Baike	78	30	0	13	121
18		Baraula	Lami Damar	650	0	0	0	650
19			Lede	86	0	0	35	121
20			Khal Kamere	150	0	0	30	180
21			Chheun Kamere	100	0	0	100	200
22			Chidi Damar	450	100	0	40	590
23		Pakala	Naughat	35	0	0	0	35
24			Khara	250	50	0	0	300
25			Khasre	190	0	0	0	190
26			Mitha bagar	100	0	0	0	100
27		Dhuwang	Bokse	65	0	0	0	65
28			Chokte	23	0	0	0	23
29			Lami Khewa	42	0	0	0	42
30		Dhungegadhi	Kudule	150	0	0	0	150
31			Sajanpur	25	0	0	0	25
<b>Total</b>	<b>2</b>	<b>7</b>	<b>31</b>	<b>6325</b>	<b>290</b>	<b>0</b>	<b>1141</b>	<b>7756</b>
<b>%</b>				<b>81.55</b>	<b>3.74</b>	<b>0.00</b>	<b>14.71</b>	<b>100</b>

Source: NESS Field Survey, 2012

**Appendix 4: Land Holding Size by Settlements of the Reservoir Area**

S.N.	District	VDC	Settlement	khet	Bari	kharbari	Total
1	Arghakhanchi	Jaluke	Tarule(chyaun khola)	41	2	6	49
2			Kalleri (Amilye Chaur)	44	56	0	100
3			Takura	38	21	27	86
4			Siyala (Tallo and upallo Siyala)	250	200	100	550
5			Hadye	75	100	100	275
6			Satighat	100	0	35	135
7			Timale	100	75	20	195
8			Naumure(Tallo Naumure)	0	61	0	61
9	Pyuthan	Dangwang	Majhi Damar	120	55	130	305
10			Dabar	363	0	125	488
11			Kudule	200	0	100	300
12			Besi (Sallikot Besi)	115	0	65	180
13			Kalikath	115	0	55	170
14		Hansapur	Dumai	100	250	140	490
15			Bange Besi (Tallo Bange)	200	150	20	370
16			Panaha	725	375	0	1100
17			Tallo Baike	65	13	13	91
18		Baraula	Lami Damar	400	250	0	650
19			Lede	80	6	35	121
20			Khal Kamere	150	0	30	180
21			Chheun Kamere	100	0	100	200
22			Chidi Damar	450	0	40	490
23		Pakala	Naughat	35	0	0	35
24			Khara	250	0	0	250
25			Khasre	190	0	0	190
26			Mitha bagar	100	0	0	100
27		Dhuwang	Bokse	0	65	0	65
28			Chokte	0	23	0	23
29			Lami Khewa	42	0	0	42
30		Dhungegadhi	Kudule	0	150	0	150
31			Sajanpur	25	0	0	25
<b>Total</b>	<b>2</b>	<b>7</b>	<b>31</b>	<b>4473</b>	<b>1852</b>	<b>1141</b>	<b>7466</b>
<b>%</b>				<b>59.91</b>	<b>24.81</b>	<b>15.28</b>	<b>100</b>

Source: NESS Field Survey, 2012

**Appendix 5: Area under different Crops (Ropani) and Production under different Crops (Muri)**
**Table 1: Area under different Crops (Ropani)**

S.N.	District / VDC	Settlement	Area (ropani)							
			Paddy	Maize	Millet	Wheat	Potato	Pulse	Oilseed	
1	<b>A. Arghakhan chi / Jaluke</b>	Tarule (chyaun khola)	41	25	0	41	5	0	0	
2		Kalleri (Amilye Chaur)	44	56	22	0	0	22	22	
3		Takura	38	25	0	48	0	5	5	
4		Siyala (Tallo and upallo Siyala)	250	200	0	150	0	0	100	
5		Hadye	75	100	0	100	0	0	50	
6		Satighat	100	0	0	0	0	0	0	
7		Timale	100	75	0	75	0	0	0	
8		Naumure (Tallo Naumure)	0	61	0	61	0	0	0	
9	<b>B. Pyuthan Dangwang</b>	Majhi Damar	120	150	20	120	0	30	0	
10		Dabar	240	240	0	240	60	0	0	
11		Kudule	200	100	0	200	0	20	0	
12		Besi (Sallikot Besi)	115	0	0	115	0	0	0	
13		Kalikath	115	115	0	115	0	0	0	
14		Hansapur	Dumai	100	200	0	250	0	0	0
15		Bange Besi (Tallo Bange)	200	190	0	350	0	0	0	
16		Panaha		725	375	0	375	0	0	0
17		Tallo Baike		65	78	0	78	0	0	0
18		Baraula	Lami Damar	400	500	200	500	0	100	200
19		Lede	80	86	0	86	0	0	0	
20		Khal Kamere	150	150	0	150	0	0	0	
21		Chheun Kamere	100	100	0	100	0	30	0	
22		Chidi Damar	450	350	0	350	0	0	0	
23	Pakala	Naughat	35	35	0	35	0	0	0	
24		Khara	250	250	0	250	0	0	0	
25		Khasre	190	190	0	190	0	0	0	
26		Mitha bagar	100	100	0	100	0	0	0	
27	Dhuwang	Bokse	0	65	0	65	0	0	0	
28		Chokte	0	23	0	23	0	0	0	
29		Lami Khewa	42	42	0	43	0	0	0	
30	Dhungegadh i	Kudule	0	150	0	150	0	30	0	
31		Sajanpur	25	25	0	25	0	0	0	
<b>Total</b>			<b>4350</b>	<b>4056</b>	<b>242</b>	<b>4385</b>	<b>65</b>	<b>237</b>	<b>377</b>	

Source: NESS Field Survey, 2012

**Table 2: Production under different Crops (Muri)**

S.N.	District / VDC	Settlement	Production (Muri)							
			Paddy	Maize	Millet	Wheat	Potato	Pulse	Oilseed	
1	<b>A. Arghakhan chi / Jaluke</b>	Tarule (chyaun khola)	150	75	0	41	20	0	0	
2		Kalleri (Amilye Chaur)	250	150	30	0	0	8	15	
3		Takura	80	25	0	70	0	3	3	
4		Siyala (Tallo and upallo Siyala)	750	400	0	100	0	0	50	
5		Hadye	225	100	0	75	0	0	25	
6		Satighat	300	0	0	0	0	0	0	
7		Timale	300	100	0	75	0	0		
8		Naumure (Tallo Naumure)	0	90	0	100	0	0	0	
9	<b>B. Pyuthan Dangwang</b>	Majhi Damar	480	300	30	180	0	15		
10		Dabar	1200	480	0	360	3750	0	0	
11		Kudule	1000	200	0	300	0	30	0	
12		Besi (Sallikot Besi)	460	0	0	100	0	0	0	
13		Kalikath	230	175	0	115	0	0	0	
14		Hansapur	Dumai	200	300	0	300	0	0	0
15		Bange Besi (Tallo Bange)	600	570	0	1050	0	0	0	
16		Panaha		4400	1125	0	190	0	0	0
17			Tallo Baike	325	78	0	78	0	0	0
18		Baraula	Lami Damar	1600	1000	400	1000	0	50	200
19		Lede	320	215	0	172	0	0	0	
20		Khal Kamere	450	300	0	150	0	0	0	
21		Chheun Kamere	500	250	0	250	0	15	0	
22		Chidi Damar	1800	700	0	700	0	0	0	
23	Pakala	Naughat	140	105	0	105	0	0	0	
24		Khara	500	625	0	200	0	0	0	
25		Khasre	750	400	0	190	0	0	0	
26		Mitha bagar	300	200	0	150	0	0	0	
27	Dhuwang	Bokse	0	100	0	90	0	0	0	
28		Chokte	0	25	0	20	0	0	0	
29		Lami Khewa	126	84	0	50	0	0	0	
30	Dhungegadh i	Kudule	0	300	0	300	0	20	0	
31		Sajanpur	50	40	0	40	0	0	0	
<b>Total</b>			<b>17486</b>	<b>8512</b>	<b>460</b>	<b>6551</b>	<b>3770</b>	<b>141</b>	<b>293</b>	

Source: NESS Field Survey, 2012



**Appendix 6: Sale of Agricultural Produces**

Price N	District / VDC	Settlement	Sale Detail					Price (Rs.)	place of sale
			Paddy	Maize	Wheat	Potato			
1	<b>A. Arghakhan chi / Jaluke</b>	Tarule (chyaun khola)	25	10		1 quintal	Paddy: 1000/Muri, Maize: 1500/Muri, Potato: 2000/quintal	With in the village and near bye villages.	
2		Kalleri (Amilye Chaur)					0	0	
3		Takura					0	0	
4		Siyala (Tallo and upallo Siyala)					0	0	
5		Hadye					0	0	
6		Satighat					0	0	
7		Timale					0	0	
8		Naumure (Tallo Naumure)					0	0	
9	<b>B. Pyuthan Dangwang</b>	Majhi Damar	50	15	10		Paddy: 1000/Muri, Maize: 1600/Muri, Wheat: 1000/Muri)	With in the village.	
10		Dabar	100	25	30		Paddy: 1000/Muri, Maize: 1600/Muri, Wheat: 1000/Muri)	With in the village.	
11		Kudule	100	40	25		Paddy: 1000/Muri, Maize: 1600/Muri, Wheat: 1000/Muri)	With in the village.	
12		Besi (Sallikot Besi)					0	0	
13		Kalikath					0	0	
14	Hansapur	Dumai					0	0	
15		Bange Besi (Tallo Bange)					0	0	
16	Panaha		200				Paddy: 1000/Muri	With in Village	
17		Tallo Baike					0	0	
18	Baraula	Lami Damar	200	100	100		Paddy: 1000/Muri, Maize: 1600/Muri, Wheat: 1000/Muri)	With in the village.	
19		Lede					0	0	
20		Khal Kamere	50				Paddy: 1000/Muri	With in the village.	
21		Chheun Kamere					0	0	

Price N	District / VDC	Settlement	Sale Detail					Price (Rs.)	place of sale
			Paddy	Maize	Wheat	Potato			
22		Chidi Damar	200	100	100		Paddy: 1000/Muri, Maize: 1600/Muri, Wheat: 1000/Muri)	With in the village.	
23	Pakala	Naughat					0	0	
24		Khara					0	0	
25		Khasre					0	0	
26		Mitha bagar					0	0	
27	Dhuwang	Bokse					0	0	
28		Chokte					0	0	
29		Lami Khewa					0	0	
30	Dhungegadhi	Kudule					0	0	
31		Sajanpur					0	0	
	<b>Total</b>		<b>925</b>	<b>290</b>	<b>265</b>	<b>1 quintal</b>			

Source: NESS Field Survey, 2012

**Appendix 7: Occupation of the Reservoir Area Population**

S.N.	District / VDC	Settlement	Occupation			
			Agriculture	Service	Wage labor	Foreign employment
1	<b>A.</b> Arghakhanchi/ Jaluke	Tarule (chyaun khola)	12	0	0	6 (India)
2		Kalleri (Amilye Chaur)	45	0	0	22 (20 India and 2 Malaysia)
3		Takura	13	0	0	2 (India)
4		Siyala (Tallo and upallo Siyala)	190	1 (male)	0	15 (12 India), 2 Qatar and 1 Malaysia)
5		Hadye	45	1 (male)	0	10 (8 India, 1 Dubai and 1 Qatar)
6		Satighat	28	0	0	3 (India), 1 (Malaysia)
7		Timale	20	0	0	3 (India)
8		Naumure (Tallo Naumure)	15 (Almost all)	0	0	4 (India)
9	<b>B.</b> Pyuthan Dangwang	Majhi Damar	100	4 (3 male, 1 female)	50 (as a part time task)	5 (India), 1 (Malaysia)
10		Dabar	350 (Almost all except children, old and disable)	4 (male)	25 people as a part time job	15 (10 India, 5 (Malaysia)
11		Kudule	120 (Almost all capable people)	0	0	13 (12 India, 1 Dubai)
12		Besi (Sallikot Besi)	130	0	0	11 (10 India, 1 Dubai)
13		Kalikath	40 (Almost all)	0	0	10 (India) 1 (Malyasia)
14	Hansapur	Dumai	120	2 (Male)	0	12 (10 India, 2 Saudi Arab)
15		Bange Besi (Tallo Bange)	90	2 (Male)	0	10 (6 India, 1 Qatar, 2 Malyasia, 1 Dubai)
16	Panaha		100	2 (Male)	0	14 (10 India, 2 Qatar, 2 Saudi Arab)
17		Tallo Baike	35	0	0	12
18	Baraula	Lami Damar	100	0	0	30 (India)
19		Lede	25	0	0	3 (India)
20		Khal Kamere	25	0	0	2 ( India)
21		Chheun Kamere	55	1	0	1 (India)
22		Chidi Damar	125	0	0	20 (India)
23	Pakala	Naughat	13	2	0	0
24		Khara	90	0	0	10 (3 India, 3 Malaysia, 3 Dubai)
25		Khasre	95	1 (male)	0	10 (5 India, 3 Malaysia, 2 Saudi)
26		Mitha bagar	15	0	0	2 (India)
27	Dhuwang	Bokse	25	0	0	2 (India)
28		Chokte	8	0	0	0
29		Lami Khewa	13	0	0	6 (India)
30	Dhungegadhi	Kudule	95	0	0	9 (6 India, 3 Malaysia)
31		Sajanpur	20		0	0
	<b>Total</b>		<b>1049</b>	<b>17</b>	<b>75</b>	<b>259</b>
	<b>%</b>		<b>74.93</b>	<b>1.21</b>	<b>5.36</b>	<b>18.50</b>

Source: NESS Field Survey, 2012

**Appendix 8: House Type**

S.N.	District / VDC	Settlement	House Types	
			Kacchi	Pakki
1	<b>A. Arghakhanchi/ Jaluke</b>	Tarule (chyaun khola)	5 (4 Houses having Roof with khar, wall with wood and mud and 1 House having Roof with khar, wall with stone and mud)	0
2		Kalleri (Amilye Chaur)	12 (House having Roof with khar, wall with stone and mud)	3 (House having roof with tin and wall with mud and stone).
3		Takura	0	4 ( 2 house having roof with tin and wall with mud and stone and remaining 2 with roof tin and wall with cement and stone)
4		Siyala (Tallo and upallo Siyala)	30 (House having Roof with khar, wall with stone and mud)	3 (House having roof with tin and wall with mud and stone).
5		Hadye	16 (House having Roof with khar, wall with stone and mud)	2 (House having roof with tin and wall with mud and stone)
6		Satighat	6 (House having Roof with khar, wall with stone and mud)	1 (House having roof with tin and wall with mud and stone)
7		Timale	7 (House having Roof with khar, wall with stone and mud)	0
8		Naumure (Tallo Naumure)	4 (House having Roof with khar, wall with stone and mud)	0
9	<b>B. Pyuthan Dangwang</b>	Majhi Damar	17 (House having Roof with khar, wall with stone and mud)	11 (House having roof with tin and wall with mud and stone)
10		Dabar	56 (House having Roof with khar, wall with stone and mud)	8 (House having roof with tin and wall with mud and stone)
11		Kudule	18 (House having Roof with khar, wall with stone and mud)	1 (House having roof with tin and wall with mud and stone)
12		Besi (Sallikot Besi)	21 (House having Roof with khar, wall with stone and mud)	3(House having roof with tin and wall with mud and stone)
13		Kalikath	14 (House having Roof with khar, wall with stone and mud)	2 (House having roof with tin and wall with mud and stone)
14	Hansapur	Dumai	16 (House having Roof with khar, wall with stone and mud)	5(House having roof with tin and wall with Cement stone), 3 HHs( Tayal, mud and stone)
15		Bange Besi (Tallo Bange)	7 (House having Roof with khar, wall with stone and mud)	9 (6House having roof with tin and wall with Cement stone), 3 HHs( Tayal, mud and stone)
16	Panaha		7 (House having Roof with khar, wall with stone and mud)	13 (5House having roof with tin and wall with Cement stone),8 HHs (Tayal, mud and stone)
17		Tallo Baike	5 (House having Roof with khar, wall with stone and mud)	3 (1House having roof with tin and wall with Cement stone), 2 HHs (roof with tin, mud and stone)
18	Baraula	Lami Damar	23 (House having Roof with khar, wall with stone and mud)	3 (1House having roof with tin and wall with mud and stone, 2 HHs with Tayal, mud and stone)
19		Lede	4 (House having Roof with khar, wall with stone and mud)	1 (House having roof with tayel and wall with Cement,stone)
20		Khal Kamere	7 (House having Roof with khar, wall with stone and mud)	0

S.N.	District / VDC	Settlement	House Types	
			Kacchi	Pakki
21		Chheun Kamere	6 (House having Roof with khar, wall with stone and mud)	1 (House having roof with tayel and wall with stone, wood and mud)
22		Chidi Damar	20 (House having Roof with khar, wall with stone and mud)	6 (4 House having roof with tin and wall with mud and stone, 2 HHs with Tayal, mud and stone)
23	Pakala	Naughtat	4 (House having Roof with khar, wall with stone and mud)	0
24		Khara	14 (House having Roof with khar, wall with stone and mud)	5 (1House having roof with tin and wall with mud and stone, 4 HHs with Tayal, mud and stone)
25		Khasre	15 (House having Roof with khar, wall with stone and mud)	4 (2House having roof with tin and wall with mud and stone, 2 HHs with Tayal, mud and stone)
26		Mitha bagar	2 (House having Roof with khar, wall with stone and mud)	1 (House having Roof with tin, wall with stone and mud)
27	Dhuwang	Bokse	5 (House having Roof with khar, wall with stone and mud)	0
28		Chokte	1 (House having Roof with khar, wall with stone and mud)	0
29		Lami Khewa	2 (House having Roof with khar, wall with stone and mud)	1 (House having roof with tin and wall with mud and stone)
30	Dhungegadhi	Kudule	15 (House having Roof with khar, wall with stone and mud)	0
31		Sajanpur	3 (House having Roof with khar, wall with stone and mud)	0
	<b>Total</b>		<b>352</b>	<b>90</b>
	<b>%</b>		<b>79.64</b>	<b>20.36</b>

Source: NESS Field Survey, 2012

**Appendix 9: Road and Suspension Bridge**

S.N.	District / VDC	Settlement	Road Detail			Suspension Bridge
			Type	Length	Name of road	
1	<b>A.</b> Arghakhanchi / Jaluke	Tarule (chyaun khola)	kachhi	About 200m in the submergence area	Sana Dhungre, Tarule sadak khanda	Majhi Damar chyaun khola suspension Bridge
2		Kalleri (Amilye Chaur)	0	0	0	0
3		Takura	kachhi	About 200m road section.	Sana Dhungre, Takura sadak khanda	0
4		Siyala (Tallo and upallo Siyala)	kachhi	About 500m	Deurali, Diruwati road section	0
5		Hadye	kachhi	About 500m throughout the village	Deurali, Diruwati road section	0
6		Satighat	0	0	Deurali, Diruwati road section	Bridge joining Dabar and Satighat village.
7		Timale	kachhi	Passes through the village area and covers about 500 area of the viillage.	Thada, Airabati road Section	0
8		Naumure (Tallo Naumure)		0	0	0
9	<b>B.</b> Pyuthan Dangwang	Majhi Damar	kachhi	200 with in the territory of the village	Thada, Majhi Damar road Section	Majhi Damar chyaun khola suspension Bridge
10		Dabar	0	0	0	Dabar, Satighat suspension Bridge
11		Kudule	0	0	0	0
12		Besi (Sallikot Besi)	0	0	0	0
13		Kalikath	0	0	0	Dumai kalikath suspension bridge
14	Hansapur	Dumai	kachhi	about 500m	Badhdanda Airabati road section	Dumai kalikath suspension bridge
15		Bange Besi (Tallo Bange)	0	0	0	Mitha bagar Suspension bridge
16	Panaha		kachhi	about 300m	Badhdanda Panaha road section	Mitha bagar Suspension bridge
17		Tallo Baike	0	0	0	0
18	Baraula	Lami Damar	0	0	0	0
19		Lede	0	0	0	0
20		Khal Kamere	0	0	0	0
21		Chheun Kamere	0	0	0	0
22		Chidi Damar	kachhi	About 150	Badhdanda Chidi Damar road section	Naughat bridge

S.N.	District / VDC	Settlement	Road Detail			Suspension Bridge
			Type	Length	Name of road	
23	Pakala	Naughat	kachhi	About 150	Badhdanda Chidi Damar road section	Naughat bridge
24		Khara	0	0	0	0
25		Khasre	0	0	0	0
26		Mitha bagar	0	0	0	0
27	Dhuwang	Bokse	0	0	0	0
28		Chokte		0	0	0
29		Lami Khewa	0	0	0	0
30	Dhungega dhi	Kudule	0	0	0	0
31		Sajanpur	0	0	0	Majhi Damar chyaun khola suspension Bridge
	<b>Total</b>			3.4 km		11

Source: NESS Field Survey, 2012

## Appendix 10: Irrigation Infrastructures in the Reservoir Area

S.N.	District/ VDC	Settlement	Irrigation Scheme and Command Area		
			Name of the scheme	Command Area (Ropani)	Remarks
1	<b>A.</b> Arghak hanchi / Jaluke	Kalleri (Amilye Chaur)	Amilye Chaur Irrigation Project	300	Covers about 1.5 km distance from Agricultural Land to source
2		Siyala (Tallo and upallo Siyala)	Satighat Irrigation project	150	
3		Hadye	0		
4		Satighat	Satighat Irrigation project	100	
5	<b>B.</b> Pyuthan Dangwa ng	Majhi Damar	Dabar Irrigation Project	120	covers about 3 km from the source (Chhachhare)
6		Dabar	Dabar Irrigation Project	300	it is at the distance of 4.5 km from the source and covers about 1.5 km in the village territory and is utilized for
7		Kudule	Dabar Irrigation Project	100	
8		Besi (Sallikot Besi)	Dabar Irrigation Project	115	
9		Kalikath	Traditional Canal	115	
10	Hansapu r	Dumai	Traditional Canal	100	
11		Bange Besi (Tallo Bange)	Bhalu khola Irrigation Project	200	
12		Panaha	Traditional Canal	725	
13		Tallo Baike	Traditional Canal	65	
14	Baraula	Lami Damar	Ghaksye Khola Irrigation Project	400	
15		Lede	Traditional Canal	80	Traditional canals (Bansari canal for 35 Ropanies Lede canal for 45 Ropanies)
16		Khal Kamere	Khal khola Irrigation Scheme	150	
17		Chheun Kamere	Traditional Canal	100	
18		Chidi Damar	Traditional Canal (locally funded).	450	
19	Pakala	Naughat	Traditional Canal	35	
20		Khara	Traditional Canal	250	
21		Khasre	Traditional Canal	190	
22		Mitha bagar	Traditional Canal	100	
23	Dhuwan g	Lami Khewa	Traditional Canal	42	
24	Dhunge gadhi	Kudule	Traditional Canal	150	
	<b>Total</b>	<b>24</b>	<b>25</b>	<b>3887</b>	

Source: NESS Field Survey, 2012



**Appendix 11: Settlements having Drinking Water Scheme**

S.N.	District/ VDC	Settlement	Name of scheme	Number Taps
1	<b>B. Pyuthan Dangwang</b>	Majhi Damar	West Nepal Rural drinking water, Community forest promotion Program	14
2		Dabar	Dabar Rural Drinking water Scheme	11
3		Kudule	West Nepal Rural drinking water	5
4		Besi (Sallikot Besi)	West Nepal Rural drinking water	5
5		Kalikath	West Nepal Rural drinking water	6
6	Hansapur	Dumai	Scheme from Poverty Eradication program	7
7		Bange Besi (Tallo Bange)	Purne Khola drinking water Scheme (West Nepal Rural drinking water)	6
8	Panaha		Bud khola drinking water scheme ( Nepal Khane pani sangstha) , Behorye Khola drinking water scheme (West Nepal Rural drinking water)	12
9		Tallo Baike	Baike rural drinking water and Sanitation Scheme (West Nepal Rural drinking water)	2
10	Baraula	Lami Damar	Nepal Khane pani sangstha	5
11		Lede	Nepal Khane pani sangstha	2
12		Khal Kamere	West Nepal Rural drinking water	3
13		Chheun Kamere	Sikhri khola drinking water Scheme (Nepal Khane pani sangsthan)	3
14		Chidi Damar	Gela muhan drinking water Scheme (Nepal Khane pani sangsthan)	7
15	Pakala	Naughat	Adauti khola drinking water Scheme	1
16	Dhuwang	Bokse	Bokse drinking water scheme (Poverty eradication program)	2
17		Lami Khewa	Hapur Khola drinking water Scheme (Poverty eradication)	1
<b>Total</b>	<b>1/6</b>	<b>16</b>	<b>17</b>	<b>92</b>

Source: NESS Field Survey, 2012

**Appendix 12: Community Forests, Wetland / Recreation centre**

S.N.	District/ VDC	Settlement	Description	
			Community Forestry	Wetland /Recreation centre
1	B. Pyuthan Dangwang	Majhi Damar	Dobata Community Forest	0
2		Dabar	Dobata Community Forest	0
3		Besi (Sallikot Bes)	Airabati Dangbang community forest	Airabati temple is treated as holy place and people from different VDCs of the district visit this place as the place of recreation
4		Kalikath	Airabati Community Forest	Airabati temple is treated as holy place and people from different VDCs of the district visit this place as the place of recreation
5	Hansapur	Dumai	Chama Community forest	0
6		Bange Besi (Tallo Bange)	Rani Aap Community forest	0
7	Panaha		Soli ghopte paiwa gaira Community forest	0
8		Tallo Baike	Bahakhor Community forest, Tarye Bhir Community forest	0
9	Baraula	Lami Damar	Baha Pokhari community forest and Sath talye Community forest	
10		Lede	Sath talye Community forest	0
11		Khal Kamere	Kutmeri Community forest	0
12		Chheun Kamere	Daha Pokhari Community forest	0
13		Chidi Damar	Bhitri Khola Community forest	0
14	Pakala	Naughat	Khara Community forest	0
15		Khara	Ramche Community forest	0
16		Mitha bagar	Madane Community forest	0
17	Dhuwang	Bokse	Madane Community forest	0
18		Chokte	Madane Community forest	0
19		Lami Khewa	Kharda Community forest	0
		<b>Total</b>	<b>21</b>	<b>2</b>

Source: NESS Field Survey, 2012

## Appendix 13: Culture, Festivals and Religious Places

S.N.	District/ VDC	Settlement	Detail of the Culture and Festivals			Cremation Ghat
			Main festival	Any festivals of Janajatis	Religious site at the river	
1	<b>A.Arghak hanchi/ Jaluke</b>	Tarule(chyaun khola)	Dashain, Tihar, Teej, Maghe sankranti, Saune Sankranti.	No such special one but Magars of locality specially celebrate Saune sankranti	No such site	Below the Suspension Bridge on the left bank of the Jhimruk river called "Chyaun khola ghat"
2		Kalleri (Amilye Chaur)	Dashain, tihar,teej,maghe sankranti	No any	No such site	They dont have such ghats but they take dead body either to Chyaun khola ghat or to Airabati.
3		Takura	Dashain, tihar,teej,maghe sankranti	No any	No such site	They dont have such ghats but they take dead body either to Chyaun khola ghat or to Airabati.
4		Siyala (Tallo and upallo Siyala)	Dashain, tihar,teej,maghe sankranti,Chaite Dashain	No any	Bhumi Than Temple (lies in middle of the viillage)	No Cremation ghats, they take dead body to Airabati
5		Hadye	Dashain, tihar,teej,maghe sankranti,Chaite Dashain	No any	No such site	No Cremation ghats, they take dead body to Airabati
6		Satighat	Dashain, tihar,teej,maghe sankranti,Chaite Dashain	No any	No such site	No Cremation ghats, they take dead body to Airabati
7		Timale	Dashain, tihar,teej,maghe sankranti,Chaite Dashain	No any	No such site	No Cremation ghats, they take dead body to Airabati
8		Naumure(Tall o Naumure)	Dashain, tihar,teej,maghe sankranti	No any	Airabati temple	Airabati ghat
9	<b>B. Pyuthan Dangwang</b>	Majhi Damar	Dashain,Tihar, Teej	No any	No such site	Shadane Ghat
10		Dabar	Dashain, tihar,teej,maghe sankranti	No any, all Brahmin and janajati celebrate same sort of festivals	Bhumi temple on the right bank of the Jhimruk khola	No Cremation ghats, they take dead body to Airabati
11		Kudule	Dashain, Tihar,Teej,Maghe sankranti, Saune Sankranti.	No any	0	No Cremation ghats, they take dead body to Airabati
12		Besi (Sallikot Bes)	Dashain, tihar,teej,maghe sankranti	No any	0	No Cremation ghats, they take dead body to Airabati
13		Kalikath	Dashain, tihar,teej,maghe	No any	Airabati temple	Airabati ghat

S.N.	District/ VDC	Settlement	Detail of the Culture and Festivals			Cremation Ghat
			Main festival	Any festivals of Janajatis	Religious site at the river	
			sankranti			
14	Hansapur	Dumai	Dashain, tihar,teej,maghe sankranti	No any	Airabati temple	Airabati ghat
15		Bange Besi (Tallo Bange)	Dashain, tihar,teej,maghe sankranti	No any	No such site	No ghat
16	Panaha		Dashain, tihar,teej,maghe sankranti	No any	No such site	No ghat
17		Tallo Baike	Dashain, tihar,teej,maghe sankranti	No any	No such site	No ghat
18	Baraula	Lami Damar	Dashain, tihar,teej,maghe sankranti	No any	No such site	No Cremation ghats, they take dead body to Airabati
19		Lede	Dashain, tihar,teej,maghe sankranti	No any	No such site	Barra ghat
20		Khal Kamere	Dashain, tihar,teej,maghe sankranti	No any	No such site	No Cremation ghats, they take dead body to Airabati
21		Chheun Kamere	Dashain, tihar,teej,maghe sankranti	No any	No such site	No Cremation ghats, they take dead body to Naughat.
22		Chidi Damar	Dashain and Tihar only	No any	No such site	Rolna khola dobhan (Naughat)
23	Pakala	Naughat	Dashain, tihar,teej,maghe sankranti	No any	No such site	Naughat
24		Khara	Dashain, tihar,teej,maghe sankranti	No any	No such site	Adwaiti Dumai Ghat
25		Khasre	Dashain, tihar,teej,maghe sankranti	No any	No such site	Khanye ghat
26		Mitha bagar	Dashain, tihar,teej,maghe sankranti	No any	No such site	No ghat
27	Dhuwang	Bokse	Dashain, tihar,teej,maghe sankranti	No any	No such site	No ghat
28		Chokte	Dashain, tihar,teej,maghe sankranti	No any	No such site	No ghat
29		Lami Khewa	Dashain, tihar,teej,maghe sankranti	No any	No such site	No ghat
30	Dhungegad hi	Kudule	Dashain, tihar,teej,maghe sankranti	No any	No such site	Chidyar ghat
31		Sajanpur	Dashain, tihar,teej,maghe sankranti	No any	No such site	No ghat
	<b>Total</b>					<b>8</b>

Source: NESS Field Survey, 2012

**Appendix 14: Perception of the Community on the Proposed Project**

S.N.	District	VDC	Settlement	Positive impact	Negative impact
1	Arghakhanchi	Jaluke	Tarule(chyaun khola)	We don't think of any positive impact because our land and House hold will be submerged and	Project will directly affect our livelihood, we don't have alternative to these Agricultural land.
2	Arghakhanchi	Jaluke	Kalleri (Amilye Chaur)	Project may be beneficial for the development work especially on the sector of electricity.	Our Agricultural land will be submerged and will become landless.
3	Arghakhanchi	Jaluke	Takura	No such benefit to us.	We will become homeless.
4	Arghakhanchi	Jaluke	Siyala (Tallo and upallo Siyala)	We are not directly benefited	Ropanies of Agricultural land will be submerged
5	Arghakhanchi	Jaluke	Hadye	No such benefit to us.	We will become homeless and landless
6	Arghakhanchi	Jaluke	Satighat	No Positive impact at all	problem will be created if our land will be submerged
7	Arghakhanchi	Jaluke	Timale	Helpful for the development of the country in the sector of electricity	problem will be created if our land will be submerged
8	Arghakhanchi	Jaluke	Naumure(Tallo Naumure)	No such benefit to us.	We will become homeless and landless
9	Pyuthan	Dangwang	Majhi Damar	No such benefit to us.	We will become homeless and landless
10	Pyuthan	Dangwang	Dabar	No such benefit to us.	We will become homeless and landless
11	Pyuthan	Dangwang	Kudule	No such benefit to us.	We will become homeless and landless
12	Pyuthan	Dangwang	Besi (Sallikot Besi)	Beneficial in term of country development perspective	We will become homeless and landless
13	Pyuthan	Dangwang	Kalikath	significant for the development and we may get job opportunity	We will become homeless and landless
14	Pyuthan	Hansapur	Dumai	Beneficial in term of country development perspective in the sector of electricity	Our Agricultural land will be submerged and will become landless.
15	Pyuthan	Hansapur	Bange Besi (Tallo Bange)	No benefit to Villagers	Our Agricultural land will be submerged and will become landless.
16	Pyuthan	Hansapur	Panaha	No benefit to Villagers	Our Agricultural land will be submerged and will become landless.
17	Pyuthan	Hansapur	Tallo Baikhe	may create good job opportunity	we will become home and landless

S.N.	District	VDC	Settlement	Positive impact	Negative impact
18	Pyuthan	Baraula	Lami Damar	Beneficial in term of country development perspective in the sector of electricity	Our Agricultural land will be submerged and will become landless.
19	Pyuthan	Baraula	Lede	Beneficial in term of country development perspective in the sector of electricity	Our Agricultural land will be submerged and will become landless.
20	Pyuthan	Baraula	Khal Kamere	Not at all	Our Agricultural land will be submerged and will become landless.
21	Pyuthan	Baraula	Chheun Kamere	Not at all	land will be submerged
22	Pyuthan	Baraula	Chidi Damar	Beneficial in term of country development perspective in the sector of electricity	Our Agricultural land will be submerged and will become landless.
23	Pyuthan	Pakala	Naughat	Not at all	We will become homeless and landless
24	Pyuthan	Pakala	Khara	No benefit to Villagers	land and houses will be submerged
25	Pyuthan	Pakala	Khasre	No benefit to Villagers	land and houses will be submerged
26	Pyuthan	Pakala	Mitha bagar	No benefit to Villagers	land and houses will be submerged
27	Pyuthan	Dhuwang	Bokse	No benefit to Villagers	land and houses will be submerged
28	Pyuthan	Dhuwang	Chokte	No benefit to Villagers	land and houses will be submerged
29	Pyuthan	Dhuwang	Lami Khewa	No benefit to Villagers	land and houses will be submerged
30	Pyuthan	Dhungegadhi	Kudule	No benefit to Villagers	land and houses will be submerged
31	Pyuthan	Dhungegadhi	Sajanpur	No benefit to Villagers	land and houses will be submerged

Source: NESS Field Survey, 2012

**Appendix 15: Occurrence of Disaster in the Reservoir Area**

S.N.	District	VDC	Settlement	type	occurrence	magnitude of damage
1	Arghakhanchi	Jaluke	Tarule(chyaun khola)	Non	Non	Non
2	Arghakhanchi	Jaluke	Kalleri (Amilye Chaur)	Non	Non	Non
3	Arghakhanchi	Jaluke	Takura	Non	Non	Non
4	Arghakhanchi	Jaluke	Siyala (Tallo and upallo Siyala)	Fire(14 <sup>th</sup> Falgun 2065)	once	5 HHs were destroyed.
5	Arghakhanchi	Jaluke	Hadye	Non	Non	Non
6	Arghakhanchi	Jaluke	Satighat	Non	Non	Non
7	Arghakhanchi	Jaluke	Timale	Non	Non	Non
8	Arghakhanchi	Jaluke	Naumure(Tallo Naumure)	Non	Non	Non
9	Pyuthan	Dangwang	Majhi Damar	Non	Non	Non
10	Pyuthan	Dangwang	Dabar	Small scale landslide before 2 years	once	Destroyed irrigation Canal
11	Pyuthan	Dangwang	Kudule	Non	Non	Non
12	Pyuthan	Dangwang	Besi (Sallikot Besi)	Non	Non	Non
13	Pyuthan	Dangwang	Kalikath	Non	Non	Non
14	Pyuthan	Hansapur	Dumai	Non	Non	Non
15	Pyuthan	Hansapur	Bange Besi (Tallo Bange)	flood in Madi river (2066, Asar 30)	once	flooded and sweep away 30 Ropanies of Agricultural land
16	Pyuthan	Hansapur	Panaha	Non	Non	Non
17	Pyuthan	Hansapur	Tallo Baike	Non	Non	Non
18	Pyuthan	Baraula	Lami Damar	Non	Non	Non
19	Pyuthan	Baraula	Lede	Non	Non	Non
20	Pyuthan	Baraula	Khal Kamere	Non	Non	Non
21	Pyuthan	Baraula	Chheun Kamere	Non	Non	Non
22	Pyuthan	Baraula	Chidi Damar	Non	Non	Non
23	Pyuthan	Pakala	Naughat	Small scale landslide (2065 B.S.)	once	sweep away 4 Ropani of Agricultural land
24	Pyuthan	Pakala	Khara	Non	Non	Non
25	Pyuthan	Pakala	Khasre	Non	Non	Non
26	Pyuthan	Pakala	Mitha bagar	Non	Non	Non
27	Pyuthan	Dhuwang	Bokse	Non	Non	Non
28	Pyuthan	Dhuwang	Chokte	Non	Non	Non
29	Pyuthan	Dhuwang	Lami Khewa	Non	Non	Non
30	Pyuthan	Dhungegadhi	Kudule	Non	Non	Non
31	Pyuthan	Dhungegadhi	Sajanpur	Non	Non	Non

Source: NESS Field Survey, 2012

**Appendix 16: List of FGD Participants (NAUMURE)  
District: Puythan and Argakhanchi**

S.N.	Name of Respondent	Address	Occupation
1.	Prem Bdr. Neupane	Jaluke-9, Chyankhola	Agriculture
2.	Ram Devi Acharya	Jaluke-9, Chyankhola	Agriculture
3.	Bel Kumari Neupane	Jaluke-9, Chyankhola	Agriculture
4.	Dhan Bdr. Kaaha Magar	Jholuke-8, Kalleri (Amilye Chaur)	Agriculture
5.	Ghani Kala Khancha Magar	Jholuke-8, Kalleri (Amilye Chaur)	Agriculture
6.	Manju Gaaha Magar	Jholuke-8, Kalleri (Amilye Chaur)	Agriculture
7.	Tika Gaaha Magar	Jholuke-8, Kalleri (Amilye Chaur)	Agriculture
8.	Sarada Gaaha Magar	Jholuke-8, Kalleri (Amilye Chaur)	Agriculture
9.	Sarada Pun	Jholuke-8, Kalleri (Amilye Chaur)	Agriculture
10.	Aatma Saru	Jaluke-7, Takura	Agriculture
11.	Namakala Saru	Jaluke-7, Takura	Agriculture
12.	Duma Kala Saru	Jaluke-7, Takura	Agriculture
13.	Jog Bdr. Saru	Jaluke-7, Siyala	Agriculture
14.	Gun Bdr. Garoja	Jaluke-7, Siyala	Agriculture
15.	Nima Nanda Acharya	Jaluke-9, Tarule	Teacher
16.	Bhim Bdr. Garaunja	Jaluke-7, Timule	Agriculture
17.	Bhakta Bdr. Garaunja	Jaluke-7, Timule	Agriculture
18.	Lok Bdr. Garaunja	Jaluke-7, Timule	Agriculture
19.	Num Bdr. Garaunja	Jaluke-7, Timule	Agriculture
20.	Hira Bdr. BK	Dangbang-3, Sallika	Agriculture
21.	Num Bdr. BK	Dangbang-3, Sallika	Agriculture
22.	Bir Bdr. Rokaya	Jaluke-2, Tallo Naumure	Agriculture
23.	Rabi Bdr. Baral	Jaluke-2, Tallo Naumure	Agriculture
24.	Yagya Bdr. Baral	Jaluke-2, Tallo Naumure	Agriculture
25.	Muga Rokaya	Jaluke-2, Tallo Naumure	Agriculture
26.	Ruma Baral	Jaluke-2, Tallo Naumure	Agriculture
27.	Sumitra Baral	Jaluke-2, Tallo Naumure	Agriculture
28.	Tara Baral	Jaluke-2, Tallo Naumure	Agriculture
29.	Ruma Rokaya	Jaluke-2, Tallo Naumure	Agriculture
30.	Santa Bdr. Pariyar	Dangawng-2, Majhi Damar	Agriculture
31.	Bhim Bdr. Pariyar	Dangawng-2, Majhi Damar	Agriculture
32.	Shiva hari Pokharel	Dangawng-2, Majhi Damar	Agriculture
33.	Lila Mani Pokharel	Dangawng-2, Majhi Damar	Teacher
34.	Shiva Lal Pokharel	Dangawng-2, Majhi Damar	Agriculture
35.	Manokanta Acharya	Dangawng-2, Majhi Damar	Agriculture
36.	Meghraj Acharya	Dangawng-2, Majhi Damar	Agriculture
37.	Dharti Acharya	Dangawng-2, Majhi Damar	Agriculture
38.	Hemraj Acharya	Dangawng-2, Majhi Damar	Business
39.	Manukanta Acharya	Dangwang-4, Dabar	Agriculture
40.	Mukti Prashad Ahcarya	Dangwang-4, Dabar	Agriculture
41.	Numlal Subedi	Dangwang-4, Dabar	Agriculture
42.	Bishnu Subedi	Dangwang-4, Dabar	Agriculture
43.	Dhurba Acharya	Dangwang-4, Dabar	Agriculture
44.	Bishnu Prashad Adhikari	Dangwang-4, Dabar	Agriculture



S.N.	Name of Respondent	Address	Occupation
45.	Chupa Nidhi Subedi	Dangwang-4, Dabar	Agriculture
46.	Nema Nanda Adhikari	Dangwang-4, Dabar	Agriculture
47.	Jeeblal Adhikari	Dangwang-4, Dabar	Agriculture
48.	Jeet Bdr. Saru Magar	Dangwang-4, Dabar	Agriculture
49.	Jeet Bdr. Tupa Magar	Dangwang-4, Kodule	Agriculture
50.	Sohobir Resmi Magar	Dangwang-4, Kodule	Agriculture
51.	Jhabindra Adhikari	Dangwang-4, Kodule	Agriculture
52.	Om Bdr. Thapa Magar	Dangwang-4, Kodule	Agriculture
53.	Yem Lal Bhandari	Dangwang-4, Kodule	Agriculture
54.	Mum Prashad Adhikari	Dangwang-4, Kodule	Agriculture
55.	Bhim Bdr. Thapa	Dangwang-4, Kodule	Agriculture
56.	Tek Bdr. Saru	Dangwang-4, Kodule	Agriculture
57.	Kamal Prasad Bhandari	Dangwang-4, Kodule	Agriculture
58.	Rudra Bdr. Saru	Dangwang-4, Kodule	Agriculture
59.	Durga Bdr. Thapa	Dangwang-4, Kodule	Agriculture
60.	Dal Bdr. Birkatta Magar	Dangwang-3, Besi	Agriculture
61.	Ran Bdr. Birkatta Magar	Dangwang-3, Besi	Agriculture
62.	Budha Bdr. Nepali	Dangwang-3, Besi	Agriculture
63.	Chandra Bdr. Magar	Dangwang-3, Besi	Agriculture
64.	Lok Bdr. Birkatta Magar	Dangwang-3, Besi	Agriculture
65.	Num Bdr. Nepali	Dangwang-3, Besi	Agriculture
66.	Nara Bdr. Nepali	Dangwang-3, Besi	Agriculture
67.	Santa Gharti Magar	Dangwang-3, Besi	Agriculture
68.	Poop Bdr. Magar	Dangwang-3, Besi	Agriculture
69.	Man Bhd Birkatta Magar	Dangwang-3, Besi	Agriculture
70.	Rukikumari Magar	Dangwang-3, Besi	Agriculture
71.	Lalmata Birkatta Magar	Dangwang-3, Besi	Agriculture
72.	Man Bdr. Gharti Magar	Dangbang-3, Kalikath	Agriculture
73.	Purna Bdr. Gurung	Dangbang-3, Kalikath	Agriculture
74.	Gor Bdr. Rana Magar	Dangbang-3, Kalikath	Agriculture
75.	Kumari Gharti Magar	Dangbang-3, Kalikath	Agriculture
76.	Kul Bdr. Gaaha	Hansapur-1, Dumai	Agriculture
77.	Dumisara Somai	Hansapur-1, Dumai	Agriculture
78.	Guman Sing Sunar	Hansapur-1, Dumai	Agriculture
79.	Tribhuvan Singh Gaaha	Hansapur-1, Dumai	Agriculture
80.	Aitye Bir Darlami	Hansapur-1, Dumai	Agriculture
81.	Lil Bdr. Barbal	Hansapur-1, Dumai	Agriculture
82.	Bam Bdr. Thapa	Hansapur-1, Dumai	Agriculture
83.	Daiba Ram Subedi	Hansapur-1, Dumai	Agriculture
84.	Dani Somai	Hansapur-1, Dumai	Agriculture
85.	Jhabilal Pun Sumai	Hansapur-1, Dumai	Agriculture
86.	Sher Bdr. Sumai	Hansapur-1, Dumai	Agriculture
87.	Heman Bdr. Sumai	Hansapur-1, Dumai	Agriculture
88.	Khum Bdr. Rana Magar	Hasanpur-7, Bange Besi	Agriculture
89.	Hira Bdr. Budhamagar	Hasanpur-7, Bange Besi	Agriculture
90.	Yem Bdr. Ranamgar	Hasanpur-7, Bange Besi	Agriculture

S.N.	Name of Respondent	Address	Occupation
91.	bir Bdr. Ranamagar	Hasanpur-7, Bange Besi	Agriculture
92.	Yubraj Magar	Hasanpur-7, Bange Besi	Agriculture
93.	Deviram Gharti Magar	Hasanpur-7, Bange Besi	Agriculture
94.	Chetan Rana Magar	Hasanpur-7, Bange Besi	Agriculture
95.	Man Bdr. Magar	Hasanpur-7, Bange Besi	Agriculture
96.	Janak Bdr. Pun	Hasanpur-7, Panaha	Agriculture
97.	Bhim Bdr. Rana	Hasanpur-7, Panaha	Agriculture
98.	Om Bdr. Rana	Hasanpur-7, Panaha	Agriculture
99.	Lehem Bdr. Rana	Hasanpur-7, Panaha	Agriculture
100.	Mina Devi Saru	Hasanpur-7, Panaha	Agriculture
101.	Dela Ram Rana	Hasanpur-7, Panaha	Agriculture
102.	Num Bdr. Resmi	Hasapur-9, Tallo Baike	Agriculture
103.	Top Bdr. Marsangi	Hasapur-9, Tallo Baike	Agriculture
104.	Dani Sara Pun	Hasapur-9, Tallo Baike	Agriculture
105.	Hari Kala Thapa	Hasapur-9, Tallo Baike	Agriculture
106.	Kalawati Resmi	Hasapur-9, Tallo Baike	Agriculture
107.	Tulsi Devi Reshmi	Hasapur-9, Tallo Baike	Agriculture
108.	Jibi Sara Resmi	Hasapur-9, Tallo Baike	Agriculture
109.	Farja Bdr. Pulami Magar	Baraula-3, Lami Damar	Agriculture
110.	Khed Bdr. pulami	Baraula-3, Lami Damar	Agriculture
111.	Hira Singh Gharti Magar	Baraula-3, Lami Damar	Agriculture
112.	Lok Bdr. Bakabal Magar	Baraula-3, Lami Damar	Agriculture
113.	Poop Bdr. Gharti Magar	Baraula-3, Lami Damar	Agriculture
114.	Kul Bdr. Pulami Magar	Baraula-3, Lami Damar	Agriculture
115.	Uma Pulami Magar	Baraula-3, Lami Damar	Agriculture
116.	Khem Prasad Panthi	Baraula-3, Lede	Agriculture
117.	Jeeblal Panthi	Baraula-3, Lede	Agriculture
118.	Narayan Panthi	Baraula-3, Lede	Agriculture
119.	Pabitra Panthi	Baraula-3, Lede	Agriculture
120.	Dadi Ale	Baraula-3, Lede	Agriculture
121.	Shyam Kala Panthi	Baraula-3, Lede	Agriculture
122.	Bhuma Bhaiyya (Magar)	Baraula-3, Lede	Agriculture
123.	Yamkala Panthi	Baraula-3, Lede	Agriculture
124.	Dadi Ram Subedi	Baraula-4, Khal Kamere	Agriculture
125.	Tila Subedi	Baraula-4, Khal Kamere	Agriculture
126.	Uma Subedi	Baraula-4, Khal Kamere	Agriculture
127.	Rem Lal Pandey	Baraula-4, Khal Kamere	Agriculture
128.	Kamal Nepali	Baraula-4, Chheun Kamire	Agriculture
129.	Bhim Bdr. Nepali	Baraula-4, Chheun Kamire	Agriculture
130.	Durga Bdr. Bhaiya Magar	Baraula-4, Chheun Kamire	Agriculture
131.	Loki Bhaiya Magar	Baraula-4, Chheun Kamire	Agriculture
132.	Nam Bdr. Bhaiya Magar	Baraula-4, Chheun Kamire	Agriculture
133.	Debi Ram Bhiya Magar	Baraula-4, Chheun Kamire	Agriculture
134.	Mani Kumari Bhaiya Magar	Baraula-4, Chheun Kamire	Agriculture
135.	Gayetri Nepali	Baraula-4, Chheun Kamire	Agriculture
136.	Gaumata Bhaiya Magar	Baraula-4, Chheun Kamire	Agriculture

S.N.	Name of Respondent	Address	Occupation
137.	Lila Bhaiya Magar	Baraula-4, Chheun Kamire	Agriculture
138.	Rita Bhaiya Magar	Baraula-4, Chheun Kamire	Agriculture
139.	Hom Lal Pandey	Baraula-4, Chidi Bash	Agriculture
140.	Deu Bahadur Ale	Baraula-4, Chidi Bash	Agriculture
141.	Kul Bdr. Gharti	Baraula-4, Chidi Bash	Agriculture
142.	Mul Bdr. Gharti	Baraula-4, Chidi Bash	Agriculture
143.	Gopilal Gharti Magar	Baraula-4, Chidi Bash	Agriculture
144.	Nam Bdr. Nepali	Baraula-4, Chidi Bash	Agriculture
145.	Surye Bdr. Gharti Magar	Baraula-4, Chidi Bash	Agriculture
146.	Shob Bdr. Gharti Magar	Baraula-4, Chidi Bash	Agriculture
147.	Tek Bdr. Gharti Magar	Baraula-4, Chidi Bash	Agriculture
148.	Kul Bdr. Nepali	Baraula-4, Chidi Bash	Agriculture
149.	Lal Bdr. Nepali	Baraula-4, Chidi Bash	Agriculture
150.	Chuman Singh Gharti Magar	Baraula-4, Chidi Bash	Agriculture
151.	Khuma Khatri Chhetri	Baraula-4, Chidi Bash	Agriculture
152.	Hari Kala Bhaiya	Baraula-4, Chidi Bash	Agriculture
153.	Santa Sunar	Baraula-4, Chidi Bash	Agriculture
154.	Kamal Thapa	Pakala-7, Khara	Student
155.	Tukman Thapa	Pakala-7, Khara	Agriculture
156.	Suraj Bdr. Rana Magar	Pakala-7, Khara	Agriculture
157.	Chandra Bdr. Thapa	Pakala-7, Khara	Agriculture
158.	Buddha Singh Thapa	Pakala-7, Khara	Agriculture
159.	Chandra Bdr. Thapa	Pakala-7, Khara	Student
160.	Buddha Singh Thapa	Pakala-7, Khara	Agriculture
161.	Sher Bdr. Thapa	Pakala-7, Khara	Agriculture
162.	Bikram Thapa	Pakala-7, Khara	Agriculture
163.	Tham Bdr. Thapa	Pakala-7, Khara	Agriculture
164.	Nim Bdr. Thapa	Pakala-7, Khara	Agriculture
165.	Hum Bdr. Rana Magar	Pakala-7, Khara	Agriculture
166.	Hasti Bdr. Rana Magar	Pakala-7, Khara	Agriculture
167.	Jeet Bdr. Buddha Magar	Pakala-7, Kasre	Agriculture
168.	Ran Bdr. Raskoti Magar	Pakala-7, Kasre	Agriculture
169.	Sher Bdr. Budha Magar	Pakala-7, Kasre	Student
170.	Tek Bdr. Raskoti Magar	Pakala-7, Kasre	Agriculture
171.	Khum Bdr. Gharti Magar	Pakala-7, Kasre	Agriculture
172.	Thagan Singh Buddha Magar	Pakala-7, Kasre	Agriculture
173.	Pan Bdr. Buddha Magar	Pakala-7, Kasre	Agriculture
174.	Ram Bdr. Gharti Magar	Pakala-7, Kasre	Agriculture
175.	Rabilal Gharti Magar	Pakala-7, Kasre	Agriculture
176.	Dek Bdr. Budha Magar	Pakala-7, Kasre	Agriculture
177.	Chabi Lal Buddha Magar	Pakala-7, Kasre	Agriculture
178.	Dhan Bdr. Buddha Magar	Pakala-7, Kasre	Agriculture
179.	Chut Bdr. Buddha Magar	Pakala-7, Kasre	Agriculture
180.	Dhan Singh Buddha Magar	Pakala-7, Kasre	Agriculture
181.	Ram Bdr. Buddha Magar	Pakala-7, Kasre	Student
182.	Lum Bdr. Buddha Magar	Pakala-7, Kasre	Student

S.N.	Name of Respondent	Address	Occupation
183.	Top Bdr. Pun Magar	Dhuwang-7, Bokse	Agriculture
184.	Mausam Pun Magar	Dhuwang-7, Bokse	Agriculture
185.	Fanta Bdr. Pun Magar	Dhuwang-7, Bokse	Agriculture
186.	Nar Bdr. Pun Magar	Dhuwang-7, Bokse	Agriculture
187.	Bhadra Bir Thapa Magar	Hasanpur-9, Uppallo Bige	Agriculture
188.	Parbati Rokaya Magar	Dangwang-7, Lamikhewa	Agriculture
189.	Fulmaya Thapa	Dangwang-7, Lamikhewa	Agriculture
190.	Parbati Pun	Dangwang-7, Lamikhewa	Agriculture
191.	Num Bdr. Khamcha Magar	Dhunge Gadhi-5, Kudale	Business
192.	Dhan Bdr. Thapa Magar	Dhunge Gadhi-5, Kudale	Agriculture
193.	Dan Bdr. Thapa Magar	Dhunge Gadhi-5, Kudale	Agriculture
194.	Aita Bdr. Thapa Magar	Dhuwang-8, Chhateun	Agriculture
195.	Tul Bdr. Marcha Magar	Dhunge Gadhi-5, Kudale	Agriculture
196.	Manoj Kumar Pun Magar	Dhuwang-8, Choteun Dammar	Agriculture
197.	Bhoj Bdr. Magar	Dhunge Gadhi-5, Mandre	Agriculture
198.	Sher Bdr. Thapa Magar	Dhunge Gadhi-5, Kudale	Agriculture
199.	Bhopal Thapa Magar	Dhunge Gadhi-5, Piyarpata	Agriculture
200.	Robin Pun Magar	Dhuwang-8, Chhateun Damar	Agriculture
201.	Gome Bdr. Darlami Magar	Dhungegadhi-5, Upallo Mandre	Agriculture
202.	Iswor Thapa	Devasthan-1, Nayagao	Farming/Business
203.	Devi Ram Rana	Yekchote-7, Ramdi	Agriculture
204.	Dal Bahadur Bohora	Simalchour-4, Tiram	Agriculture
205.	Som Bdr Thapa	Bainke-9, Hamapur	Agriculture
206.	Ran Bdr Birkaja Magar	Sallikot Besi-3; Danbang	Agriculture
207.	Jog Bdr Saru Magar	Jaluke-7, Arghakhanchi	Agriculture
208.	Pharsa Ram Pulami Magar	Lamidamar-3, Baroula	Farmer
209.	Khum Prasad Acharya	Majhidamar-2, Danbang	Farmer
210.	Dor Bahadur Yogi	Jaspur, Chakchake	Fisherman
211.	Rem Bdr Magar	Danbang-3, Kalikath	Fisherman
212.	Shyam Bdr Yogi	Chakchake, Jaspur	Fisherman
213.	Purna Bdr Thapa	Chakchake, Jaspur	Fisherman
214.	Lal Bdr Pun Magar	Chakchake, Jaspur	Fisherman
215.	Kaman Shing Haujali Magar	Chakchake, Jaspur	Fisherman
216.	Khim Bdr Thapa Magar	Chakchake, Jaspur	Fisherman
217.	Tek Bdr Thapa Magar	Simalchour, Tiram	Fisherman
218.	Pam Bdr Thapa Magar	Simalchour, Tiram	Fisherman
219.	Sintha Bdr Thapa	Thakleni, Tiram	Fisherman
220.	Lok Bdr Thapa Magar	Thakleni, Tiram	Fisherman
221.	Dil Bdr Magar	Kamere, Baroula	Fisherman
222.	Krishna Bdr Magar	Kalikath, Danbang	Fisherman
223.	Iswor Bdr Magar	Kalikath, Danbang	Fisherman
224.	Kul Bdr Magar	Kalikath, Danbang	Fisherman
225.	Ram Bdr Magar	Kalikath, Danbang	Fisherman
226.	Nar Bdr Magar	Kalikath, Danbang	Fisherman
227.	Dhobilal Aale Magar	Amilchour	Fisherman

**Appendix 17: Public Consultation Naumre Project (Arghakhanchi and Puythan District)**

Field visit to the Naumre Project site was made on 8<sup>th</sup> to 14<sup>th</sup> June 2012. The objective of the visit was to collect primary information on the social, socio-economic, cultural, forest resources, wildlife, disaster records and aquatic ecological aspects from the reservoir area and the key structural locations of the project.

Since the study period was limited, most of the information related to the above aspects was derived based on the public consultations and interviews with the key informants. The socio-economic information was solicited from the focus group discussions at various settlements within the reservoir area. Information on disaster, fishermen, and fish diversity is based on the key informant interviews, while information on the forest, floral and wildlife diversity is based on the direct observation and interviews with the key informants of the local area. Focus group consultation meetings were held at 27 sites within the reservoir area (Table 1), while 11 key informants were interviewed for in depth knowledgeable information (Table 2).

**Table 1: Participants of the Focus Group Discussion**

S.N.	NAME OF RESPONDENT	OCCUPATION / POSITION	LOCATION
<b>TARULE</b>			
1	PREM BDR NEUPANE	FARMER	JAKULE-9, TARULE
2	RAM DEVI ACHARYA	FARMER	JAKULE-9, TARULE
3	BEL KUMARA NEUPANE	FARMER	JAKULE-9, TARULE
<b>KALLERI</b>			
1	DHAN BDR MAGAR	FARMER	JALUKE-8, KALLERI
2	GHANI KALA KANCHA MAGAR	FARMER	JALUKE-8, KALLERI
3	MANJU MAGAR	FARMER	JALUKE-8, KALLERI
4	TIKA MAGAR	FARMER	JALUKE-8, KALLERI
5	SARADA MAGAR	FARMER	JALUKE-8, KALLERI
6	SARADA PUN	FARMER	JALUKE-8, KALLERI
<b>TAKURA</b>			
1	AATMA RAM SARU	FARMER	JOKUKLE-7, TAKURA
2	NAMKALA SARU	FARMER	JOKUKLE-7, TAKURA
3	DUMA KALA SARU	FARMER	JOKUKLE-7, TAKURA
<b>SIYALA</b>			
1	JOG BDR SARU	FARMER	JAKULE-7, SIYALA
2	GUN BDR GAROJA	FARMER	JAKULE-7, SIYALA
3	NIMA NANDA ACHARYA	TEACHER	JAKULE-7, SIYALA
<b>HADYA</b>			
1	JOG BDR SARU	FARMER	JAKULE-7, HADYA
2	HUN DDR GAROJA	FARMER	JAKULE-7, HADYA
3	NIMA NANDA ACHARYA	TEACHER	JAKULE-7, HADYA
<b>SOTIGHAT</b>			
1	JOG BDR SARU	FARMER	JALUKE-7, SOTIGHAT
2	HUN BDR GAROJA	FARMER	JALUKE-7, SOTIGHAT
3	NIMA NANDA ACHARYA	TEACHER	JALUKE-7, SOTIGHAT
<b>TIMALE</b>			
1	BHIM BDR GARAUNJA	FARMER	JAKULE-7, TIMALE
2	BHAKTA BDR GARAUNJA	FARMER	JAKULE-7, TIMALE

3	LOK BDR GARAUNJA	FARMER	JAKULE-7, TIMALE
4	NUM BDR GARAUNJA	FARMER	JAKULE-7, TIMALE
5	HIRA BDR BI KA	FARMER	JAKULE-7, TIMALE
6	NUM BDR BI KA	FARMER	JAKULE-7, TIMALE
<b>NAUMURE</b>			
1	BIR BDR ROKAYA	FARMER	JAKULE-2, NAUMURE
2	RABI BDR BARAL	FARMER	JAKULE-2, NAUMURE
3	NUM BDR BARAL	FARMER	JAKULE-2, NAUMURE
4	YAGYA BDR BARAL	FARMER	JAKULE-2, NAUMURE
5	MUGA ROKAYA	FARMER	JAKULE-2, NAUMURE
6	RUMA BARAL	FARMER	JAKULE-2, NAUMURE
7	SUMITRA BARAL	FARMER	JAKULE-2, NAUMURE
8	TERA BARAL	FARMER	JAKULE-2, NAUMURE
9	RUMA ROKAYA	FARMER	JAKULE-2, NAUMURE
<b>MAJHI DAMAR</b>			
1	SANTA BDR PARIYAR	FARMER	DANGBANG-2, MAJHI DAMAR
2	BHIM BDR PARIYAR	FARMER	DANGBANG-2, MAJHI DAMAR
3	SHIVA HARI POKHAREL	FARMER	DANGBANG-2, MAJHI DAMAR
4	LILA HARI POKHAREL	FARMER	DANGBANG-2, MAJHI DAMAR
5	SHIVA LAL POKHAREL	FARMER	DANGBANG-2, MAJHI DAMAR
6	MANOKANTA ACHARYA	FARMER	DANGBANG-2, MAJHI DAMAR
<b>DABAR</b>			
1	MANUKANTA ACHARYA	FARMER	DANGBANG-4,
2	MUKTI PD ACHARYA	FARMER	DANGBANG-4,
3	NUM LAL SUBEDI	FARMER	DANGBANG-4,
4	BISHNU SUBEDI	FARMER	DANGBANG-4,
5	DURBHA ACHARYA	FARMER	DANGBANG-4,
6	BISHNU PRASHAD ADHIKARI	FARMER	DANGBANG-4,
7	CHUPA NIDHI SUBEDI	FARMER	DANGBANG-4,
8	NEMA NANDA ADHIKARI	FARMER	DANGBANG-4,
9	JEEBLAL ADHIKARI	FARMER	DANGBANG-4,
10	JEET BDR SARU MAGAR	FARMER	DANGBANG-4,
<b>KHUDALI</b>			
1	JEET BDR THAPA MAGAR	FARMER	DANGBANG-4, KHUDALI
2	SOHOBIR RESMI MAGAR	FARMER	DANGBANG-4, KHUDALI
3	JHABINDRA ADHIKARI	FARMER	DANGBANG-4, KHUDALI
4	UUM BDR THAPA MAGAR	FARMER	DANGBANG-4, KHUDALI
5	YEM LAL BHANDARI	FARMER	DANGBANG-4, KHUDALI
6	MUM PRASHAD ADHIKARI	FARMER	DANGBANG-4, KHUDALI
7	BHIM BDR THAPA	FARMER	DANGBANG-4, KHUDALI
8	TEK BDR SARU	FARMER	DANGBANG-4, KHUDALI
9	KAMAL PRASHAD BHANDARI	FARMER	DANGBANG-4, KHUDALI
10	RUDRA BDR SARU	FARMER	DANGBANG-4, KHUDALI
11	DURGA BDR THAPA	FARMER	DANGBANG-4, KHUDALI
<b>BESI</b>			
1	DAL BDR MAGAR	AGRICULTURE	DANGBANG-3, BESI
2	RAN BDR MAGAR	AGRICULTURE	DANGBANG-3, BESI
3	BUDHA BDR NEPAL	AGRICULTURE	DANGBANG-3, BESI
4	CHANDRA BDR MAGAR	AGRICULTURE	DANGBANG-3, BESI
5	LOK BDR BIRKATHA MAGAR	AGRICULTURE	DANGBANG-3, BESI
6	NUM BDR NEPALI	AGRICULTURE	DANGBANG-3, BESI
7	NARA BDR NEPALI	AGRICULTURE	DANGBANG-3, BESI

8	SANTA GHARTI MAGAR	AGRICULTURE	DANGBANG-3, BESI
9	POOP BDR MAGAR	AGRICULTURE	DANGBANG-3, BESI
	KALIKATH		
1	MAN BDR GHARTI MAGAR	FARMER	DANGBANG-3, KALIKATH
2	PURNA BDR GURUNG	FARMER	DANGBANG-3, KALIKATH
3	GOR BDR RANA MAGAR	FARMER	DANGBANG-3, KALIKATH
4	KUMARA GHARTI MAGAR	FARMER	DANGBANG-3, KALIKATH
<b>DUMAI</b>			
1	DUMISARA SOMAI	FARMER	HASANPUR-1, DUMAI
2	GUMAN SINGH SUNAR	FARMER	HASANPUR-1, DUMAI
3	TRIBHUVAN SINGH GAAHA	FARMER	HASANPUR-1, DUMAI
4	AITE BIR DARLAMI	FARMER	HASANPUR-1, DUMAI
5	BAAM BDR THAPA	FARMER	HASANPUR-1, DUMAI
6	DAIBA RAM SUBEDI	FARMER	HASANPUR-1, DUMAI
7	DHANI SOMAI	FARMER	HASANPUR-1, DUMAI
8	JHABI LAL PUN SUMAI	FARMER	HASANPUR-1, DUMAI
9	HEMEN BDR SUMAI	FARMER	HASANPUR-1, DUMAI
<b>BANGE BESI</b>			
1	KHUM BDR RANA MAGAR	FARMER	HASANPUR-6, BANGE BESI
2	YEM BDR RANA MAGAR	FARMER	HASANPUR-6, BANGE BESI
3	YUBRAJ MAGAR	FARMER	HASANPUR-6, BANGE BESI
4	DEVIRAM CHARTI MAGAR	FARMER	HASANPUR-6, BANGE BESI
5	CHETAN RANA MAGAR	FARMER	HASANPUR-6, BANGE BESI
6	MAN BDR MAGAR	FARMER	HASANPUR-6, BANGE BESI HASANPUR -6, BANGE BESI
<b>PANAHA</b>			
1	JANAK BDR PUN	FARMER	HASANPUR-7, PANAHA
2	BHIM BDR RANA	FARMER	HASANPUR-7, PANAHA
3	OM BDR RANA	FARMER	HASANPUR-7, PANAHA
4	KHEM BDR SARU	FARMER	HASANPUR-7, PANAHA
5	MINA DEVI SARU	FARMER	HASANPUR-7, PANAHA
6	DELA RAM RANA	FARMER	HASANPUR-7, PANAHA
<b>TALLO BAIKE</b>			
1	NUM BDR RESMI	FARMER	HASANPUR-9, TALLO BAIKE
2	KHAGESHWOR RESMI	FARMER	HASANPUR-9, TALLO BAIKE
3	DAMI SAR PUN	FARMER	HASANPUR-9, TALLO BAIKE
4	HARI KALA THAPA	FARMER	HASANPUR-9, TALLO BAIKE
5	TULSI DEVI RESMI	FARMER	HASANPUR-9, TALLO BAIKE
6	JIBI SARA RESMI	FARMER	HASANPUR-9, TALLO BAIKE
<b>LAMI DAMAR</b>			
1	KHED BDR PULAMI	FARMER	BARUALA-3, LAMI DAMAR
2	HIRA SINGH GHA MAGAR	FARMER	BARUALA-3, LAMI DAMAR
3	LOK BDR BAKABAL MAGAR	FARMER	BARUALA-3, LAMI DAMAR
4	POOP BDR MAGAR	FARMER	BARUALA-3, LAMI DAMAR
5	KUL BDR PULAMI	FARMER	BARUALA-3, LAMI DAMAR
6	UMA PULAMI MAGAR	FARMER	BARUALA-3, LAMI DAMAR
<b>LEDE</b>			
1	KHEM PD PANTHI	FARMER	BARAULA-3, LEDE
2	JEEBLAL PANTHI	FARMER	BARAULA-3, LEDE
3	NARAYAN PANTHI	FARMER	BARAULA-3, LEDE
4	PABITRA PANTHI	FARMER	BARAULA-3, LEDE
5	DADDI ALE	FARMER	BARAULA-3, LEDE

6	SHYAM KALA PANTHI	FARMER	BARAULA-3, LEDE
7	YAM KALA PANTHI	FARMER	BARAULA-3, LEDE
<b>KHAL KHOLA</b>			
1	DADI RAM SUBEDI	FARMER	BARAULA-4, KHAL KHOLA
2	TILA SUBEDI	FARMER	BARAULA-4, KHAL KHOLA
3	UMA SUBEDI	FARMER	BARAULA-4, KHAL KHOLA
4	REM LAL PANDEY	FARMER	BARAULA-4, KHAL KHOLA
<b>CHEUN KAMIRE</b>			
1	KAMAL NEPALI	FARMER	BARAULA-4, CHEUN KAMIRE
2	BHIM BDR NEPALI	FARMER	BARAULA-4, CHEUN KAMIRE
3	DURGA BDR MAGAR	FARMER	BARAULA-4, CHEUN KAMIRE
4	NAM BDR MAGAR	FARMER	BARAULA-4, CHEUN KAMIRE
5	DEBI RAM MAGAR	FARMER	BARAULA-4, CHEUN KAMIRE
6	MANI KUMARA MAGAR	FARMER	BARAULA-4, CHEUN KAMIRE
7	GAUMATA BHAIYA MAAGAR	FARMER	BARAULA-4, CHEUN KAMIRE
8	LILA MAAGAR	FARMER	BARAULA-4, CHEUN KAMIRE
9	RITA MAGAR	FARMER	BARAULA-4, CHEUN KAMIRE
<b>CHIDI DAMAR</b>			
1	HOM LAL PANDEY	FARMER	BARAUAL-4, CHIDI DAMAR
2	DEV BDR ALE	FARMER	BARAUAL-4, CHIDI DAMAR
3	MUL BDR GHARTI	FARMER	BARAUAL-4, CHIDI DAMAR
4	NAM BDR NEPALI	FARMER	BARAUAL-4, CHIDI DAMAR
5	TEK BDR GHARTI MAGAR	FARMER	BARAUAL-4, CHIDI DAMAR
6	LAL BDR NEPALI	FARMER	BARAUAL-4, CHIDI DAMAR
7	KHUMA KHATI CHETRRI	FARMER	BARAUAL-4, CHIDI DAMAR
8	HARI KALA BHAIYA	FARMER	BARAUAL-4, CHIDI DAMAR
9	SANTA SUNAR	FARMER	BARAUAL-4, CHIDI DAMAR
<b>NAUGHAT AND KHARA</b>			
1	KAMAL THAPA	STUDENT	PAKAL-8, NAUGHAT
2	TUMAN THAPA	FARMER	PAKAL-8, NAUGHAT
3	CHANDRA BDR THAPA	FARMER	PAKAL-8, NAUGHAT
4	NIM BDR THAPA	FARMER	PAKAL-8, NAUGHAT
5	PITAMBER PARAJULI	FARMER	PAKAL-8, NAUGHAT
<b>KASARE</b>			
1	JEET BDR BHUDHA MAGAR	FARMER	PAKALA-7, KASARE
2	RAN BDR RASKOTI MAGAR	FARMER	PAKALA-7, KASARE
3	TEK BDR RASKOTI MAGAR	STUDENT	PAKALA-7, KASARE
4	KHUM BDR RASKOTI MAGAR	FARMER	PAKALA-7, KASARE
5	PAN BDR BUDHA MAGAR	FARMER	PAKALA-7, KASARE
6	RAM BDR GHARTI MAGAR	FARMER	PAKALA-7, KASARE
7	RABILAL GHARTI MAGAR	FARMER	PAKALA-7, KASARE
8	DEK BDR BUDHA MAGAR	FARMER	PAKALA-7, KASARE
9	DHAN BDR BUDHA MAGAR	FARMER	PAKALA-7, KASARE
10	RAM BDR BUDHA MAGAR	STUDENT	PAKALA-7, KASARE
11	LUM BDR BUDHA MAGAR	STUDENT	PAKALA-7, KASARE
<b>MITHA BAGART</b>			
1	JEET BDR BHUDHA MAGAR	FARMER	PAKALA-7, MITHA BAGAR
2	RAN BDR RASKOTI MAGAR	FARMER	PAKALA-7, MITHA BAGAR
3	TEK BDR RASKOTI MAGAR	STUDENT	PAKALA-7, MITHA BAGAR
4	KHUM BDR RASKOTI MAGAR	FARMER	PAKALA-7, MITHA BAGAR
5	PAN BDR BUDHA MAGAR	FARMER	PAKALA-7, MITHA BAGAR
6	RAM BDR GHARTI MAGAR	FARMER	PAKALA-7, MITHA BAGAR



7	JEET BDR BHUDHA MAGAR	FARMER	PAKALA- 7, MITHA BAGAR
8	RAN BDR RASKOTI MAGAR	FARMER	PAKALA- 7, MITHA BAGAR
<b>BOKSE</b>			
1	TOP BDR PUN MAGAR	FARMER	DHUWANG-7, BOKSE
2	MAUSAM PUN MAGAR	FARMER	DHUWANG-7, BOKSE
3	SANTA BDR PUN MAGAR	FARMER	DHUWANG-7, BOKSE
4	NAR BDR PUN MAGAR	FARMER	DHUWANG- 7, BOKSE
5	BHADRA BIR THAPA MAGAR	FARMER	DHUWANG- 7, BOKSE
<b>CHOKTE</b>			
1	NUM BDR RESMI	FARMER	DHUWANG -7, CHOKTE
2	KHAGESHWOR RESMI	FARMER	DHUWANG -7, CHOKTE
3	DAMI SAR PUN	FARMER	DHUWANG -7, CHOKTE
4	HARI KALA THAPA	FARMER	DHUWANG -7, CHOKTE
5	TULSI DEVI RESMI	FARMER	DHUWANG -7, CHOKTE
6	JIBI SARA RESMI	FARMER	DHUWANG -7, CHOKTE
<b>LAMIKHEWA</b>			
1	PARBATI ROKAYA MAGAR	FARMER	DUBANG -7, LAMIKHEWA
2	FULMAYA THAPA MAGAR	FARMER	DUBANG -7, LAMIKHEWA
3	PARBATI PUN	FARMER	DUBANG -7, LAMIKHEWA
<b>KUDULE AND SAJANPUR</b>			
1	NUM BDR KHAMCHA MAGAR	BUSINESS	DHUNEGADHI-5 , KUDULE
2	DHAN BDR THAPAMAGAR	FARMER	DHUNEGADHI-5 , KUDULE
3	AAITA BDR THAPA MAGAR	FARMER	DHUNEGADHI-5 , KUDULE
4	TUL BDR MARCHA MAGAR	FARMER	DHUNEGADHI-5 , KUDULE
5	MANOJ KUMAR PUN MAGAR	FARMER	DHUNEGADHI-5 , KUDULE
6	SHER BDR THAPA MAGAR	FARMER	DHUNEGADHI-5 , KUDULE
7	BHIM BDR MAGAR	FARMER	DHUNEGADHI-5 , KUDULE
8	BHAPAL THAPA MAGAR	FARMER	DHUNEGADHI-5 , KUDULE
9	ROBIN PUN MAGAR	FARMER	DHUNEGADHI-5 , KUDULE
10	GAME BDR DARLAMI MAGAR	FARMER	DHUNEGADHI-5 , KUDULE

Table 2: Key Informant for Interview

S.N	NAME OF RESPONDENT	OCCUPATION/POSITION	LOCATION
1	ISWOR THAPA	FARMING/BUSINESS	DEVISTHAN-1
2	DEVI RAM RANA	AGRICULTURE	YEKCHOTE-7, RAMDI
3	DAL BAHADUR BOHORA	AGRICULTURE	SIMALCHOUR-4,TIRAM
4	SOM BDR THAPA	AGRICULTURE	BAINKE-9, HAMAPUR
5	RAN BDR BIRKAJA MAGAR	AGRICULTURE	SALLIKOT BESI-3;DANBANG
6	JOG BDR SARU MAGAR	AGRICULTURE	JALUKE-7, ARGHAKHANCHI
7	PHARSA RAM PULAMI MAGAR	FARMING	LAMIDAMAR-3, BAROULA
8	KHUM PRASAD AACHARYA	FARMING	MAJHIDAMAR-2,DANBANG
9	BHIM BDR RAJKOTI	FISHERMEN	KAMERE-4,BAROULA(MADI KHOLA)
10	REM BDR MAGAR	FISHERMEN	KALIKATH-3, DANBANG
11	DOR BAHADUR YOGI	FISHERMEN	JASPUR,CHAKCHAKE

To solicit the information from the project site's local communities the strategic approach taken was to aware people on the Nationwide Master Plan Study of the Storage Type Hydro-electric Projects before seeking information on the local environmental and social resources and the concerns of the people regarding the Naumure project.

It is therefore the field survey team, before initiating dialogue with the local communities described why the Nationwide Master Plan Study for Storage type hydroelectric project is needed? Who is undertaking the study? What will be the output of the study? In this process the team also highlighted on how this project in this area was selected for further study? And what the study team will like to get information from the local area communities not limiting to the social and environmental information but also the concerns of the people with regard to the project and their aspirations with the project if it is screened for further study and development.

This section describes the local people knowledge on the project apart from the concerns and aspirations of the people from the project.

The local communities were aware of the project and enquired when the Indian government is going to start the project for construction as informed by the media some 7 to 8 years back. For the overall development of the region and to ease the current electricity crisis, the communities were ready to support the project development. The major concern of the people is regarding the resettlement and rehabilitation. The place they are currently living is the food bowl of the area and is the major source of the community livelihood. The concern was whether they will be resettled and rehabilitated in a similar productive area. Some people raised the concern of the landslides once the reservoir is formed. Some of the area as reported by the communities are weak and may yield to landslide due to water saturation even affecting the areas higher above the water level of the reservoir.

The local community aspiration is that the affected communities should get job opportunities in the project considering their contribution to the project. The community infrastructures such as schools, health posts, and road network are not adequate to meet the needs and aspired that the project will contribute significantly in the development of the community infrastructures. They also aspired to get skill trainings so as to maximize the benefit of the available job opportunities in the project.

**Annex 22: Comments on SEA Report**  
**from**  
**Department of Forests**

The Study Team explained the brief overview of the Study to the Department of Forests in the Ministry of Forests and Soil Conservation and submitted a draft SEA report to them requesting their comments if any. Table 1 shows comments and suggestions from the Department of Forests. Figure1 to 5 are their originals in the original letter.

**Table1 Comments on SEA Report from Department of Forests and Reply from JICA Study Team**

No.	Comment from Department of Forests	Reply from JICA Study Team
1	The proposed SEA report should consider the forestry sector policy of maintaining the forest coverage to 40 % of total area of Nepal.	The Impact on a forest was studied and have been described in the SEA report, Chapter 9-3 (3) “Space Crowing Impact on Forest Ecosystem” and 10 “Mitigation Measure in particular”.
2	The Provision of Strategic Environmental Assessment (SEA) is not included in Environment Protection Act, 2053 and Environment Protection Regulation, 2054. So, question of authorization of SEA report may put forward.	The Study Team understood that the SEA report was not included in the Environment Protection Act, 2053 and Environment Protection Regulation, 2054. The inquiry for the Department of Forest was recommended by Advisory Committee for Environmental and Social Considerations of JICA.
3	Could not see objectives explaining explicitly environmental protection and sustainability.	Chapter 2 of the SEA report is showing target setting of SEA. It is said “The target of the SEA is to propose promising projects and developing order in order to fulfill this demand mainly by storage type hydroelectric power projects in an environmentally sustainable manner without having a serious impact on natural environment and social issues.”
4	Baseline survey methodology for biodiversity assessment is not described.	Baseline survey methodology for biodiversity assessment has been described in 6.2, 7.2, 8.2 of the SEA main report and 1.2, 2.1 of the Annex 11. The first and second steps are conducted based on document survey. Base line data of all the 10 project sites were collected by site survey.
5	Detailed Survey methodology for biodiversity assessment is not described.	Detailed survey for EIA will be conducted in the feasibility study stage. The suggested methodology is shown in Chapter 13.
6	Detailed study on direct impacts like habitat loss, habitat fragmentation, direct loss of species, impediment to species migration, genetic isolation of population and invasive species propagation should be done. Similarly, indirect impacts like water quality deterioration, hydrological flow regime change, and increased pressure on natural resources should be done.	Direct impacts such as habitat loss were studied in the SEA Report (See 7.3, 8.3, 9.3 of SEA main report and Annex 11 to Annex 21 of SEA report). The information on some species such as genetic diversity and migration is too limited to assess the impact in this stage. The suggestions for detailed study were described in Chapter 13.

No.	Comment from Department of Forests	Reply from JICA Study Team
7	Cumulative effect of hydropower and climate change on biodiversity should be studied.	Cumulative effect was studied from the following 3 points, (1) Water regulation effects, (2) Barrier effects on fish migration, and (3) Space crowning effects for selecting cumulative impact assessment. Regarding the effect of climate change on biodiversity, it should be reviewed in other study.
8	Strategic Alternative analysis of project locations should be done.	Three steps of alternative analyses are done in the SEA report (See Chapter 6, Chapter 7, and Chapter 8). 10 project locations were selected from 67 project sites listed by NEA by scoping and by evaluation using various evaluation criteria. In addition, zero option was studied and has been mentioned in Chapter 5.
9	During impact evaluation process, identification of indicators should be done which supports that the project is contributing sustainability.	Some indicators such as, impact on protected area, and the number of trees and protected species are used to measure biological sustainability (See Chapter 6, Chapter 7, Chapter 8). The adequacy of the indicators are repeatedly explained in the SHMs.
10	The study of ecological context in which whether the ecosystem is fragile or robust and overall level of ecosystem degradation should be studied.	The fragileness of the ecosystem in the national parks was investigated to be evaluated by the number of IUCN red list species (See Chapter 9).
11	The provision of payment for environmental services (PES) should be considered to the local catchment conservers.	PES is usually used for measuring the forest value. The method is not suitable for the master plan study for the hydroelectric power.
12	Less weightage should not be given to natural environment and social environment in evaluation criteria.	Natural environment and social issues account for 50% in Base Case (See table 7.2-34) and 60% in Case 2 (See Table 7.2-36). It is estimated that sufficient importance is given to them.
13	There is insufficient attendance and consultation of officials of Ministry of Forests and Soil conservation and concerned Departments during stakeholders meeting.	The three invitations were sent to the Ministry of Forest and Soil Conservation before the SHMs (See the Attendance lists in Chapter 12). Some officials attended the meetings.
14	Long term project should be assessed based on river basin systems and with interlinkage among small rivers & their catchment.	Cumulative impacts in the river basin systems were studied in Chapter 9.
15	Page 3/4/5-Table 3.4.1 Buffer zone and protected area should be separately described.	Both buffer zones and protected areas are designated in the National Parks and Wildlife Conservation Act, 2029 and environmental flow rate of HPPs in such zones and areas are regulated in the same.

No.	Comment from Department of Forests	Reply from JICA Study Team
16	<p>Page 3/4/5</p> <p>More emphasis has been given to protected areas but there are biodiversity hot spots outside protected areas managing under department of forests such a Collaborative Forest, Protected Forest and Community Forest which have not been regarded for long term impact zones.</p>	<p>Some biodiversity hot spots are considered as KBAs. It is recommended that the Department of Forest prepare distribution maps about the collaborative forest, protected forest and community forest in next stage.</p>
17	<p>Page No.7: 3.5</p> <p>Conservation species have included within the lists, it is ok, but Government has declared 27 mammals, 9 birds and 3 reptiles as a protected species should be separately listed clearly on the report table sheet, likewise protected species have not been reported/ recorded in the lists.</p>	<p>There are no tables showing protected species which are specified by the Government of Nepal. However, the report mentioned that there are 39 species of protected wildlife identified by the Government of Nepal.</p>
18	<p>Page No. 20, Chapter 4 Law and Regulations:</p> <p>4.1 Related laws and Regulations</p> <p>There are a few mistakes to indicate enforcement year of law &amp; Regulation</p> <p>Such as :</p> <ul style="list-style-type: none"> <li>- Forest regulation 2051 is correct</li> <li>- Local self Government Act 2055 is correct and respective regulation is 2056.</li> <li>- Public Roads Act 2031 is correct (please check)</li> </ul> <p>4.2 Policies and Guidelines</p> <p>Few policies which should be considered for consultation &amp; long terms visionary aspects are missing such as:</p> <ul style="list-style-type: none"> <li>- Water Resources Strategy, 2002</li> <li>- Land use Policy, 2068</li> <li>- Nepal Biodiversity Strategy, 2002</li> <li>- Sustainable Development Agenda for Nepal, 2003</li> <li>- Climate Change Policy, 2011</li> <li>- Leasehold Forestry Policy, 2002</li> <li>- National Agriculture Policy, 2004</li> <li>- Rural Energy Policy, 2006</li> <li>- Agrobiodiversity Policy 2007</li> <li>- Tourism Policy 2009</li> <li>- Forest Fire Management Strategy 2020</li> <li>- National Wetland Policy 2012</li> <li>- Irrigation Policy 2013</li> </ul> <p>4.3 International Agreement and Treaty</p> <p>Biodiversity Conservation 1992 &amp; CBD 1993 is the same All treaties / Agreements should be clearly indicated with year and corrected names (should be revised)</p> <p>Missing</p> <ul style="list-style-type: none"> <li>- International Treaty on Plant Genetic Resources for Food and Agriculture 82001)</li> </ul>	<p>SEA report is corrected as according to the comments.</p>
19	<p>The SEA report should indicate rough estimation of forest area for hydropower projects.</p>	<p>The forest area affected by reservoir was calculated based on latest satellite images at each project area and described in the Table 4 of Annex 11.</p>

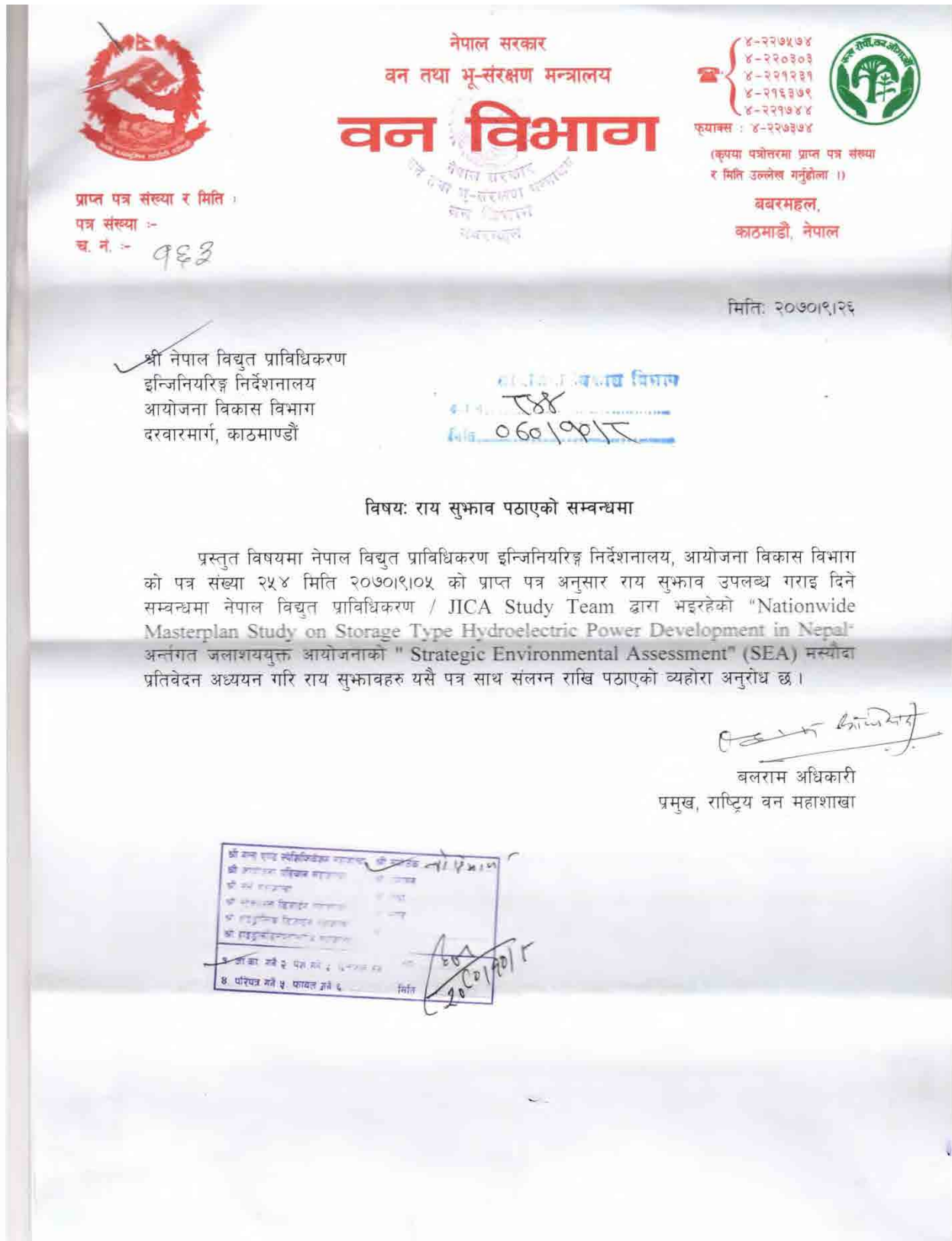
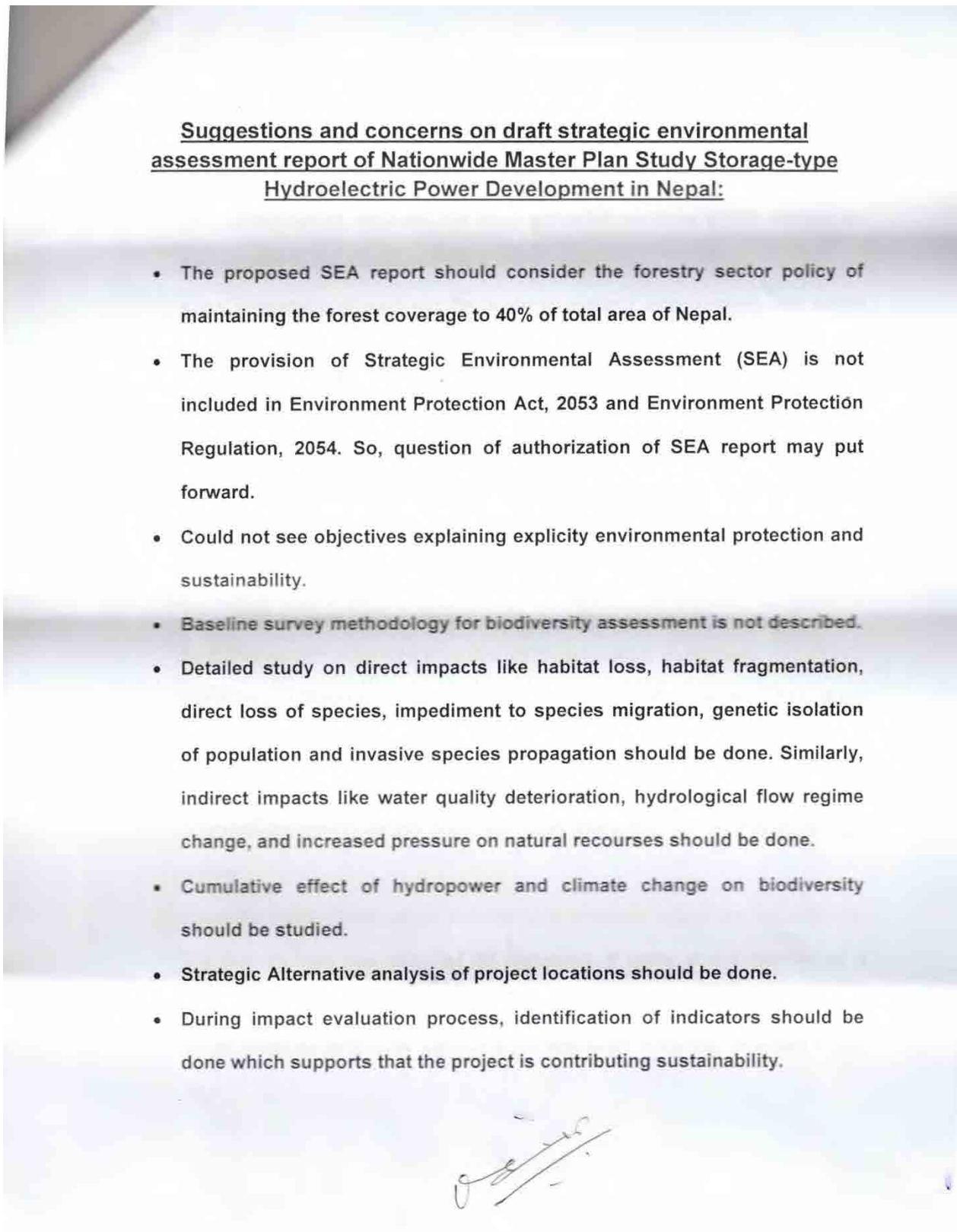
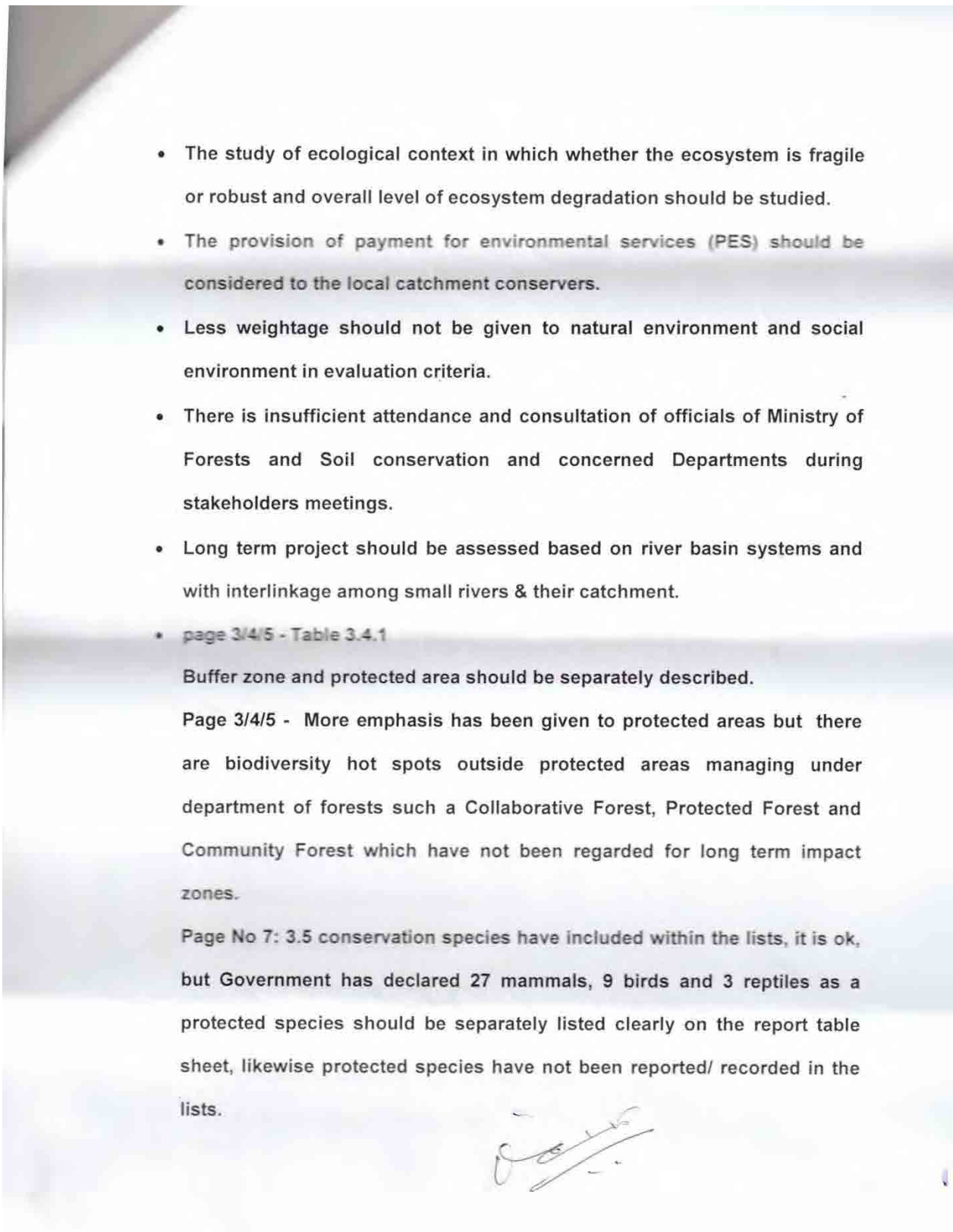


Figure 1: Letter Head of Comments on SEA Report from Department Forest

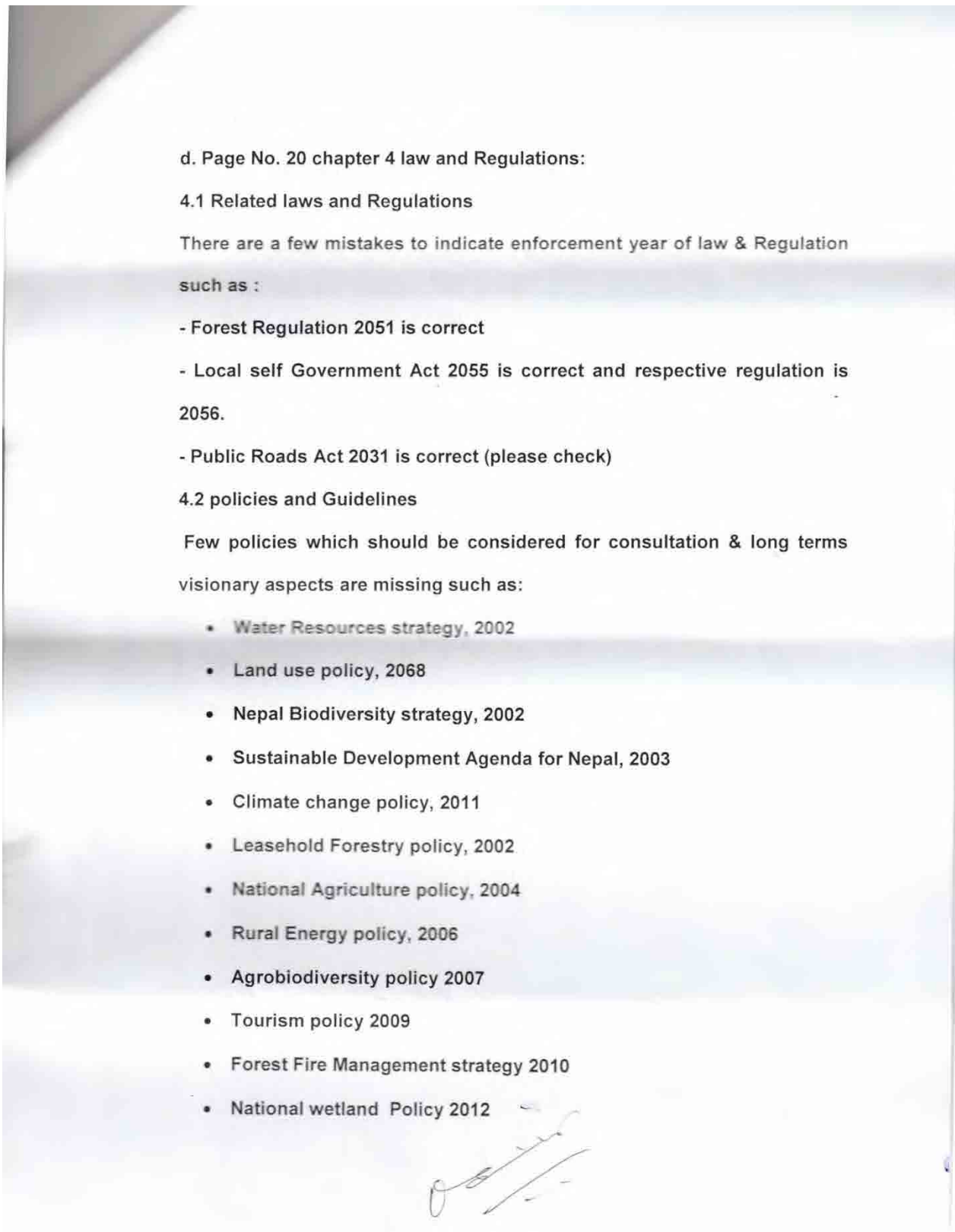


**Figure 2: Comments on SEA Report from Department Forest – Page 1**

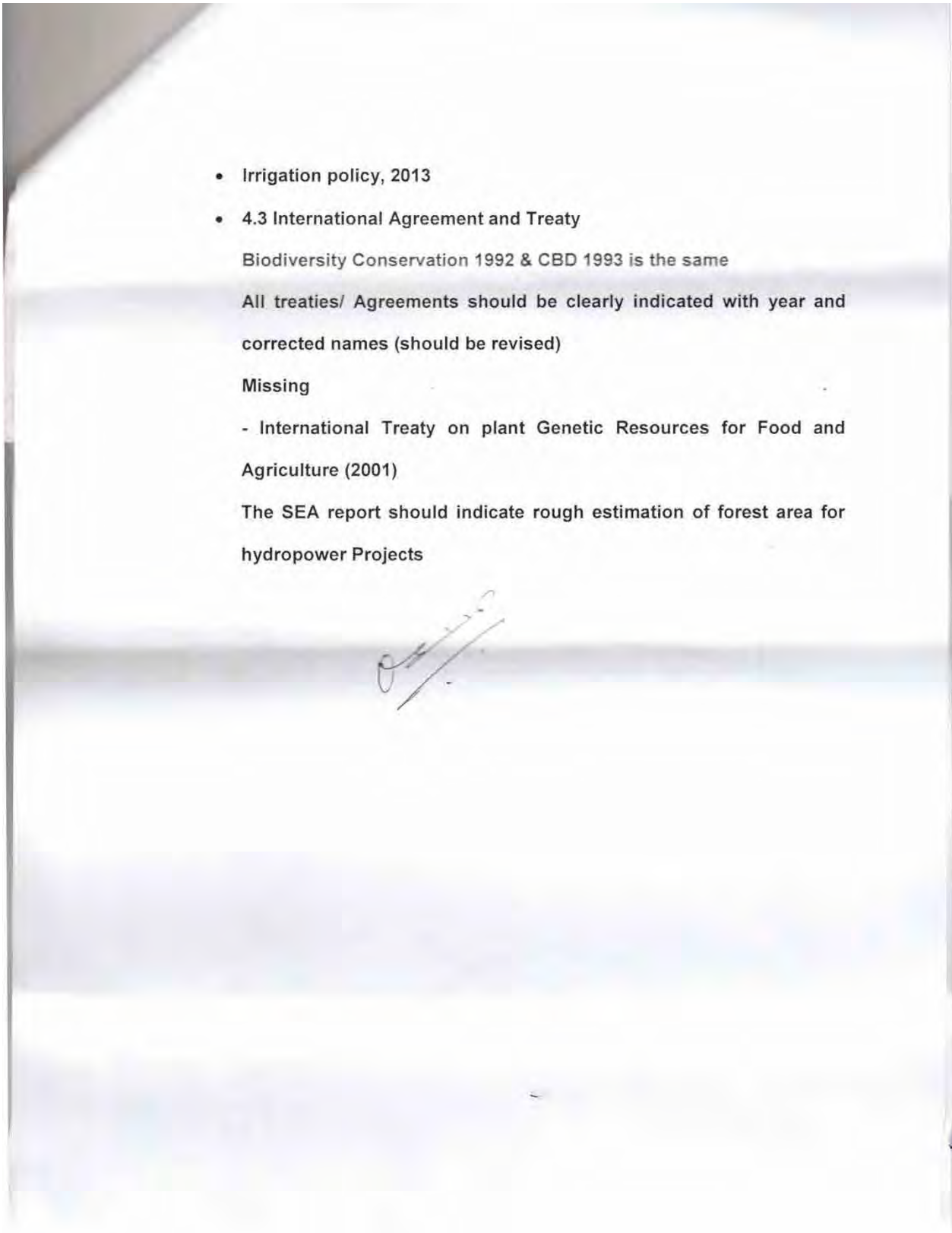




**Figure 3: Comments on SEA Report from Department Forest – Page 2**



**Figure 4: Comments on SEA Report from Department Forest – Page 3**



**Figure 5: Comments on SEA Report from Department Forest – Page 4**