NAFRA HYDRO ELECTRIC PROJECT OF 96 MW (2 X 48 MW), ARUNACHAL PRADESH

Volume II

Social Impact Assessment (SIA), Land Acquisition and Rehabilitation Plan

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Chapter 1

PROJECT UNDERSTANDING

1 PROJECT UNDERSTANDING

1.1 PROJECT BACKGROUND

The Govt of India has launched the '50,000 MW Hydro Electric Initiative' with the objective of increasing the hydropower capacity in India. Out of this more than half of the capacity has been identified in the State of Arunachal Pradesh.

Government of Arunachal Pradesh has earmarked certain projects for allocation to provide developers which will generate economic activity in the state leading to its growth and also serve as an engine to achieve the objective of promoting all round development of the state and the country. As per the MoA signed between GoAP and SEW Energy Ltd on 14th Sep 2007 Nafra HEP is to be developed on BOOT basis.

The Project is envisaged as a run of the river scheme without any seasonal storage (only lean season diurnal pondage) harnessing a gross head of about 184.40m and design discharge of 61.38 Cumec.

1.1.1 Project Location

The project site is located at West Kameng District of Arunachal Pradesh. The site is located between 125MW Dibin HE Project and 600MW Kameng HE Project (Under Construction by NEEPCO).

The Dam site is located at Latitude 27^0 21' 15.71"N, Longitude 92^0 33' 56.66"E where the river bed is at elevation of about 944m above mean sea level. The Power House site is located at Latitude 27^0 19' 24.91" N longitude 92^0 35' 25.26" E where the natural ground elevation is 810m above mean sea level.

Figure 1:1 Map Showing Project Location in Arunachal Pradesh

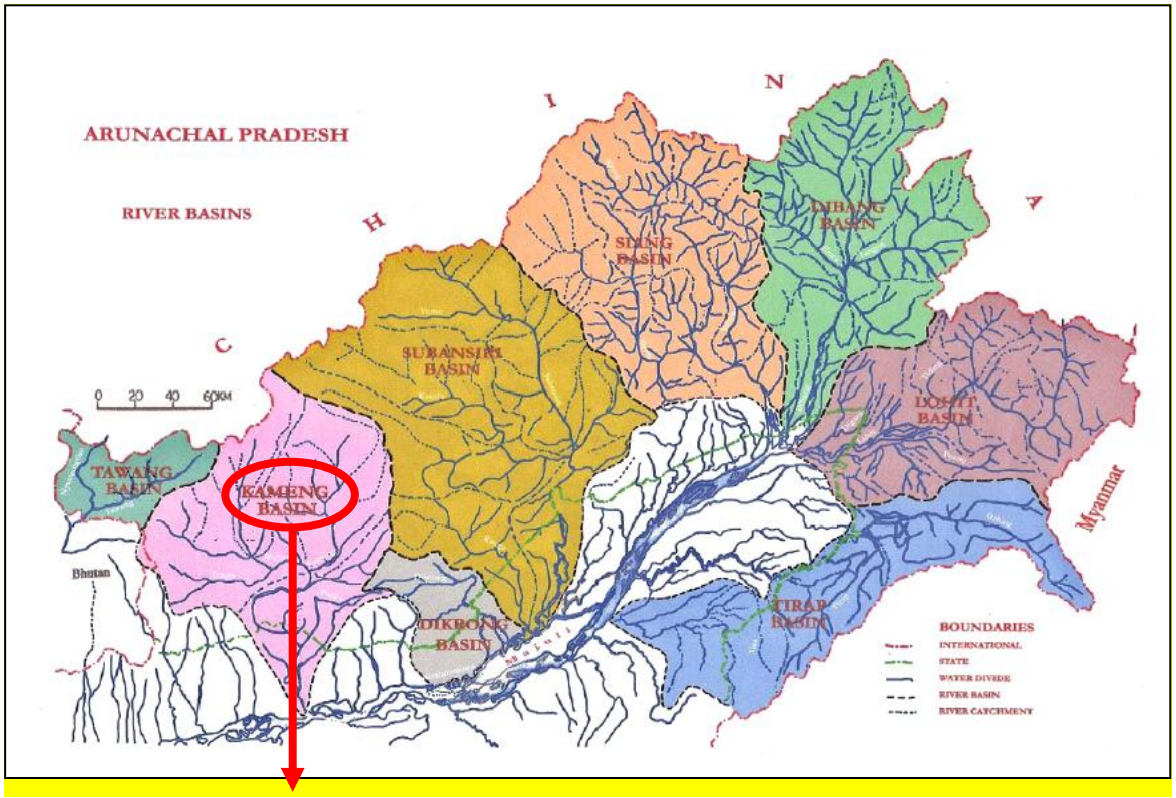
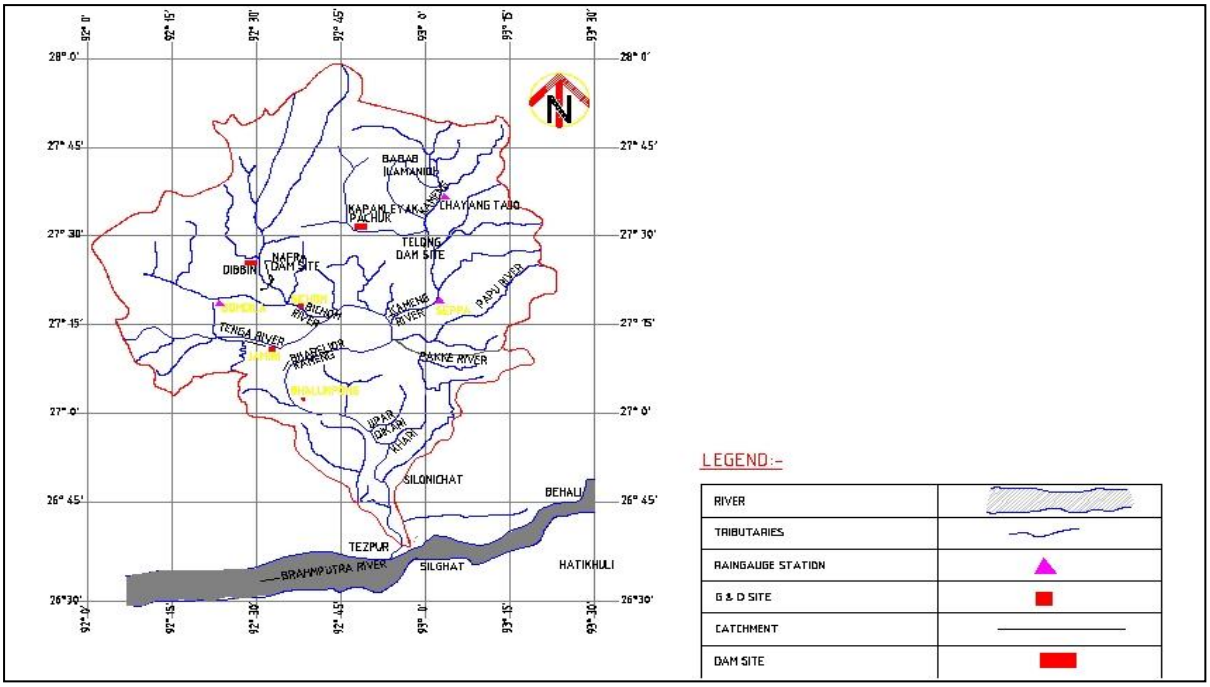


Figure 1:2 Major Drainage Lines and Location of the Hydro Electric Projects Proposed



1.1.2 Design Considerations

The project envisages a composite structure Rockfill dam with sluice spillway arrangement on the Bichom river 3 km downstream of Nafra Village, a Power Intake on the right bank to divert the flows into water conductor system comprising, one Modified Horse Shoe-shaped tunnel of 5.0m diameter and length of 3.68 km along the chord of the river so as to create a gross head of 184.40m, a Surge Shaft of 10.50 m diameter, two penstock 3.0 m diameter, a Surface Powerhouse with installed capacity of 96 MW (two units of 48 MW capacity each) and 165m long and 22m wide Tailrace.

The Nafra HE Project involves civil works which could be completed in 42 months which includes 6 months for infrastructure works. The project would afford design energy of 415.39MU in a 90% dependable year.

1.2 Scope of EIA Study

The Environmental Impact Assessment study has been taken up to assess preliminary environmental condition relevant to the project, so that it can be reviewed at later stage. Therefore, the main objectives of the study are:

- Prioritize the project from environmental viewpoint
- Assess the baseline environmental, economic and social condition
- Evaluate the impacts on the environment due to the project
- Recommend suitable measures for design consideration

1.3 Planned Benefits of the Project

Broad objective of the project is to meet the power demand of the state. The peak power supply deficit of Arunachal Pradesh is (-12.6%) during 2006-07. Not only has the capacity to be added but also the present hydro-thermal imbalance of 26:74 has to be corrected and brought to 40:60 to meet the power load requirement.

The design energy tariff at 95% machine availability in a 90% dependable year has been worked out as 401 MU and in 50% dependable year has been worked out as 468.30 MU.

1.4 Salient Features[1]

The salient features of the Nafra Hydro Electric Project are provided in the table below for the purpose of easy reference.

1.	**LOCATION**		
	a)	State	Arunachal Pradesh
	b)	District	West Kameng
	c)	River	Bichom
	d)	Latitude & Longitude (Dam Site)	27° 21' 15.71" N; 92° 33' 56.66" E
	e)	Nearest rail Head / Nearest Airport	Tezpur
	f)	Distances	
		Guwahati – Tezpur	220 km
		Tezpur – Bhalukpong	50 km
		Bhalukpong – Bomdila	110 km
		Bomdila – Nafra	55 km
	g)	Name of river basin	Kameng
2.	**HYDROLOGY**		
	a)	Catchment Area upto Dam Site	776 Sq.km
	b)	Average annual rainfall	3188 mm
	c)	Probable maximum Flood	5988 m^3/sec.
	d)	90% available discharge	38.43 m^3/sec.
	g)	Annual Inflow	1219 MCM
3.	**DAM**		
	a)	Type	Rock Fill dam
	b)	Maximum height above River Bed	40m
	c)	River Bed Level (masl)	944.0m
	d)	Elevation of top of Dam (masl)	984.0m
	e)	Length of Dam at top	241m

[1] Design Report, 2009 Vol-I.

g)	Freeboard	3.0 m to FRL
h)	Width at top	10.0m

4. SPILLWAY

a)	Type	Sluice spillway
b)	No. & size of gates (Radial Gates)	4Nosx10m wide x 12m high
c)	Discharge capacity	5978 m^3/sec. (PMF)
d)	Number of bays	4 Nos
e)	Length of Spillway	58.0m
f)	Bay width	10.00m
g)	Crest elevation (masl)	952.00m

5. RESERVOIR AND SUBMERGENCE

a)	Full Reservoir Level FRL (masl)	981.00m
b)	Maximum Water Level	982.00m
c)	Minimum Draw Down Level (masl)	972.00m
d)	Gross capacity	5.267 MCM
e)	Live capacity	2.413 MCM
f)	Dead storage capacity	2.854 MCM
g)	Submergence area at FRL	32.67 ha
f)	No. of villages affected	NIL

6. HEAD RACE TUNNEL

a)	Length	3.68km.
b)	Diameter and shape	5.00m, Modified horse shoe
c)	Design Discharge, Velocity	
	- Discharge	61.38 m^3/sec
	- Velocity	3.02 m/sec
d)	Invert Level of intake (masl)	961.50m

7. SURGE SHAFT

a)	Type	Restricted orifice type Surge Shaft
b)	Surge Shaft Diameter	10.50m
c)	Orifice Diameter	2.35m
d)	Height	57.00m

e)	Top Elevation (masl)	1002.00m
f)	Bottom Elevation (masl)	945.00m
g)	Gates for Penstock	2.0 Nos

8. PENSTOCK

a)	Type	Subsurface Penstock
b)	Number of Pressure shafts /Penstock	2 Nos
c)	Maximum discharge through Pressure shaft/Penstock	30.69 m^3/s
d)	Diameter of each Pressure shaft/Penstock	3.00m
e)	Maximum Velocity	4.34 m/sec
f)	Total Length of the Penstock	586.00m
g)	Length of sub Surface Penstock	100.00m
h)	Length of Penstock	486.00m

9. POWER HOUSE

a)	Type	Surface
b)	Location	1.5 km upstream of Digo river confluence with Bichom
c)	Latitude & Longitude	27° 19' 24.91" N; 92° 35' 25.26" E
d)	Number of Units	2Nos
e)	Rated Unit Capacity	48 MW
f)	Installed Capacity	96 MW
g)	Maximum Gross Head	184.4 m
h)	Design Net Head	173.31m
i)	Type of Turbine	Vertical Francis
j)	Maximum flow through each unit	30.69 m3/s
k)	Normal Tail Water Level	796.57m (Two units running at full load)
l)	Minimum Tail Water Level	794.84m (one units running at no Load)
m)	Speed Specific & Synchronous	375 rpm
n)	Type of Switchyard	Outdoor (53m x 42m)

10. POWER BENEFITS

a)	Peaking Capacity	96 MW
b)	Annual Energy (GWh/year)	

	for 50% Dependable yr.	491.60 MU
c)	Load Factor for Operation	
	(Annual / Lean Period) for 50% Dependable yr	58.46%, 30.72%
d)	Annual Energy (GWh/year)	
	for 90% Dependable yr.	423.95 MU
e)	Load Factor for Operation	
	(Annual / Lean Period) for 90% Dependable yr	50.41%, 22.76%

11. ESTIMATED COST

a)	Civil Works (Including gates & hoists)	Rs. 379.44 Crore
b)	E&M Works (including costs of	
	transmission line to pooling station)	Rs. 149.30 Crore
	Total Basic Cost	Rs. 528.74 Crore
c)	Escalation during construction	Rs. 73.75 Crore
d)	Interest during Construction	Rs. 80.90 Crore
	Total (Generation Works)	Rs. 690.70 Crore
	Cost per MW installed	Rs. 7.19 Crore

12. FINANCIAL ASPECTS

a)	Levelized Tariff for Design Energy at	Rs 3.53 /kWh
	90% Dependable Year	
b)	PIRR (Project Internal Rate of Return for 35 years)	10.46 %

13. CONSTRUCTION PERIOD 36 Months

Chapter 2

POLICY, LEGAL & REGULATORY FRAMEWORKS

2 POLICY, LEGAL & REGULATORY FRAMEWORKS

2.1 Small Hydropower Project Policy 2007, Arunachal Pradesh[2]

Small Hydropower Project Policy 2007 of Arunachal Pradesh envisages private participation in development of small hydro projects with certain attractive incentives. Apart from being eco-friendly and renewable, the micro/mini/small hydro projects are low in gestation period and ideal for viable investment for State's domestic power requirement.

This policy provides an Action Plan for Small Hydro Power Generation with provisions for capacity addition and determines the extent of involvements of various stake holders of state Government/Agencies in the field. Small Hydro Projects are classified under this policy in three categories as under:

Category I: Projects having installed capacities of above 1 MW and upto 25 MW shall have the capability of operating in both Grid and Isolation mode. This category of projects will have all components and features of conventional hydro power projects providing Grid Quality Power.

Category II: Projects having installed capacities of above 100KW and up to 1000 KW shall be designed for standalone mode for providing dedicated power to a village or a habitat or a locality or a cluster of villages with or without connectivity to grid. The power supply to the consumers shall be provided either at High Voltage or Low Voltage systems as the case may be.

Category III: Projects having installed capacities of up to 100 KW shall be designed for standalone mode dedicated to a village or a habitat directly distributing power to the households without high tension systems.

This policy under clause 12 to 15 discusses the compliance to statutory regulations such as land acquisition, law and order and rehabilitation and resettlement. These clauses are reproduced below for reference.

"12. COMPLIANCE TO STATUTORY REGULATIONS: The developer/user agency shall strictly comply with the statutory regulations of the Central Government/CERC and the State Govemment VSERC while implementing the project. The developers shall strictly comply with the provisions of the Forests (Conservation) Act, 1980. The developer shall also pay the cost of raising the compensatory afforestation including payment of the Net Present Value (NPV) of the forests land being diverted tor non-forest purpose under the relevant Forests (Conservation) Act, 1980 and Environmental Protection Act, 1986. The provisions relating to labour welfare existing as in force under the labour Laws/Acts shall be strictly adhered to by the developer during the implementation/operation and maintenance of the Project. The provisions of the Electricity Act 2003 and other laws and rules framed under such laws shall apply on the Projects under this policy.

13. LAND ACQUISITION FOR THE PROJECT: The land required for construction of the project and other allied infrastructures, as may be applied by the developer, shall be acquired and leased to the developer against payment of land revenue as per relevant tariff of the State Government. The period of lease will be continued till the BOOT period of the project.

14. LAW AND ORDER: The State Government would be responsible for maintaining general law and order in and around the project area for security and safety of personnel and properties of the project.

[2] Notification 25th Jan 2008, Published in The Arunachal Pradesh Gazette, February 15, 2008, Part-I.

15. REHABILITATION AND RE-SETTLEMENT: Rehabilitation and re-settlement works, if any, for displaced persons due to the project shall be financed by the developer, as per relevant laws guidelines of the State."

2.2 Scope of Social Impact Assessment in EIA Notification 2006 and NRRP 2007

Environment (Protection) Act 1986 is the principal legislation that governs the EIA policy and procedure in India. It not only has made the EIA a statutory requirement, it has progressively made the EIA process more effective and professional. In recent years, the term environment is defined broadly to include 'social', 'cultural', and other human dimensions. In this context, the aim of SIA is to identify the human consequences of a proposed action, giving particular attention to the mitigation of adverse or unintended aspects. Hence, Social Impact Assessment is an integral part of the Environment Impact Assessment (EIA).

The EIA Manual (2001) prepared by Impact Assessment Division, Ministry of Environment and Forests, Government of India describes the Socio-economic and health environment as one of the components of EIA. The EIA notification 2006, also mentions the SIA and R&R Action Plans as part of the 'generic structure of the EIA document' (In Appendix-III, under Additional Studies, S. No. 7). The details listed under this component are as follows:

- Collection of demographic and related socio-economic data
- Collection of epidemiological data, including studies on prominent endemic diseases (e.g. fluorosis, malaria, fileria, malnutrition) and morbidity rates among the population within the impact zone
- Projection of anticipated changes in the socio-economic and health due to the project and related activities including traffic congestion and delineation of measures to minimise adverse impacts
- Assessment of impact on significant historical, cultural and archaeological sites/places in the area
- Assessment of economic benefits arising out of the project
- Assessment of rehabilitation requirements with special emphasis on scheduled areas, if any.

Furthermore, the National Policy for Rehabilitation and Resettlement 2007 (NPRR), and the Resettlement and Rehabilitation Bill 2007 also have made provisions for Social Impact Assessment. The Section-6 of the RR Bill 2007 that deals with this subject is produced below:

"6. (*1*) Wherever it is required, as per the provisions of any law, rules and guidelines issued thereunder, to undertake environmental impact assessment, the social impact assessment study shall be carried out simultaneously with the Environmental Impact Assessment study.

(*2*) The public hearing undertaken in the project affected area for the environmental impact assessment shall also cover issues relating to social impact assessment.

(*3*) A copy of the social impact assessment report shall be made available to the Impact Assessment Agency authorised in respect of environmental impact assessment by the Central Government in the Ministry of Environment and Forests, and a copy of the environmental impact assessment report shall be shared with the expert group notified under section 5."

2.3 Policies and Laws for Impact Mitigation, Resettlement and Rehabilitation (R&R)

2.3.1 R&R Provisions under MoA between SEW Energy and Govt of Arunachal Pradesh

The Memorandum of Agreement (MoA) signed between M/s SEW Energy Ltd and Govt. of Arunachal Pradesh contains the following contractual obligations with regard to the social impact mitigation and

resettlement and rehabilitation of the project affected persons. The relevant articles and clauses from this document are mentioned below:

Article-2, Clause 2.4: The project shall be developed in tune with the state government policy to develop the project in the most environment, eco and people-friendly manner.

Article-2, Clause 2.19: The Company shall ensure that the water requirement for the construction of the project including potable drinking water shall be generally arranged and harnessed by them from the river source. The local sources of water supply may be utilized by the company only to the extent it does not adversely affect the local people.

Article-2, Clause 2.21: The Company shall ensure that the land is used only for the project and activities ancillary to the project.

Article-3, Clause 3.1: The site required for the construction, operation and maintenance of the project and for the associated works as will be assessed by the Company shall be transferred by the State Government to Company on lease basis against payment of land revenue as per approved rate of State Government. The period of lease will cease with the project getting reverted to the State Government on expiry of 40 years. The Company shall be entitled to mortgage the land to the lenders/financiers of the project with prior consent of the state government subject to the condition that such period of mortgage shall not exceed the lease period. The State Government shall acquire for the Company under the land acquisition Act 1894 as in force and as per Bengal Eastern Frontier Regulation 1873 (5 of 1873) at the expense of the Company such private lands within the State of Arunachal Pradesh, as may be required from time to time by the Company for the construction, operation and maintenance of the project.

Article-4, Clause 4.1.2: The provision relating to labour welfare existing as in force under Laws/Acts shall strictly adhere to by the Company during the implementation/operation and maintenance of the project.

Article-4, Clause 4.2: The fishing, recreational and navigational rights, tourism prospects in the river, water channel, reservoir, lake etc shall remain vested in the Govt. of Arunachal Pradesh subject only to such restriction as may be necessary for the operational requirements and safety and security of the project and the general guidelines of the Govt. of Arunachal Pradesh.

Article-7, Clause 7.1: The Company shall reserve the following categories of posts against the project to be filled up by the local tribal people, subject to the incumbents fulfilling the job requirements and considered suitable by the Company as per the criteria given below.

Managerial/Professional Post=	25%
Ministerial/Clerical Post=	50%
Skilled Jobs=	25%
Unskilled Jobs=	75%

Article-7, Clause 7.2: The Company shall give preference to the local contractors fulfilling the eligibility criteria in the award of the work except for the specialized jobs.

Article-8, Clause 8.1: The Company shall earmark a reasonable amount for the social works in accordance with the National Policy on Rehabilitation and Resettlement-2003 (NPRR-2003). The Company shall also adhere/conform to the local laws of the State.

Article-8, Clause 8.2: Rehabilitation and Resettlement Plan if any, of the oustees from the project/project affected families shall be executed by the State Government as per the approved rehabilitation and re-settlement plan at the cost of the Company, keeping in view the latest guidelines issued by Govt. of India on the subject. The R&R plan shall in any case be not inferior to the National Policy on Rehabilitation and Resettlement-2003.

Article-15, Clause 15.5: The Company shall contribute an amount @ one paisa per unit of electricity sold towards local area development fund. This contribution shall be subject to appropriate enhancement with increase in the rate of tariff.

2.3.2 Provisions of R & R Benefits for Project Affected Families as per NPRR-2007

The National Policy on Resettlement and Rehabilitation (2007) makes its provisions compulsory for all such cases where the involuntary displacement enmass is more than 400 families in plain area and 200 families in hilly and scheduled areas. As NAFRA-HEP project do not involve involuntary displacement to the prescribed extent, the provisions of NPRRP 2007 will not be fully applicable here. Clause 4(1) of the NPRR-2007 states as follows:

"4. (1) Whenever, it is desired to undertake a new project or expansion of an existing project, which involves involuntary displacement of four hundred or more families an masse in plain areas, or two hundred or more families en masse in tribal or hilly areas, DDP blocks or areas mentioned in the Fifth Schedule or Sixth Schedule to the Constitution, the appropriate Government shall ensure that a social impact assessment study is carried out in the proposed affected areas in the manner as may be prescribed."

Hence, there is no requirement to conduct a detailed SIA for Nafra-HEP. However, we have followed the spirit of the NPRRP to assess the social impact on a wide range of parameters. The National Policy of Resettlement and Rehabilitation (2007) asserts "There should be a clear perception, through a careful quantification of the costs and benefits that will accrue to society at large, of the desirability and justifiability of each project. The adverse impact on affected families - economic, environmental, social and cultural- needs to be assessed in a participatory and transparent manner."

2.3.3 The Arunachal Pradesh (Land Settlements and Records) Act. 2000

The Arunachal Pradesh (Land Settlements and Records) Act. 2000 is an act to provide a comprehensive law for land revenue administration for the whole of the state of Arunachal Pradesh incorporating customary rights on the land and certain measures of land reforms.

This Act in the history of Arunachal Pradesh is the first ever attempt to formalize the land and revenue administration. Thus this Act aims to achieve the following:-

- Land Revenue Administration comes in place.
- Customary rights incorporated in the act.
- Record of rights to be prepared.
- All unoccupied land i.e. res nullius to be the property of the govt.
- Survey and settlement of land revenue to be done.
- Customary rights getting converted into statutory rights. This also means supplanting of customary rights by statutory rights.

Some of the relevant provisions that require a mention here are as follows:

Title of lands etc. (Sec-9): All lands, public roads, lanes, paths, bridges, ditches, dikes, rivers, streams, nallahs etc. which are not the property of any person or community are hereby declared to be the property of the Government. Right to mines, quarries, minerals, natural gas, petroleum, etc. shall vest in the Government.

Arunachal Pradesh (Land Settlement and Records) Rules 2002 came into being on 20 July 2005. Under the provisions of the rules land settlement and records are proposed to be maintained. Those in

actual possession/occupation of land, other than Government land, may be necessarily given land possession certificate (LPC). The LPC is considered to be the authentic record for possession of land.

2.3.4 Legal Framework for Land Acquisition

The Land Acquisition Act 1894 and the Land Acquisition (Companies) Rules, 1963 are applicable to the state of Arunachal Pradesh. There are no state specific amendments on this Act. The Deputy Commissioner of a District is the chief revenue officer and is appointed as the competent authority by the State Government to exercise the power under The Land Acquisition Act 1894.

2.3.5 Other Applicable Laws and Provisions Prevailing in Arunachal Pradesh

2.3.5.1 Power of Deputy Commissioner to Eject Undesirable Persons

Under the provisions of the Chin Hills Regulation 1896 the Deputy Commissioner has the power to eject undesirable persons, not being the native of such area, if their continuance is injurious to the peace or good administration of the area.

2.3.5.2 Power of State Government to Regulate Forest or Wasteland under Assam Forest Regulation 1891

Matters related to land under the provisions of Assam Forest Regulation 1891 are given below:-

"Section – 36A **:** The State Govt. may regulate or prohibit in any forest or wasteland the breaking up or clearing of land, the pasturing of cattle or the fixing or clearing of vegetation.

Section – 36B: The State Govt. may assume management of such forest or land in public interest.

Section – 36C: Power of the State Govt. to acquire any private property under the Land Acquisition Act 1894 for public purpose."

2.3.5.3 Rights and Privileges of Local People over Forest under Assam Forest Regulation 1891

Though, the State Government has regulatory power in regard to land ownership and the local people have certain rights and privileges only. Following are some of the privileges that the community enjoys under Assam Forest Regulation 1891.

Section-8-13: Describes privileges of local people to take up *jhuming* and its recognition by Forest Settlement Officer (FSO). This is subject to control restriction and abolition by the State Govt. and not be a right. Jhuming was thus a privilege and not a right

Section – 11: A right of way, a right to water course or use of water or right of pasture or to produce. Except these, FSO can accept or reject other claims on land.

2.4 Definitions

1. Project Affected Family: "affected family" means— *(i)* a family whose primary place of residence or other property or source of livelihood is adversely affected by the acquisition of land for a project or involuntary displacement due to any other reason; *(ii)* any tenure holder, tenant, lessee or owner of other property, who on account of acquisition of land (including plot in the *abadi* or other property) in the affected area or otherwise, has been involuntarily displaced from such land or other property; (*iii*) any agricultural or non-agricultural labourer, landless person (not having homestead land, agricultural land, or either homestead or agricultural land), rural artisan, small trader or self-employed person; who has been residing or engaged in any trade, business, occupation or vocation continuously for a period of not less than five years in the affected area preceding the date of declaration of the affected area, and who

has been deprived of earning his livelihood or alienated wholly or substantially from the main source of his trade, business, occupation or vocation because of the acquisition of land in the affected area or being involuntarily displaced for any other reason.

2. Affected Area: “affected area” means area of village or locality notified by the appropriate Government under sub-section (*1*) of section 20 of the Land Acqusition Act.

3. Agricultural Labour: “agricultural labourer” means a person primarily resident in the affected area for a period of not less than five years immediately before the declaration of the affected area, who does not hold any land in the affected area but who earns his livelihood mainly by manual labour on agricultural land therein immediately before such declaration and who has been deprived of his livelihood;

4. Agricultural Land: “agricultural land” means lands being used for the purpose of— (*i*) agriculture or horticulture; (*ii*) dairy farming, poultry farming, pisciculture, sericulture, breeding of livestock or nursery growing medicinal herbs; (*iii*) raising of crops, grass or garden produce; and (*iv*) land used by an agriculturist for the grazing of cattle, but does not include land used for cutting of wood only;

5. BPL Family: “below poverty line or BPL Family” means below poverty line families as defined by the Planning Commission of India

6. Family: "family" includes a person, his or her spouse, minor sons, unmarried daughters, minor brothers, unmarried sisters, father, mother and other relatives residing with him or her and dependent on him or her for their livelihood; and includes "nuclear family" consisting of a person, his or her spouse and minor/children;

7. Land Acquisition: "land acquisition" or "acquisition of land" means acquisition of land under the Land Acquisition Act, 1894, as amended from time to time, or any other Act of the Union or a State for the time being in force;

8. Marginal Farmer: "marginal farmer" means a cultivator with an unirrigated land holding up to one heactare or irrigated land holding up to half hectare;

9. Non-Agricultural Labour: "non-agricultural labourer" means a person who is not an agricultural labourer but is primarily residing in the affected area for a period of not less than five years immediately before the declaration of the affected area and who does not hold any land under the affected area but who earns his livelihood mainly by manual labour or as a rural artisan immediately before such declaration and who has been deprived of earning his livelihood mainly by manual labour or as such artisan in the affected area;

10. Small Farmer: "small farmer" means a cultivator with an un-irrigated land holding up to two hectares or with an irrigated land holding up to one hectare, but more than the holding of a marginal farmer.

12. Vulnerable Groups: The vulnerable groups includes socially marginalized groups such as Schedule Castes and Scheduled Tribes; economically vulnerable groups such as families below the poverty line, and women headed households; and such other sections of the society including senior citizens, physically challenged and children who require special consideration.

2.5 Impacts and Entitlements

The displacement and resettlement impact of the Nafra Hydro Electric Project is negligible. Hence, a Resettlement Action Plan is not mandatory. But, the provisions of NPRR-2007 are applicable for deciding the mitigation measures.

Chapter 3

APPROACH AND MEHODOLOGY

3 APPROACH AND METHODOLOGY

The role of the Social Development Professional is fundamental to managing impacts (negative and positive) and achieving sustainable, beneficial outcomes at all scales (Local, National and Global) from development projects. A transparent and participative process was adopted for this social Impact Assessment Study with support from community representatives, government bodies and project developers. Following steps were followed in this process.

3.1 Understanding the Proposed Development Project

Understanding of the Project was gained by participating in the environmental and technical design of the planned intervention. The understanding of the project is obtained from the reference of relevant documents, site visit and through interaction with the design team. After preliminary understanding was gained Stakeholders (interested and affected people) were identified and a preliminary stakeholder analysis was conducted.

3.2 Stakeholder involvement

A roadmap of public and other stakeholder involvement was prepared and information was shared with the project developer for ensuring his support. The local community was given the most important participant in this study. They were considered as a source of otherwise inaccessible data, and as an essential co-interpreter of the implications of proposed changes.

The information provided by the local community may suffer from the bias created by their construction and interpretation of reality based on the kind of information he receives about the project and its likely impacts. Developing ways of working with relevant local interests is a critical skill that requires great skills of facilitating community participation. Methodologically, calibration of these biases is significant for maintaining the objectivity and reliability of the information collected.

3.3 Creating Profile of baseline condition

In order to calculate the impact, defining or profiling the baseline condition is a pre-requisite. In preparing the profile information available from the secondary sources that are reliable were collected. Then it was supplemented by information obtained through a sample survey executed in the project impact area. As it was difficult to access and understand wide range of information within a fixed timeframe, help from a couple of appropriate candidates from the local community was sought. They helped in gaining a quick understanding of the cross-cultural issues.

The socio-economic information collection was done through administering a structured questionnaire that covered a sample household in the affected local area. The questionnaire used for this socio economic survey is provided in the *Appendix-1*. The survey was conducted in a large sample size to make the information more representative and assessments more accurate. The sample survey covered 180 households spread in three villages in the vicinity. The total population covered in this survey is 987. As per 2001 census the total enumerated population in these three villages was 1800. Hence, this sample is fairly representative of the universe.

3.4 Scoping or Identification of Range of Likely Impacts

The scoping involves the process to identify and prioritize the range of likely social impacts through a variety of means. The prescribed policies and regulatory guidelines defines the scopes of the SIA, hence the relevant guidelines and policies has been adopted during this scoping exercise. The relevant policies and guidelines used in the scoping exercise are discussed in Section 2 of this report that deals with policy, legal and regulatory frameworks.

3.5 Public Opinion Survey on Range of Likely Impacts

A public opinion survey was conducted in a sample of 180 households in the impact area. In this survey the entire range of likely impacts was referred to the public for their assessment. The result is analysed and produced in this report. The views expressed by them are integrated into the mitigation measures suggested in Chapter-8 of this report.

3.6 Assessment of Impact

Apart from this socio-economic survey, observation of socio-cultural processes, rapid ethnography, Group Discussions, and informant interviews were conducted to gather qualitative information to analyze and predict the probable impacts of the project against baseline conditions. Photographs and summary of the consultations and discussions held by different groups is presented in Appendix-2.

3.7 Conducting Land Acquisition Survey

A field survey was conducted as per the design of different components in Detailed Project Report. This survey was conducted jointly with the community representatives and local revenue officials to identify and record the ownership of the land that would be affected by the project. All land, structures, and other fixtures affected by the project were duly recorded and their cost was estimated as per the procedural guidelines.

3.8 Rehabilitation Plan and Budget

As the projects do not involve displacement, no resettlement plan is prepared. The project however involves acquisition of land under private possessions of 10 families, and the rest under collective ownership of the community. Hence, the rehabilitation of these project affected families is addressed in land acquisition plan and social mitigation measures. The budget requirement for both land acquisition and rehabilitation activities is also estimated.

3.9 Social Impact Mitigation Measures

A comprehensive Mitigation Plan is prepared and presented in Chapter-8 of this report for facilitating implementation of the recommendations.

Chapter 4

REGIONAL PROFILE: THE BASELINE CONDITION

4 REGIONAL PROFILE: The Baseline Condition

4.1.1 General Profile: Arunachal Pradesh

Arunachal Pradesh is situated between latitude 26° 30' N and 29° 30 ' N and longitude 91° 30' E and 97° 30' E with 83743 sq. kms area and has a long international border with Bhutan to the west, China to the north and north-east (1,080 km) and Myanmar to the east (440 km). Itanagar is the capital of Arunachal Pradesh and located at an altitude of 530 meters above MSL.

As of today, the population of Arunachal Pradesh is little over 1 million (1,091,117- Census-2001). The total number of households in Arunachal Pradesh is 2,12,615. The people of Arunachal Pradesh are divided into 82 tribes and sub-tribes. Population of tribal groups constitutes 63% of the total population and the rest 37% are non-tribal migrants. The State has the lowest density of 13 persons per sq. km. As against decadal growth rate of 21.34% at the national level, the population of the State has grown by 26.21% over the period 1991-2001. The sex ratio of Arunachal Pradesh at 901 females to 1000 males is lower than the national average of 933. Total literacy of the State rose to 54.74% from 41.59% in 1991.

The state is divided into 16 districts (as on 31st Mar 2004), and 44 subdivisions, 85 blocks and 169 Circles, 17 towns, 3863 villages.

4.1.2 General Profile: West Kameng District

West Kameng district constitutes about 8.86 percent of the total area of the state of Arunachal Pradesh and is located between 91°-56'E and 28°-01'N. The district is surrounded by Tibet in the north, Bhutan in west, Tawang district of Arunachal Pradesh in north, East Kameng in the north-east, and Assam in the southern boundary.

The name of the district is derived from the Kameng River, a tributary of the "Brahmaputra River (Assam)" that flows through the district. The topography of the district is mostly mountainous. A greater part of it is 'higher mountain zone' - a mass of tangled peaks and valleys. There are two principal mountain ranges, i.e., Bomdila Range and Foothills range. The Bomdila range has an average height of 9000 feet separated by a 4500 feet high valley of river Dirang-Chu, a Tributory of 'Kameng River'. Foothills range lies to the south of the Bomdila range with hills of low altitude. The foothill area is full of tropical forest with trees of great economic values and several wild animals.

Three rivers traverse though West Kemang district, viz: Tenga, Bichom, and Dirang-Chu. All three of them are tributaries to the Kameng River that ultimately join the river Brahmaputra in Assam. The climatic condition in the district is mostly determined by the location of the place, height of the mountains and the nature of the soil. In general the climate is hot and humid up to 4999 feet, temperate up to 7000 feet, and cold and humid beyond that.

Table 4:1 Administrative Set-up of Kameng District

1	Sub-Division	3 Nos.
2	Circle	12 Nos.
3	Town	1 No. (Bomdila)
4	Villages (As per 2001 Census)	213 Nos.
5	Community Development Block	4 Nos.
6	Gram Panchayat	97 Nos.
7	Anchal Samity	9 Nos.
8	Zilla Parishad	1 No
9	Assembly Constituency	4 Nos.
11	Police Station	6 Nos.

Source: West Kameng District At a Glance 2006, District Statistical Office (As on 31/03/2006)

The entire district is divided into 3 sub-divisions, viz., Bomdila, Rupa and Thrizino. Nafra is one of the five circles that constitute Thrizino sub-division. The Deputy Commissioner, West Kemang district is the overall in-charge of the district administration. He also maintains law and order with help from other administrative officers and police force. The villages have their own 'customary administrative system' in the form of traditional village councils. The village council is usually consists of the *'Gaon Burahs'* and '*Panchayat Members'*. The Assam Frontier Administration of Justice Regulation 1945' authorizes the village councils to settle all civil matters falling within their jurisdiction. However, for all matters, the Deputy Commissioner and some other Administrative Officers have jurisdiction under the supervision of the 'Assam High Court', which holds the 'appellate and revisional authority'.

Table 4:2 Administrative Set-up of Thrizino Sub-Division

Circle	Year Opening	Rank of Officer Incharge	Distance from District HQ (In Km)
(i) Thrizino	1953	Sub-Division Officer (SDO)	130
(ii) Nafra	1954	Extra Assistant Commissioner (EAC)	70
(iii) Jamiri	1994	Circle Officer (CO)	45
(iv) Bhalukpong	1973	Extra Assistant Commissioner (EAC)	101
(v) Singchung	1997 (May 2006)	Additional Deputy Commissioner (ADC) Declared on 18/05/2006	32

Source: West Kameng District At a Glance 2006, District Statistical Office (As on 31/03/2006)

4.1.3 General Profile: Project Location (Nafra and surrounding area)

There are 16 human settlements in the radius of 10 kms from the central axis of the proposed Dam. The list of these settlements and their height from the mean sea level is provided in the table below:

Table 4:3 Human Settlements within 10 Kms Radius from the Dam Axis.

Sl No	Name of the Settlement/Village	Height from MSL in Meters	Sl No	Name of the Settlement/Village	Height from MSL in Meters
1	Nafra	990	10	Minzing	1890
2	Lower Jung	1200	11	Gurian	1955
3	Dishak Pam	1230	12	Rajang Phu	2291
4	Magiyang Pam	1721	13	Browjin	1800
5	Giji Pam	1700	14	Khaing Pam	1958
6	Thaljing Pam/Mashing	1850	15	Khelong	1270
7	Singson Pam	1400	16	Lacha	1775
8	Magyon Pam	1721			
9	Guriang	2255			

Figure 4:1 Map of Affected Area and Position of the Village Settlements located in close proximity

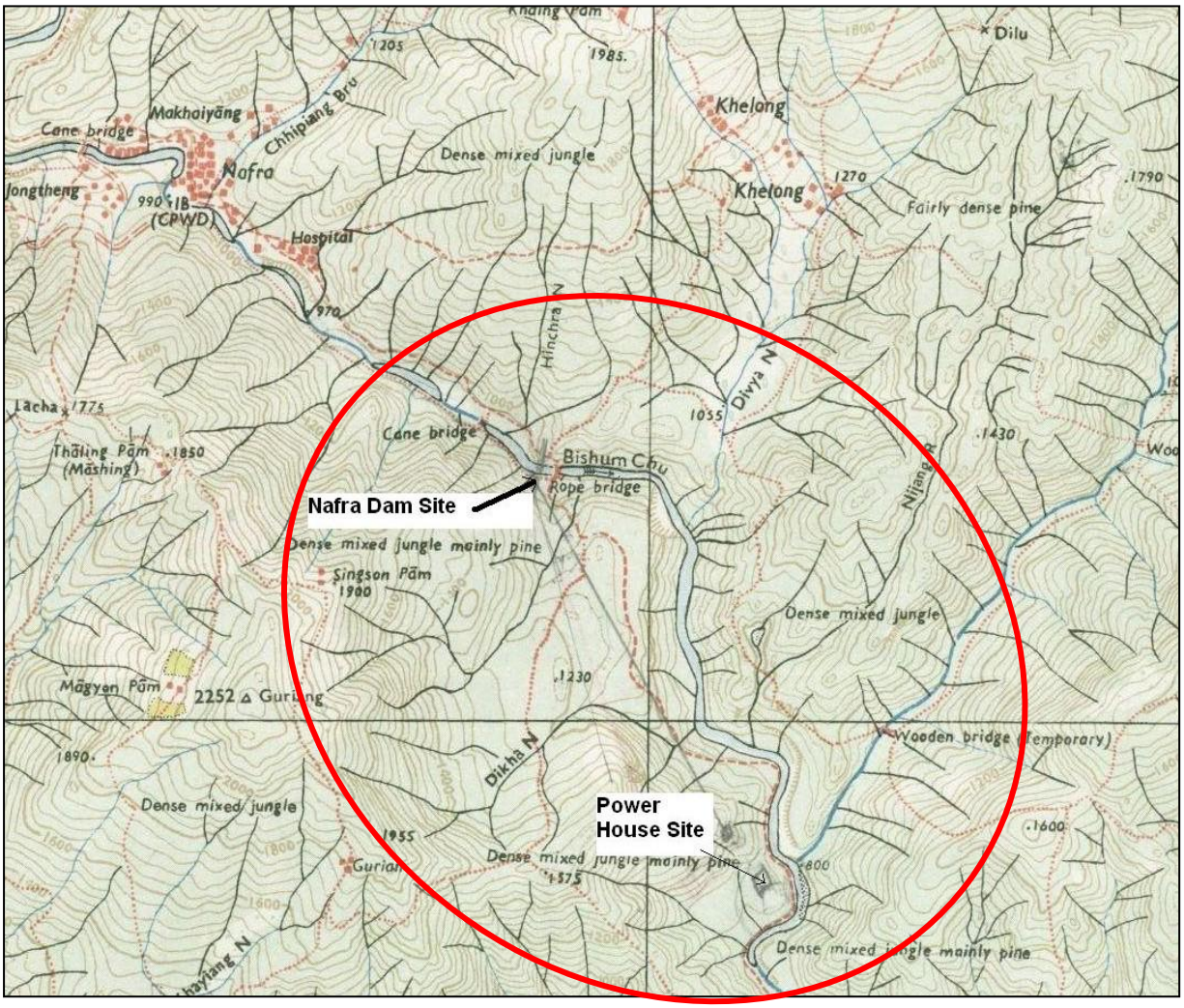
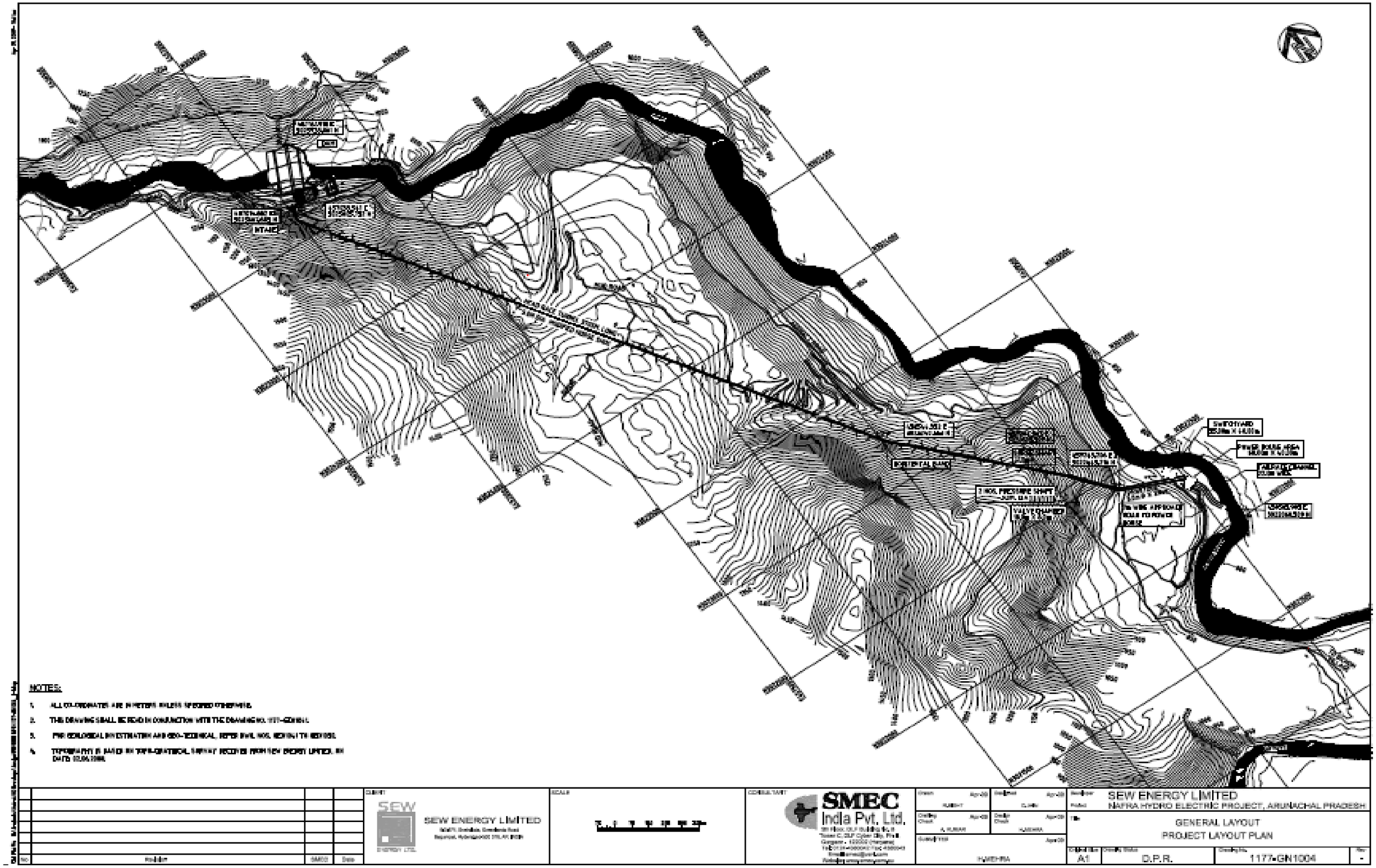


Figure 4:2 Map Showing different Project Components.



The Map provided here shows the location of different components of the project such as dam site, submergence area, powerhouse, transmission line etc. The proposed Nafra HEP site falls within the area regulated by Lower Jung and Khellong village panchayat under Nafra circle. The affected area in the left bank of the Bichom river falls within the Khellong Gram Panchayat, and that of the right bank belongs to the Lower Jung Gram Panchayat. Other villages/settlements located within 10 kms radius from the dam axis are situated in higher elevation. Hence, their dependency on the proposed river is negligible.

4.2 Socio-Cultural Profile

4.2.1 Socio-Cultural Profile: Arunachal Pradesh (State Level)

Broadly the people of Arunachal Pradesh may be divided into three cultural groups on the basis of their socio-religious affinities. The Monpas and Sherdukpens of Tawang and West Kameng districts follow the *lamaistic* tradition of Mahayana Buddhism. Noted for their religious fervour, the villages of these communities have richly decorated Buddhist temples, locally called 'Gompas'. Though largely agriculturists practising terrace cultivation, many of these people are also pastoral and breed herds of yak and mountains sheep. Culturally similar to them are Membas and Khambas who live in the high mountains along the northern borders. Khamptis and Singphos inhabiting the eastern part of the State are Buddhists of Hinayana sect. They are said to have migrated from Thailand and Burma long ago and still using ancient scripts derived from their original homeland.

The second group of the people is Adis, Akas, Apatanis, Bangnis, Nishis, Mishmis, Mijis, Thongsas etc., who worship Sun and Moon God namely, Donyi-Polo and Abo-Tani, the original ancestors for most of these tribes. Their religious rituals largely coincide with phases of agricultural cycles. They invoke nature deities and make animal sacrifices. They traditionally practice jhumming or shifting cultivation. Adis and Apatanis extensively practice wet rice cultivation and have a considerable agricultural economy. Apatanis are also famous for their paddy-cum-pisciculture. They are specialised over centuries in harvesting two crops of fish along with each crop of the paddy.

The third group comprises Noctes and Wanchos,adjoining Nagaland in the Tirap District. These are hardy people known for their strictly structured village society in which hereditary village chief still plays a vital role. The Noctes also practise elementary form of Vaishnavism.

The tribal groups of Arunachal Pradesh have highly ordered and organised system of functioning in their villages. All matters relating to the community as a whole are decided at the village level. The socio-administrative structure of the society, as evolved over a period of centuries, recognizes democratic partition right down to the level of villages.

The traditional Village Panchayat of an Adi Village is locally, known as 'Kebang' which is judicio-administrative body, consisting of mature and influential elders, Kebang looks after the administration of justice in the society by setting all matters of dispute. Similar such self-governing institutions exist among other tribes. They are variously called as *Jong* among the Sherdukpens, *Mel* among the Akas, *Buliang* among the Apaptanis and so on.

4.2.2 Socio-Cultural Profile: West Kemang (District Level)

There are five major Tribes in West Kameng District, viz., Monpas, Mijis, Sherdukpens, Akas (Hruss) and Khawa (Gugun). A Brief description of their cultural profile is provided here.

Monpas: The Monpas belong to the Tibeto-Mongoloid ethnic stock. A Monpa family is patriarchal. Though monogamy is the general norm, in some cases polygamy is also observed to be practiced. Monpas have their own hierarchy of clans and castes. Monpas are 'Mahayan Budhist' by religion with close cultural religious affinities with Bhutanese and Tibetans.

Monpas are agriculturists. They practice both shifting and permanent type of cultivation. They keep horse, yak, cow, pigs, sheep and fowls. They also do hunting by net, angle and trap. They are known for their traditional skills in wood carving, carpet making, weaving and painting.

Sherdukpen: The Sherdukpen belong to 'Tibeto-Mongoloid Stock'. Their main concentration is found to be spread over four main villages of Rupa, Jigaon, Shegaon and Thongri. Some of them are also settled in Kemengbari area in the district. Sherdukpens are sub-divided into two groups, viz., Thong and Chao. Thongs are believed to be descendants of the king Japtang Bura and the Chaos are descendants of his partners and servants. Hence, Thongs consider themselves superior to the Chaos. Each of these groups is further divided into several clans. The Sherdukpen family is patriarchal and they mostly practice monogamy. Like Monpas, the Sherdukpens are also Budhists and are deeply religious.

Sherdukpens are agriculturists and practice both shifting and permanent cultivation. They keep livestock like ponies, cows, goats, sheeps, bullocks and fowls. They hunt with bows and arrows. They also practice fishing by means of nets, angles an traps. Sherdukpen women possess traditional skills of weaving. An interesting feature of Sherdukpen life is their 'annual migration'. They migrate during the winter months to Doimara and in the adjoining foothills area for the purpose of trade and maintain their age old relationship with plains.

Aka (Hrusso): The Akas mostly inhabit south-eastern part of the district. Their main concentration is found in the 'Thrizino area'. Akas also bear tattoo marks in the face.

The Aka society has two groups, viz., Kutsun and Kavatsun. Aka family is patriarchal. Polygamy is a general practice in Aka society and cross cousin marriages are preferred. The practice of bride price is noticed and generally mithuns are paid in the form of bride price.

The most important community festival of the Akas is known as Nachido, performed by village priest once in a year.

The Akas are agriculturists and they practice 'shifting cultivation'. They keep Mithun, Cow, Horse, Goat, Pig and Poultry. They also practice hunting by use of spears. The women folk make colourful bags and basketry is a popular handicraft among men folk. The most common form of art is wood painting.

Khawa (Bugun): The Khawas belong to the mongoloid stock, and they also call themselves Bugun. Both men and women keep long hairs. They are also sub-divied into many clans. Khawa family is patriarchal, and they practice tribe endogamy and clan exogamy. They are mostly monogamous, but bigamy is observed occasionally. They are found in some of the villages in Thrizino circle in west Kameng district

The most important ceremony amongst the Khawas is Kshyatsowat. The village priest (*phabi*) performs the ritual and officiate ceremonies.

The Khawas are agriculturists, they also practice shifting cultivation. They keep domestic animals like cow, horse, pig, sheep, goat, foul and very rarely mithun too. They hunt and chase by means of spear, traps and arrows.

Sajolang/Mijis: The Miji, also known by the names of Sajolang and Damai. Sajolang belong to the 'mongoloid' ethnic stock. They mostly live in the Valley of Bichom River and they are a small community. According to their traditional beliefs, they had originally been migrated from the plains and claim to have close connection with the 'Ahom' kings who ruled over Assam. They are divided into two classes, namely, Nyubbu and Nyullu. These two sub-groups do not intermarry.

The Sajolang family is patriarchal. They are easily recognized by the prominent tattoo marks in their faces. Sajolang follow an indigenous religion which has certain amount of budhist influence as well. Though they believe in many Gods, 'Junglungnui' is the most powerfull among all. The most important festivals is known as 'fungglin' or 'chimdang'. In addition to this, they also celebrate a festival in honor of 'spirit' in the month of October every year. Each and every village has got a 'Deori' or priest who officiates in the rituals.

Sajolangs are mostly agriculturists and they do practice shifting cultivation. They were as well traditionally engaged in hunting and fishing. Basketry is a traditional skill found with the Sajolang men.

4.2.3 Socio-Cultural Profile: Study Area (Nafra and Surrounding Area)

The Nafra town, Khellong and Lower Jung is inhabited by the Sajolang tribe. The Sajolang inhabiting here belong to four clans. Each of this village is governed by a village council of its own. The prominent personalities of these villages are provided below:

Table 4:4 Prominent Personalities of the villages in the Affected Area

Village Name	Name of Person	Position
Lower Jung	Jaboi Longthen	Gaonbura
	Smt Maje Longthen	President, Gram Panchayat
	Dongseng Longthen	Member, Gram Panchayat
	Gorkha Longthen	Anchal Samiti Member
	Karmo Longthen	President, Joint Forest Committee
Nafra	Logyong Kikhong	Member, Anchal Samiti
	Leki Dongru	Member, Anchal Samiti
	Rinchin Kharu	Ex-MLA
	Zappu Daru	Ex-MLA
Khellong	Dimyang Dajangju	Gaonbura
	Thongyang Nikhangju	Ex-Block Chairperson
	Chondey Dajangju	Member, Anchal Samiti
	Ajin Thriju	Gaonbura

4.3 Demographic Profile

4.3.1 Demographic Profile: Arunachal Pradesh (State Level)

As per the Census 2001, the total population of Arunachal Pradesh is 1,091,117, out of which 573,951 are male and 517,166 are female. The sex ratio in the state is 901 females per thousand males. The literacy rate is only 54.74%.

Table 4:5 Demographic Profile of Arunachal Pradesh (As per Census 2001)

Population of State (2001 Census)	1, 091, 117
Males	573, 951
Females	517, 166

Literate Persons	487, 796
Literacy Rate	54.74%
Sex Ratio	901 females to 1000 males

4.3.2 Demographic Profile: West Kameng (District Level)

As per 2001 Census, West Kemang district has 213 villages and its district head quarter, Bomdila being the only town. The total population of the West Kameng district is 74,599. The broad demographic outline of the district is presented in the table below.

Table 4:6 Demographic Profile of West Kameng District, Arunachal Pradesh (As per Census 2001)

1	Total Population (2001)	=	74,599
2	Rural Population (2001) (Scheduled Tribe)	=	34,067
3	Urban Population (2001)	=	2,884
4	Scheduled Tribes Population	=	36,951
5	Scheduled Caste Population	=	372

The economic survey which was conducted in 2005 is the most recent source of statistical information for the West Kameng District. Highlights of the vital demographic information as per the economic census 2005 are presented in the table below. The decennial growth rate for the district is quite impressive at 32.31%. The growth of population in the district has been also noticed to be steady and has been more than 30% in the last two decades. The population density has reached 10 persons per square kilometers from the earlier figure of 8 persons. The sex ratio in the population has been improving since 1961.

Table 4:7 Vital Demographic Profile of West Kameng District, Arunachal Pradesh

Sl. No.	Particulars	As On 31/03/2006
1	Decennial Growth Rate	(+) 32.31 (%)
2	Density Of Population	10 Persons Per Sq. Km
3	Total Literate Population And Literacy Rate (Excluding 0-6 Percentage Year Age Group)	38488 (61.67%)
	A. Male	25864(48.56%)
	B. Female	12624 (71.02%)
4	Total Population (Age Group Of In Nos 0-6 Years)	12181
	Male	6221
	Female	5960
5	Percentage Decadal Variation In Population	
	1961 - 1971	(+)19.50%
	1971 - 1981	(+)29.44%
	1981 - 1991	(+)35.74%
	1991 - 2001	(+)32.21%
6	Sex Ratio	

Sl. No.	Particulars	As On 31/03/2006
	1961	586
	1971	661
	1981	834
	1991	822
	2001	901

* Source: Economic Census 2005

The West Kameng District is organized into four community development blocks. The composition of these CD blocks in terms of the circles and villages is presented in the table below.

Table 4:8 Composition of West Kameng District: Community Development Blocks, Circles and Villages in 2001 and 2005.

Sl. No.	Community Development Block (C. D. Block)	Block Head-Quarter	Circles Covered By The C. D Block	Villages Cover The Block As Per The	
				Population Cencus 2001	Economic Cencus 2005
1	Nafra - Bomdila C.D. Block	Nafra (H.Q)	(I) Bomdila	2	2
			(Ii) Nafra	26	33
2	Dirang C.D. Block	Dirang (Hq)	(I) Dirang	58	78
			(Ii) Thembang	10	10
3	Kahaktang C.D. Block	Kahaktang (Hq)	(I) Kalaktang	24	23
			(Ii) Rupa	10	14
			(Iii) Shergaon	6	8
			(Iv) Balemu	8	10
4	Thrizino Buragaon C. D. Block	Thrizino (Hq)	(I) Thrizino	19	21
			(Ii) Singchung	28	33
			(Iv) Bhalukpong	9	91
			(V) Jamiri	13	12
	Total	4	12	213	252

West Kameng district is composed of 12 circles. The population in these circles is provided in the table below. The population of the Nafra circle is 5818 (Census 2001), out of which 4648 belong to scheduled tribes.

Table 4:9 Circle wise Population, West Kameng District, Arunachal Pradesh

Sl. No.	Circle	Person/ Total (Col 3 + 4)	Male	Female	Schedule Tribes		
					Person Total (6+7)	Male	Female
0	1	2	3	4	5	6	7
1	Bomdila	7826	4199	3627	3671	1866	1085
2	Dirang	17106	9530	7576	11713	5922	5791

Sl. No.	Circle	Person/ Total (Col 3 + 4)	Male	Female	Schedule Tribes		
					Person Total (6+7)	Male	Female
3	Thembang	1320	700	628	1284	674	610
4	Nafra	5818	3012	2806	4648	2376	2272
5	Rupa	7191	4289	2902	2217	1130	1097
6	Kalaktang	6891	3318	3073	4646	2322	2324
7	Shergaon	3128	1789	1339	1282	651	631
8	Thrizino	3202	1611	1591	2577	1240	1337
9	Singchung	14608	9681	4972	2078	1081	991
10	Jamiri	1539	829	710	977	494	483
11	Bhalukpong	5519	3072	2447	1377	711	666
12	Balemu	943	512	431	481	245	236
	Total	75091	42542	32102	36951	18712	17523

*Source: Population Census – 2001,

Table 4:10 Total Population of 0.6 Years Age-group of West Kameng District

Sl. No.	Circle	Rural/ Urban	Population 0-6 Yrs Age Group		
			Person	Male	Female
1	Bomdila	Total	1047	545	502
		Urban	857	440	417
		Rural	190	105	85
2	Dirang	Rural	2790	1409	1381
3	Nafra	Rural	1271	688	633
4	Rupa	Rural	1088	554	534
5	Kalaktang	Rural	1546	788	758
6	Thrizino	Rural	750	379	379
7	Singchung	Rural	1360	672	680
8	Jamiri	Rural	289	155	134
9	Bhalukpong	Rural	940	503	437
10	Balemu	Rural	258	129	129
11	Special Charge	Rural	824	441	383
12		Urban	10	8	2
13	Bomdila Town	Urban	857	440	417
Grand Total (Urban + Rural)			12134	5221	5960

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

The population in 0-6 age group in west Kemang district is 12134, out of which 5221 are boys and 5960 girls. The sex ratio in 0-6 age-group is 1142 female per thousand males. This is well above the Kemang District overall sex ratio of 990 in 2001. The 0-6 age group population in Nafra Circle is 1271, out of which 688 are boys and 633 are girls. The sex ratio of the Nafra Circle in 2005 is 920 girls per thousand boys only. Hence, it deserves special attention.

There are 26 villages in Nafra Circle. The population figures of the villages under the Nafra Circle are

provided in the table below.

Table 4:11 Village wise population of Nafra Circle, West Kameng District, Arunachal Pradesh

Sl. No.	Name Of Village/Town	Population		
		Person	Male	Female
1	Longtin	330	160	170
2	Upper-Dzong	128	67	61
3	Janaching	188	90	98
4	Challan	166	91	75
5	Khozalang	165	89	76
6	Lapusa	63	41	22
7	Nijung	69	37	32
8	Khelong	315	168	147
9	Sanchipam	83	40	43
10	Nakhu	193	140	89
11	Nachibon	179	97	82
12	Najang	85	43	42
13	Dibirick	141	71	70
14	Wothung	12	8	4
15	Dillung	46	24	22
16	Dishing	19	13	6
17	Dibbin	251	115	136
18	Chillang	18	9	9
19	Mathow	134	67	67
20	Bulu	33	16	17
21	Ditchik	543	276	267
22	Rurang	233	124	109
23	Saidle	154	83	71
24	Khoina (Dhingchanpam)	308	156	152
25	Jerigaon	555	296	259
26	Nafra (Hq)	1407	727	680
	Grand Total (Nafra Circle)	5818	3012	2806

*Source: Population Census 2001.

Hence most of these settlements are small settlements with population even less than 300. The population of Nafra which is the head quarter of the circle is 1407. The other major villages with population more than 300 are Jerigaon, Khoina, Ditchik, Khelong and Longtin.

4.3.3 Demographic Profile: Project Impact Area

The proposed Nafra HEP is located close to the circle head quarter at Nafra. The two other villages that are located in the surrounding area are Kellong and Lower Jung. A brief profile of the project Impact area is given in Table-4.12 below.

Table 4:12 Demographic Profile of the Project Impact Area

Sl. No.	Name Of Village/Town	Population (2008)**			Sex Ratio
		Person	Male	Female	
1	Khelong	523	265	258	974
2	Lower Jung	171	78	93	1192
3	Nafra (Hq)	292	150	142	947
	Total	986	493	493	

*Source: ** Survey conducted by SIA team in November 2008

The marital status of the local population is provided in the table 4.13 below. Most of the people are married with only a negligible number of divorced or widowed persons. This indicates family as the most fundamental form of social institution is valued by the local community.

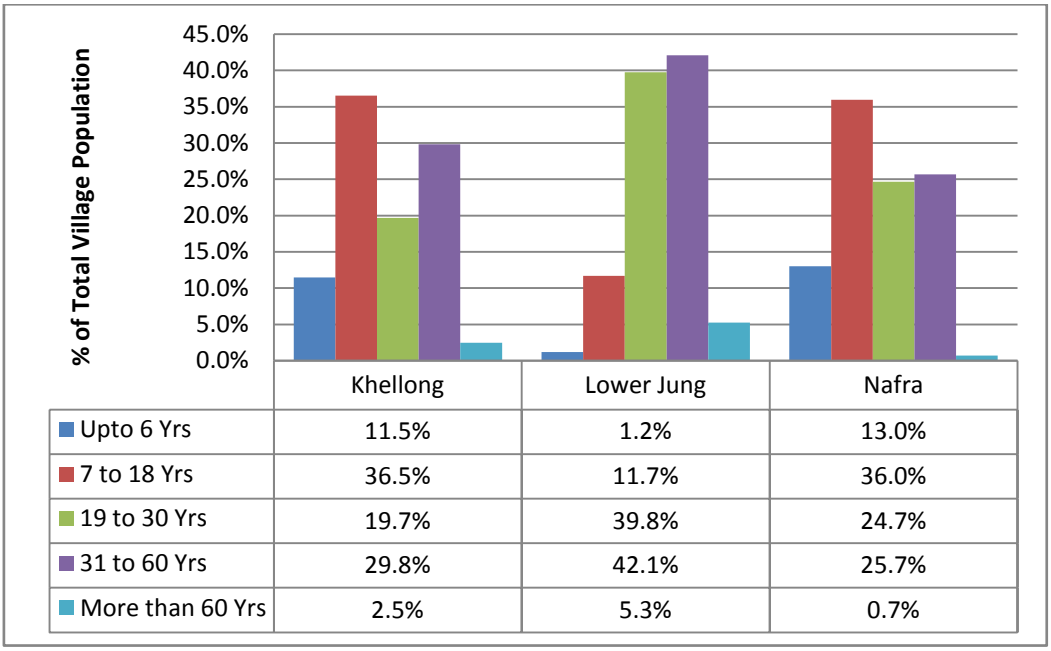
Table 4:13 Marital Status of the community in the impact area.

Villages	Married	Unmarried	Divorced	Widow/ Widower	Grand Total
Khellong	43.98%	55.26%	0.19%	0.57%	100.00%
Lower Jung	67.84%	25.15%	3.51%	3.51%	100.00%
Nafra	46.58%	53.42%	0.00%	0.00%	100.00%
Grand Total	48.88%	49.49%	0.71%	0.91%	100.00%

* Survey conducted by SIA team in November 2008

The age structure of the local community is presented in the Chart No. 4.1 below. 32% of the total population is in the age-group of 7-18 years. Only 2.4% of the total population is above 60 years of age. Hence, the life expectancy of the population seems to be low.

Chart 4.1 Age Structure of the surveyed population in villages of the impact area.



	Khellong	Lower Jung	Nafra
Upto 6 Yrs	11.5%	1.2%	13.0%
7 to 18 Yrs	36.5%	11.7%	36.0%
19 to 30 Yrs	19.7%	39.8%	24.7%
31 to 60 Yrs	29.8%	42.1%	25.7%
More than 60 Yrs	2.5%	5.3%	0.7%

* Survey conducted by SIA team in November 2008

Table 4:14 The gender break-up of the population in the impact area.

Village Name	Upto 6 Yrs		7 to 18 Yrs		19 to 30 Yrs		31 to 60 Yrs		More than 60 Yrs		Grand Total
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
Khellong	26 (5.0%)	34 (6.5%)	94 (18.0%)	97 (18.5%)	60 (11.5%)	43 (8.2%)	80 (15.3%)	76 (14.5%)	5 (1.0%)	8 (1.5%)	523 (100%)
Lower Jung	1 (0.6%)	1 (0.6%)	7 (4.1%)	13 (7.6%)	31 (18.1%)	37 (21.6%)	34 (19.9%)	38 (22.2%)	5 (2.9%)	4 (2.3%)	171 (100%)
Nafra	23 (7.9%)	15 (5.1%)	51 (17.5%)	54 (18.5%)	37 (12.7%)	35 (12.0%)	38 (13.0%)	37 (12.7%)	1 (0.3%)	1 (0.3%)	292 (100%)
Grand Total	50 (5.1%)	50 (5.1%)	152 (15.4%)	164 (16.6%)	128 (13.0%)	115 (11.7%)	152 (15.4%)	151 (15.3%)	11 (1.1%)	13 (1.3%)	986 (100%)

* Sample Survey conducted by SIA team in November 2008

The religious composition of the population living in the impact area is given in table 4.15 below. Almost all of them belong to Sajolang Tribe. Most of them term themselves as Hindus, though they mostly follow their indigenous belief system. Some of them follow Budhism and Christianity too.

Table 4:15 The Religious composition of the population in the impact area

Village Name	Indigenous (Tribal)	Hindu	Budhist	Christian	Grand Total
Khellong		523			523
Lower Jung	10	153	8		171
Nafra	12	238	19	23	292
Grand Total	22	914	27	23	986

* Sample Survey conducted by SIA team in November 2008

4.4 Education Profile

4.4.1 Education Profile: Arunachal Pradesh

The literacy rate increased from 38.48% in 1991 census to 61.67% in 2001 census. The gender breakup of the literacy rates in 1991 and 2001 census is provided in the table 4.16 below.

Table 4:16 Literacy rate of Arunachal Pradesh

Gender	Literacy in 1991	Literacy in 2001
Male	55.03%	71.02%
Female	35.22%	48.56%
Persons	38.48%	61.67%

4.4.2 Education Profile: West Kameng District

The literacy rate for the West Kameng District

Table 4:17 Literacy rate for West Kameng District

Gender	Literacy in 1991	Literacy in 2001
Male	55.03%	71.02%
Female	35.22%	48.56%
Persons	38.48%	61.67%

The educational infrastructure available in West Kemang district is provided in the table 4.14 below. There are 87 Primary Schools and each school has a pre-primary centre attached to it. There are only

33 middle school and 6 secondary schools in West Kameng District. Hence, a facility for middle and secondary school education is very restricted.

Table 4:18 Educational Infrastructure in West Kameng District.

Particulars	As On		
	31-03-03	31-03-04	31-03-05
Higher Secondary School	5	5	5
Secondary School	6	6	6
Senior Basic School	NIL	NIL	NIL
Middle School	33	33	33
Pre-Primary School	87	87	87
Primary School	87	87	87
Community School	2	31	34
Kendriya Vidhyalaya School	2	2	2

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

The scenario of higher and vocational education is also quite gloomy. The district has only one Industrial Training Institute (ITI). The trades on which this sole ITI centre provides vocational training is provided in Table- 4.19. The number of Trainees passed out from this centre is not even in double digits. Only trades which have some demand in the local job market are fitter and welder.

Table 4:19 Vocational Trades offered in Industrial Training Institute (I. T. I.), Dirang.

Sl.No.	Particulars / Name Of Trades	Number Of Passed-Out Trainees 2001 - 2002	Number Of Passed-Out Trainees 2002 - 2003	Number Of Passed-Out Trainees 2004 - 2005
(i)	Fitter	7	Nil	3
(ii)	Welder	6	5	3
(iii)	Turner	2	Nil	Nil
(iv)	Mechanist	3	Nil	Nil
(v)	Metallurgy	Nil	Nil	Nil
	Total	18	5	6

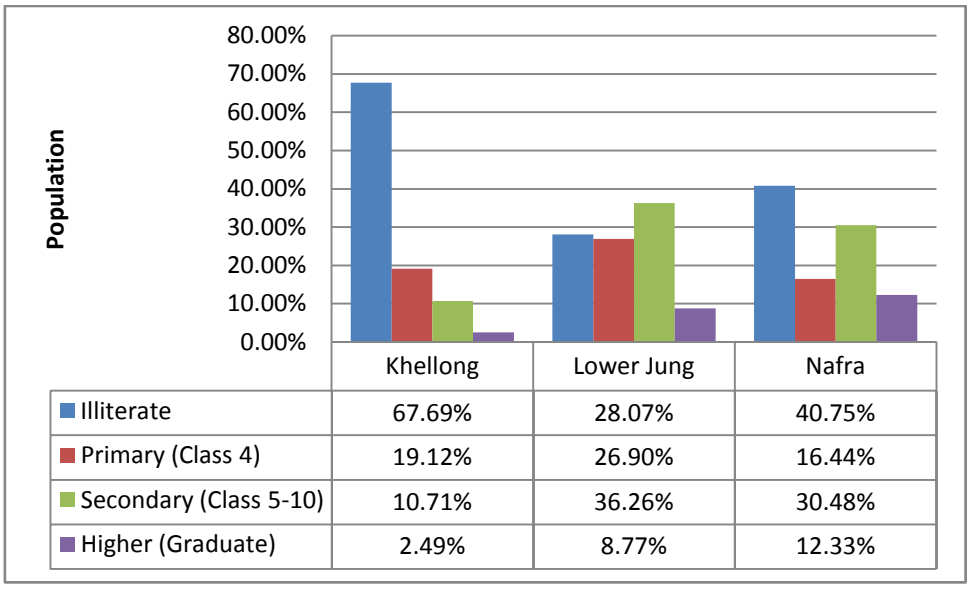
*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

4.4.3 Education Profile: Project Impact Area

The sample study conducted by the SIA team in November 2008 also included the educational level of the respondent and the family members. The findings on the education level of the population in the impact area are provided in the chart 4.2. The literacy level in Khellong is the lowest among the three at 32.31%. The literacy level of Lower Jung is as high as 72% and that of Nafra is at 59%. The higher education (Beyond School Education) is as low as 6.5% of the total population and just 14% of the total literate population. Khellong village which is located at a higher elevation and has no proper road connectivity has only 2.5% of the total population who have received higher education. Most of the

educated (higher education) population lives in Nafra town. 12.33% of the total population in Nafra has received higher education. Not a single person in the impact area is reported to have received technical or vocational education.

Chart 4.2 Education Profile in the Impact Area

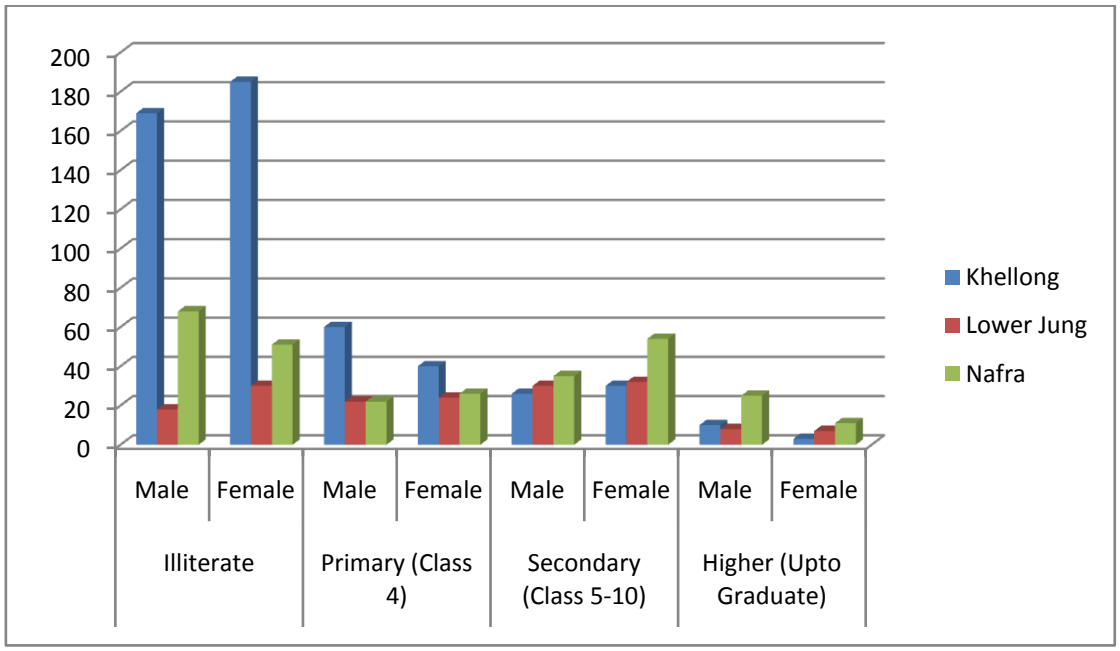


	Khellong	Lower Jung	Nafra
Illiterate	67.69%	28.07%	40.75%
Primary (Class 4)	19.12%	26.90%	16.44%
Secondary (Class 5-10)	10.71%	36.26%	30.48%
Higher (Graduate)	2.49%	8.77%	12.33%

*Source: Sample Survey by SIA Team in Nov 2008

The gender break-up of the education level of the surveyed population is presented in the chart 4.3. The illiterate female population is more than illiterate males in all the three villages. This trend continues till primary level. In Secondary level, the difference between the male and female reduces for Khellong and Lower Jung. The females reaching secondary level are more in Nafra in comparison to males. Then at higher level the female literacy again drops against the male literacy.

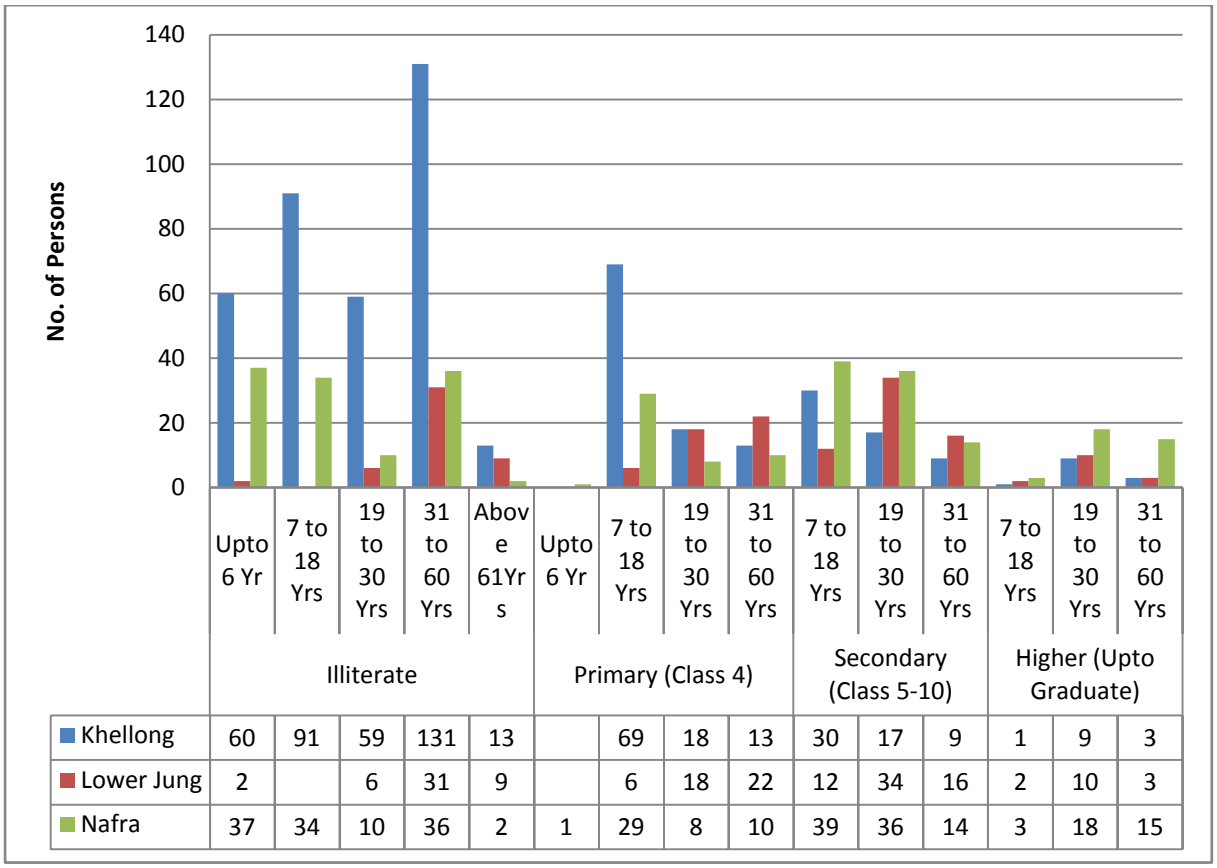
Chart 4.3 Gender Breakup at different education levels in Impact Area.



*Source: Sample Survey by SIA Team in Nov 2008

The chart 4.4 displays the age break-up of the educational levels discussed above. There are 91 persons in the age-group of 7 to 18 who are illiterate in Khellong and 34 persons in this age group in Nafra. The population in 19 to 30 yrs age group who have completed secondary education, and higher education could be provided skill trainings for their employment.

Chart 4.4 Age Breakup of the Education Level in Impact Area



	Illiterate					Primary (Class 4)				Secondary (Class 5-10)			Higher (Upto Graduate)		
	Upto 6 Yr	7 to 18 Yrs	19 to 30 Yrs	31 to 60 Yrs	Above 61Yrs	Upto 6 Yr	7 to 18 Yrs	19 to 30 Yrs	31 to 60 Yrs	7 to 18 Yrs	19 to 30 Yrs	31 to 60 Yrs	7 to 18 Yrs	19 to 30 Yrs	31 to 60 Yrs
Khellong	60	91	59	131	13		69	18	13	30	17	9	1	9	3
Lower Jung	2		6	31	9		6	18	22	12	34	16	2	10	3
Nafra	37	34	10	36	2	1	29	8	10	39	36	14	3	18	15

*Source: Sample Survey by SIA Team in Nov 2008

4.5 Economic Profile

As per Satelite Survey of December 1988 to February 1999, the total forest area in Arunachal Pradesh is 68,847 sq. kms (82.21% of the total area). Agriculture is the main occupation of the local people in the district and 80% people practice it as their primary occupation.

4.5.1 Economic Profile: Arunachal State

The State domestic product is defined as the aggregate of the economic value of all final goods and services produced within the state in a year and only such of the economic goods and services that can satisfy socially accepted human wants are considered. The estimate for the year 2004-05 is available in the district statistical handbook (2005) and is reproduced here in Table 4.13. The handbook also provides information on the provisional estimates for the year 2003-04 and the revised estimate for the year 2002-03. These estimates reflect the economic situation of the state and indicate the trajectory of development over a period of time.

The Gross State Domestic Product (GSDP) is estimated at 255637 lakhs in 2004-05 as against 89311 lakhs in 1993-94. In 2004-05, Net State Domestic Product (NSDP) is estimated at Rs 226630 lakhs at current prices as against R 812213 lakhs in 1993-94. The growth of NSDP during the years from 1993-94 to 2004-05 is 124.04% at current prices.

Table 4:20 Net State Domestic Product (NSDP) Estimates from 2001 to 2005

Item	1993-94	2000-01	2001-02	2002-03	2003-04	2004-05
NSDP (Rs. In Lakhs)	81262	99305	103572	109209	116161	118902
Indices of NSDP (1993-94 = 100)	100	122.28	127.53	134.47	143.03	146.41
Percentage change in NSDP over previous year	-	4.78	4.3	5.44	6.37	2.36
Per Capita NSDP (In Rs.)	8733	9153	9331	9742	10234	10348
Indices of per Capita NSDP (1993-94 = 100)	100	104.81	106.85	111.56	117.17	118.5
Percentage change in per Capita NSDP over previous year	-	2.96	1.94	4.41	5.05	1.11

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

The per capita NSDP shows a steady increase over the years from 2001 to 2005. The percentage change in per capita NSDP over the previous year however has fluctuated between 1.11 to 5.05. The change in 2002-03 and 2003-04 were high indicating period of soaring economic activities.

The state of Arunachal Pradesh has shown rapid progress in the last decades. The table-14 gives a comparative picture of number of enterprises in the state in 1998 and in 2005. In rural areas one notices growth of agricultural enterprises, however the growth of non-agricultural enterprises in rural area is only 26.69%. **Hence, the scope of technology driven non-agricultural development in rural areas needs to be emphasized**. In urban areas, the growth of agricultural enterprises is 300%. This indicates that the state is undergoing modernization of the agricultural practices, hence the growth of support facilities at the urban hubs. The growth of non-agricultural enterprises is 60.60% in urban areas. **This indicates the state still needs to provide more impetus to secondary and tertiary sectors in its development initiatives.**

Table 4:21 Percentage Growth In Number Of Enterprises In Arunachal Pradesh

Sl. No.	Particulars (Rural/ Urban)	Economic Census (E.C)		
		1998	2005	Percentage (%) Growth in No. of Enterprise
A	Rural			
I	Agricultural	181	357	97.24 (%)
Ii	Non-Agricultural	14364	18342	27.69 (%)
B	Urban			
I	Agricultural	20	80	300 (%)
Ii	Non-Agricultural	6129	9843	60.60 (%)

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

4.5.2 Economic Profile: West Kameng District

The Gross and Net Domestic Product estimates by industry is provided in the table 4.15. The estimates of NDMP at current prices for 2003-04 reveal that Lohit district has the highest contribution of 13.20% to the total NSDP of Arunachal Pradesh, followed by Changland District (11.55%), Paumpare district (10.55%), Tirap District (9.82%), West Siang (9.26%), West Kameng district (8.12%), Lower Subansiri district (7.77%), East Siang district (7.12%), Dibang Valley District (5.78%), Upper Subansiri District (5.04%), East Kameng district (4/85%), Tawang District (3.85%) and the smallest contribution from Upper Siang district (3%).

Among the districts, **per capita income of West Kameng district was found to be the highest** with Rs 23,897/- at current prices during 2003-04. At current prices, the highest contribution to the primary

sector was from Changland district (19.11%), followed by Hohit district (12.94%), Tirap district (12.90%), and Lower Subansiri district (9.75%), and Upper Siang district (3.26%) being at the bottom.

The highest contributin to the secondary sector is from the Lohit district (12.47%), followed by West Kemang district (10.97%), Papumpare district (10.71%), and Tirap district (10.32%), and the lowest contribution being from Tawang district (1.34%).

Papumpare district contributed the highest of (15.03%) to the tertiary sector followed by Lohit district (13.70%), West Siang district (10.21%) and West Kameng district (8.84%), and the lowest contribution being from the Upper Siang district (2.10%).

Table 4:22 Estimates Of Gross District Domestic Product Of West Kameng For Year 2003-04 at Current Prices

SL. NO.	Industry	West kameng gross domestic product 2003-04 (Rs. In Lakhs)
1	Agriculture	2693
2	Forestry and Logging	1436
3	Fishing	90
4	Mining and Quarrying	15
	Sub Total (Primary Sector)	4234
5	Manufacturing (Un-Registered)	374
6	Construction	3858
7	Electricity Gas and Water Supply	925
	Sub Total (Secondary Sector)	5157
8	Transport, Storage and Communication	890
9	Trade, Hotel and Restaurant	918
10	Banking and Insurance	635
11	Real Estate, Ownership of Dwellings and Business services	200
12	Public Administration	3147
13	Other Services	3220
	Sub Total (Tertiary Sector)	9010
	Gross District Domestic Product	18401
	Population (Lakhs)	0.77
	Per Capita (In Rupees)	23,897/-

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

Hence, West Kameng's economy is stronger in the secondary and tertiary sectors. Hence the primary sector activities need to get attention to provide strong base and stability to the economy of the district. Table 4.23 provides the circle wise details of the households, enterprises and workers in West Kameng District.

Table 4:23 Total number of Household Industries/ Enterprise/ Workers in West Kameng district as per Economic Census – 2005

Sl. No.	Circle	Household Industries	Enterprises	Workers
1	Bomdila	1906	559	2283
2	Dirang	3467	367	893
3	Thembang	175	18	34

Sl. No.	Circle	Household Industries	Enterprises	Workers
4	Nafra	1229	195	490
5	Rupa	1352	259	1025
6	Kalaktang	1454	171	406
7	Shergaon	608	99	393
8	Singchung	2374	308	1200
9	Thrizino	585	84	357
10	Jamiri	254	35	272
11	Bhalukpong	1529	321	1617
12	Balemu	256	35	68
	TOTAL	15189	2451	9038

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

The table 4.24 provides the estimates of the category of workers such as agricultural labours, cultivators, household industries and other workers in West Kameng district. 35.42% of the working populations are cultivators, 3.99% are agriculture laborers, 1.03% depends on household industries, and 50.56% are engaged in other vocations.

Table 4:24 Category of Workers and Marginal Workers in West Kameng District (Economic Census 2005)

Sl. No.	Category Of Workers And Marginal Workers	As On 31/03/2006	
		In Nos.	Percentage
A	Cultivators	11470	(35.42)
I	Male	6235	(18.15)
II	Female	5235	(17.27)
B	Agriculturral Labours	1370	(3.99)
I	Male	722	(2.10)
II	Female	348	(1.39)
C	Household Industry	355	(1.03)
I	Male	147	(0.43)
II	Female	208	(0.60)
D	Other Workers	20450	(50.56)
I	Male	17766	(51.72)
II	Female	2603	(7.84)

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

Table 4.25 provides an overview of the status and characteristics of the enterprises functioning in West Kemang district and a comparative picture vis-a-vis the state level information.

Table 4:25 Enterprises with Selected Characteristics In Respect Of West Kameng District (Economic Census 2005)

Particulars	West Kameng district	Arunachal Pradesh
Total Number Of Enterprises (Rural)		
Without Premises	35	941
With Premises	1872	17758
Agricultural and Non-Agricultural	1907	18699

Particulars	West Kameng district	Arunachal Pradesh
Agricultural	32	357
Non-Agricultural	1875	18342
Having 10 (Ten) or More workers	106	915
Total Number Of Enterprises (Urban)		
Without Premises	30	857
With Premises	514	9066
Agricultural	0	80
Non-Agricultural	544	9843
Agricultural and Non-Agricultural	544	9923
Having 10 (Ten) or More workers	43	578
Total Number Of Enterprises (Combined) (Rural + Urban)		
Without Premises	65	1788
With Premises	2386	26824
Agricultural	32	437
Non-Agricultural	2419	28185
Agricultural and Non-Agricultural	2451	28622
Having 10 (Ten) or More workers		1493
Total Number Of Persons Usually Working (Rural)		
Adult Male	5267	48565
Adult Female	1445	15007
TOTAL (Including Children)	6800	64343
Total Number Of Persons Usually Working (Urban)		
Adult Male	1521	32256
Adult Female	685	10339
TOTAL (Including Children)	2249	42855
Total Number Of Persons Usually Working (Combined) (Rural + Urban)		
Adult Male	6788	80821
Adult Female	2130	25346
TOTAL (Including Children)	9049	107198
Total Number Of Non-Hired Persons Usually Working (Rural)		
Adult Male	366	9913
Adult Female	442	3627
TOTAL (Including Children)	1357	13931
Total Number Of Non-Hired Persons Usually Working (Urban)		
Adult Male	354	7198
Adult Female	221	1525
TOTAL (Including Children)	603	8828
Total Number Of Non-Hired Persons Usually Working (Combined) (Rural + Urban)		
Adult Male	1220	17111
Adult Female	663	5152
TOTAL (Including Children)	1960	22759

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

The primary sector activities such as agriculture, forestry, fishing and mining or quarrying are not the major chunk of the gross domestic product, though they engage majority of the working population. **The tertiary sector is almost three times larger than the primary sector economic activities. The secondary sector is also almost twice the size of the primary sector. Hence, the scope for economic development seems to be restricted to only a limited section of the population.** In other words, there is a tremendous scope to integrate the larger number of working population into the secondary and tertiary sector to boost their income.

Some of the important sectors in the economy of the West Kemang district are discussed below to provide a brief profile of the regional economy.

Agriculture

Agriculture is one of the most popular economic activities in West Kemang district where around 40% of the total workforce is engaged. The table below gives the details of the land resources such as net area sown, current fallow, uncultivated, cultivable waste land and land not available for cultivation.

Table 4:26 Land use classification in West Kameng District As per the Agriculture. Census 1990 - 1991 (Estimated)

S. No	Particulars	Community Development Blocks in West Kemang District				Total
		Dimang C.D Block	Nafra C.D Block	Kalaktang C.D Block	Thrizino-Buragaon C.D Block	
1	Net Area Sown	2,075	2,366	2,101	NA	6,542
2	Area Under Current Fallow	51	921	205	NA	1,177
3	Fallow Land Other than current Fallow	27	1,148	429	NA	1,604
4	Uncultivated other than fallow	584	865	534	NA	1,983
5	Cultivable Waste Land	NIL	726	497	NA	1,223
6	Land not available for cultivation	48	619	227	NA	894

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

The table below provides details of the production and yield rate of important crops in West Kemang district. Paddy/Rice, Maize and Wheat are three main crops grown in the district. The Maize is the most popular crop throughout all the CD blocks in the district. The next most cultivated crop is rice, though wheat is cultivated all across the district to a limited extent. In Nafra CD block, the major crop is Maize and Rice too.

Table 4:27 Area, Production and Yield per Hectare of Important Crops in West Kameng District during the Year, 2005 – 2006

C.D. Blocks	Paddy / Rice			Maize			Wheat		
	Area	Prod-Uction	Yield	Area	Prod-Uction	Yield	Area	Prod-Uction	Yield
Dirang C.D Block	310	430	13.6	1018	1578	15.5	92	147	N. A
Nafra C. D. Block	95	129	13.6	535	829	15.5	10	16	N. A

C.D. Blocks	Paddy / Rice			Maize			Wheat		
	Area	Prod-Uction	Yield	Area	Prod-Uction	Yield	Area	Prod-Uction	Yield
Kalaktang C.D Block	238	312	13.6	839	1300	15.5	72	115	N. A
Thrizino-Buragaon on C.D Block	217	298	13.6	432	670	15.5	8	13	N. A
TOTAL: -	860	1,169	13.6	2,824	4,377	15.5	182	291	N. A

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

Cottage Industries:

The status of the cottage industries in the district of West Kameng district is presented in the table 4.28. The presence of cottage industries in the district is quite flimsy. Apart from the craft centres, and weaving units, no village and small scale industries are found in the district. Though there are sericulture demonstration emporiums in the district, no promotional schemes are implemented. **Hence, there is a need to promote cottage industries in the district.** The Nafra circle where the proposed hydro electric project is located neither has any craft centre of village industries or small scale industries.

Table 4:28 Cottage Industries in West Kemang District, Arunachal Pradesh (As on 31st March 2006)

S No.	Particulars	Cottage Industries As On 31/03/2006					
		Bomdila	Dirano	Nafra	Kalaktang	Thrizino	Total
1	Craft Centre (In Nos)	1	NIL	NIL	1	NIL	2
2	Annual Out-Turn Craft Centres (In Lakhs Rupees)	2.32	NIL	NIL	0.22	NIL	3
3	Annual Sale Proceeds Craft Centres (In Lakhs Rupees)	2	NIL	NIL	N.A	NIL	2
4	Sericulture Demonstration of Emporium Centre (In Nos)	NIL	1	2	NIL	NIL	3
5	Weaving Unit (In Nos)	1	2	NIL	NIL	1	4
6	Medium Industries (In Nos)	NIL	NIL	NIL	NIL	NIL	NIL
7	Village and small Scale Industries (In Nos)	NIL	NIL	NIL	NIL	NIL	NIL
8	Rural Industries Project / District Industries Centre (D. I. C.) (In Nos)	NIL	NIL	NIL	NIL	NIL	NIL
9	Sericulture Scheme under North Eastern Council (N. E. C.) (In Nos)	NIL	NIL	NIL	NIL	NIL	NIL

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

Minor Forest Produce

Minor Forest Produce is another important economic resource for the people of West Kemang District. The West Kemang district constitutes four forest divisions, viz., Bomdila division, Rupa division, Bhalukpong division, and Kamngbari division. In Bomdila forest division, bamboo and cane are one of the major items.

Table 4:29 Minor Forest Products in West Kameng District, Arunachal Pradesh

FOREST DIVISION	Cost of Total Production in Lakhs				
	Bamboo	Other	Total	Cane and Bamboo	Other
	2004 - 2005			2005 - 2006	
Bomdila Forest Division, Bomdila	Rs. 0.04	Rs. 18.02	Rs. 18.06	Rs. 32.89	-
Shergaon Forest Division, Rupa	N. A.	N. A.	N. A.	N. A.	N. A.
Khellong Forest Division, Bhalukpong	Rs. 0.04	Rs. 0.03	Rs. 0.07`	Rs. 0.296	Rs. 0.3929
Northern Resources Survey Division, Kamngbari	NIL	NIL	NIL	NIL	NIL
	Rs. 0.08	Rs. 18.05	Rs. 18.13	Rs. 33.186	Rs. 0.3929

Fishery

Another important economic activity in West Kemang district is Fishery. The total fish production during the year 2005-06 in the district was 122 metric ton. The total inland fish production in 2005-06 has shown a marked improvement from its quantity in previous year. The total production in 2004-05 was only 20 metric ton, which reached 120 metric ton in the year 2005-06. Hence, the fish production is emerging as a new economic activity in the district and needs to be promoted.

Table 4:30 Total Fish Production / Fish Seed Production / Inland Fish Production In West Kameng District.

Sl. No.	Inland Fish Production	Unit	2004 - 2005	2005-2006
1	Quantity	In M.T	20	120
2	Price	Rs. Per Kg	80/-	80/-
3	Value	In Rs.	16,00,000/-	96,00,000/-

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

Tourism Development

Tourism is one of the important other economic activity in the district. Both domestic and foreign tourist visits the district. The table 4.31 provides the details of the infrastructure available in the district for supporting tourism activities. This could be one of the important sources of income for the local people.

Table 4:31 Information on Tourism Sector for West Kemang District, Arunachal Pradesh

	Particulars	2003-04	2004-05
1	Tourist visited during the Years	965	67
(a)	Foreigners	229	252

	Particulars	2003-04	2004-05
(b)	Domestic (Indian)	736	815
2	Govt. Tourist Lodge		
(a)	Number of Rooms	8	8
(b)	Number of Beds	16	16
3	Govt. Cafeteria Available	NIL	NIL
(a)	Tourist Lodge Constructed	NIL	NIL
(b)	Expanditure Incurred	NIL	NIL

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

4.5.3 Economic Profile: Project Impact Area

In this backdrop of the state and district's economic profile, let us discuss the economic profile of the Impact Area. The sample survey conducted in the impact area covered some of these important features and the findings are discussed in this section.

Land Holding and Agriculture:

The summary of land holding pattern in project impact area is presented in table 4.32. The average land holding in the impact area is 4.14 acres. The average land holding in Lower Jung is highest at 7.33 acres, 4.18 acres for Khellong and the lowest in Nafra at 1.53 acres. The average cropped land however is much lower. The average cropped land in Khellong is 2.87 acres, in Lower Jung 1.64 acres and in Nafra 0.80 acres. Hence, Khellong and Lower Jung are more reliant on the agriculture than Nafra. The average barren land holding however is highest in Lower Jung. The proportion of barren land in Khellong and Nafra is in average 0.02 acres only. Hence, most of the land owned by these two villages are put to agricultural use. Hence, Khellong villagers own more non-productive land. They have also put more land for tree plantation and grown orchard on it.

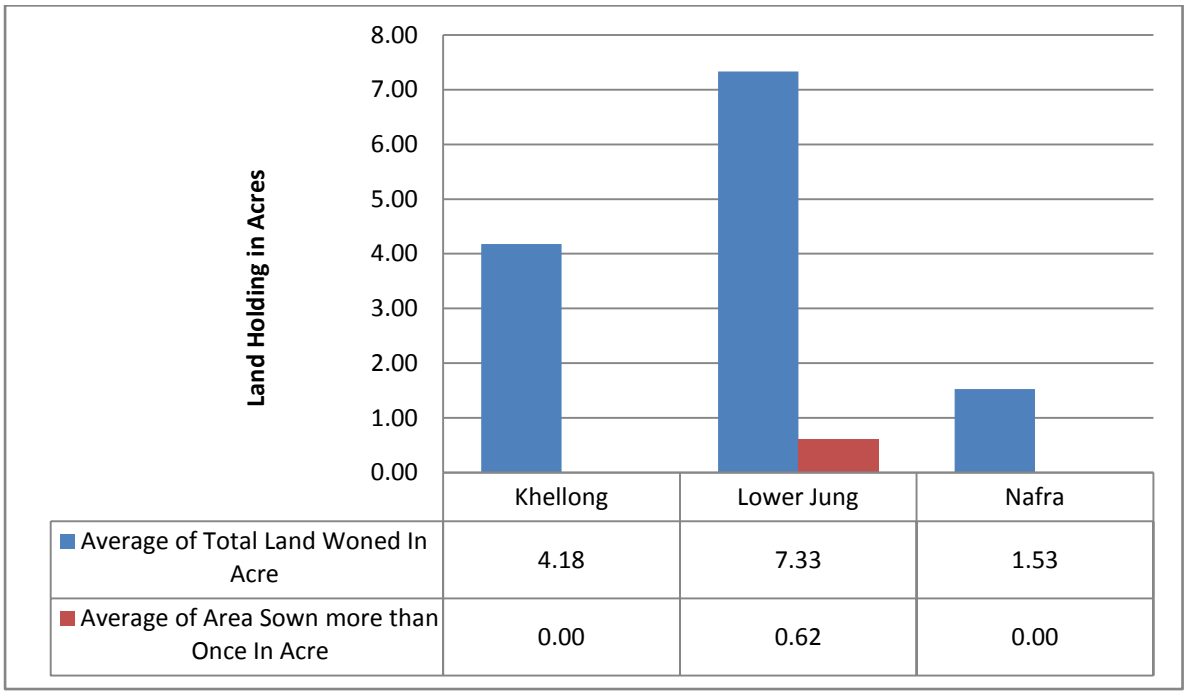
Table 4:32 Land-use Pattern in Project Impact Area

Village Name	Average of Residential Plot Area In Acre	Average of Barren Land In Acre	Average of Orchard In Acre	Average of Cropped Land In Acre	Average of Total Land owned In Acre
Khellong	1.02	0.02	0.33	2.87	4.18
Lower Jung	0.04	3.62	1.99	1.64	7.33
Nafra	0.56	0.02	0.39	0.80	1.53
Grand Total	0.66	0.84	0.72	2.00	4.14

*Source: Survey by SIA Team in Nov 2008

However the area sown more than once vis-à-vis the total land owned reveals that most of the land is cultivated just once in a year. Only in Lower Jung, 0.62 acres in average of the total land owned which constitutes only 8% of the total land holding is cultivated more than once in a year. Hence, agricultural operation in the impact area is mostly confined to a single season and single crop. This leaves people free from agricultural operation and available for being employed for other activities.

Chart 4.5 Area Sown more than Once vis-à-vis Total Land Owned

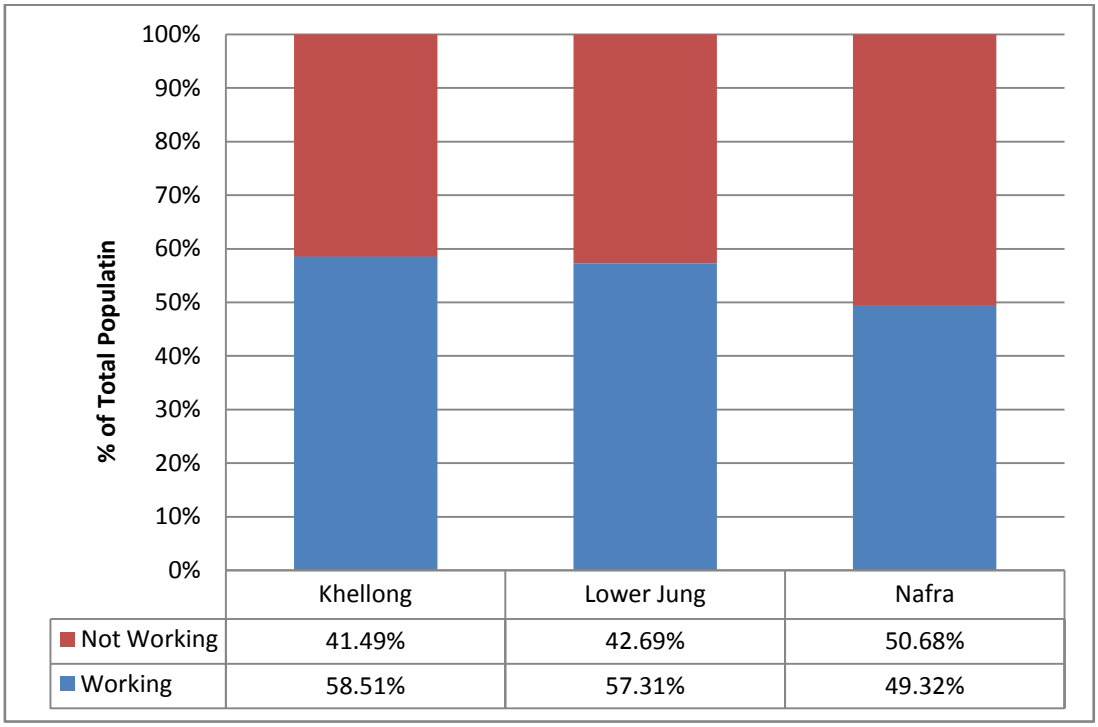


	Khellong	Lower Jung	Nafra
Average of Total Land Woned In Acre	4.18	7.33	1.53
Average of Area Sown more than Once In Acre	0.00	0.62	0.00

*Source: Survey by SIA Team in Nov 2008

In this context it is pertinent to have a look at the working and non-working population in the surveyed population in the impact area. Khellong and Lower Jung being more rural in nature, the working population is approximately 58% of the total population. The working population in Nafra however is below 50%.

Chart 4.6 Working and Non-Working Population in Impact Area



	Khellong	Lower Jung	Nafra
Not Working	41.49%	42.69%	50.68%
Working	58.51%	57.31%	49.32%

*Source: * Survey by SIA Team in Nov 2008

Livestock:

As people are dependent on only one crop per year, their reliance on livestock breeding is expected to be high. People keep Cattle, Mithun, Poultry, and Goat among others. The findings of the sample survey on livestock economy of the impact area are discussed below.

The total number of cattle enumerated during the sample survey is 710. There are 4 cattle per household in the project impact area. The size of cattle holding is highest in Lower Jung and lowest for Khellong village.

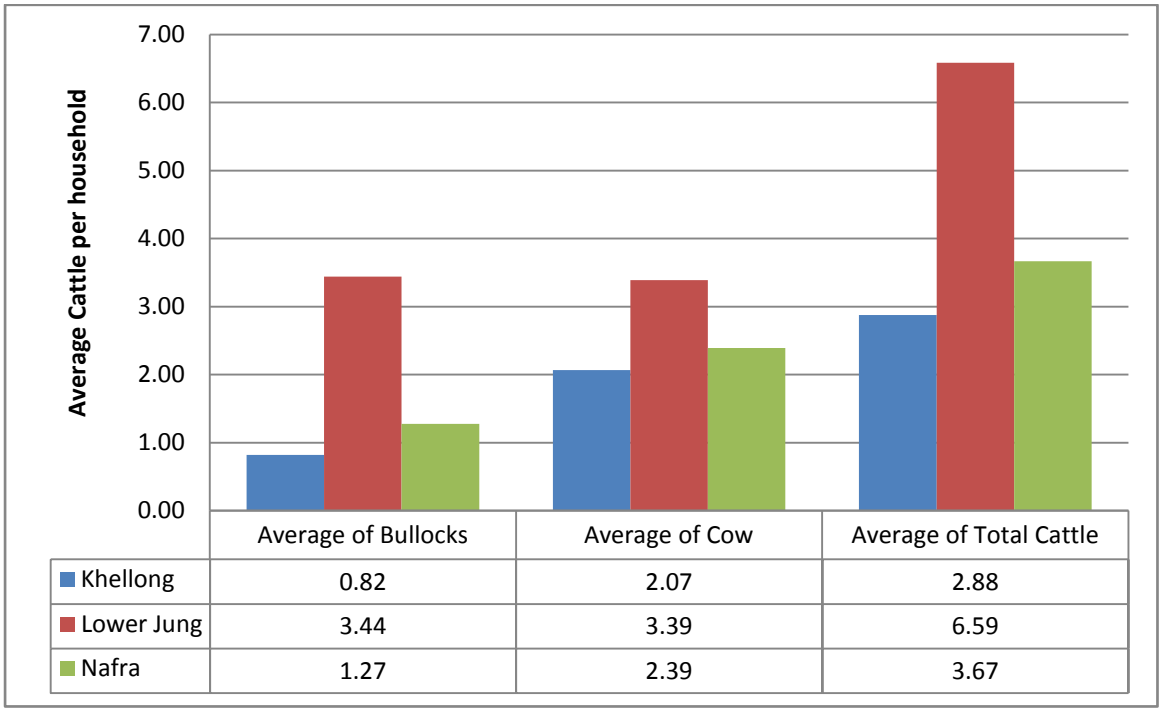
Table 4:33 Number of Cattle Population in Project Impact Area

Villages	Bullocks	Cow	Total Cattle	Average of Total Cattle per Household
Khellong	72	182	253	2.88
Lower Jung	141	139	270	6.59
Nafra	65	122	187	3.67
Grand Total	278	443	710	3.94

*Source: Survey by SIA Team in Nov 2008

The break up of the cows and bullocks in the cattle population is presented in the chart 4.7 below. In Lower Jung, there is not much difference in cow and bullock numbers. However, in Nafra and Khellong one notices remarkable difference. Hence, Khellong and Nafra seem to keep cows for milk production in addition to the use of bullocks in agricultural operation.

Chart 4.7 Reliance on Cattle in the Economy of the Impact Area



*Source: Survey by SIA Team in Nov 2008

Another important animal in the livestock composition of the local people is Mithun, a hill variant of cow. The ownership of the Mithun in the surveyed household during the sample survey is presented in table 4. 34 below. The total number of Mithuns enumerated during the survey was 603. The average number of Mithuns possessed by the household is 3.35. The average ownership of Mithuns in Lower Jung is highest and that of Khellong is the lowest. The Mithun is mostly bred for the meat and is one of the preferred variety of meat for the local population.

Table 4:34 The Mithuns in the Local Economy.

Village Name	Male Mithun	Female Mithun	Total Mithun	Average of Total Mithun per Household
Khellong	88	187	249	2.83
Lower Jung	85	109	180	4.39
Nafra	64	120	174	3.41
Grand Total	237	416	603	3.35

*Source: Survey by SIA Team in Nov 2008

Another important animal on which meat the local people rely is pig. The details are presented in the table 4.35 below. The sample survey enumerated 1046 pigs in the impact area. The pig population in Khellong is remarkably higher than other two villages. Average per household pigs for Khellong stands at 8.18 in comparison to that of 3.61 per household for Nafra and 3.46 per household for Lower Jung.

Table 4:35 Ownership of Pigs among households in the impact area.

Village Name	Male Pigs	Female Pigs	Total Pigs	Average of Total Pigs per Household
Khellong	219	425	720	8.18
Lower Jung	77	83	142	3.46
Nafra	66	116	184	3.61
Grand Total	362	624	1046	5.81

*Source: Survey by SIA Team in Nov 2008

There are 1442 goats in the impact area. The table 4.36 gives the details. Approximately 60% of these total goat population belongs to households in Khellong. The goat ownership per household in Khellong is 9.67. The goat ownership in Lower Jung village is also high, and is estimated at 8.93. However, average goat ownership per household in Nafra is only 4.41.

Table 4:36 Ownership of Goats among Households in the Impact Area.

Village Name	Male Goat	Female Goat	Total Goat	Average of Total Goat per Household
Khellong	256	632	851	9.67
Lower Jung	167	212	366	8.93
Nafra	80	146	225	4.41
Grand Total	503	990	1442	8.01

*Source: Survey by SIA Team in Nov 2008

Sheep rearing is a rare activity in the locality. The sample survey findings on this aspect are provided in the table 4.37 below. There are only 32 sheep in the locality and the average sheep ownership per households is only 0.07.

Table 4:37 Ownership of sheep among Households in the Impact Area.

Village Name	Male Sheep	Female Sheep	Total Sheep	Average of Total Sheep per Household
Khellong	15	0	15	0.05
Lower Jung	9	5	14	0.15
Nafra	1	2	3	0.06
Grand Total	25	7	32	0.07

*Source: Survey by SIA Team in Nov 2008

Table 4:38 Ownership of Horse/Ponies among Households in Impact Area

Village Name	Male Horses	Female Horses	Total of Horses	Average of Horses per household
Khellong	48	54	88	1.00
Lower Jung	5	6	8	0.20
Nafra	4	12	16	0.31
Grand Total	57	72	112	0.62

*Source: Survey by SIA Team in Nov 2008

Some of the households in impact area also keep horse/ponies. 112 ponies were reported to be owned by people in the impact area. The ownership of horse in Khellong is higher than other villages. Another important item in the livestock of the people here is poultry. People keep mostly chicken though few people report to have ducks even. The people of Khellong report to have almost 75% of the poultry in the locality. Hence average chicken per household in Khellong village is as high as 57.84. People of Nafra and Lower Jung also keep Chicken both for domestic use and for sale. The detail of the ownership of chicken is presented in table 4.39 below.

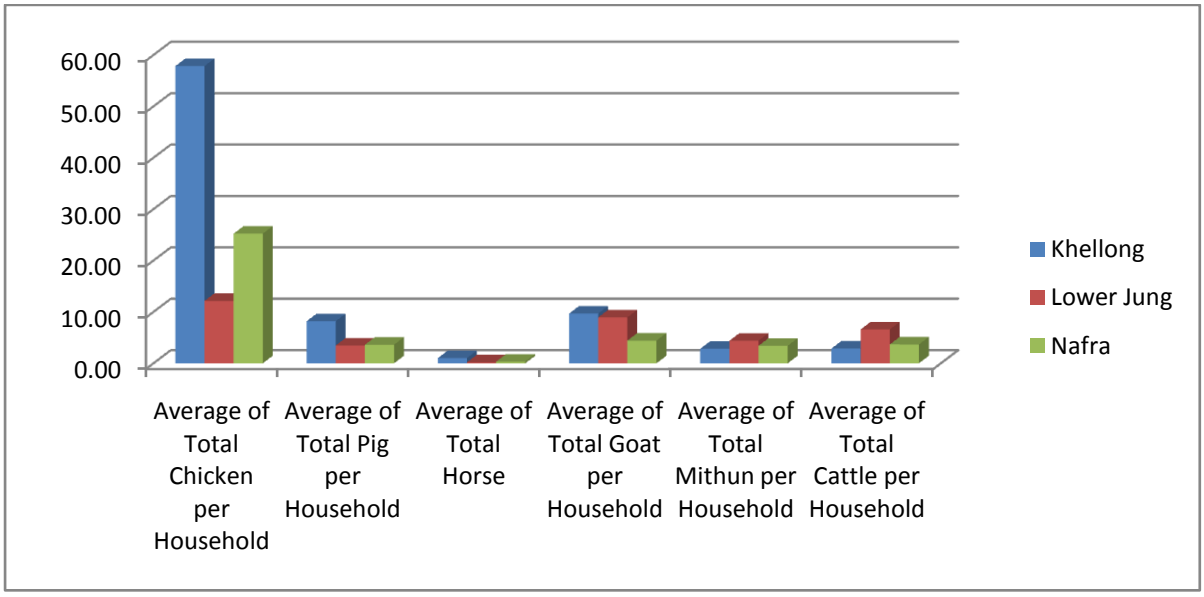
Table 4:39 Poultry among Households in Impact Area.

Villages	Cocks	Hen	Total Chicken	Average of Total Chicken per Household
Khellong	2071	3918	5989	57.84
Lower Jung	256	292	548	12.15
Nafra	469	805	1274	25.24
Grand Total	2796	5015	7811	38.19

*Source: Sample Survey by SIA Team in Nov 2008

The summary of the livestock ownership among households in impact area is provided in the chart 4.8 below. The average per household ownership of chicken, pig, horse/ponies, goat, mithun and cattle is plotted in the form of a bar graph. Khellong is observed to be more reliant on livestock keeping than other two villages. The high value livestocks such as mithun and cattle however is also found in Lower Jung and Nafra.

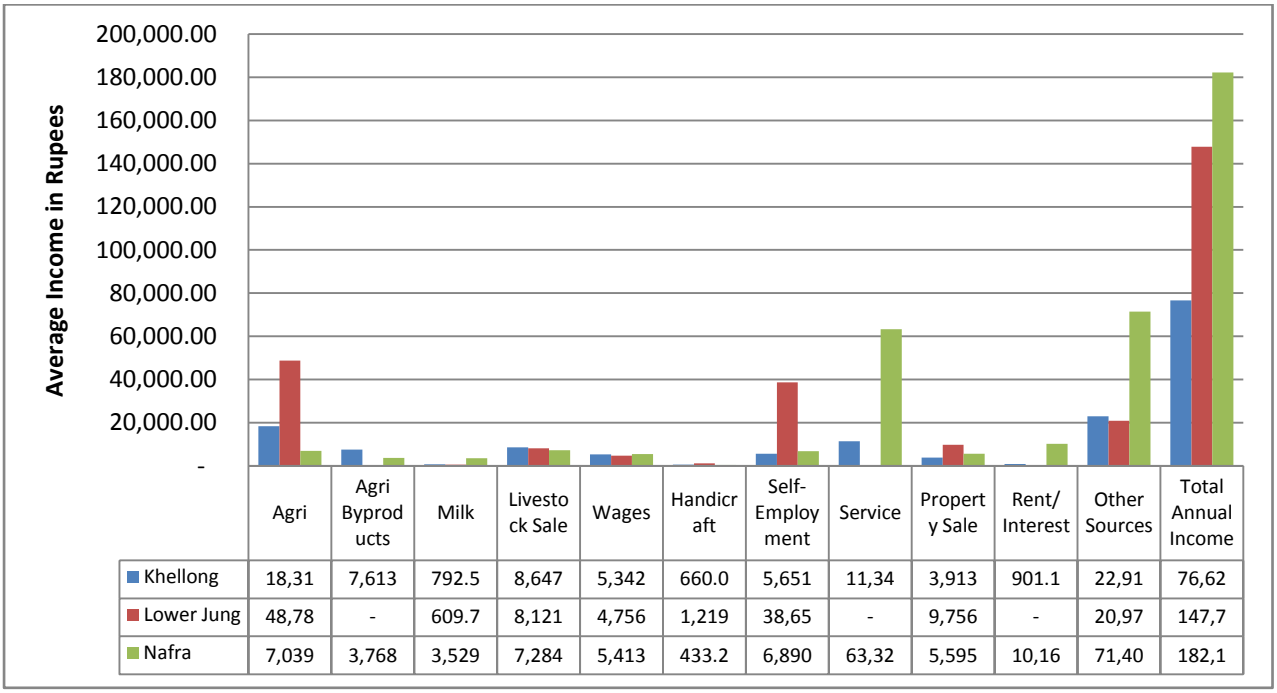
Chart 4.8 Livestock Ownership among households in Impact Area.



*Source: Survey by SIA Team in Nov 2008

The household economy thus depends on multiple sources of income. The income of the surveyed households from different sources of income is presented in table 4.40. The estimate of the average income from different sources for the Khellong village is the lowest and for Nafra it is highest. Nafra supplements its income from opportunity of services, and other miscellaneous income opportunities which is not available to other villagers.

Chart 4.9 Profile of Household Income from Different Sources in Impact Area



	Agri	Agri Byproducts	Milk	Livestock Sale	Wages	Handicraft	Self-Employment	Service	Property Sale	Rent/ Interest	Other Sources	Total Annual Income
Khellong	18,31	7,613	792.5	8,647	5,342	660.0	5,651	11,34	3,913	901.1	22,91	76,62
Lower Jung	48,78	-	609.7	8,121	4,756	1,219	38,65	-	9,756	-	20,97	147,7
Nafra	7,039	3,768	3,529	7,284	5,413	433.2	6,890	63,32	5,595	10,16	71,40	182,1

*Source: Survey by SIA Team in Nov 2008

The agricultural income in Khellong is lower than the people in Lower Jung village, and people in Nafra depend less on the agricultural income. The income from self-employment is strikingly high in Lower Jung in comparison to that of the other two villages. Income from wages however is almost similar for all the three villages.

Table 4:40 Average Household Income from different Sources.

Income Sources	Khellong (in Rs)	Lower Jung (in Rs)	Nafra (in Rs)	Grand Total (in Rs)
Average of Agricultural Income	18,317.05	48,784.34	7,039.22	22,061.43
Average of Income from Agricultural Byproducts	7,613.31		3,768.49	4,789.80
Average of Income from Milk	792.56	609.76	3,529.53	1,526.39
Average of Income from Lifestock Sale	8,647.00	8,121.95	7,284.02	8,141.23
Average of Income from Wages	5,342.56	4,756.10	5,413.73	5,229.14
Average of Income from Handicraft	660.02	1,219.51	433.24	723.21
Average of Income from Self-Employment	5,651.88	38,658.63	6,890.20	13,520.94
Average of Income from Service	11,342.05	-	63,327.45	23,487.78
Average of Income from Sale of Property	3,913.86	9,756.10	5,595.10	5,720.94
Average of Income from Rent/Interest	901.14	-	10,168.63	3,321.67
Average of Income Other Sources	22,916.25	20,975.61	71,400.00	36,211.28
Average of Total Annual Income	76,623	147,756	182,167	122,730

*Source: Survey by SIA Team in Nov 2008

The expenditure pattern of the surveyed population was also recorded. The expenditure on different heads is presented in the table 4.41 below. The expenditure on food is the major head of expenditure.

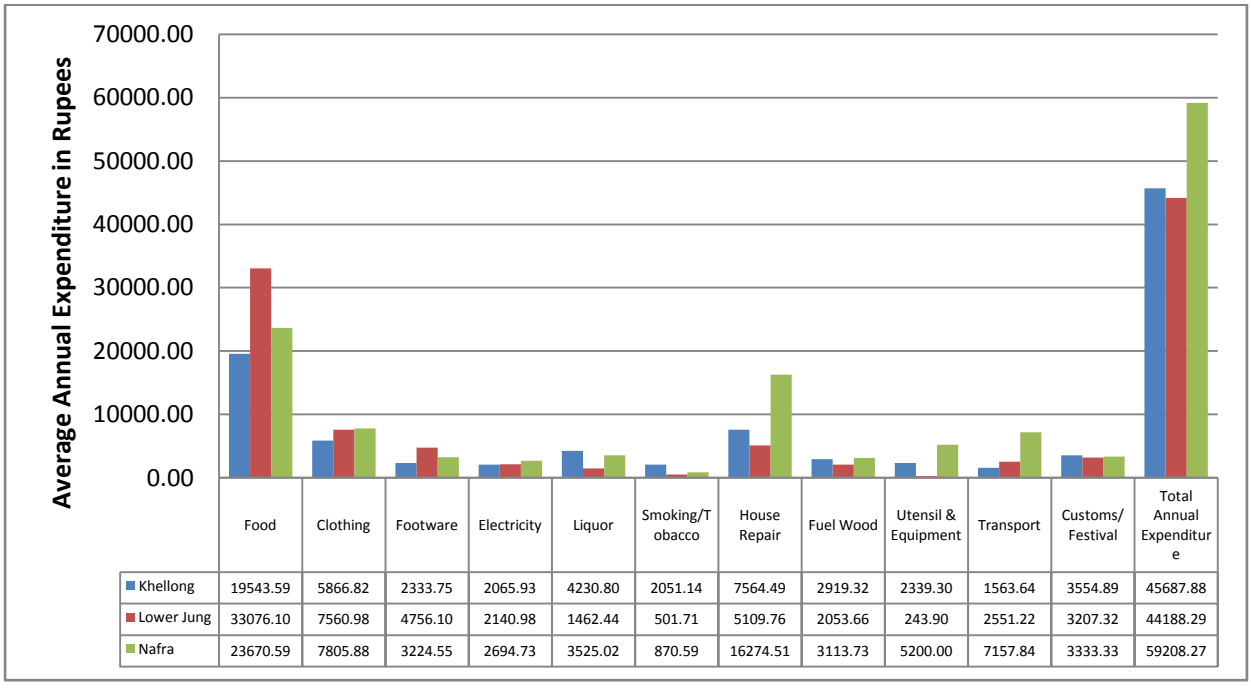
Table 4:41 The Average Expenditure Pattern of the Households surveyed in Impact Area.

Expenditure Heads	Khellong (In Rs)	Lower Jung (In Rs)	Nafra (In Rs)	Grand Total (In Rs)
Average of Food Expenditure (Rs.)	19543.59	33076.10	23670.59	23795.31
Average of Clothing Expenditure (Rs.)	5866.82	7560.98	7805.88	6802.11
Average of Expenditure (Rs.) on Footwear	2333.75	4756.10	3224.55	3137.90
Average of Electricity Expenditure (Rs.)	2065.93	2140.98	2694.73	2261.18
Average of Expenditure on Liquor(Rs.)	4230.80	1462.44	3525.02	3400.26
Average of Smoking/Tobacco Expenditure (Rs.)	2051.14	501.71	870.59	1363.72
Average of Expenditure (Rs.) House Repair	7564.49	5109.76	16274.51	9473.19
Average of Expenditure (Rs.) Fuel Wood	2919.32	2053.66	3113.73	2777.22
Average of Expenditure (Rs.) Utensil & Equipment	2339.30	243.90	5200.00	2672.54
Average of Transport Expenditure (Rs.)	1563.64	2551.22	7157.84	3373.61
Average of Expenditure (Rs.) on Customs/ Festival	3554.89	3207.32	3333.33	3412.94
Average of Total Annual Expenditure (Rs.)	45,688	44,188	59,208	49,177

*Source: Survey by SIA Team in Nov 2008

The comparative picture of the average annual expenditure of the surveyed households in the impact area is presented in the chart 4.10 below.

Chart 4.10 The Annual Expenditure Pattern of the Households Surveyed in Impact Area



*Source: Survey by SIA Team in Nov 2008

4.6 Community Health: West Kameng District

The birth and death rates in both rural and urban areas from 1985 to 2001 is provided in table 4. 42. The birth rate of the district has been quite high for the last decade (more than 30%). The infant death rate has also reduced drastically over the years. The infant death rate in 2001 in rural areas was recorded as 5.4% and 4.7% in urban areas. The death rate similarly has shown improvement. Interestingly, the death rate in urban areas is more than the rural areas.

Table 4:42 Birth and Death Rates of West Kameng District

Sl. No.	Year	Unit	Birth And Death Rates Of West Kameng District					
			Urban			Rural		
			Birth Rate	Death Rate	Infant Death	Birth Rate	Death Rate	Infant Death
1	1985	In %	8.8	6.9	54	10.8	2.7	13
2	1986	In %	26.2	26.1	59.7	15.6	3.5	3.9
3	1987	In %	17.4	5.6	13.33	19.8	5.4	30.07
4	1990	In %	32.15	11.37	6.8	17.5	4.82	22.95
5	1991	In %	34.16	15.9	25.16	15.06	2.3	18.87
6	1992	In %	18.44	7.82	0.76	6.85	1.53	1.58
7	1993	In %	20.78	5.93	20.22	5.87	1.56	13.7
8	1994	In %	22.39	8	7.14	11	1.2	9.24
9	1995	In %	0.44	7.32	0.76	6.85	1.53	1.58
10	1996	In %	29.42	7.32	9.05	6.91	1.13	17.9
11	1997	In %	23.8	6.6	10.9	6.3	0.9	24.6
12	1998	In %	3.3	7	NIL	0.8	1.9	11.5
13	1999	In %	31.2	6.9	NIL	9.9	1.7	13.5
14	2000	In %	0.4	7	NIL	11	2.1	NIL
15	2001	In %	31.6	5.8	4.7	20.8	1.7	5.4

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

The total number of medical facilities in West Kemang district is 60, out of which 57 are located in rural areas and 3 in urban areas. The health service requirement of the district is covered by 2 CHCs and 4 PHCs along with 28 health sub-centres. In addition to this interior places are covered by 22 medical teams.

Table 4:43 Status of Health or Medical facilities in West Kameng district, Arunachal Pradesh.

SL. NO.	Numbers of Medical Institutions	AS ON 31/ 03/ 2006
(A)	Rural Area	57
(i)	General Hospital	NIL
(ii)	District Hospital	NIL
(iii)	Community Health Centre (C. H. C.)	2
(iv)	Primary Health Centre (P. H. C.)	4
(v)	Health Sub-Centre	28
(vi)	Health Unit	NIL
(vii)	Dispensary	NIL
(viii)	Others	1
(ix)	Medical Team	22
	Sub Toatal (A): -	57
(B)	Urban Area	3
(i)	General Hospital	NIL
(ii)	District Hospital	1

SL. NO.	Numbers of Medical Institutions	AS ON 31/ 03/ 2006
(iii)	Dispensary / H. D.	1
(iv)	Hansem Disease Sanaterium	NIL
(v)	Homeopathic Dispensary	1
(vi)	Medical Team	NIL
	Sub Toatal (B): -	3
	GRAND TOTAL (A + B): -	60

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

The table below provides information on the number of beds available in medical facilities found in West Kemang district. There are only 177 beds available in the whole district. 102 beds are located in hospitals of rural area and 75 beds in hospitals located in urban areas.

Table 4:44 Number Of Beds in Medical Institutions during the Year 2005-2006

Sl No	Particulars	Beds in Hospitals
(i)	In Rural Area	102
(ii)	In Urban Area	75
	Total Number of Beds	177

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

The status of the trained medical and para-medical personnel present in West Kemang district is provided in the table below. There are 29 doctors serving out of which 18 are men and 11 are lady doctors. In paramedical personnel, there are only 8 nurses and 21 ANMs. There is one doctor for every 2572 persons, one nurse for every 9324 persons, and one ANM for every 8108 persons in West Kameng district.

Table 4:45 Registered Medical and Para Medical Personnel in the Year 2005-2006

Medical Personnel	**Number**
Doctors	29
Men	18
Women	11
Population per Sector	2,572
Nurse	8
Population per Nurse	9,324
Auxiliary Nurse/Midwife	21
Midwife /population	8,108

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

The table Table **4**:**46** Total Numbers of Patients Treated Disease wise During the Year, 2005-2006gives a profile of the diseases in West Kemang district that was treated during 2005-06. It shows that Tuberculosis, Syphilis, Malaria are some of the major diseases. Fever however is the most commonly treated ailment.

Table 4:46 Total Numbers of Patients Treated Disease wise During the Year, 2005-2006

Sl. No	Name of Disease	No of Patients
1	Tuberculosis	88
2	Syphilis	11
3	Malaria	205
4	Fever	1,155
	Total	1,459

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

Table **4**:**47** provides the health profile of the local population in the impact area. Approximately 96% of the total populations covered in the sample survey are found to be healthy. Only 1% of the total population is classified as handicapped and 3% have chronic health problems. Most of the people with chronic health problem belong to Khellong.

Table 4:47 Health Profile of the population in Impact Area

Villages	Healthy Population	Handicap by Birth	Handicap Due to Other Reasons	Other Chronic Health Problems	Grand Total
Khellong	491		6	26	523
Lower Jung	168	2	1		171
Nafra	283	2	2	5	292
Grand Total	942	4	9	31	986

*Source: Sample Survey by SIA Team in Nov 2008

Animal Husbandry and Veterinary Services:

The information on the Animal husbandry and veterinary service infrastructure in West Kameng district is provided in the table below. There is no veterinary hospital in the district. However, there are 7 dispensaries and 17 aid centers in the district. There are specialized centers for cattle, goat, sheep, and poultry rearing.

Table 4:48 Infrastructure facilities in Animal Husbandry in West Kameng District

Sl No	Particulars	(2002-2003)	(2003-2004)	(2004-2005)	(2005-2006)
1	Veterinary Hospital	NIL	NIL	NIL	NIL
2	Veterinary Dispensary	7	7	7	7
3	Veterinary Aid Centre	17	17	17	17
4	Cattle Up-grading Centre	15	15	15	15
5	District Diagnostic Laboratory	1	1	1	1
6	Sheep and Wool Extension Centre	3	3	3	3
7	Cattle Breeding Farm	1	1	1	1
8	Goat Farm	NIL	NIL	NIL	NIL
9	Pig Breeding Farm	NIL	NIL	NIL	NIL
10	Poultry Breeding Farm	1	1	1	1

Sl No	Particulars	(2002-2003)	(2003-2004)	(2004-2005)	(2005-2006)
11	Mobile Veterinary Dispensary	2	2	2	2
12	Govt. Veteronary Dairy Farm	1	1	1	1
13	Regional Sheep Breeding Farm	1	1	1	1
14	Regional Temperate Fodder and Seed Production-Cum-Demonstration Farm / Centre	1	1	1	1
15	Artificial Insemination Centre	NIL	NIL	NIL	NIL
16	Mini Hatchery	NIL	NIL	NIL	NIL

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

4.7 Other Infrastructure

Transport and power/energy are two most important infrastructure required for economic development of people. This section provides a review of the transport and power situation of the west Kameng district and project impact area.

4.7.1 Transport and Connectivity: West Kameng District

The road connectivity is not found to cover all the villages in West Kameng district. Due to hilly terrain, the building road infrastructure is a difficult task in the region. Table **4**:**49** provides the number of vehicles registered each year from 2003-04 to 2005-06. There are a small number of private four wheelers and two wheelers. The public transport is mostly dependent on taxi services. These taxis are used both for ferrying tourists and the local people from one destination to other.

Table 4:49 The Transport Vehicles Registered in West Kameng District

Particulars	2003 - 2004	2004 - 2005	2005 - 2006
Two Wheelers (Motor Cycle / Scooters)	115	110	125
L.M.V. (Maruti Car / Gypsy / Maruti Van)	10	97	8
Car / Station Wagon	45	NIL	100
Jeep / Tata Sumo	NIL	NIL	39
Taxi	20	44	30

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

4.7.2 Power and Electricity: West Kameng District

The power and electricity situation in West Kameng District is provided in the Table **4**:**50** below. Only 57.58% of the villages in the districts were electrified till March 2006. The present Installed plant capacity for electricity generation is 6.33 MW. Out of this 1.8MW is generated through diesel sets and only 4.48 MW is from hydro power. The present level of consumption is 5.54 MW and the electricity generated is 5.41 MW. Hence, there is slight deficiency in the power supply to meet the current consumption. Hence, the goal to achieve 100% electrification could be achieved only through additional power generation in the district.

Table 4:50 Profile of Power and Electricity in West Kameng district, Arunachal Pradesh

Sl. No.	Particulars	Unit	Upto to March 2006
1	Town Electrified	In Nos	1
2	Villages Electrified	In Nos	208
3	Percentage of Electrified Villages	In Nos	57.58%
4	Installed Plant Capacity and Electricity Generated: -		
(i)	Micro-Hydel	In KW	4480KW
(ii)	Diesel Set	In KW	1,857KW
	Total	In KW	6337 KW
5	Electricity Generated		
(i)	Micro Hydel	In MW	4.48
(ii)	Diesel Set	In MW	0.93
	Total	In MW	5.41
6	Consumption of Electricity Power by User		
(i)	Domestic Lighting	In MW	3.26
(ii)	Commercial Lighiting	In MW	0.5
(iii)	Industrial Lighting	In MW	NIL
(iv)	Public Lighting	In MW	0.31
(v)	Non-Residential	In MW	1.13
(vi)	Army	In MW	NIL
(vii)	Others	In MW	0.34
	Total	In MW	5.54

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

The name of other hydel power project and their capacity is provided in the Table **4:51** below. The total generation capacity for these hydel power projects is 4480 KW.

Table 4:51 Other Hydel Projects in West Kameng District

Name of Hydel Project	Location	Capacity
Sessa Micro Hydel Project	Sessa	1500 KW
Rupa Micro Hydel Project	Rupa	200 KW
Dirang Micro Hydel Project	Dirang	2000 KW
Rahung Micro Hydel Project	Rahung	750 KW
Dukumpani Micro Hydel Project	Dukumpani	30 KW
Total		4480 KW

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

Other Alternative Sources of Energy:

The reliance on the hydel power becomes more important looking at other alternative sources of energy available to people. The Arunachal Pradesh Energy Development Agency (APEDA) which has the mandate to create alternative sources of energy has not been able to match the requirement. The detail of the achievement of the APEDA in West Kameng District is provided in the Table **4**:**52** below.

Table 4:52 Alternative Energy Sources developed by Arunachal Pradesh Energy Development Agency (A.P.E.D.A.)

Sl. No.	Particulars	Unit	2004-2005	2005-2006
1	Bio Gas Plants Installed	In Nos	30	15 Nos
2	Solar Lanteras Distributed	In Nos	NIL	NIL
3	Mettalic Improved Chullah Distributed	In Nos	174	NIL
4	S.P.V. Power Plant Installed	In Nos	NIL	NIL
5	Water Mill Installed	In Nos	6	NIL
6	Wind Master	In Nos	2	NIL
7	Home Lighting System Distributed (4-Brints)	In Nos	NIL	NIL
8	Rural Electrification by Biomass Gasifier	K.W.	NIL	NIL

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

4.8 Law and Order

Law and Order plays a significant role in the economic development of any region. Table **4**:**53** provides the crime profile as recorded in different Police Stations in Arunachal Pradesh for the year 2005-06. The Project area is located within the jurisdiction of Bomdila Police Station. The Rupa Police Station records the highest number of crime in 2005-06, and the Bomdila Police Station being the second. The Bomdila further has witnessed some of the serious crimes such as murder, burglary, docoity and theft in this year. Hence, the law and order situation cannot be said to be the best within the state of Arunachal Pradesh. Hence, there should be special attention to the law and order situation in the district to promote the development activities for the benefit of all. It is important to note here that Nafra does not have a police station, and the nearest police station is at Bomdila which is 70 kms away. The cases registered in the court also further reinforce these assertions. The detail of the cases registered in the year 2005 and 2006 is provided in table 4.47 below.

Table 4:53 Incidents of Crime during The Year 2005 – 2006

Sl. No.	Incidents of Crime	Bomdila P.S.	Dirang P. S.	Rupa P. S.	Bhalukpong P.S	Kalaktang P.S.	Balemu P. S.
1	Murder	4	NIL	1	NIL	NIL	NIL
2	Dacoity	1	NIL	NIL	NIL	NIL	NIL
3	Burglary	3	1	1	1	1	1
4	Theft	4	2	3	1	1	1
5	Robbery	NIL	NIL	3	1	1	NIL
6	Kidnapping	NIL	NIL	NIL	NIL	NIL	NIL

Sl. No.	Incidents of Crime	Bomdila P.S.	Dirang P. S.	Rupa P. S.	Bhalukpong P.S	Kalaktang P.S.	Balemu P. S.
7	Riot	NIL	NIL	NIL	NIL	NIL	NIL
8	Culpable Homicide	NIL	NIL	NIL	NIL	NIL	NIL
9	Counter Faiting	NIL	NIL	NIL	NIL	NIL	NIL
10	Miscellaneous	21	7	24	1	NIL	NIL
11	Total Cognizable Crime I.P.C	33	10	32	4	4	2
12	Other Act	2	NIL	8	NIL	NIL	NIL
	GRAND TOTAL:	35	10	40	26	4	2

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

Table 4:54 Criminal Cases Registered for the Year, 2005 and 2006

Sl. No.	Heads of Crime	Cases Reported (In Numbers)	
		1st January/2005 To 31st December/2005	1st January/2006 To 31st December/2006
1	Murder	6	1
2	A Murder	NIL	NIL
3	Rape	NIL	1
4	Kidnap/ Abduction	1	NIL
5	Dacoity	2	NIL
6	Robbery	4	1
7	Burglary	10	1
8	Theft	25	3
9	C.B.T	3	NIL
10	G/ Hurt	13	2
11	S/ Hurt	8	2
12	Extortion	7	1
13	Cheating	2	NIL
14	Rioting	NIL	NIL
15	Arson	NIL	NIL
16	Assault	5	2
17	Molestation	NIL	NIL
18	Mischief	3	NIL
19	Forgery	1	NIL
20	Fatal Accident	9	4
21	N/F Accident	10	2
22	Other I.P.C	2	1
23	Arms Act	9	2
24	N.P.D.S Act	NIL	NIL
	Total: -	120 (Cases)	23 (Cases)

*Source: Economic Census 2005, District Socio Economic Review, 2006, District Statistical Centre, Bomdila.

Chapter 5

SOCIAL IMPACT ASSESSMENT

5 SOCIAL IMPACT ASSESSMENT

The assessment of impact on different aspects of the economic and social life is discussed in this chapter. The assessment is based on the information available from the secondary sources, information collected through the sample survey, group discussions, and interview with key informants etc. In addition to this an impact perception survey was conducted among the local population in the impact area. The view expressed by the public is discussed in the beginning of this section.

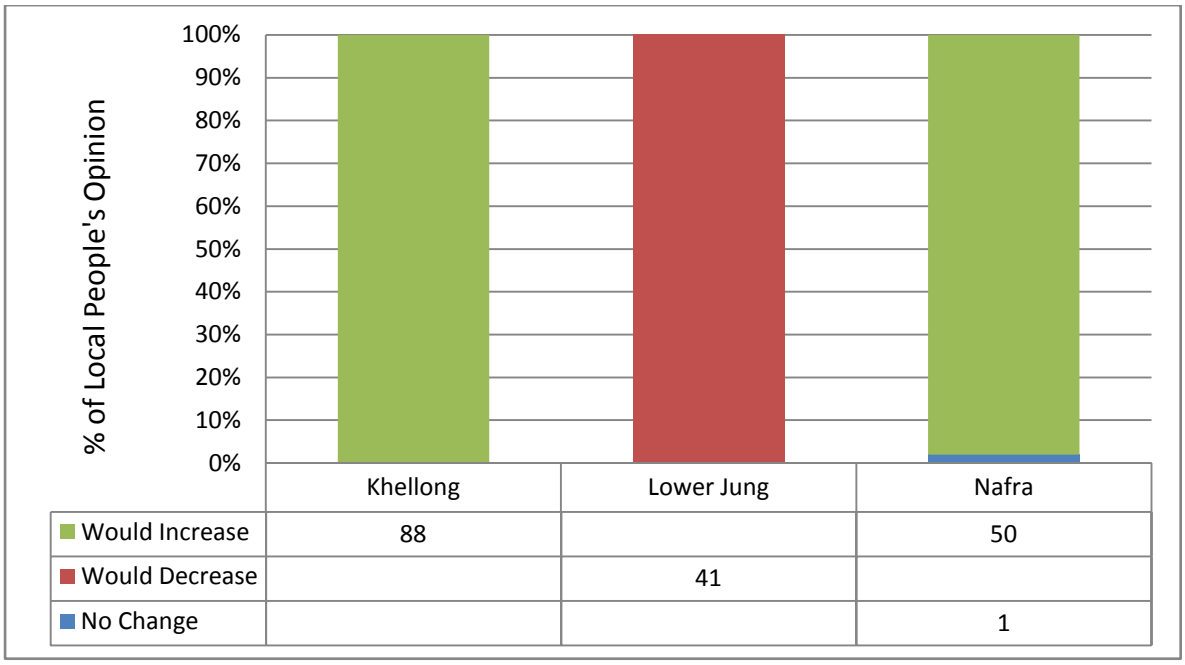
5.1 Impact Perception of Local Communities

The perception of social and economic impact of the local community was assessed through a structured questionnaire during the sample survey. The key informants who provided the detail information of the household was asked to give his assessment as increase, decrease, no-change or do not know for a range of questions. The informants were asked to give their assessments on a range of parameters both in 'During Construction' period and 'After Construction' period to distinguish between the short term and long term impact perception of the community members. Hence, the findings of this opinion survey are discussed here in two sub-sections, i.e., 'Impact During Construction', and 'Impact After Construction'.

5.1.1 Likely Impacts During Construction:

A series of questions were asked to the community members to give their impact assessment. The result of this impact assessment opinion survey is discussed here. The first question was impact on migration for local people outside their village for work. The result of the opinion survey is provided in Chart **5.1**. The people of Khellong think that their village people will definitely go outside their village to work on the dam construction. The Dam being located in the vicinity of Lower Jung, people see the opportunity being available within their village and migration outside of their village for work will definitely decrease for them. Most of the people of Nafra also see their people participating in the dam construction that would be in the Lower Jung area.

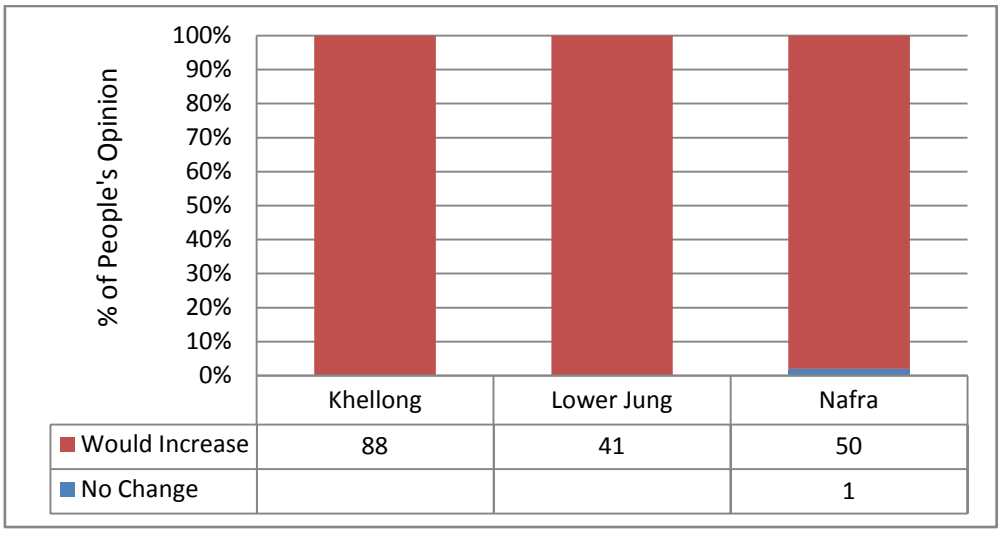
Chart 5.1 Local Peoples opinion on impact on Migration for Local People Outside their Village for Work



*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The second question was on the likely impact on migration of outside people into their locality for work. Most of the people think it would increase. Hence, there is awareness among the local people that the proposed HEP project would bring outside workers to their locality during construction period.

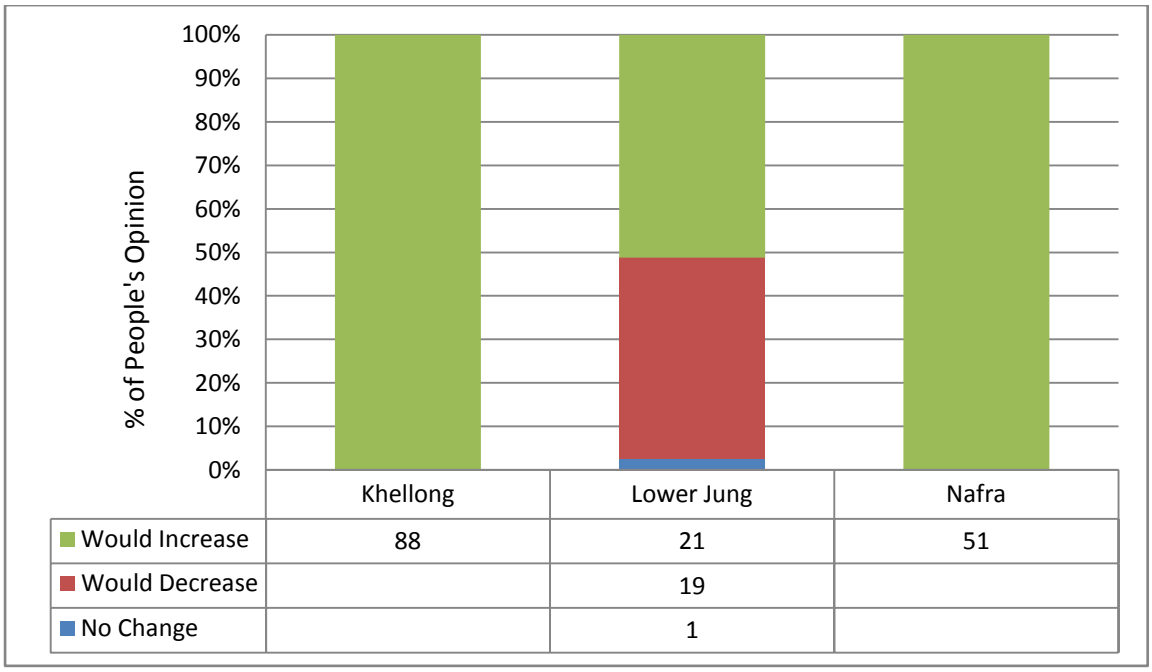
Chart 5.2 Local People's Opinion on Migration of Outside People to their Area for Work



*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The third question asked was on the likely impact of occurrence of diseases in the locality during the construction period. People in Khellong and Nafra feel the occurrence of diseases will increase. Surprisingly almost half of the people in Lower Jung to the contrary believe occurrence of disease would decrease.

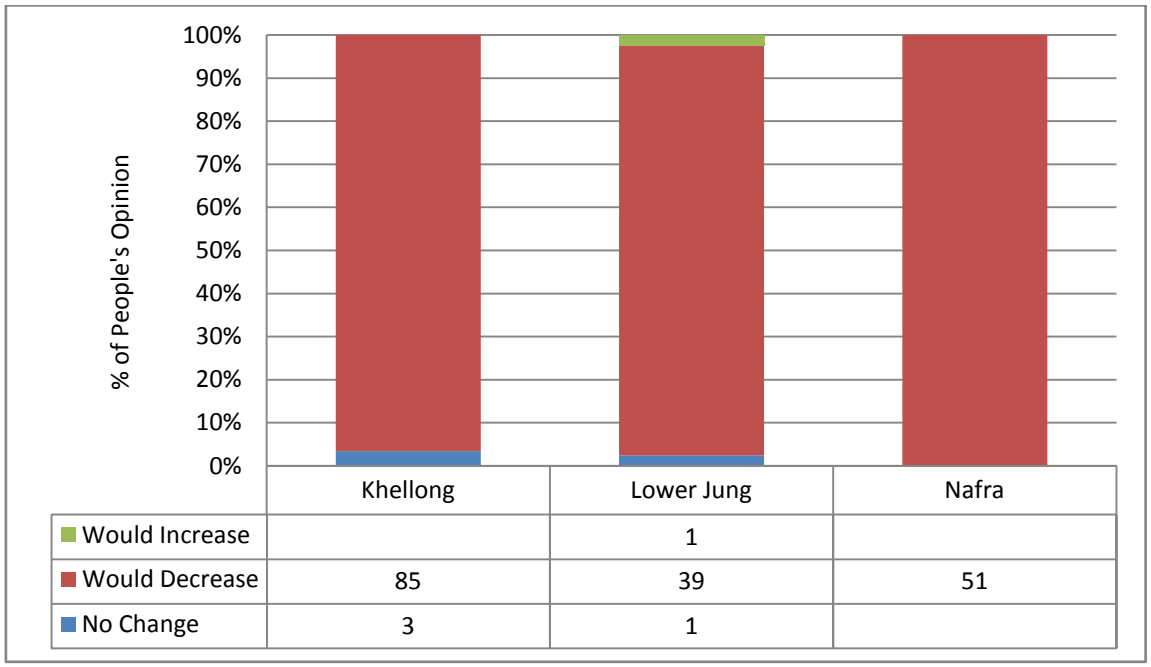
Chart 5.3 The Local People's Opinon on Occurance of Diseases



*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The fourth question was to give their opinion regarding impact on forest area in the locality. There is almost consensus among people of all three villages that the forest area will decrease.

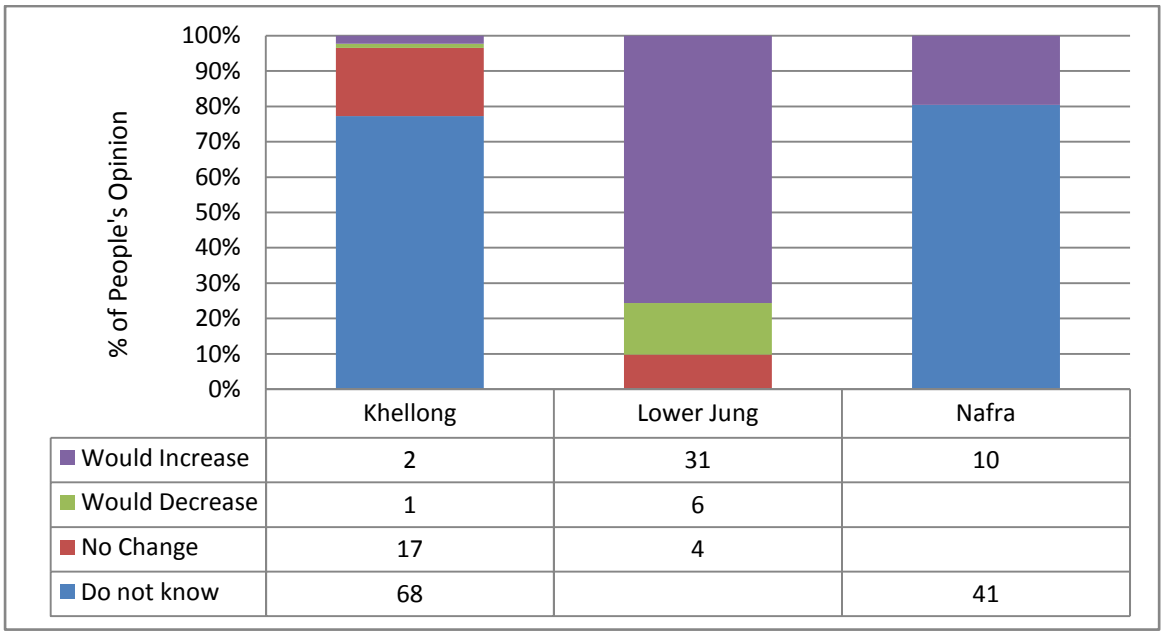
Chart 5.4 People's Opinon regarding Impact on Forest Area in the Locality



	Khellong	Lower Jung	Nafra
Would Increase		1	
Would Decrease	85	39	51
No Change	3	1	

*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

Chart 5.5 Peoples Opinon on Impact on Soil Erosion

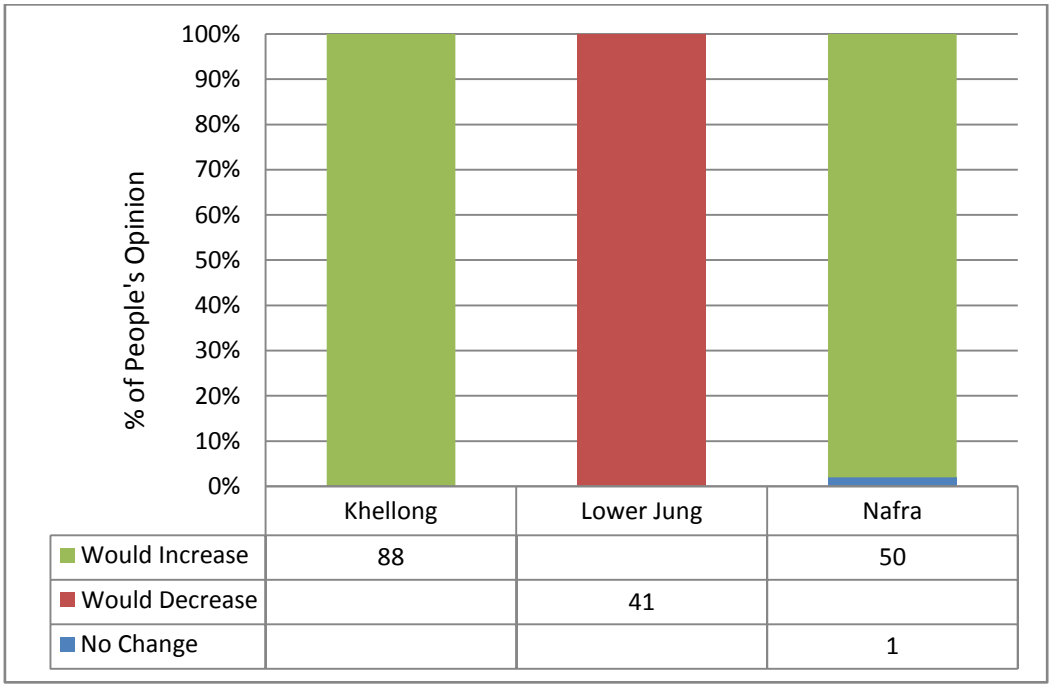


	Khellong	Lower Jung	Nafra
Would Increase	2	31	10
Would Decrease	1	6	
No Change	17	4	
Do not know	68		41

*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The fifth question was regarding the likely impact on soil erosion in the locality. Majority people in Khellong and Nafra answer that they do not know. However, majority opinion in Lower Jung feels the soil erosion will increase.

Chart 5.6 People's Opinon on Impact on Availability of Fuel Wood

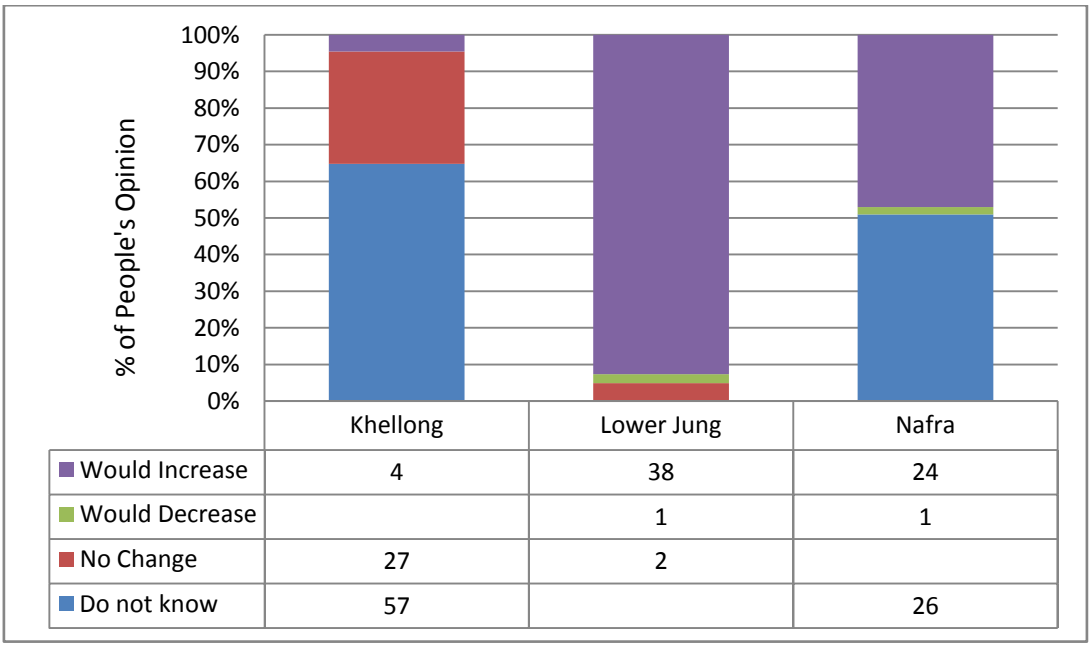


	Khellong	Lower Jung	Nafra
Would Increase	88		50
Would Decrease		41	
No Change			1

*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The sixth question was to assess the impact on availability of fuel wood. The people of Khellong and Nafra believe that availability of fuel wood would increase. To the contrary the people of Lower Jung believe that fuel wood availability will decrease.

Chart 5.7 People's Opinon on Impact on Water Pollution

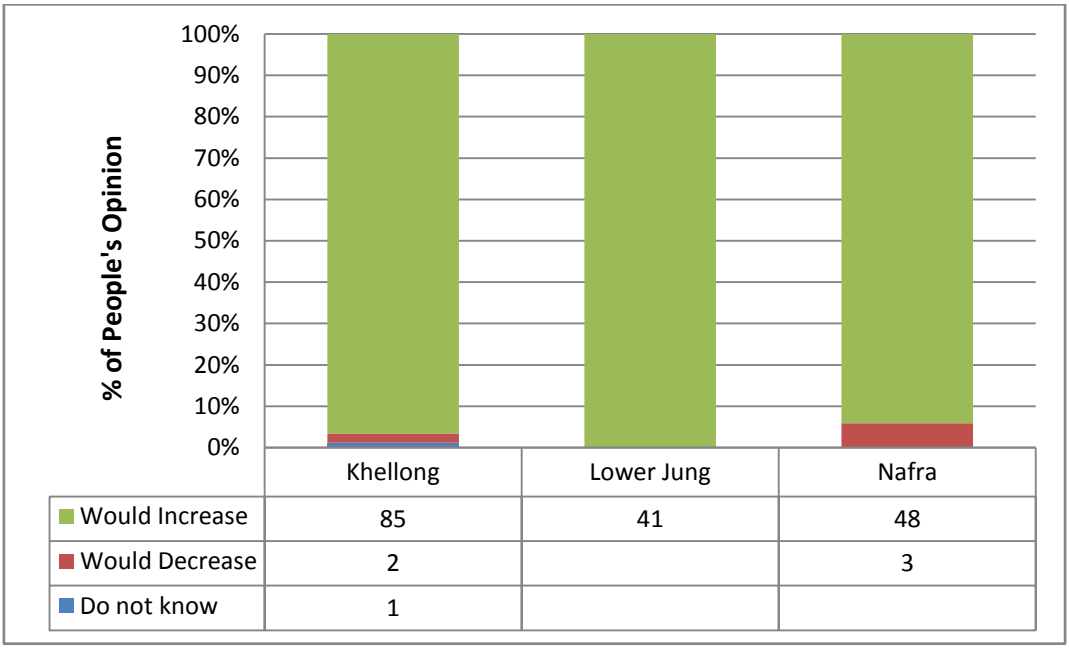


	Khellong	Lower Jung	Nafra
Would Increase	4	38	24
Would Decrease		1	1
No Change	27	2	
Do not know	57		26

*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The seventh question was on likely impact on water pollution. People of Lower Jung feel that the water pollution would increase. Majority of Khellong villagers do not know about the impact. The opinion of Nafra people is almost equally divided between 'would increase' and 'do not know'.

Chart 5.8 People's Opinion regardig impact on Employment Potential for Educated Youths

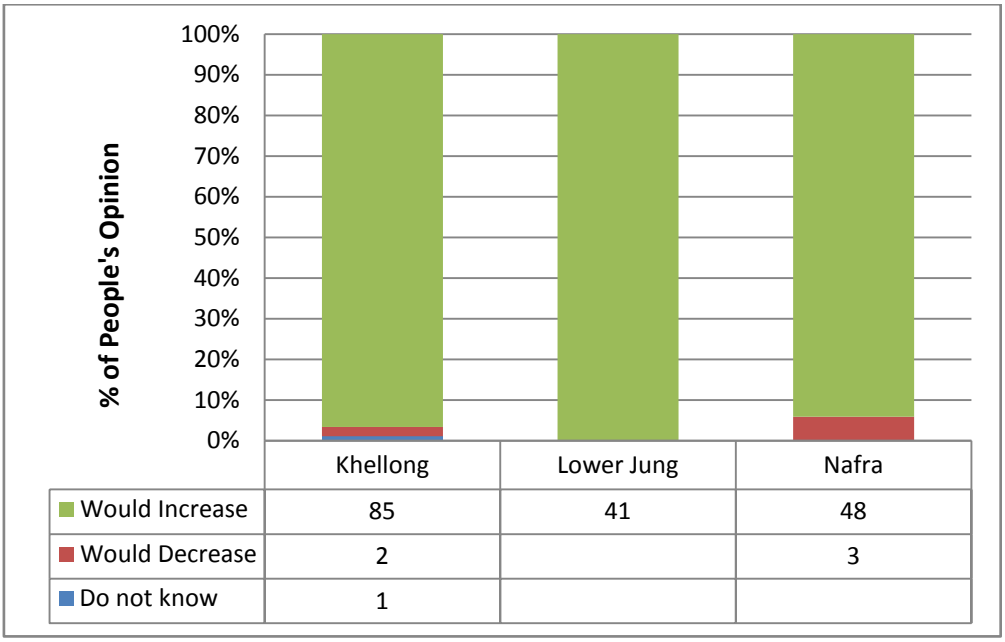


	Khellong	Lower Jung	Nafra
Would Increase	85	41	48
Would Decrease	2		3
Do not know	1		

*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The eighth question was regarding the impact on employment potential for educated youths in their village. Almost all of them feel that the employment potential for the youths would increase.

Chart 5.9 People's Opinon about impact on Income for Most of the Villagers



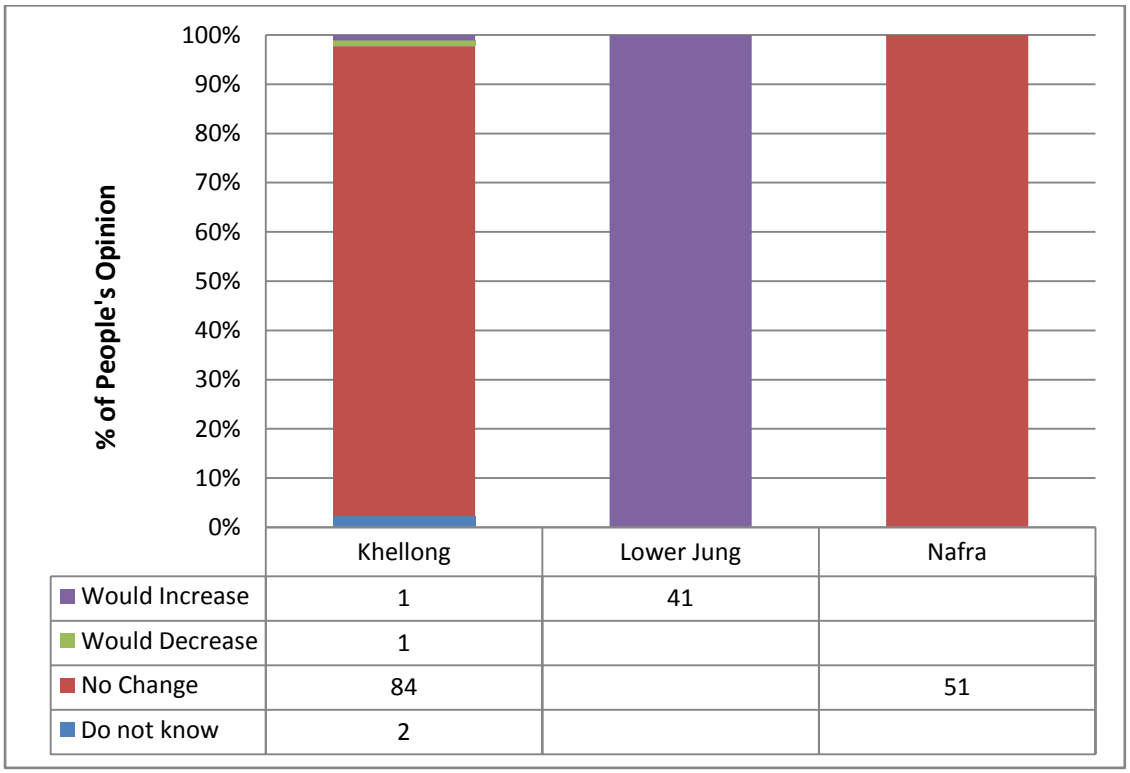
	Khellong	Lower Jung	Nafra
Would Increase	85	41	48
Would Decrease	2		3
Do not know	1		

*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The next question was about the impact on income of most of the villagers. There is almost a consensus that income for most of the villagers would increase due to this HE Project.

The tenth question was about the impact on prominence of the name of Nafra and impact on the social prestige of people in the locality. People of Lower Jung believe that it would increase. However, the people of Khellong and Nafra think there will be no change.

Chart 5.10 People's Opinion about Impact on Prominence of Nafra and Social Prestige of its People

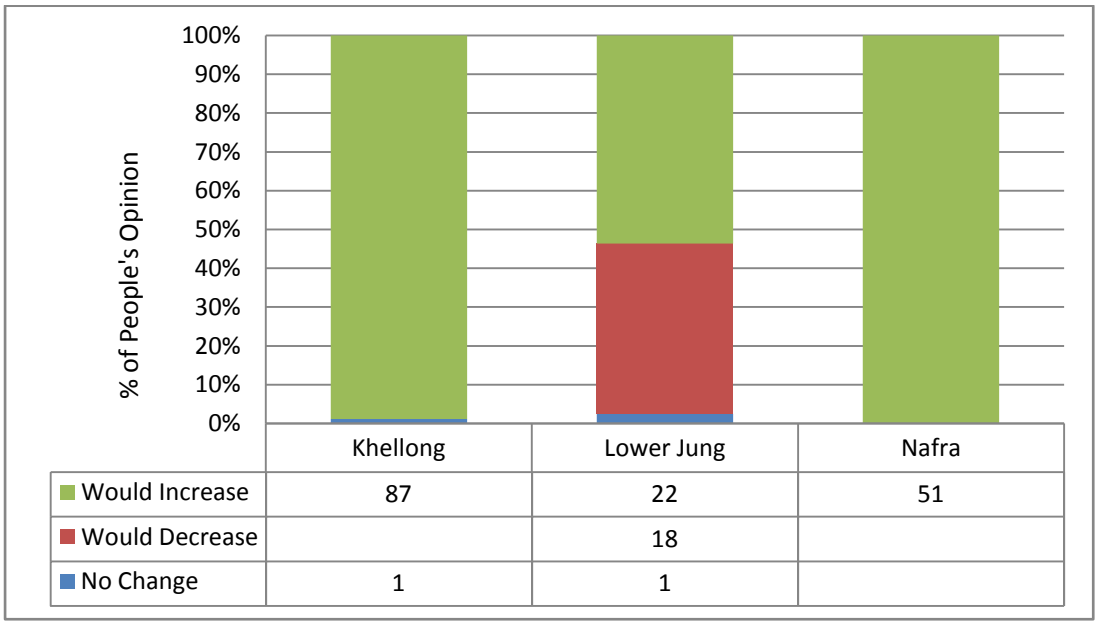


	Khellong	Lower Jung	Nafra
Would Increase	1	41	
Would Decrease	1		
No Change	84		51
Do not know	2		

Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The eleventh question was about the impact on crime in the locality. People in Khellong and Nafra believe that the occurrence of crime in the locality will increase. The opinion of people in Lower Jung village on this issue seems to be divided. There are a sizable number of people who believe that the crime in the locality will decrease.

Chart 5.11 People's Opinion about Impact on Crime in the Locality

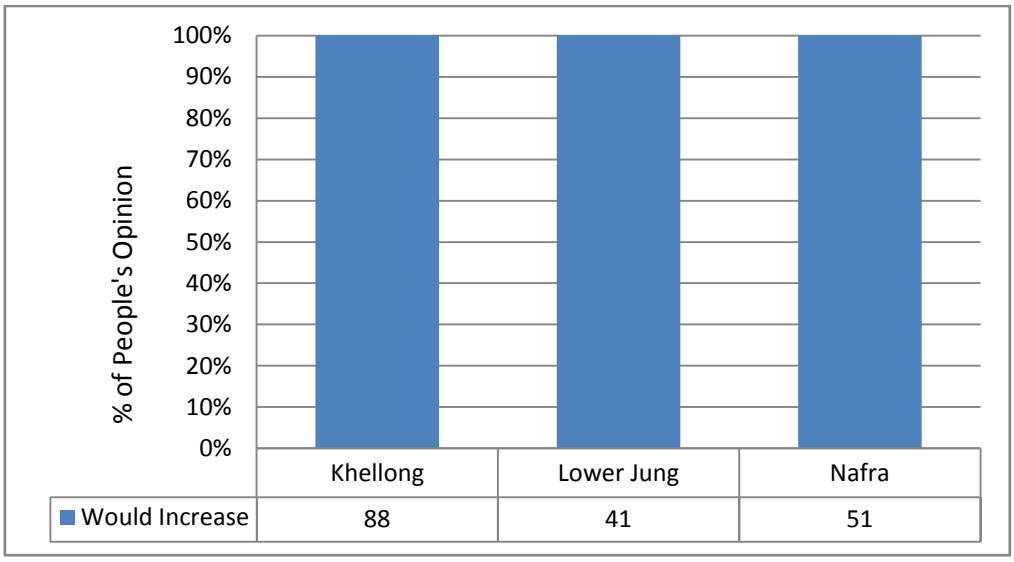


	Khellong	Lower Jung	Nafra
Would Increase	87	22	51
Would Decrease		18	
No Change	1	1	

Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The twelfth question was regarding impact on Road condition and Transport facilities. There is a consensus among people of all the three villages that it would increase due to the proposed project.

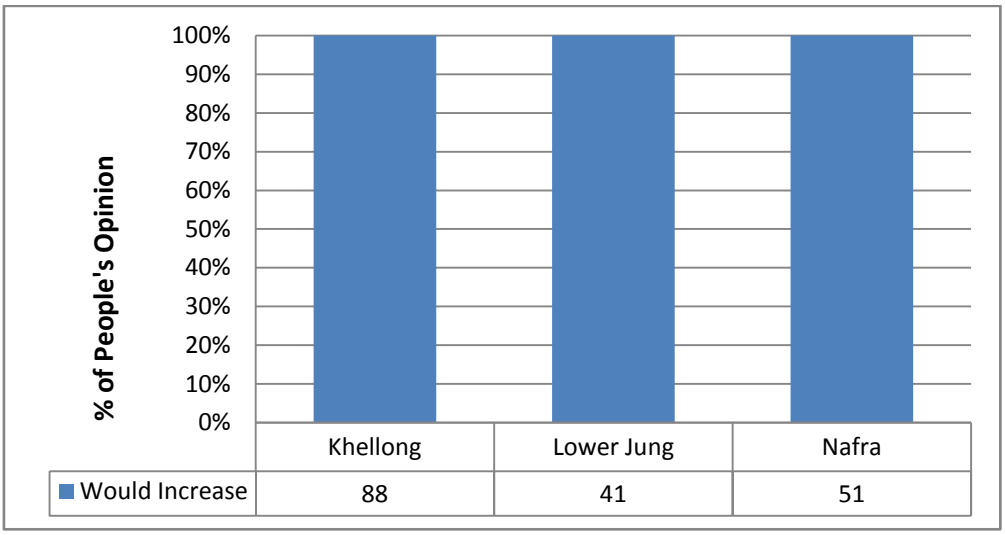
Chart 5.12 People's Opinion about Impact on Road Condition and Transport Facilities



Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The thirteenth question was about the likely impact on the impact on Electricity Supply. On this issue there is consensus that the electricity supply will increase.

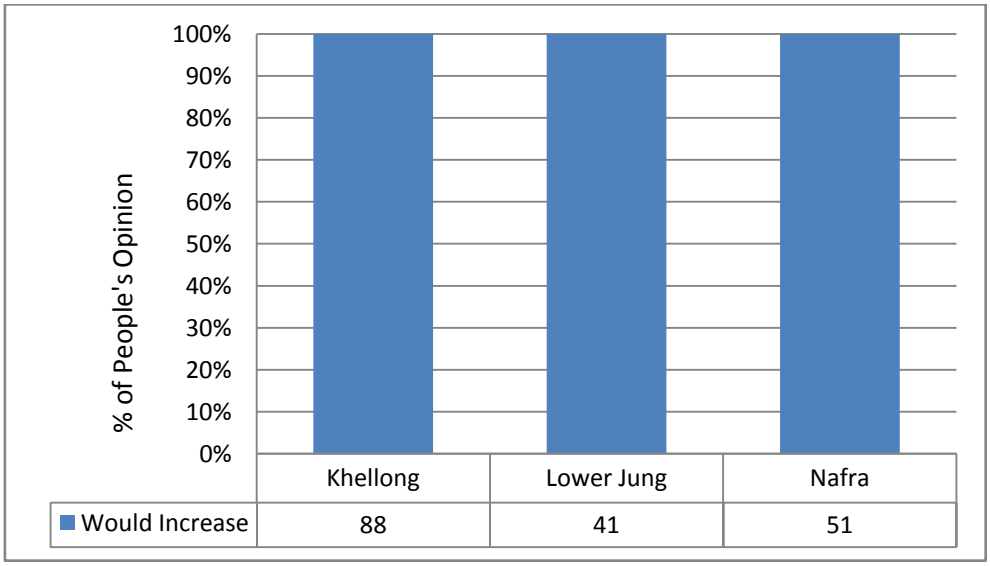
Chart 5.13 People's Opinion regarding Impact on Electricity Supply



Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The fourteenth and the last question in the series on likely impact during construction period was about impact on trade and business activities. There is a consensus among the people of all the three villages that trade and business activities will get a boost.

Chart 5.14 People's Opinion about Impact on Trade and Business Activities



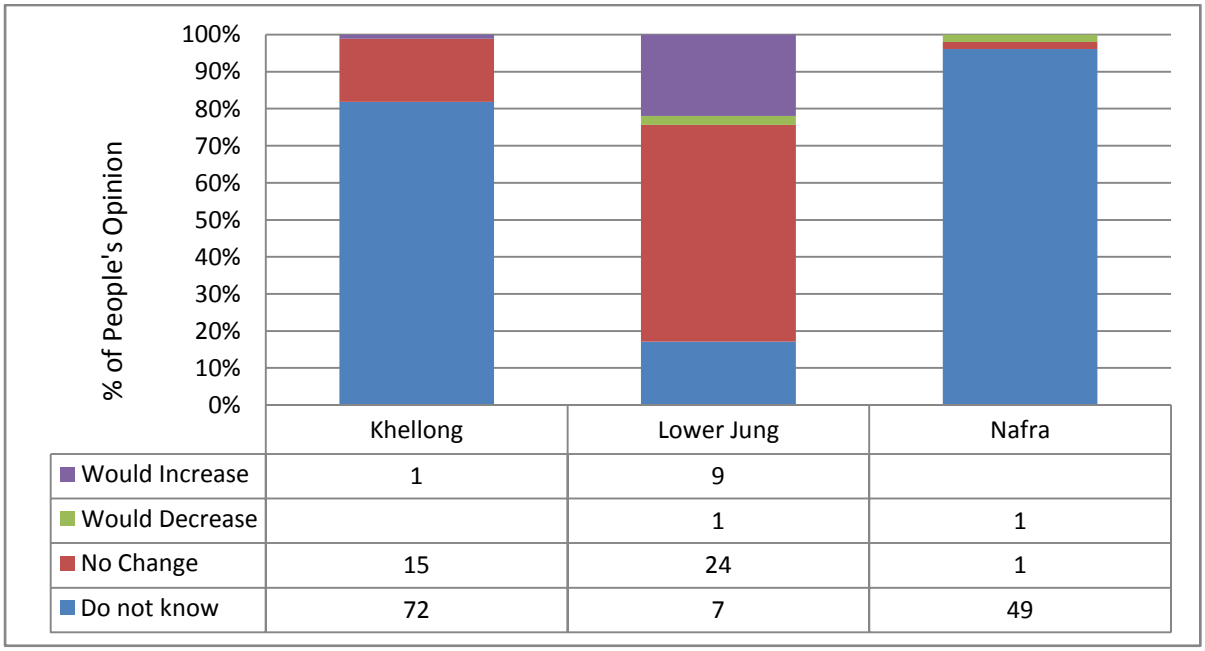
*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

5.1.2 Likely Impacts in After Construction Phase

People were asked a series of twenty two questions to express their opinion on likely impacts of the proposed HE project on their economic and social life after construction is over.

The first in this series of the question was regarding likely impact on the water flow in small streams in their villages. Majority of the people in Khellong and Nafra do not know. Majority opinion in Lower Jung village feel there would be no change in the water flow in the local streams. A few people in Lower Jung even feel the water flow would increase.

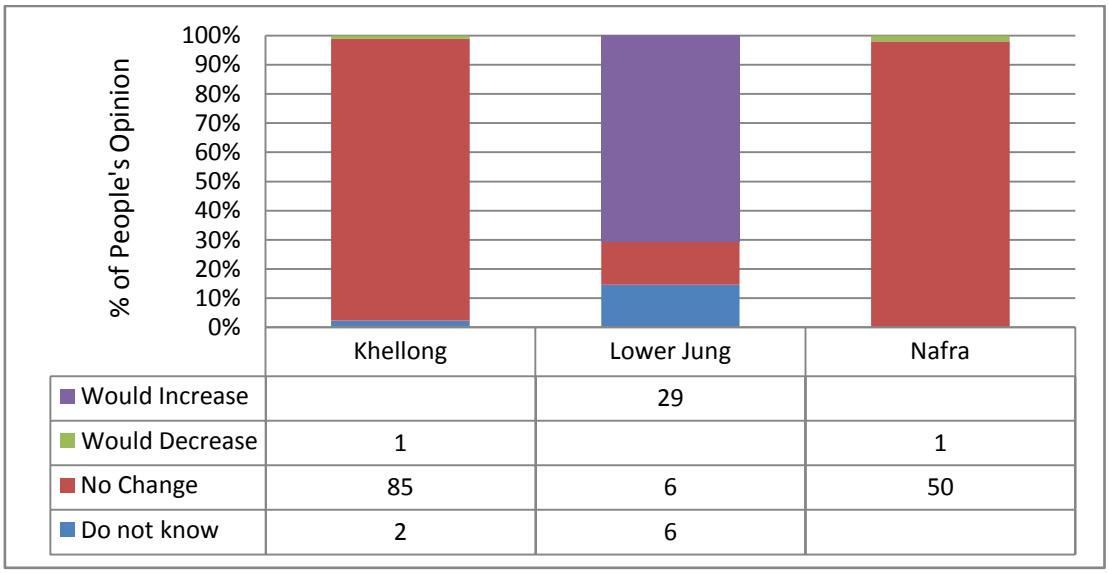
Chart 5.15 People's Opinion about Impact on Waterflow in Small Streams in the Village



Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The second question in this series was about likely impact on possibility of irrigation. Majority of people in Khellong and Nafra feel there will be no change in the irrigation potential in the region. However, majority people in Lower Jung expect that the irrigation possibility will definitely increase.

Chart 5.16 People's Opinion about Impact on Possibility of Irrigation

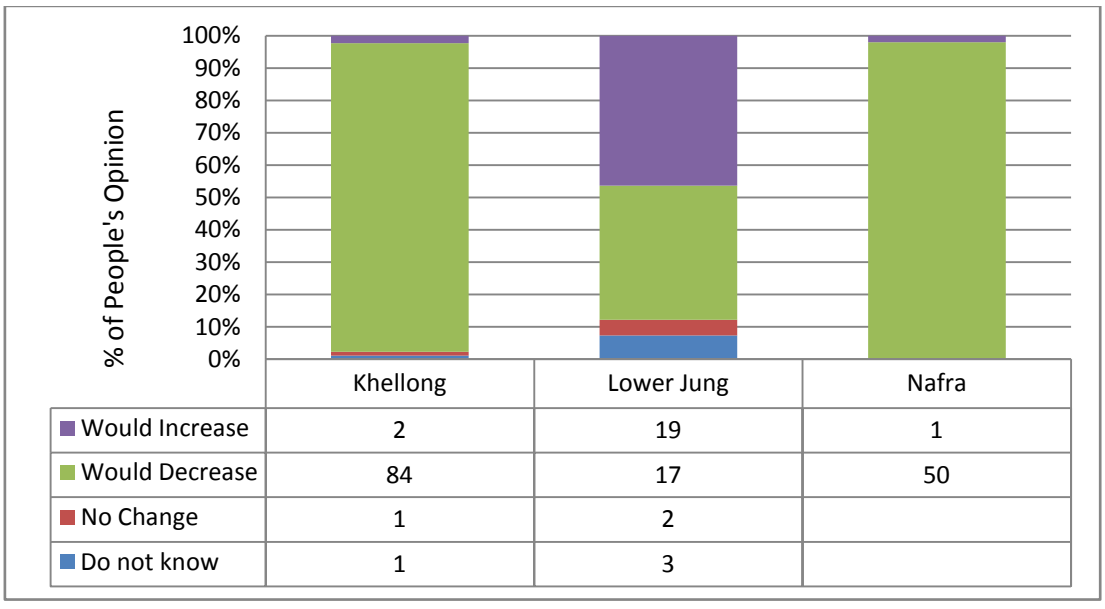


	Khellong	Lower Jung	Nafra
Would Increase		29	
Would Decrease	1		1
No Change	85	6	50
Do not know	2	6	

Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The third question was about the likely impact on forest area in after construction phase. Majority of the people in Khellong and Nafra village think the forest area in their locality would decrease due to the proposed project. Approximately 45% of the people in Lower Jung village however think the forest cover would increase.

Chart 5.17 People's Opinion about Impact on Forest Area

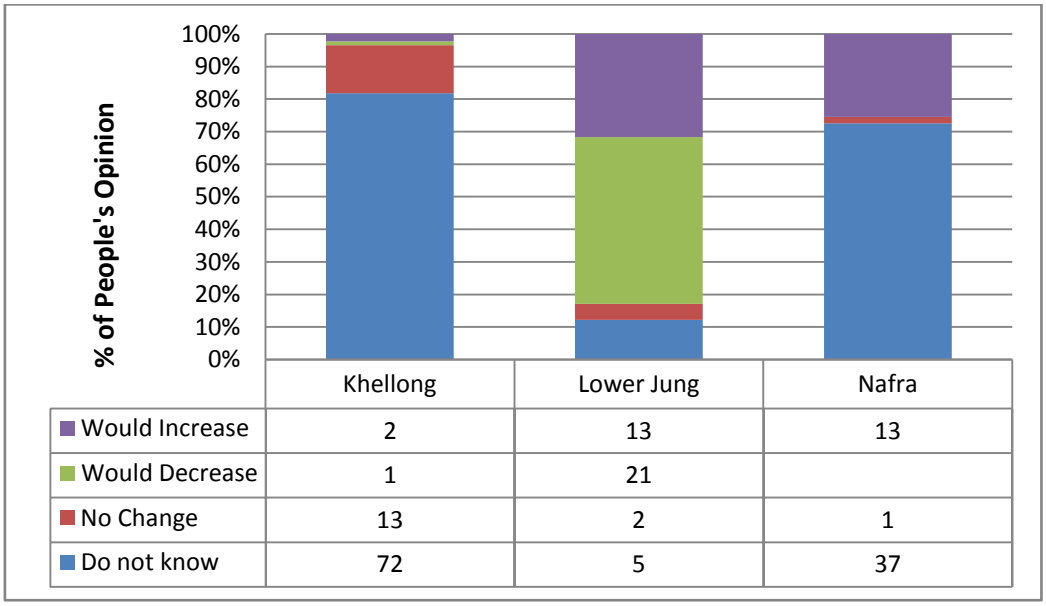


	Khellong	Lower Jung	Nafra
Would Increase	2	19	1
Would Decrease	84	17	50
No Change	1	2	
Do not know	1	3	

Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The fourth question was about likely impact on the soil erosion in the after construction phase. Majority of people in Khellong and Nafra village express their ignorance on the likely impact. Approximately 50% of the Lower Jung villagers however think the soil erosion would increase.

Chart 5.18 People's Opinion about Impact on Soil Erosion

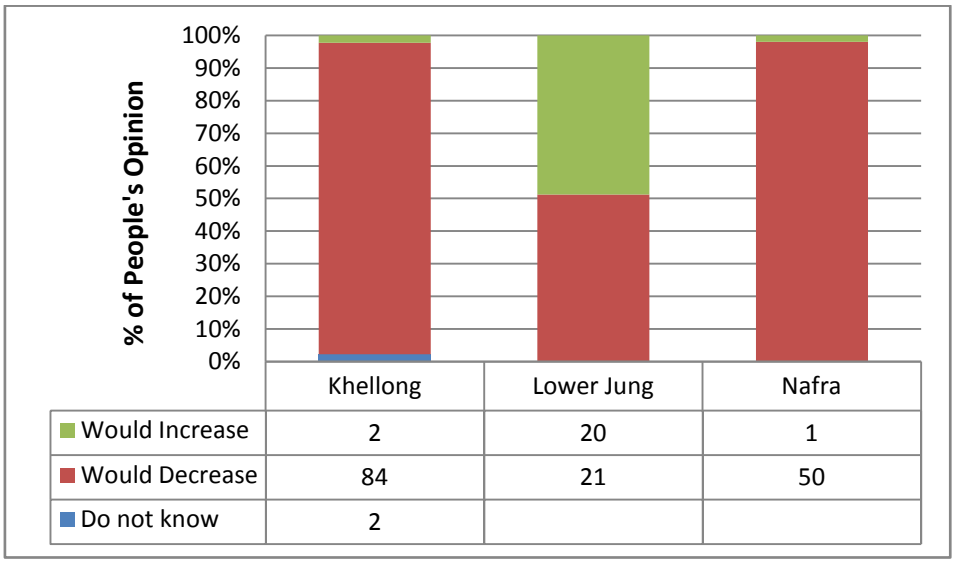


	Khellong	Lower Jung	Nafra
Would Increase	2	13	13
Would Decrease	1	21	
No Change	13	2	1
Do not know	72	5	37

Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The fifth question was on the likely impact on availability of fuel wood. Majority of people in Khellong and Nafra think that the availability of fuel wood would decrease. It is pertinent to bring it to the notice that the response to the same question in the during-construction phase was that it would increase. The opinion in Lower Jung however is almost equally divided.

Chart 5.19 People's Opinion about the Impact on Availability of Fuel wood

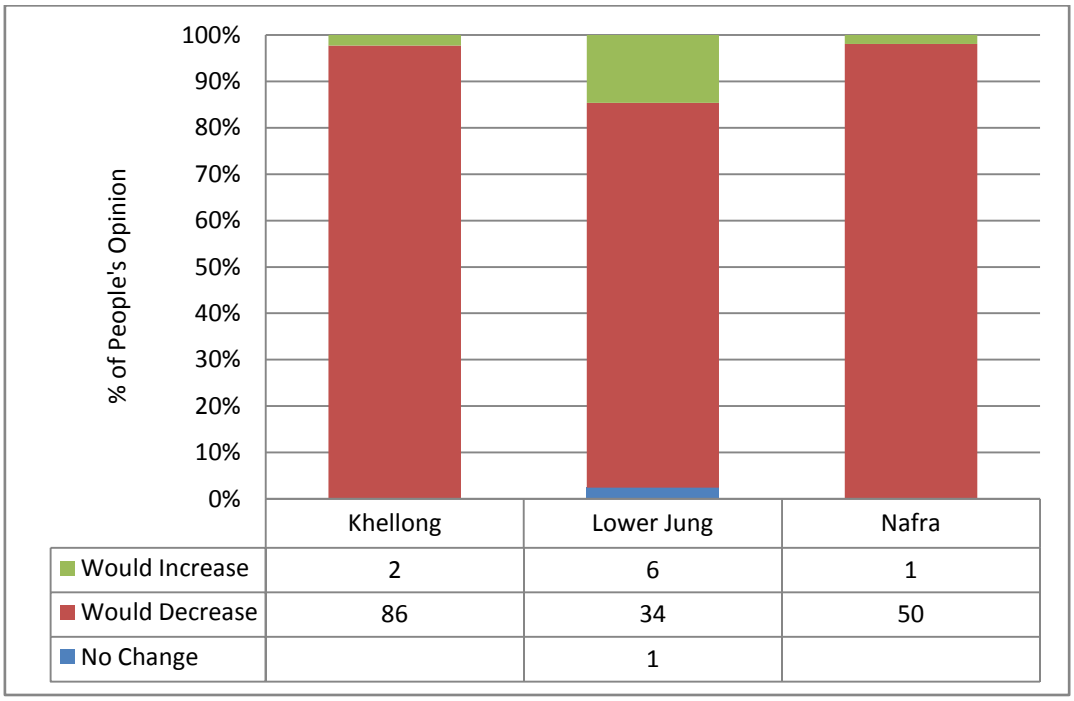


	Khellong	Lower Jung	Nafra
Would Increase	2	20	1
Would Decrease	84	21	50
Do not know	2		

*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The Sixth question was on the likely impact on the loss of local plants used for food. There is almost consensus that the availability of local plants used for food will decrease.

Chart 5.20 People's Opinion about impact on Loss of Local Plants Used for Food

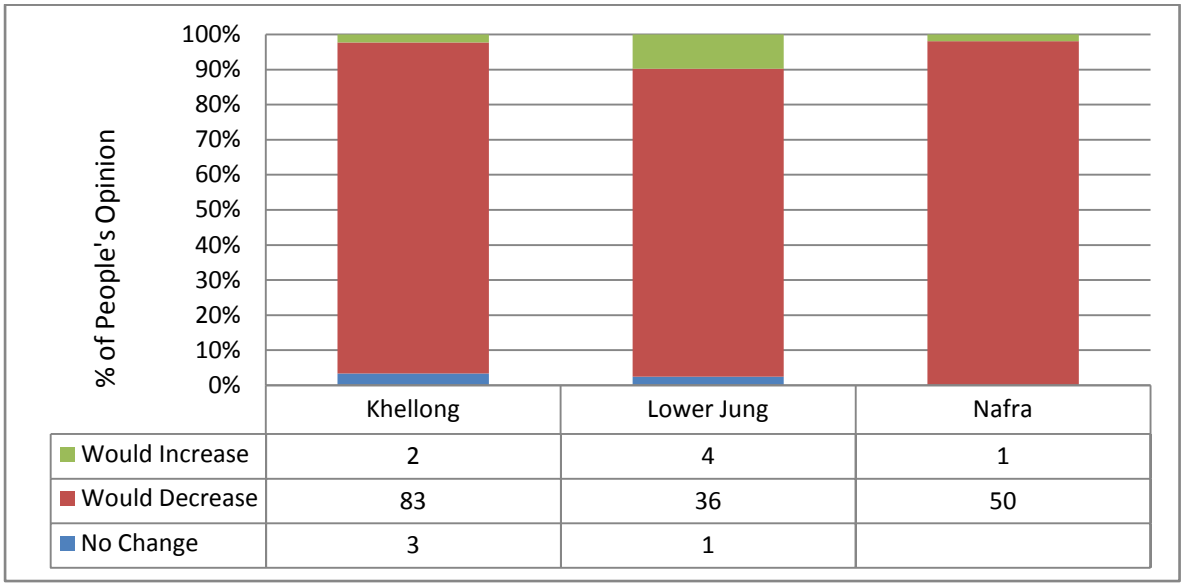


	Khellong	Lower Jung	Nafra
Would Increase	2	6	1
Would Decrease	86	34	50
No Change		1	

*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The seventh question was on the likely impact on the availability of local animals used for food. The common perception of the local people in all the three villages is that it would decrease.

Chart 5.21 People's Opinion about Impact on availability of Local Animals Used for Food

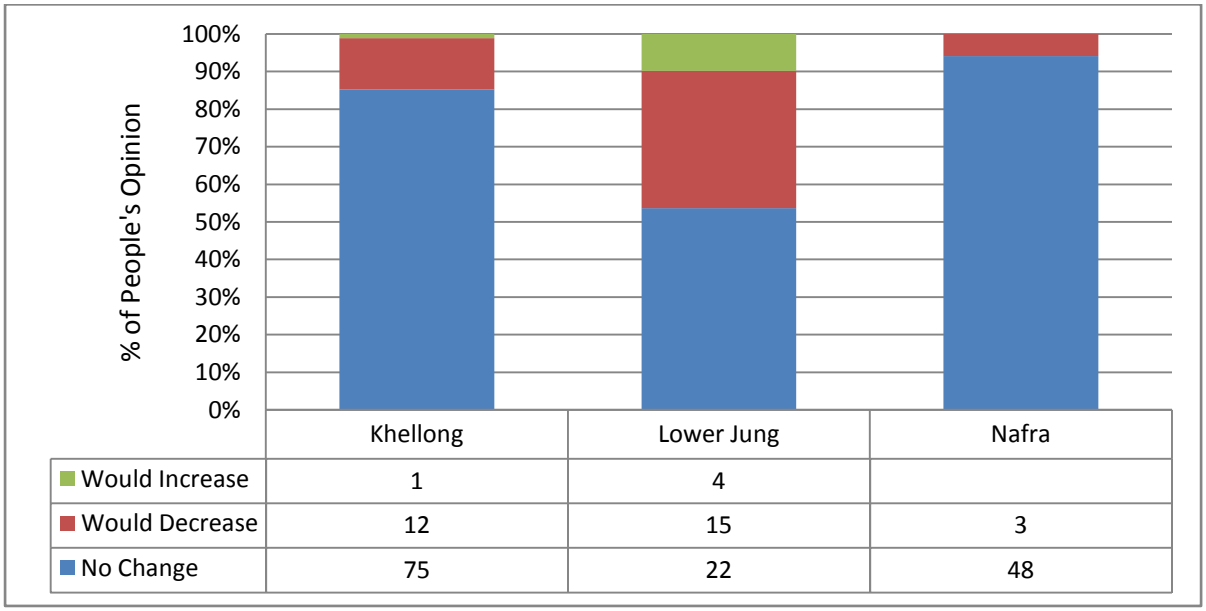


	Khellong	Lower Jung	Nafra
Would Increase	2	4	1
Would Decrease	83	36	50
No Change	3	1	

Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The eighth question to the people was on the likely impact on the agricultural farm land. Majority of the people in Khellong and Nafra feel there would be no change. However approximately 30% people in Lower Jung and 15% in Khellong and 5% in Nafra think that the availability of farm land would decrease.

Chart 5.22 People's Opinion on Impact on Agricultural Farm Land

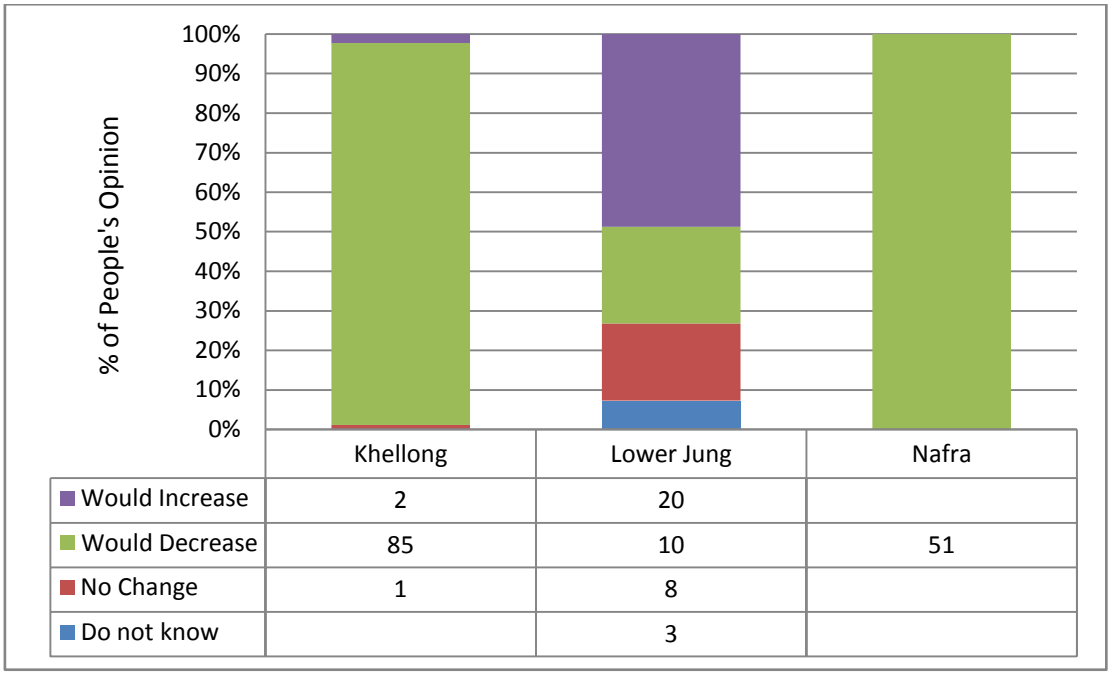


	Khellong	Lower Jung	Nafra
Would Increase	1	4	
Would Decrease	12	15	3
No Change	75	22	48

Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The ninth question to the people was on the likely impact on the availability of fodder for their domestic livestock. There is almost consensus in Khellong and Nafra that the fodder availability will decrease due to the project. However, approximately 50% of the people in Lower Jung think availability of fodder will increase.

Chart 5.23 People's Opinion about Impact on Fodder Availability for Domestic Livestock



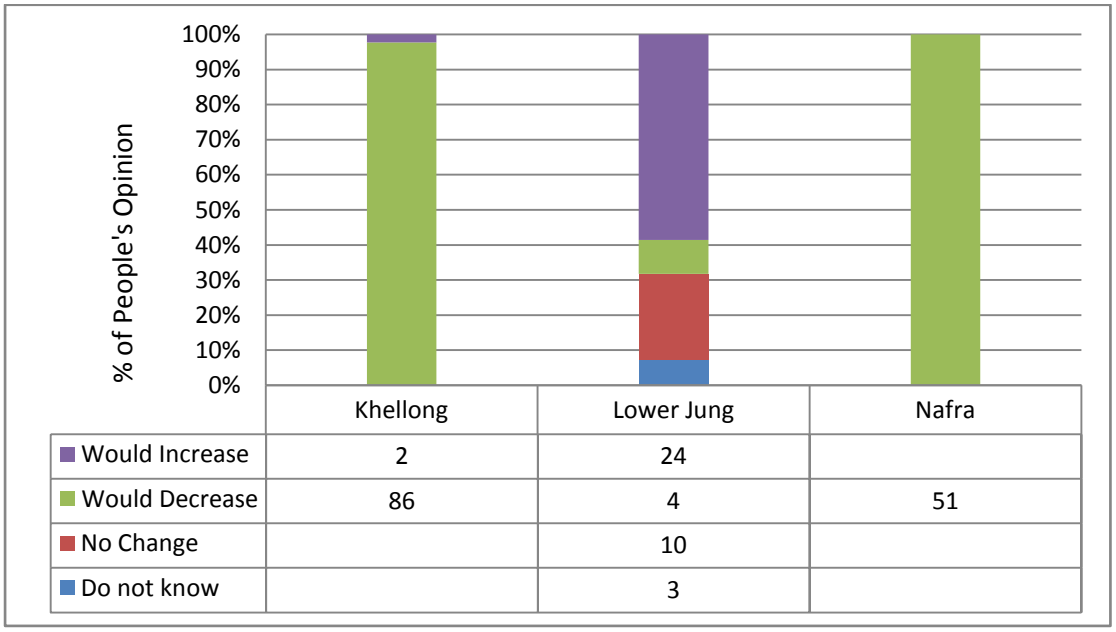
	Khellong	Lower Jung	Nafra
Would Increase	2	20	
Would Decrease	85	10	51
No Change	1	8	
Do not know		3	

Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The tenth question asked to people during this opinion survey was about the impact on livestock numbers in the locality. There is almost consensus among the people of Khellong and Nafra that the

number of livestock will decrease. However, the public opinion in Lower Jung village is divided. Majority of them think that the livestock numbers will increase and the rest of them stand divided.

Chart 5.24 People's Opinion about Impact on Livestock Numbers in the Locality

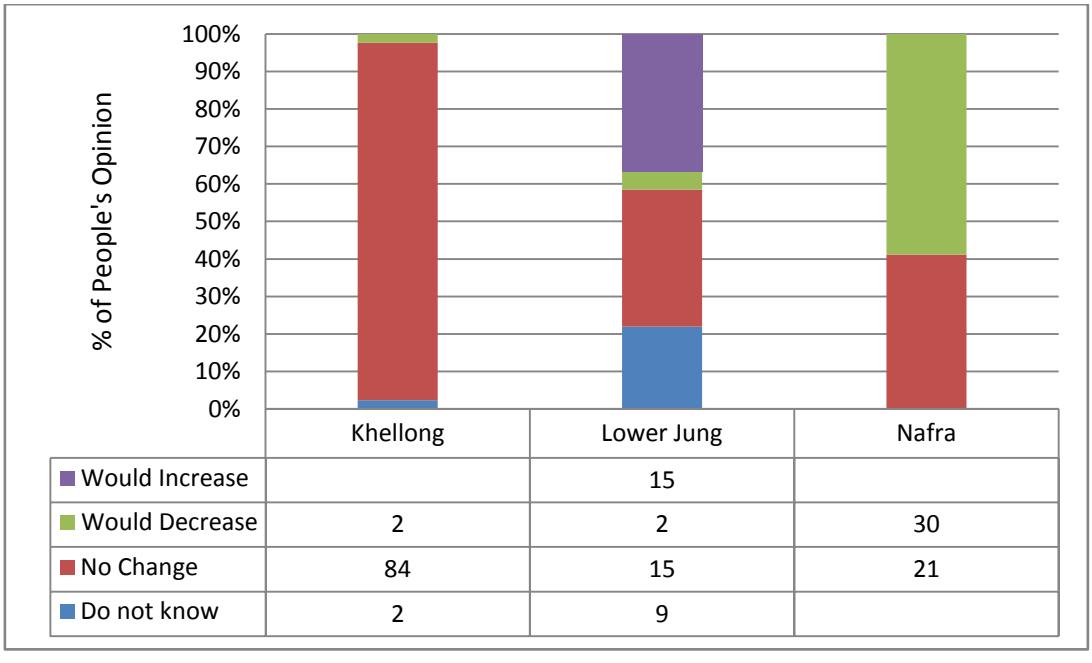


	Khellong	Lower Jung	Nafra
Would Increase	2	24	
Would Decrease	86	4	51
No Change		10	
Do not know		3	

Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The eleventh question referred for public opinion was about the likely impact on the practice of cultivation of cash crops. The opinion among the people of Khellong is that there will be no change. About 40% people in Nafra and Lower Jung also think there will be no change in this respect. Approximately 35% people in Lower Jung think the practice of cultivation of cash crops will increase. However, 60% of the Nafra people believe that it would decrease.

Chart 5.25 People's Opinion about Impact on Cultivation of Cash Crops

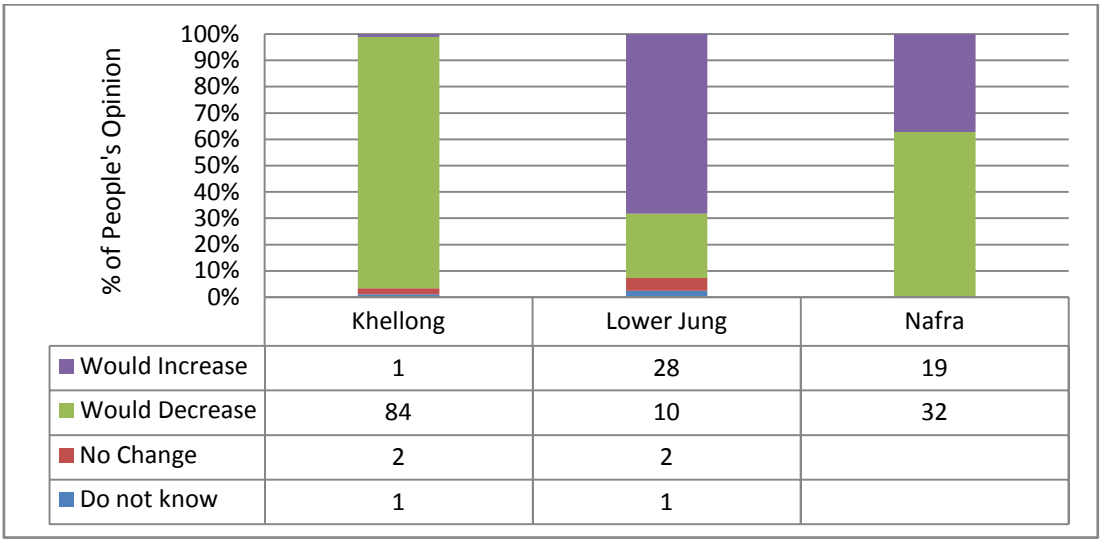


	Khellong	Lower Jung	Nafra
Would Increase		15	
Would Decrease	2	2	30
No Change	84	15	21
Do not know	2	9	

Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The twelfth question referred for public opinion was about likely impact on fishing opportunity to the local people. A large majority of the people in Khellong believe that the fishing opportunities will decrease. Similar opinion is expressed by more than 60% of the people in Nafra and 25% of the people in Lower Jung. Approximately 70% of the people in Lower Jung and around 35% in Nafra however believe the fishing opportunity will increase.

Chart 5.26 People's Opinon about Impact on Fishing Opportunities

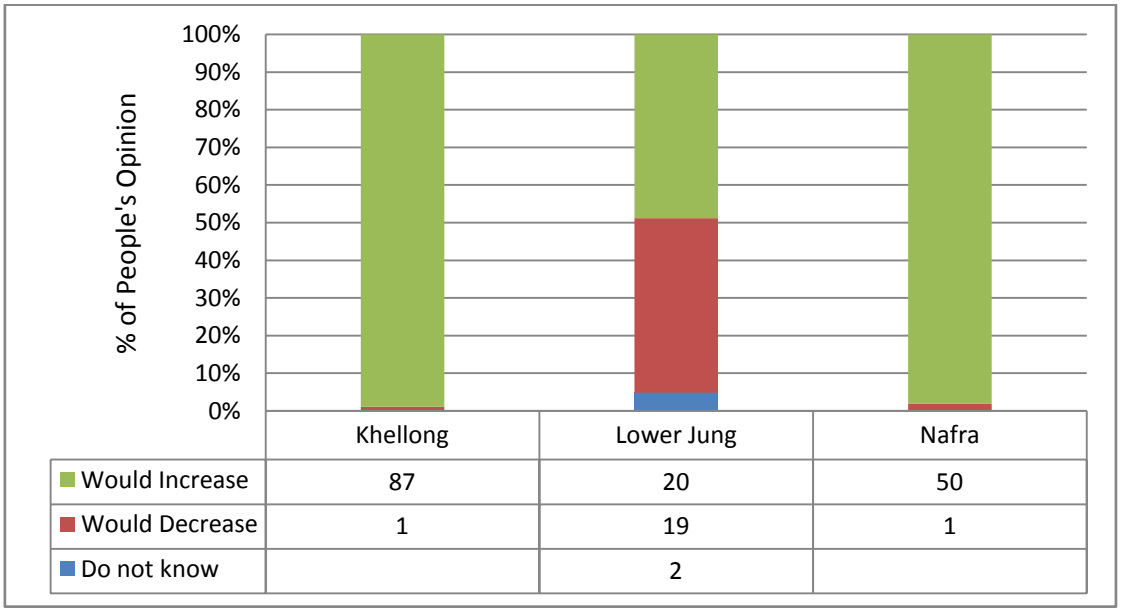


	Khellong	Lower Jung	Nafra
Would Increase	1	28	19
Would Decrease	84	10	32
No Change	2	2	
Do not know	1	1	

Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The thirteenth question referred for public opinion was about likely impact on mosquito population in the locality. A large majority in Khellong and Nafra and almost 50% of the Lower Jung people believe that the mosquito population would increase. A little above 45% of the people in Lower Jung however expect the mosquito population to decrease.

Chart 5.27 People's Opinion about Impact on Mosquito Population in the Locality



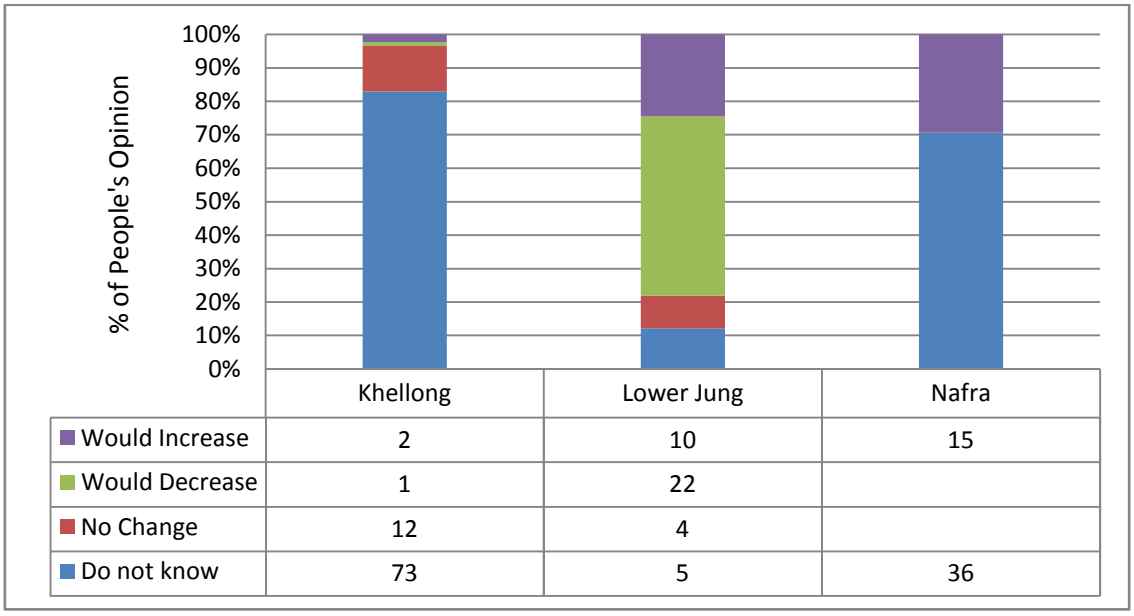
	Khellong	Lower Jung	Nafra
Would Increase	87	20	50
Would Decrease	1	19	1
Do not know		2	

*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The fourteenth question posed before the local people, was about likely impact on the flooding hazard. A majority of the people in Khellong and Nafra expressed their ignorance on the likely impact. However,

majority of Lower Jung people feel the flood hazard would decrease. Approximately 25% in Lower Jung and 30% in Nafra to the contrary think the flooding will increase due to the project.

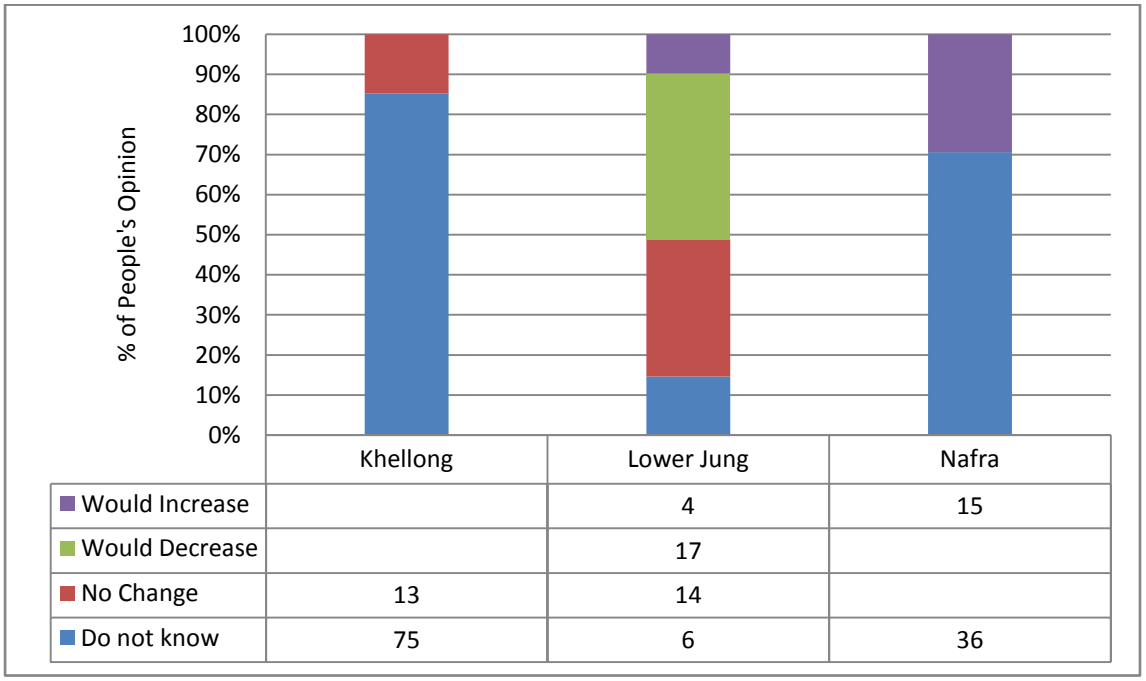
Chart 5.28 People's Opinion about Impact on Flooding Hazard



	Khellong	Lower Jung	Nafra
Would Increase	2	10	15
Would Decrease	1	22	
No Change	12	4	
Do not know	73	5	36

*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

Chart 5.29 People's Opinion about Impact on Occurence of Drought

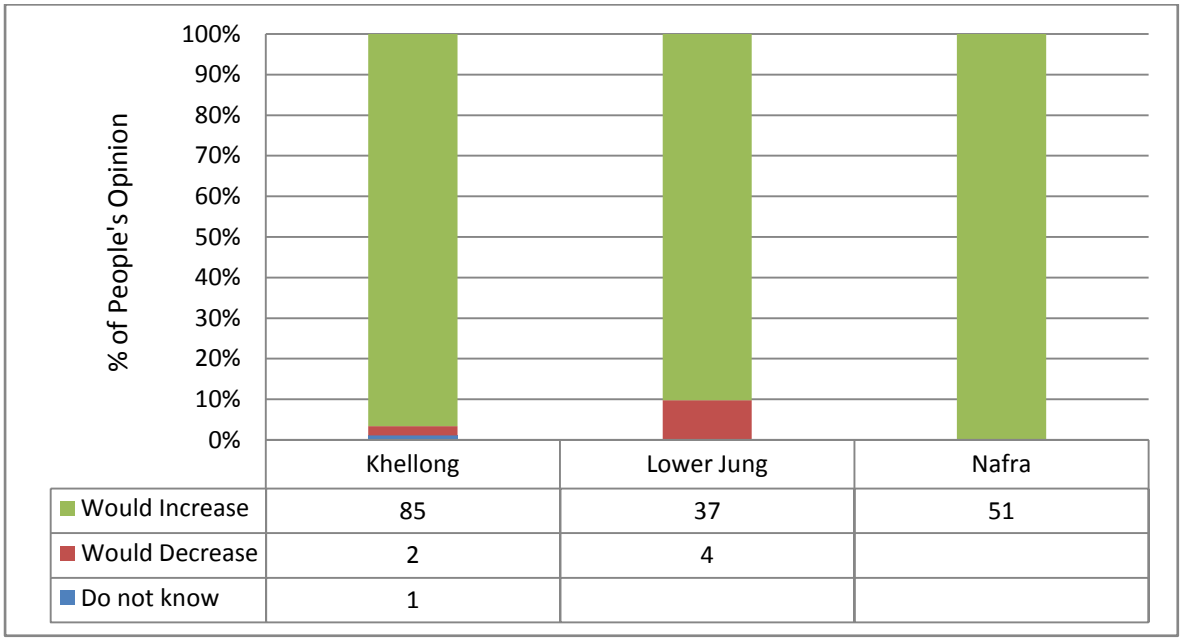


	Khellong	Lower Jung	Nafra
Would Increase		4	15
Would Decrease		17	
No Change	13	14	
Do not know	75	6	36

*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The fifteenth question referred to public for their opinion was about the likely impact on the occurrence of drought. A large majority in Khellong and Nafra expressed their ignorance on the issue. The public opinion in Lower Jung village was found to be divided. Approximately 40% of the people in Lower Jung thought the occurrence of drought would increase while 25% thought there would be no change. Around 30% people in Nafra and 10% of Lower Jung think that the occurrence of drought would increase.

Chart 5.30 People's Opinion about Impact on Employment Potential for Educated Youths



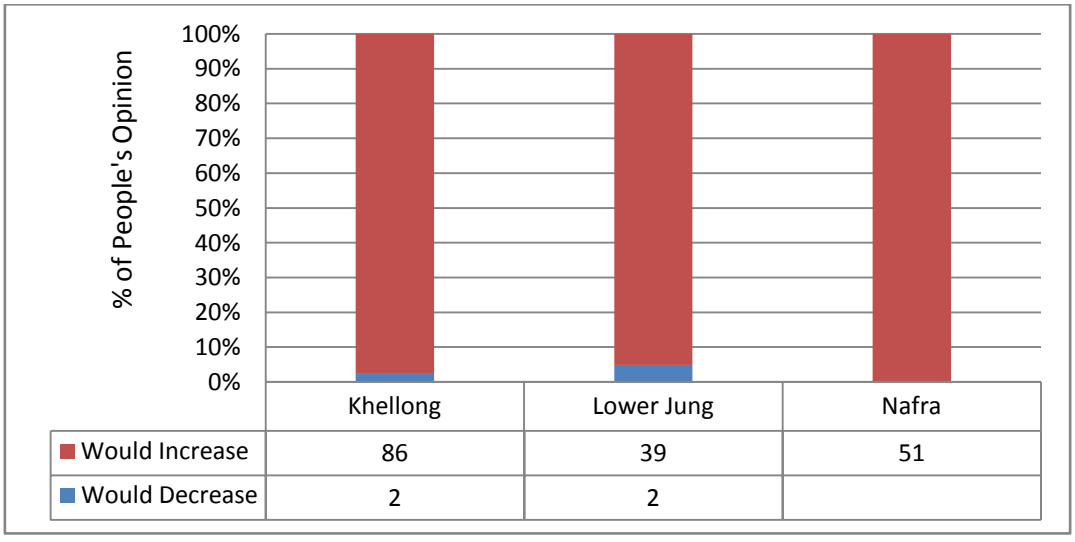
	Khellong	Lower Jung	Nafra
Would Increase	85	37	51
Would Decrease	2	4	
Do not know	1		

*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The sixteenth question referred to the public for their opinion was on the likely impact on the employment potential for educated youths in the locality. A large majority of the people in all three villages think that the employment potential for the educated youth would increase.

The seventeenth question on which people provided their opinion was on the likely impact on the income for most of the village people irrespective of their educational status. There is almost a consensus among the people of all the three villages that the income for most the village people would increase.

Chart 5.31 People's Opinion on Impact on Income for Most of the Village People

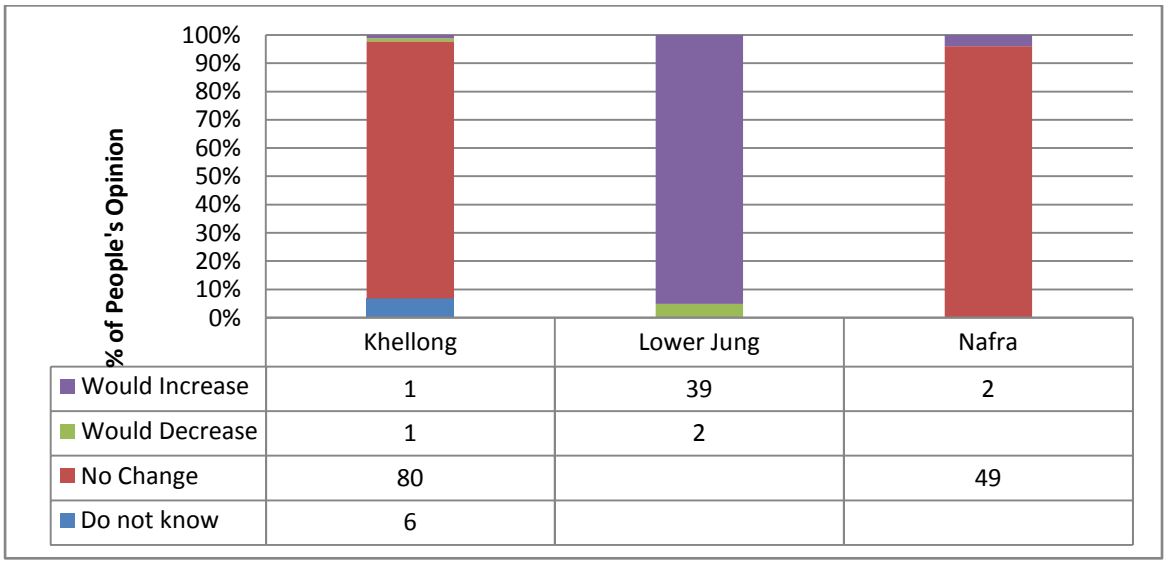


	Khellong	Lower Jung	Nafra
Would Increase	86	39	51
Would Decrease	2	2	

*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The eighteenth question posed before the people in the impact area for their opinion was about the likely impact on prominence of Nafra region and social prestige for its people. A large majority in Khellong and Nafra think there will be no change. However, majority of the people in Lower Jung village think that it would increase their social prestige.

Chart 5.32 People's Opinion about Impact on Prominence of Nafra and Social Prestige for its People

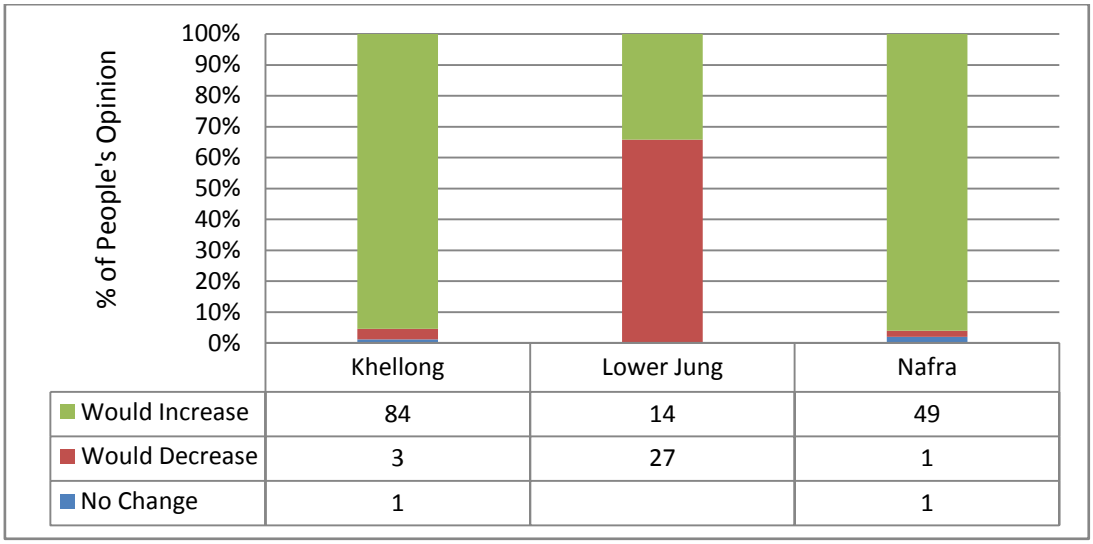


	Khellong	Lower Jung	Nafra
Would Increase	1	39	2
Would Decrease	1	2	
No Change	80		49
Do not know	6		

*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The nineteenth question referred to public for their opinion was about the impact on crime in the locality after the construction period. A large majority in Khellong and Nafra think the crime rate will increase. However, majority of Lower Jung people think that the crime rate will decrease.

Chart 5.33 People's Opinion about Impact on Crime in the Locality

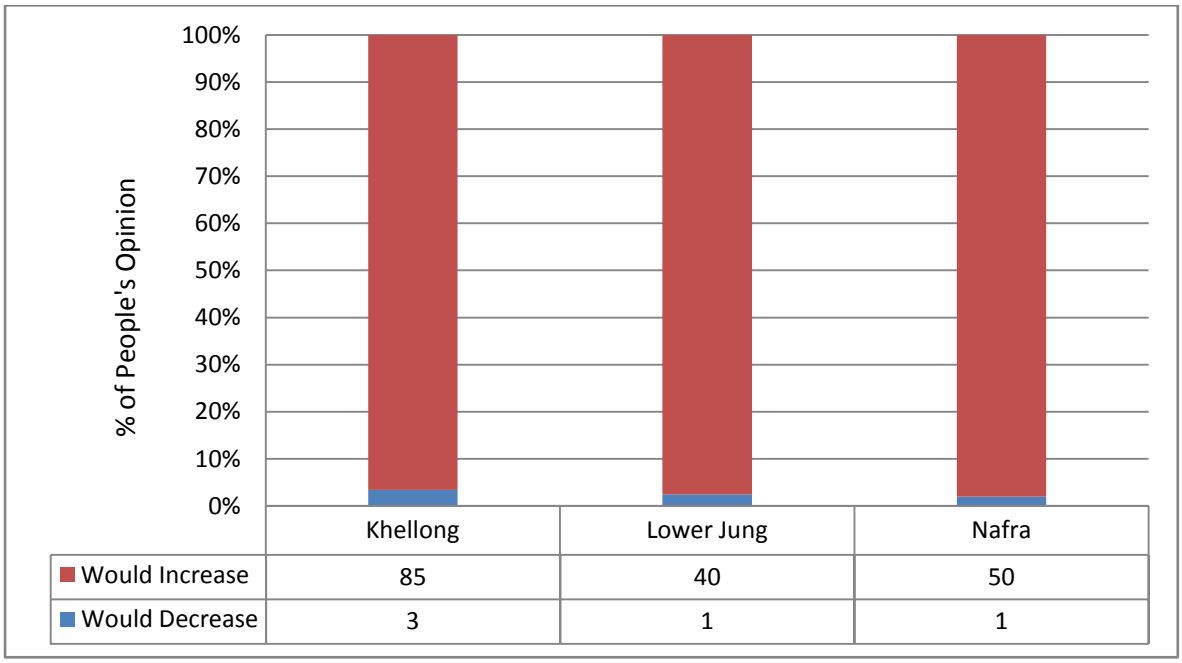


	Khellong	Lower Jung	Nafra
Would Increase	84	14	49
Would Decrease	3	27	1
No Change	1		1

*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The twentieth question referred to the public for their opinion was about the impact on road condition and the transport facility for their village. There is almost a consensus among the people of all the three villages that the road condition and transport facilities would increase.

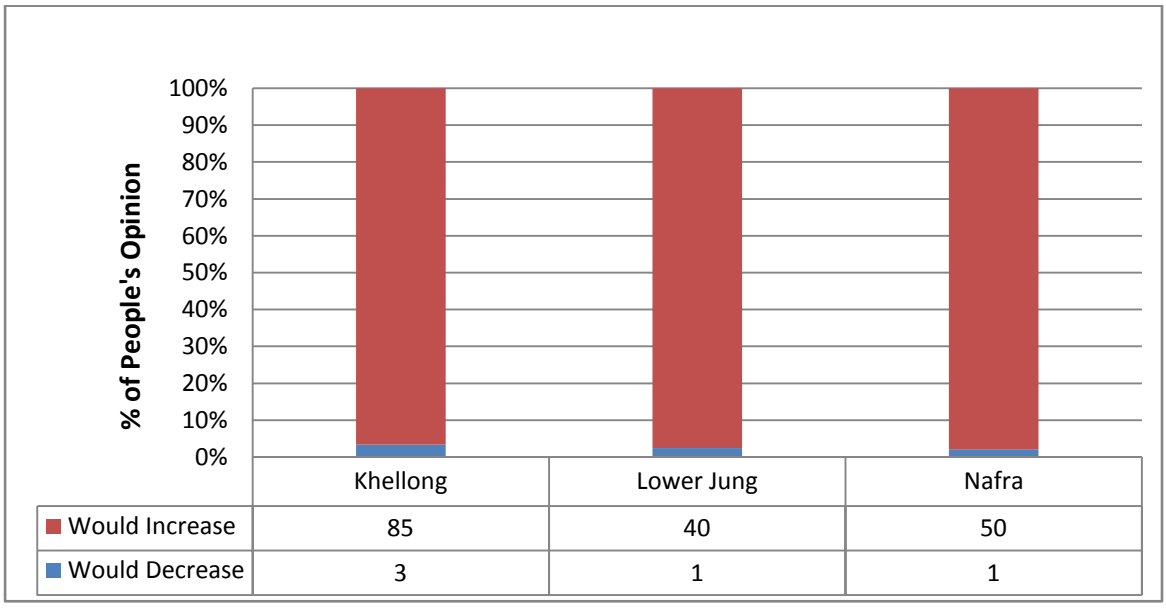
Chart 5.34 People's Opinion about Impact on Road Condition and Transport Facilities



*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The twenty-first question referred to the public in the impact area for their opinion was about the impact on electricity supply to their village. There is almost a consensus that the electricity supply would increase.

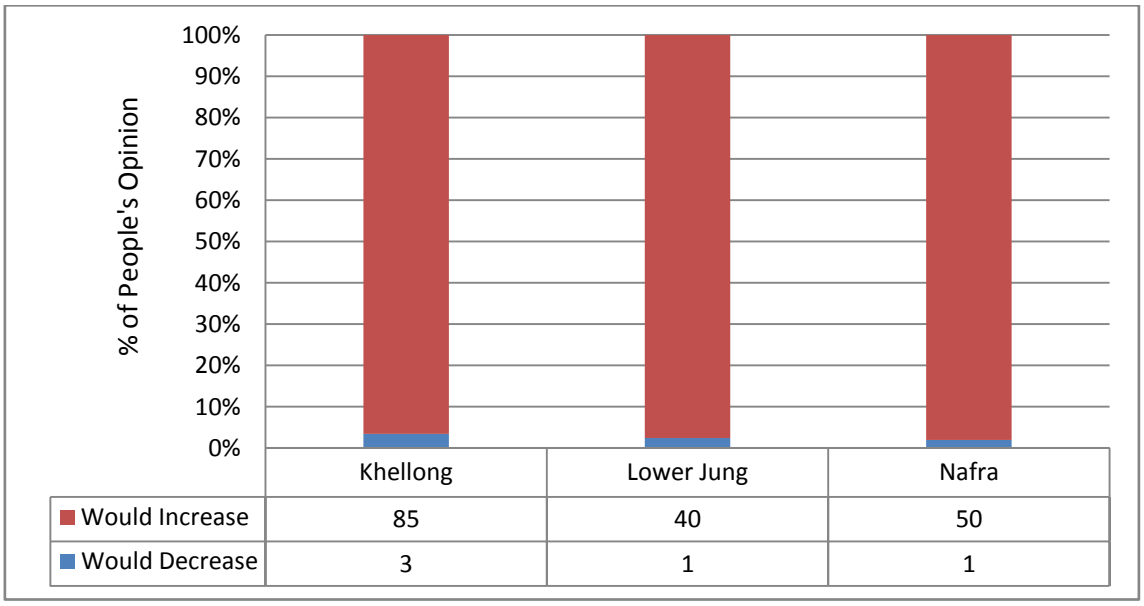
Chart 5.35 People's Opinion about Impact on Electricity Supply



*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

The last and the twenty second question referred to the public of the impact area for their opinion was about the likely impact of the HE project on the trade and business activities in their villages. There is almost a consensus on this issue. A large majority think the trade and business activities in their village would increase.

Chart 5.36 People's Opinion about Impact on Trade and Business Activities



*Source: Impact Assessment Opinion Survey by SIA Team in Nov 2008

5.2 Summary of Opinion Survey on Perception of Local Communities:

The public opinion on these issues shows that the public has a fair idea about the likely impact of this project on their social and economic life. The overall public opinion on the Nafra Hydro Electric project is positive. A large majority of the people welcome this project. If the results of the opinion survey are summarized, the local people support this project for the following list of benefits that they expect from this project.

1. Employment Opportunity for the local people would increase both during the construction and after commissioning of the project.
2. This would augment family income for most of the people and expand the scope for expansion of trade and business activities.
3. The road and transport facilities for their villages will improve.
4. The availability of reliable supply of electricity for the domestic and industrial use.
5. The availability of water in the reservoir will create possibility of irrigation, fishing, and intensification of agricultural and horticultural activities.

There are certainly a number of apprehensions and concerns of the local people. But, these apprehensions override the developmental benefits that they expect out of this project. The list of apprehensions expressed by the local community is as follows:

1. Reduction in the forest area.
2. Increase in soil erosion.
3. Introduction of new diseases into the region by migrant labors.
4. Increase of mosquito and health hazards connected to them.
5. Increase of crime
6. The reduction in supply of the fish, plants and animals used for food purpose.

These apprehensions should be addressed through discussion with the community and possible mitigation measures should be planned. Some of their apprehensions are based on their ignorance or misinformation. These apprehensions should be addressed through a public information and education campaign. Once these apprehensions are addressed, a greater level of cooperation from the local community can be expected.

5.3 Assessment of Social Impacts:

In this section, the expectations, concerns and apprehensions expressed by the local people as discussed in the previous section on public perception of likely impacts are examined objectively. In addition to these issues, a range of other issues of significance is also reviewed.

5.3.1 Economic and fiscal impacts

Indian economy in the last decade has shown a steady progress and is now one of the rapidly growing developing countries. The rapid growth in industrialization and modernization of the agricultural operations has pushed up demand for power/energy. Furthermore, the improvement of quality of life also has put additional requirement of power. However there is a huge gap in the demand and supply. This gap needs to be filled quickly to maintain the growth of the national and regional economy.

Arunachal Pradesh has a great potential and major part of it is still remains to be exploited. Under the 50K MW Hydro Electricity Initiative, 42 out of 162 identified projects are located in Arunachal Pradesh. 27,293 MW of installed capacity will be achieved through these 42 identified projects for which PFR is been submitted. Hence, this will provide ample power production in the state. This will definitely be a major source of revenue for the state of Arunachal Pradesh.

Availability of power will also help in establishing industries and creating employment opportunity in a wide range of secondary and tertiary sector of the economy. The West Kameng districts mostly rely on the secondary and tertiary sector economic activities. The primary sector activities such as forestry, fishing, and mining are not major chunk of the Gross Domestic Product of the District. The tertiary sector is almost three times larger than the primary sector. This imbalance has resulted in a huge economic disparity in the region. To make the development more broad based, the primary sector economic activities should receive attention. Additional employment opportunities could be generated through promotion of cottage industries based on the local raw material.

Looking at the limitations of the agricultural possibilities in the region, technology driven non-agricultural development should be emphasized. The primary education profile of the Arunachal Pradesh is quite satisfactory. However, the opportunities for higher education are quite limited. The technology driven non-agricultural economic activities would require appropriate technical education and skill sets for the educated youth. Hence, appropriate steps should be taken to create educational infrastructure.

Nafra Hydro Electric Project thus at the macro level contribute to the generation of power and creating revenue for the State of Arunachal Pradesh. At the micro level, it will generate employment opportunity for the local people to be employed as unskilled and semi-skilled labors. A few of the educated youth would also get into clerical and managerial jobs. It would also create business opportunity for local contractors and businessmen to get the sub-contracts related to the construction work. However, these employment opportunities are not permanent in nature. The construction of the project is expected to be over in 5 or 6 years time. After the commissioning of the project, the employment opportunity will drastically reduce. If steps for expanding the primary sector activities are not initiated, the impetus for the economic growth cannot be sustained.

Hence, the Government of Arunachal Pradesh should plan for expansion of the primary sector activities through modernization programs and create linkages to micro and mini enterprises that would be technology driven. Thus, the macro fiscal benefits generated through this project should be passed on to Nafra region by the State Government. The Government may promote the social enterprises on a PPP model to translate these macro-benefits into regional and local development.

The MoA between SEW and GoAP in Article-15, Clause 15.5 makes a provision that the Company shall contribute an amount @ one paisa per unit of electricity sold towards local area development fund. This amount should be used to promote skill enhancement and technical education of the local people to enhance their employability and create entrepreneurs.

5.3.2 Demographic impacts

During the construction of the Dam and other components of the Hydro electric Project, there will be an influx of skilled and semi-skilled labor into the locality. It is expected that at least 400 people would be required to work on different construction activities for a period of five years. Though local people will be given preference in employment, it would still require at least 70% of the required work force to be brought from other regions. Hence, this would be an additional population. The population of the three large human settlements in the impact area as per 2001 census is 1807. Hence this additional number of population would be significant portion of the total population in the locality.

The migrant population though would mostly be skilled and semi-skilled construction labors; there would also be construction supervisors, administrative, technical and managerial personnel. Hence, people with different economic, educational, professional, and cultural background would require to be assimilated into the local populace.

The gender composition of the migrant population may not have the desired sex-ratio creating gender imbalance in the area. Further, the age-composition of the labor employed is expected to be mostly young people. Hence, it would also imbalance the age-structure of the local demography.

However, the age-structure and sex-ratio imbalance in the local population will not have a permanent effect on the local demography. After the construction of the dam and other components are completed, the migrant population would return to their homeland. As the hydro electric generation does not require a large work force, there will be only a few employees staying in the locality.

Appropriate mitigation measures needs to be planned and executed to reduce the negative impacts of demographic change during construction period.

A separate labor colony is planned in a location that would be away from the habitations of the local people. The proposed labor colony is connected by the road that is independent of the approach road to Lower Jung, Nafra and Khellong. The labor colony will be provided with utility shops and tea and snacks outlets specifically catering to their needs. This will provide a reasonable degree of isolation to the migrant population. This will also help keeping a vigil on the movement and behavior of the migrant labors.

5.3.3 Impacts on Indigenous Peoples rights (both Statutory & Customary)

The land ownership in Arunachal Pradesh is vested on the community inhabiting the region. The customary rights on the land and forest resources are also recognized in statutory provisions under Assam Forest Regulation 1891. Following are some of the privileges that the community enjoys under Assam Forest Regulation 1891.

Section-8-13: Describes privileges of local people to take up *jhuming* and its recognition by Forest Settlement Officer (FSO). This is subject to control restriction and abolition by the State Govt. and not be a right. *Jhuming* was thus a privilege and not a right

Section – 11: A right of way, a right to water course or use of water or right of pasture or to produce. Except these, FSO can accept or reject other claims on land.

Thus the local community has a right over the water course and use of the water for fishing. This privilege used by the local community will be curtailed to some extent by this project.

People have expressed their concern about the shortage of fuel wood as migrant labors would bring additional demand. Hence, alternative arrangements should be made.

The MoA between SEW and GoAP in Article-4, Clause 4.2 states that the fishing, recreational and navigational rights, tourism prospects in the river, water channel, reservoir, lake etc shall remain vested in the Govt. of Arunachal Pradesh subject only to such restriction as may be necessary for the

operational requirements and safety and security of the project and the general guidelines of the Govt. of Arunachal Pradesh. Hence, the state government would make appropriate arrangement in consultation with the company on providing access to the local people for fishing in the reservoir.

Another concern expressed by the local people is about the reduction in the availability of local fish varieties, plants and animals used by them for food. This aspect is fully studied by the ecological studies. The fish varieties exploited by the local people for food are identified and their habitat is studied in detail. It is proposed that habitat enhancement steps should be undertaken between the dam and powerhouse site to promote breeding and sustenance of such fish species. The local population thus can still have supply of these food items. Similarly, the plant species that grows naturally along the river course would be rehabilitated in alternate locations to ensure continuation of their supply to the local community.

5.3.4 Political impacts:

The project has a well ramified political impact too. The project is to be developed by a private company which is been contracted by an elected government belonging to one political party. Hence, other political parties would subject this decision to strict scrutiny. Hence any instance of violation of human rights, procedural compliance, or governance lapses would have the potential for resistance in its smooth progress. Hence, due care should be taken to protect human rights, comply to all procedural norms, and remain transparent in its decision making and liaisoning with government.

At the local level, there should be regular interaction with all political leadership and involve the local political and governance structure in issues with public concern. A specific cell should be set up to monitor the issues of public concern and human rights and provide regular feed back to the management.

Political leaders may use issues arising from this project execution to further their political interests. In such cases, issues may be blown out of proportion to create tension and disrupt the public life and project execution. For a small number of vested interest group, the larger public benefit will be compromised. Hence, there should be constant process of direct relationship with the community to avoid such miscommunication and thereby leaving space for the political touts to creep in.

It is in the interest of the larger interest of the state, all political parties should have a consensus on building an enabling environment for private participation in the development process of the state. They should ensure a sustained policy of strengthening public and private partnership in developing key infrastructures required for development.

5.3.5 Physical health and mental health impacts

The sudden increase of the population in the locality could affect the physical and mental health of people involved in the project. The migrant population may introduce new disease carrying agents into the local environment. As the migrant population would be sharing the public service infrastructures such as road, transport, and market places they would come in close interaction with the local population. Through this intermingling, both the migrant population and the local population would get exposed to diseases hitherto unknown to them. Precaution should be taken to monitor the contagious and viral diseases that could have serious impact.

The local population those who would be engaged as wage labors may not have earlier experience of working in construction activities. They would thus be exposed to a range of chemical and mechanical processes, increasing the risk of health hazards. In addition to this, the accidents in the construction site causing both minor and fatal injuries to the workforce needs medical attention too.

The migrant population would come from a very different eco-zone and climatic condition. Hence, they would face problem in getting adjusted to the new eco-climatic condition. They would surely be prone to

seasonal common ailments that would be requiring medical attention. The children migrating with their parents would be required to be vaccinated and provided medical care and services.

The local population would for the first time be exposed to such a large number of outside populations with ethnic, religious and cultural difference with them. They have to share and compete with them for public services in their day to day life. Hence, local people are more likely to feel alienated and subverted in their own land. Those who would be engaged in the work, have to compete with the outsiders in performance. If they find themselves lagging behind the outside workers, a feeling of defeatism would grow within them. The local people thus would be facing many such challenges that is so typical of any industrial economic life as new challenges in their life. This would increase chances of impacting their mental health too. Hence, they should be provided with professional counseling to avoid any unpleasant events.

On the contrary, the migrant population may feel deprived of their social and cultural life in this new place of work. The distance from their family and friends may affect their mental health. The migration to a new area usually causes loss of political power and rights that is available to them in their native places. Hence, a feeling of powerlessness and subjugation may grow within them affecting their mental health. Hence, mitigation measures should be planned to reduce these tensions and keep the labor in a right state of mental health for getting the optimum output from them.

5.3.6 Development impacts

The project will be a key milestone in the development of the Nafra CD circle. The project will fulfill the immediate requirement of employment generation in the locality to absorb the educated non-employed youth. It would also give opportunity to the working population who sit idle in the non-agricultural season. Hence, this would definitely create employment opportunity and augment household income. The project will create a range of opportunity for supportive services and self-employment for the local entrepreneurs.

In the post construction period, after the hydro electric plant is commissioned the region will be self-sufficient in its energy requirement. This would help small scale industries to be established and expand the employment and trading activities for the region. Availability of electricity will bring the tele-communication and services of electronics items to the region.

The supply of electricity in the region will also improve the quality of life in Nafra and surrounding villages. It would help improving the performance of students in education and expanding their horizon of exposure to the outside world.

5.3.7 Infrastructural impacts

The project will be a significant development infrastructure in the region that would fufill its energy requirement primarily. However, the project will also have the peripheral benefits of improvement of other supportive infrastructures. The road condition to Nafra will definitely show improvement. The roads need to be upgraded to accommodate heavy load of movement of construction material and workforce. The transport facilities will be improved to provide mobility to the movement of people. The frequency of bus services between Nafra and the district head quarter Bomdila will surely increase. This would benefit the local people immensely.

On the other side, the project may put extra burden on the existing infrastructure. Such load may adversely impact the existing infrastructure, may even lead to total breakdown. For example the road built to withstand the normal load bearing capacity may crumble under heavy loads being transported for construction purpose. The use of arterial roads or alternative routes often increases to avoid traffic congestion on the main routes. This damages these sub-roads which are not designed to bear this heavy load. Hence, there should be a strict vigilance on the infrastructure usage to avoid such negative

impact. Road may not be the only infrastructure that would come under heavy use. Other infrastructures such as drinking water supply, health and sanitation, primary health care services, trauma centre and other advanced medical facilities, facilities for primary education, hotels and restaurant etc. A comprehensive audit of the capacity of other important infrastructure facilities should be undertaken for managing the situation efficiently.

The MoA between SEW and GoAP in Article-2, Clause 2.19 states that the Company shall ensure the water requirement for the construction of the project including potable drinking water shall be generally arranged and harnessed by them from the river source. The local sources of water supply may be utilized by the company only to the extent it does not adversely affect the local people. This should be abided by the company and any grievance should be resolved in consultation with the community representatives.

5.3.8 Institutional impacts

During the execution of the project, several local institutions will be associated. For example the local governance bodies, government departments, local associations and clubs etc. These institutions will also feel the impact of the project related dynamics. They have to play a significant role in several activities and would be required to take decisions on several matters falling under their mandate. Such decision making would be an entirely new exercise for them. They may require guidance and support in playing their role effectively and efficiently. Hence, the capacities of these local institutions and persons handling its affair should be enhanced. As a capacity building exercise they may be provided with information and could be taken for an exposure cum study trip to interact with their counterparts who have already handled such responsibilities.

5.3.9 Impacts on Community Structure and Composition

This project may also have impact on community structure and composition. The project will throw economic opportunities to the people. A few of them would succeed in using this opportunity and create personal wealth and achieve new social status in the community. Such a process of economic mobility will affect the existing social hierarchy. This may further have impact on the existing social networks and community dynamics.

Such social impacts are natural and are neither positive nor negative impacts, hence are not often considered significant. However, if such impacts result extreme disparities, and grow into exploitative regimes they become potential dangers. Hence, the government should play a vigilant role in making sure that the competition remains fair, human rights are honored, and law & order is maintained.

5.3.10 Impact on Common Natural Resources

Water and forest are two natural resources that would require to be shared by the local community with the migrant population. The demand for water for drinking and other household chores would increase. This may create a situation of scarcity for the local population. In such a situation, the local population would turn hostile towards the migrant population. Hence care should be taken for not to disrupt the water supply situation to the local populace. A separate provision for additional requirement of water for the migrant population should be made.

The forest would be another arena of contention between the local and migrant population. The migrant population, particularly the labor class would turn to fire-wood collection from the forest. The local community which has been enjoying this right and privilege may compete with the outsiders for meeting their requirement. This would create tension between these two groups. Hence, the access to the forest resources by the migrant population should be regulated for avoiding such situation of confrontation.

Alternative arrangement for supply of fire-wood for meeting the household energy requirements of the migrant labor should be made.

Another area of controversy is the access to and exploitation of aquatic life, primarily fish. Fishing is observed to be practiced by certain members of the community to supplement their food supply. Hence, the easement rights of these community members would be affected at least for certain stretch of the river course. Special facilities or alternative locations for fishing activity should be provided for them. If such provisions could not be made, then such differences should be amicably settled and due compensation should be made.

5.3.11 Impacts on social and human capital

The project will have positive impact on social and human capital of the region. The economic development and increasing trade and business activity will create regular interaction within and outside of the community. Such economic relationships will also create opportunities for social ties and cultural exchanges. Hence, both inter and intra community bondages will be strengthened to create cooperation among them. This would surely build a more cohesive society acting proactively to achieve greater economic, social and political goals.

The new opportunities will create a workforce with greater skills and efficiency. This will enhance the quality of human capital crucial for the regional development.

5.3.12 Gender impacts

The project will have a positive impact on the gender equality and empowerment of women. The status of the women in the existing social structure of the Sajolang community is much better in comparison to several other communities. The women play a significant role in the traditional economy and enjoy a significant freedom in their customary rules and regulations. However, opportunities for them to venture into modern economic arena are limited. The project will bring them opportunities at their door-step. This would increase the income of the women in the household. With more disposable income at their hand, women would surely spend for improving the quality of life. The expenditure heads that is traditionally considered as fringe items by the men-folk such as health, hygiene and sanitation, education, primary health and child care would receive preference. The project would definitely open a floodgate of gender empowerment initiatives.

5.3.13 Leisure and Tourism impacts

The project will create a large water body in the locality. This will supplement the scenic beauty of the place and will have the potential for developing it as a tourist destination. The district is a known tourist destination for both national and international tourists. The tourist traffic that passes through Bomdila to reach Tawang could be tapped. With the improvement of the road communication and transport system connecting this to the existing tourist circuits will not be problem. Hence, the state tourism department along with the local governance bodies may prepare a blueprint for developing tourism infrastructure and facilities in the locality and build it as a tourist destination.

5.3.14 Aesthetic impacts

The project will have no adverse impact on the aesthetics of the local landscape. The dam location is far removed from all the main human settlements. The modifications in the present landscape, particularly the submergence area remains beyond the existing view of the locality. Hence, there is no or minimal interference with the aesthetic appreciation of the local landscape for majority of people.

The quarry areas are selected with due consideration of preserving the aesthetics of the local landscape, hence will not deform the scenic beauty of the place in any way. In the event of developing the locality as a tourist spot appropriate beautification of the place will be undertaken by the developer to enhance the aesthetics of the locality.

5.3.15 Archaeological/cultural heritage impacts

No archaeological or cultural heritage site comes under the direct or indirect impact of the project.

5.3.16 Impact on Law and Order

The project will have a significant impact on the law and order situation of the locality. The law and order situation in West Kameng district in comparison to other districts in the state is not satisfactory. There is no presence of police in Nafra. The nearest police station is located at the district head quarter at Bomdila which is 58 kms away. Looking at several issues having potential to interrupt the law and order situation in the locality, it would be prudent to arrange for presence of police. Increasing policing activity in the region will have deterrent effect on the antisocial elements. Timely interference and mediation of the police will help preventing crimes to be committed. Hence, proper procedures should be initiated to locate a police post at Nafra.

Chapter 6

LAND REQUIREMENT AND ACQUISITION

6 LAND REQUIREMENT AND ACQUISITION

6.1 Measures Adopted for Minimizing Impacts

Efforts were made to minimize the adverse impact of the project. Measures adopted for minimizing the adverse impact are as under:

- Site selection for constructing Dam and other facilities were done in such manner which involved minimal acquisition of private land (5.68 %).
- During design stage extra care was taken to avoid affecting cultural or religious structures/ public property.
- Efforts were made to avoid affecting any settlement/habitation. Hence no village settlement or permanent dwellings of the local community is located in the submergence area of the Dam in particular and in the project area in general.

6.2 Land Acquisition Impact

The affect and influence of the Nafra Hydro-electric project can be envisaged in two distinct phases, i.e., Construction Phase and After Commissioning Phase/Operation Phase. The project will introduce a number of permanent features that are essential for its functioning and achieving the broader objective of producing electricity. Other features will be created to facilitate the construction process, hence would be temporary in nature. The index Map in **Figure 6:1** presents both the permanent and temporary features that would be created as part of the development of the Nafra Hydro-Electric Project.

The features that would be part of the functioning of the Hydro-electric project needs to be maintained. Hence, lands locating these permanent features need to be under the possession of the project authority. Consequently, those patches of land on which such permanent features are located needs to be acquired and made available to the project authority for the entire BOOT tenure. The temporary features that would come up for facilitating construction of the project components will be under possession of the project authority till the completion of the construction. After construction work is over, those patches of land will be restored and transferred back to the authorities from whom it is acquired. The Table **6**:**1** provides a list of patches of land that are required to be acquired permanently.

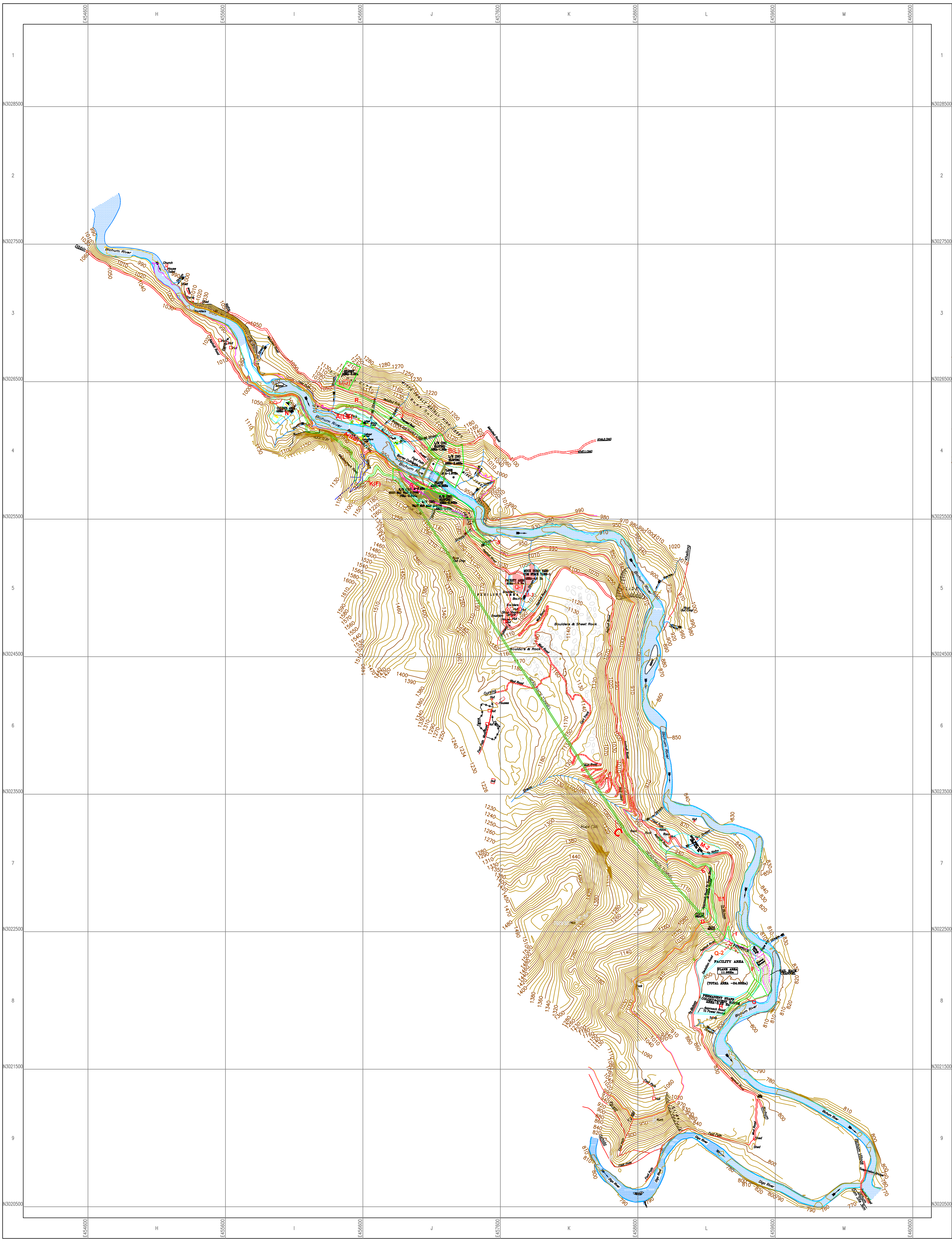
Table 6:1 Project Features for which Permanent Land Acquisition is required.

Label in Index Map	Title of Project Feature	Purpose for which the Area is Required
A (LB)	Submergence Area- Left Bank	Storage of water to be used for power generation
A (RB)	Submergence Area- Right Bank	Storage of water to be used for power generation
B(L)	Left Bank Dam Site	To provide space for undertaking on site operations of dam construction and maintenance of dam site.
B(R)	Right Bank Dam Site	To provide space for undertaking on site operations of dam construction and maintenance of dam site.
C	Head Race Tunnel	This underground tunnel will carry stored water from the Dam to the turbine installed at Power House.
D	Surge Shaft and Valve House	To control of flow of water from the Head Race Tunnel to Powerhouse.

Label in Index Map	Title of Project Feature	Purpose for which the Area is Required
E	Approach Road to Surge Shaft	This approach road will give access to the Surge Shaft for the purpose of inspection and maintenance.
E1	Approach Road to Valve House	This approach road will give access to Valve house for the purpose of inspection and maintenance.
F	Power House Site (Including Penstock and Switch Yard and Tail Race Channel)	The Power House site will have all the installations of the equipments and facilities required to generate and evacuate hydro-electric power. Hence, it would include power house, penstock and switch yard.
G	Approach Road to Power House	This road will provide all season access to the power house and other installations at this site.
H	Staff Colony and Guest House	The staff responsible for day-to-day functioning of this Hydro-Electric Project needs to be stationed close to the Power House. This staff Colony will provide housing facilities for the staff and their families. A Guest house will be located here for the use of other visiting officials.
J	Approach Road to the Dam Top	This road will provide access to the top of the dam for the purpose of routine inspection and maintenance purpose.
K	Nafra-Bichom Replacement Road	The road connecting Nafra to Bichom passes close to the Dam site. Hence, during construction of the dam the general traffic will be disturbed. In addition to this, a part of the road will be sub-merged after commissioning of the project. Hence, a replacement Road is proposed to provide un-hindered connectivity to public commuting between Nafra and Bichom. After completion of construction of the project, the road will be transferred to Government/ PWD department.
S	Approach road to Spillway	This road will be used for transporting the excavated material from the Dam Site to the muck dump yard during the construction period and to provide connectivity to the spillway after construction of the dam for maintenance purpose.

Figure 6:1 Land Acquisition Requirements for Nafra Hydro Electric Project, Arunachal Pradesh

(Please see Drawing Attached- SEW/CSPL/Index Map)

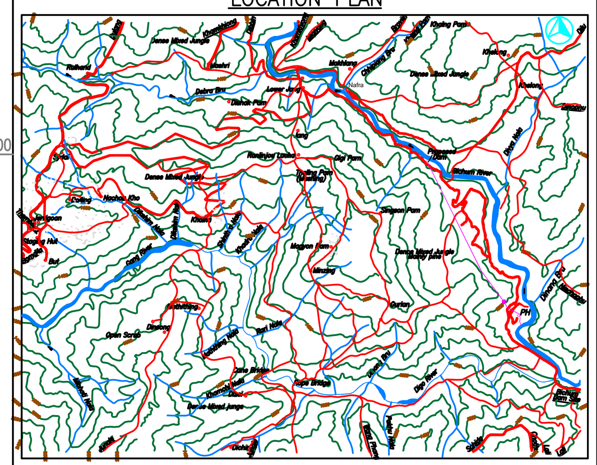


NORTH

L E G E N D

1. BUILTUP AREA: LIMIT —
2. Asphalt Road WITH CULVERT, CART TRACK/Metalled Road, – PATH WAY, PROPOSED ROAD —
3. HOUSE, HUT, TEMPLE — House HUT
4. WATER VALVE, BUND, CLIFF —
5. RIVER, NALA, STREAM,HRT ALIGNMENT —
6. FENCE, BOULDERS, GEOLOGICAL POINT —
7. KILOMETER STONE,CONTOURS, ROCK, ALIGNMENT. —
8. TRAVERSE POINTS, BENCH MARKS/BM PILLAR — TS 26 1009.552

LOCATION PLAN



LIST OF BENCHMARK POINTS

BM POINT	EASTING	NORTHING	RL
TBM1	459228.308	3022336.789	856.430
TBM2	459287.205	3023031.886	899.065
TBM4	458584.805	3023394.150	959.772
TBM7	458053.484	3025148.349	1111.128
TBM8	457726.967	3024851.087	1078.449
TBM9	457449.592	3025285.748	1033.168
TBM10	456865.382	3025851.069	986.063
TBM11	456215.486	3026174.189	980.955
TBM12	455779.908	3026478.728	1001.114
TBM13	455098.503	3027161.892	1033.770
TBM23	455833.626	3026787.175	1015.368
TBM33	459370.251	3020873.160	778.104
TBM34	458652.490	3020865.770	794.266
TBM41	458563.164	3021232.101	1025.894
TBM42	458640.909	3021295.613	1052.931

LIST OF BENCHMARK PILLAR POINTS

BM POINT	EASTING	NORTHING	RL
BM1	456980.462	3025640.956	1050.182
BM2	457269.776	3026124.407	1149.690
BM3	457013.281	3025786.932	966.566
BM4	457154.309	3025713.878	960.280
BM5	457157.466	3025883.187	952.014
BM6	457839.358	3024998.486	1061.618
BM7	457729.198	3025014.442	1062.555
BM8	459470.003	3022373.213	814.233
BM9	459482.428	3022295.515	811.286
BM10	459084.680	3022602.896	1008.27
BM11	458963.665	3022452.232	1016.737

LIST OF GEOLOGICAL POINTS

GLPOINT	EASTING	NORTHING	RL
GL1	457366.570	3026046.795	1087.548
GL2	457497.438	3025613.408	1005.796
GL3	457518.780	3025604.909	1009.478

NOTE:–

1. ALL LEVELS ARE WITH REFERENCE TO D.N.T. BM LOCATED ALONG BICHUM DAM AXIS AT ABOUT 300 M SOUTH SIDE. R.L. – 869.169 M.
2. ALL LEVELS ARE IN MTS, UNLESS OTHERWISE MENTIONED.

CLIENT	SEW ENERGY LTD. — SEW ENERGY LIMITED, 6–3–871, Snehalata, Greenlands Road, Begumpet, Hyderabad–500 016, AP, INDIA
TITLE	DETAILED TOPOGRAPHIC SURVEY OF NAFRA HYDRO ELECTRIC PROJECT (2x48MW) IN ARUNACHAL PRADESH. INDEX MAP
CAD FILE INDEXMAP	SCALE 500m 400 300 200 100 0 500m; 1:10000 OR 1CM=100m; CONTOUR INTERVAL = 10.0M
SEASON FEB 2008	DRAWING NO. SEW/CSPL/INDEXMAP — REV 0
SURVEYED & PREPARED BY	CADEN SURVEYS PVT. LTD. Survey & Civil Engineering Project Consultants, #K144/39, 11th Cross, 19th 'A' Main, 1st Block, Rajajinagar, Bangalore - 560 010. Phone: 080 - 23124811 E-mail : info@csplbangalore.com; www.csplbangalore.com

Similarly, the temporary project features for which the land acquisition will be time-bound as per their requirement in the construction phase are listed in the Table **6**:**2**.

Table 6:2 Project Features for which Land Acquisition is Temporary and would be returned back to the authority who owns it.

Label in Index Map	Title of the Project Feature	Purpose	Restoration
L (S)	Quarry Area for Stone	To source Stone for construction	Will be returned to Government/ Forest Department.
M1	Muck Dump Area-1	To Dump the Muck generated from the project construction, primarily from the excavation of the head-race tunnel and replacement road	Will be returned to Government/ Forest Department after adequate stabilization measures are undertaken.
M2	Muck Dump Area-2	To Dump the Muck generated from the project construction, primarily from the excavation of the head-race tunnel and replacement road	Will be returned to Government/ Forest Department after adequate stabilization measures are undertaken.
N	Labour Colony	To Provide Residential Facilities for the migrant Labour engaged in the construction work.	Will be returned to Community after clearing debris and initiating aforestation work.
Q1	Facility Area-1	To provide space for storage of the construction material and machines.	Will be returned to Government/ Forest Department after clearing debris and initiating aforestation work.
Q2	Facility Area-2	To provide space for storage of construction material and machines.	Will be returned to Government/ Forest Department after clearing debris and initiating aforestation work.
R	Quarry Material Transporting Road	To transport the quarried material to the Dam Site for construction.	This land will be returned to Government/ Forest Department after treatment of the slopes and drainage lines.
T	Diversion Road Near Power House	To divert the traffic during construction of pen stock	This land will be returned to Government/Forest Department after restoration

6.3 Total Land Requirement:

Total Land requirement for the Nafra Hydro Electric Project is **74.96 ha**. The summary of the land requirement for these project features is provided in the Table **6**:**3** below. It provides the breakup of the land required for permanent and temporary acquisition. Total land required for permanent acquisition is **45.04 ha** and for temporary acquisition **29.92 ha**.

Table 6:3 Details of the Land Requirement for Different Project Features.

Label in Index Map	Title of the Project Feature	Land Requirement in Hectare
I. LAND REQUIRED FOR PERMANENT ACQUISITION		
A (LB)	Submergence Area- Left Bank	10.78
A (RB)	Submergence Area- Right Bank	3.72
B(L)	Left Bank Dam Site	5.93
B(R)	Right Bank Dam Site	7.98
D	Surge Shaft and Valve House	1.76
E	Approach Road to Surge Shaft	0.81
E1	Approach Road to Valve House	0.35
F	Power House Site (Including Penstock and Switch Yard and Tail Race) Channel)	7.43
G	Approach Road to Power House	0.25
H	Staff Colony and Guest House	3.22
J	Approach Road to the Dam Top	0.64
K(F)	Nafra-Bichom Replacement Road in Forest Land	1.24
K(C)	Nafra-Bichom Replacement Road in Community Land	0.27
K(I)	Nafra-Bichom Replacement Road in Individually Possessed Area	0.14
S	Approach Road to Spillway	0.52
TOTAL LAND REQUIRED FOR PERMANENT ACQUISITION		45.04
II. LAND REQUIRED FOR TEMPORARY ACQUISITION		
L (S)	Quarry Area for Stone	2.00
M1	Muck Dump Area-1	4.60
M2	Muck Dump Area-2	3.68
C	Head Race Tunnel	2.73
N	Labour Colony	3.06
Q1	Facility Area-1	1.30
Q2	Facility Area-2	11.96
R	Quarry Material Transporting Road	0.48
T	Deviation Road Near Power House	0.11
TOTAL LAND REQUIRED FOR TEMPORARY ACQUISITION		29.92
GRAND TOTAL		**74.96**

6.4 Categories of Project Impacted Groups from Land Acquisition:

Each of these land pockets were surveyed and legal ownership was identified. The ownership/possession of these land pockets can be classified into two categories.

1. Land Owned by the Government
2. Land Owned by the Community
    a. Land In Possession of Individual Families
    b. Land Held in Common by the Community

Hence broadly the impacts of the land acquisition will be on these three categories. Each of these categories is further discussed in the following sections.

6.4.1 Land Owned by the Government (Forest Department)

The land owned by the government belongs to the Forest Department. Part of the land owned by the Forest Department has been leased out to NCPL for extraction of Resin from the pine plantation. The detail such as the location of the land and area is provided in the table below.

Table 6:4 Details of the Permanent Acquisition of the land owned by the Government (Forest Department).

Title of the Project Feature	Label in Index Map	Name of the Title Holder	Area of the Land in Ha.
Dam Site Left Bank	BL	Department of Forest	5.93
Dam Site Right Bank	BR	Department of Forest	7.98
Surge Shaft and Valve House	D	Department of Forest	1.76
Approach Road to Surge Shaft	E	Department of Forest	0.81
Approach Road to Valve House	E1	Department of Forest	0.35
Powerhouse Site	F	Department of Forest	7.43
Approach Road to Power House	G	Department of Forest	0.25
Approach Road to Dam Top	J	Department of Forest	0.64
Nafra-Bichom Replacement Road	K(F)	Department of Forest	1.24
Approach Road to Tail Race	S	Department of Forest	0.52
TOTAL			26.91

The total Forest Land to be acquired is **32.12 ha**. Out of this **26.91 ha** will be acquired permanently and **5.21 ha** temporarily for the construction period. The detail of the forest land to be acquired temporarily is provided in Table **6**:**5**. Hence, the total forest land constitutes only **42.85%** of the total land required for this project.

Table 6:5 Details of the Temporary Acquisition of the land owned by the Government (Forest Department).

Title of the Project Feature	Label in Index Map	Name of the Title Holder	Area of the Land in Ha.
Quarry for Stone	LS	Department of Forest	2.00
Quarry Material Transporting Road	R	Department of Forest	0.48
Head Race Tunnel	C	Department of Forest	2.73
TOTAL			5.21

6.4.2 Common Land Owned by the Community

The project area is inhabited by the Miji or Sajolang Tribe. According to the customary law, the entire land inhabited by the Mijis is owned by the community collectively. Individual families possess plots of lands for cultivation or growing productive trees such as bamboo and other fruit bearing trees. The

Gaonbura, the village headman takes a decision on any boundary disputes or possession issues following the procedures of customary judicial process. Apart from the plots of land in possession of individual families, the ownership of the rest of the land is vested on the particular village community collectively. Hence, the decision to alienate the land for the purpose of the project is to be made with collective consent of the concerned village communities.

6.4.2.1 Community Land in Possession of Individual Families

There are only a few families who possess and cultivate community land located in the project affected area. The details such as the location of the land, area of land, trees and other properties of significant economic value is been summarized in the table below.

Table 6:6 Details of Acquisition of Community Land in Possession of Individual Families.

Location	Label in Index Map	Name of the Title Holder	Village Name	Area of the Land in m^2	Other Properties/ Trees
A (LB)	B1 to B6	Sri Ajin Thriju	Khellong	5000	5 Guava Trees 4 Orange Plants 3 Lemon Plants
	BH1 to BH8				Labour House of 71 m^2
	BS1 to BS4				Store Room of 5 m^2
A (LB)	C1 to C4	Sri Nigee Dajangju	Khellong	237	2 Hill streams
	N1 & N2				
	B1 & B2				2 Bamboo Plantations of 9m^2 each.
A (LB)	D1 to D4	Sri Nigee Dajangju	Khellong	6589	4 Bamboo Plantation (61m2 +54m2 +85m2 +46m2) of total area 146m2
	B4a to B4b B5a to B5d B5a to B6d B7a to B7d				
	Dh1 to Dh4 Dh5 to Dh8 Dh9 to Dh12 Dh13 to Dh16				4 Labour Sheds (14m2+17m2+9m2+12 m2) of total 52m2
A (RB)	E1 to E4	Sri Sangchong Longthen	Lower Jung	2798	Labour Shed of 10m^2
	EH1 to EH4				
A (RB)	H1 to H5	Sri Dangsong Longthen	Lower Jung	6479	Labour Shed-1 of 23m^2
	HH1 to HH4				
	HH5 to HH8				Labour Shed-2 of 16m^2
	HH9 to HH12				Labour Shed-3 of 5m^2
A (RB)	J3, J4, J5 and J6	Sri Dangsong Longthen	Lower Jung	6977	Banana Plantation in whole plot
B(R)	J1, J2, J5, J6	Sri Dangsong Longthen	Lower Jung	5087	Banana Plantation in whole plot
B(R)	B1 to B4	Sri Dangsong Longthen	Lower Jung	36	4 Bamboo Plantation 9 m2 each

Location	Label in Index Map	Name of the Title Holder	Village Name	Area of the Land in m^2	Other Properties/ Trees
N	E1 to E4	Sri Sangchong Longthen	Lower Jung	2798	4 orange plants
	EH1 to EH4				Labour Shed of 10m2
N	F1 to F4	Sri Sangchong Longthen	Lower Jung	3092	4 Orange Plant 2 Lemon Plant
N	G1 to G5	Sri Abul Longthen	Lower Jung	3577	2 orange plants 2 lemon plants
TOTAL				4,2670	

Hence the total land loss under the possession of the individual families will be only **4.26 ha**, which is only **5.68%** of the total land requirement of this project.

6.4.2.2 Common Land Owned Collectively by the Village Community

The Arunachal Pradesh land records Act recognizes the customary ownership rights of the community over the land. Hence, village communities living close to the project area has legitimate claims on certain patches of land. In total **42.84 ha** of land is required for the Nafra HEP is under collective ownership of the communities. Out of this **18.13 ha** of land (**42%**) under the collective ownership of the community will be acquired permanently. The table below gives details of these land pockets to be acquired permanently.

Table 6:7 Details of permanent Acquisition of Land Owned by Village Communities.

Location	Label in Index Map	Name of the Village Community	Area of the Land in Ha.
Submergence Area Left Bank	A (LB)	Khellong Village Community	10.78
Submergence Area Right Bank	A (RB)	Lower Jung Village Community	3.72
Staff Colony & Guest House	H	Lower Jung Community	3.22
Nafra- Bichom Replacement Road	K (C)	Lower Jung Community	0.27
Nafra- Bichom Replacement Road	K (I)	Lower Jung Community	0.14
Total			18.13

58% of the total land owned by the community however would be acquired on temporary basis. These patches of lands will be returned back to the community after rehabilitating them appropriately. The details of the community land that is required to be acquired temporarily on lease basis are provided in Table 6.8.

Table 6:8 Details of temporary Acquisition of Land Owned by Village Communities.

Location	Label in Index Map	Name of the Village Community	Area of the Land in Ha.
Muck Dump Area-1	M1	Lower Jung Village Community.	4.6
Muck Dump Area-2	M2	Lower Jung Village Community.	3.68
Labour Colony	N	Lower Jung Community	3.06
Facility Area-1	Q1	Lower Jung Village Community.	1.3
Facility Area-2	Q2	Lower Jung Village Community	11.96
Deviation Road Near Power House	T	Lower Jung Community	0.11
TOTAL			24.71

6.5 Detailed Survey Maps of Individual Land Pockets to be acquired.

The **Index Map in Figure 6.1** shows the entire project area showing different project components and the land pockets to be acquired for the Nafra Hydro Electric Project. The detailed survey maps of each of these land pockets are provided in Appendix-3.

6.6 Identification of project affected families

The affect of the Nafra Hydro Electric Project is limited to 5 families in Khellong, 5 families in Lower Jung. The name of the household heads of these families is provided in the table below.

Table 6:9 Names of the Household Heads of the Project Affected Families.

Name of Villager	Names of Household Heads
Khellong	1. Nikhanju Thriju 2. Ajin Thriju 3. Nigee Dajangju 4. Moloi Dajangju 5. Norbu Bambiju
Lower Jung	1. Sangchong Longthen 2. Abul Longthen 3. Dangsong Longthen 4. Sanbang Longthen 5. Lanco Longthen

A brief discussion on the socio-economic characteristics of Project Affected Families is provided in the following paragraphs.

6.7 Screening for Vulnerable Groups among PAFs

Table 6:10 Checklist for Vulnerable Groups among Project Affected Families.

Vulnerability Category	Remarks/Findings
BPL Families	None of the project affected families belong to Below Poverty Line[3] (BPL) category.
Women Headed Households	The SIA survey did not identify any household headed by woman.
Children and Old People	As the permanent dwelling houses are not affected hence no displacement of these families would take place. Hence, children and old people do not require special attention.
Tribal/SC/ST Population	The local population is comprised of Miji/Sajolang Tribe only. No SC population exists in the project affected area.

[3] The poverty line in recent years is as follows -

Year	India rural (Rs. per month per head)	India urban(Rs. per month per head)
2000-2001	328	454
2005-2006	368	560

6.8 Assessment of Loss and Land Acquisition Budget

In this section, the loss of land and properties held by individuals, agencies, and collectives is quantified. The assessment of land prices is based on the Nafra Circle land prices as notified by the Department of Revenue, Government of Arunachal Pradesh. The assessment of structures and dwelling houses is based on the market rate of building material and schedule of rates fixed by the PWD, Government of Arunachal Pradesh.

As per the customary laws the ownership of the land is vested on the village communities; however individuals possess and cultivate patches of land or erect structures. Hence, the compensation for the loss of land even though it is in the possession of particular individuals would go to the particular village community to which he/she belongs. Similarly, individuals are allowed to grow trees in patches of forest land and reap benefit from it. Such ownership of trees and plantation is also recorded and the loss to the particular individuals is estimated.

Keeping in view the distribution of the compensation to individuals/Agency, village communities, Government bodies and migrant workers, the estimates for land acquisition is summarized and presented in four Tables (Table 6.11 to Table 6.14).

6.8.1 Loss of Property by Individuals/Agency

Table 6:11 Estimate of Loss of Private Property due to Nafra Hydro Electric Project.

Survey Points	Name of the Title Holder	Village Name	Property Details	Unit Rate (Per Sqm)	Total
A1 to A4	Sri Nikhong Thriju.	Khellong	Bamboo Plantation[4]-1 of 9m^2	4500	162,000.00
			Bamboo Plantation-2 of 9m^2		
			Bamboo Plantation-3 of 9m^2		
			Bamboo Plantation-4 of 9m^2		
A5,A6	Sri Nikhong Thriju.	Khellong	2 Orange Plants[5]	18850	37,700.00
BH1 to BH8	Sri Ajin Thriju	Khellong	Labour House[6] of 71 m^2	1500	106,500.00
BS1 to BS4	Sri Ajin Thriju	Khellong	Store Room of 5 m^2	1500	7,500.00
B1 to B6	Sri Ajin Thriju	Khellong	12 Guava Trees	18850	226,200.00
B1 to B6	Sri Ajin Thriju	Khellong	8 Orange Plants	18850	150,800.00
	Sri Ajin Thriju	Khellong	3 Timor Plants	4600	13,800.00
B1 to B6	Sri Ajin Thriju	Khellong	3 Lemon Plants	18850	56,550.00
	Sri Ajin Thriju	Khellong	3 Walnut Plants	38700	116,100.00

[4] The estimate of bamboo plantation is in approximate cost. The valuation is to be confirmed from the horticulture department.

[5] The estimate for Orange/Lemon/Guava/Peach/Pomegranate/Walnut tress is based on the evaluation by Divisional Horticulture Officer, dated 1st June 2009. The plants are assumed to be 5-6 years old.

[6] The estimate includes cost of log, labor, and other fixtures per m^2 as per the Schedule of Rates.

Survey Points	Name of the Title Holder	Village Name	Property Details	Unit Rate (Per Sqm)	Total
N1a, N1b, N2a, N2b	Sri Nigee Dajangju	Khellong	Loss of fishing opportunity in 2 Hill Steams[7]	216000	432,000.00
	Sri Nigee Dajangju	Khellong	8 Walnut Trees	35100	280,800.00
DH1 to DH4	Sri Nigee Dagangju.	Khellong	Labour Shed-1 of 14m^2	1500	21,000.00
DH5 to DH8	Sri Nigee Dagangju.	Khellong	Labour Shed-2 of 17m^2	1500	25,500.00
DH9 to DH 12	Sri Nigee Dagangju.	Khellong	Labour Shed-3 of 9m^2	1500	13,500.00
DH13 to DH16	Sri Nigee Dagangju.	Khellong	Labour Shed-4 of 12m^2	1500	18,000.00
B4a to B3d	Sri Nigee Dajangju.	Khellong	Bamboo Plantation-1 of 61m^2	4500	274,500.00
B5a to B5d	Sri Nigee Dagangju.	Khellong	Bamboo Plantation-2 of 54 m^2	4500	243,000.00
B6a to B6d	Sri Nigee Dagangju.	Khellong	Bamboo Plantation-3 of 85 m^2	4500	382,500.00
B7a to B7d	Sri Nigee Dagangju.	Khellong	Bamboo Plantation-4 of 46 m^2	4500	207,000.00
N3a, N3b, N4a, N4b	Sri Molai Dajangju	Khellong	Loss of fishing opportunity in 2 hill streams	216000	432,000.00
	Sri Norbu Bambiju	Khellong	Loss of fishing opportunity in Dry Season/ River bifurcation	216000	216,000.00
EH1 to EH4	Sri Lanco Longthen	Lower Jung	Labour Shed of 10m^2	1500	15,000.00
			1 Guava Plant	18850	18,850.00
			1 Berry Plant	17500	17,500.00
			1 Pomegranate Plant	17400	17,400.00
			1 Grape Plant	17400	17,400.00
			1 Black Pepper Plant	17500	17,500.00
			2 Peach Plant	17400	34,800.00
			1 Lemon Plant	18850	18,850.00
			1 Orange Plant	18850	18,850.00

[7] The estimate is for catching 1.5kg of fish in average per day for 180 days out of 365 days in a year and selling it at Rs 80.00 per kg. The loss of livelihood is calculated for a period of 10 years.

Survey Points	Name of the Title Holder	Village Name	Property Details	Unit Rate (Per Sqm)	Total
HH1 to HH4	Sri Dangsong Longthen	Lower Jung	Labour Shed-1 of 23m^2	1500	34,500.00
HH5 to HH8	Sri Dangsong Longthen	Lower Jung	Labour Shed-2 of 16m^2	1500	24,000.00
HH9 to HH12	Sri Dangsong Longthen	Lower Jung	Labour Shed-3 of 5m^2	1500	7,500.00
J3, J4, J5 and J6	Sri Dangsong Longthen	Lower Jung	Banana Plantation[8] of 6977m^2	25	174,425.00
J1, J2, J5, J6	Sri Dangsong Longthen	Lower Jung	Banana Plantation of 5087m^2	25	127,175.00
B1 to B4	Sri Dangsong Longthen	Lower Jung	Bamboo Plantation-1 of 9m^2.	4500	40,500.00
			Bamboo Plantation-2 of 9m^2.	4500	40,500.00
			Bamboo Plantation-3 of 9m^2.	4500	40,500.00
			Bamboo Plantation-4 of 9m^2.	4500	40,500.00
	Sri Dangsong Longthen		Fencing with Net 57m	70	6,750.00
	Sri Dangsong Longthen	Lower Jung	Barbed wire fencing[9] 1002m	50.80	50,901.00
EH1 to EH4	Sri Sangchong Longthen	Lower Jung	Labour Shed of 10m2	1500	15,000.00
F1 to F4	Sri Sangchong Longthen	Lower Jung	1 Orange Plant	18850	18,850.00
F1 to F4	Sri Sangchong Longthen	Lower Jung	1 Lemon Plant	18850	18,850.00
	Sri Sangchong Longthen	Lower Jung	Dry Rubble Wall[10]	15000	15,000.00
	Sri Sanbang Longthen	Lower Jung	1 Orange Plant	18850	18,850.00
			2 Guava Plant	18850	37,700.00
			1 Lemon Plant	18850	18,850.00
			1 Berry Plant	17500	17,500.00
			1 Black Pepper Plant[11]	17500	17,500.00

[8] The unit cost is an approximate price and needs to be confirmed from the Divisional Horticulture Office.

[9] Refer page-90, Schedule of Rates, Arunachal Pradesh, Oct 2007.

[10] The estimate is an approximate lump sum amount.

Survey Points	Name of the Title Holder	Village Name	Property Details	Unit Rate (Per Sqm)	Total
	Sri Abul Longthen	Lower Jung	2 Orange Plants	18850	37,700.00
			2 Lemon Plants	18850	37,700.00
			2 Walnut Plants	35100	70,200.00
			1 Guava Plant	18850	18,850.00
			1 Peach Plant	17400	17,400.00
Total					**42,37,551.60**

Table 6:12 Estimate of Loss to NCPL on loss of Income from extraction of resins from Plantation on its Leased Forest Plantation Area

Label in Index Map	Name of the Lease Holder	Area of the Land in Ha.	Unit Price per ha. in Rs. (Approximate)	No of Years	Total Cost (In Rupees)
L	NCPL	5.93	10000	2	118,600.00
BR	NCPL	7.98	10000	2	159,600.00
C	NCPL	2.73	10000	2	54,600.00
D	NCPL	1.76	10000	2	35,200.00
E	NCPL	0.81	10000	2	16,200.00
E1	NCPL	0.35	10000	2	7,000.00
F	NCPL	7.43	10000	2	148,600.00
G	NCPL	0.25	10000	2	5,000.00
J	NCPL	0.64	10000	2	12,800.00
K(F)	NCPL	1.24	10000	2	24,800.00
S	NCPL	0.52	10000	2	10,400.00
TOTAL		29.64			592,800.00

Note: The unit price is fixed @ 10,000.00 per hectare considering 1000 trees per hectare of land. The actual price will be estimated as per the tree count data obtained from the Forest Department.

[11] The evaluation of the Black Peeper and Berry plants is to be done from Divisional Horticulture Office.

6.8.2 Estimate of Land Acquired from Community

6.8.2.1 Estimate of Permanent Acquisition of Land from Community

Table 6:13 Estimate of Price of Acquiring Land Owned collectively by Village Communities due to Nafra Hydro Electric Project.

Title/Lable in Index Map	Name of the Village Community	Land Category	Area of the Land in Sqm	Unit Price[12] In Rupees	Total Price
1. KHELLONG VILLAGE COMMUNITY					
Submergence Area Left Bank-A (L)	Khellong Village Community	Agricultural land-Irrigated land not app. by mot. road	11589	100	1,158,900.00
		Undeveloped cultivable land app. by mot.road-flat land	70651	50	3,532,550.00
		Undeveloped cultivable land app. by mot.road-Steep Slope land	25560	30	766,800.00
		TOTAL of A(L)	107,800		5,458,250.00
Left Bank Dam Site-B (L)	Khellong Village Community	Undeveloped cultivable land not approachable-flat Land	19700	100	1,970,000.00
		Undeveloped cultivable land not approachable-Steep Slope Land	39600	30	1,188,000.00
		TOTAL of B (L)	59,300		3,158,000.00
SUB TOTAL-1 (KHELLONG VILLAGE COMMUNITY)					8,616,250.00
2. LOWER JUNG VILLAGE COMMUNITY					
Right Bank Dam site-BR	Lower Jung Community	Undeveloped cultivable land not approachable-Steep Slope Land	74720	30	2,241,600.00
		Agricultural land-Irrigated land approachable by motorable road	5087	200	1,017,400.00
		TOTAL of B(R)	79,807		3,259,000.00
Permanent Staff Colony and Guest House Area- H	Lower Jung Community	Undeveloped cultivable flat land approached by motorable road	32200	50	1,610,000.00
		TOTAL of H	32,200		1,610,000.00
Submergence Area Right Bank-A (R)	Lower Jung Village Community	Agricultural land-Irrigated land not app. by mot. road	13456	100	1,345,600.00
		Undeveloped cultivable land app. by mot.road-flat land	3644	50	182,200.00
		Undeveloped cultivable land app. by mot.road-Slope land	20100	30	603,000.00
		TOTAL of A (R)	37,200		2,130,800.00
SUB TOTAL-2 (LOWER JUNG VILLAGE COMMUNITY)					6,999,800.00
GRAND TOTAL (SUB TOTAL1 + SUB TOTAL 2)					**15,616,050.00**

[12] The land prices stated in this report is as per Memo No. BR-2537/133/2008/354-364 dated Bomdila the 17th Nov/08 obtained from Deputy Commissioner, West Kameng District.

6.8.2.2 Estimate of Land Temporarily Acquired from Community on Lease

Table 6:14 Estimate of Lease Price for the Land Temporarily Acquired from the Village Community

Label in Index Map	Name of the Village Community	Land Category	Area of the Land in m²	Land Value per m2 (In Rs.)	Unit Lease Price per Annum per m² (In Rupees)	Lease Period in Years[13]	Total Lease Price Per Annum (In Rupees)
LOWER JUNG							
Facility Area 1- Q1	Lower Jung Village Community	Uncultivable land	13000	20	2	4	104,000.00
		TOTAL of Q1					104,000.00
Facility Area 1- Q2		Uncultivable land	119600	20	2	4	956,800.00
		TOTAL of Q2					956,800.00
Labour Colony- N	Lower Jung Community	Undeveloped cultivable land not approachable- Steep Slope Land	21133	80	8	4	676,256.00
		Agricultural land-Rain fed terrace land app. by motorable road	9467	120	12	4	454,416.00
		TOTAL of N					1,130,672.00
Muck Dump Area-1	Lower Jung Village Community.	Undeveloped cultivable land not approachable- Plot Land	27900	100	10	4	1,116,000.00
M1		Undeveloped cultivable land not approachable- Slope Land	18100	30	3	4	217,200.00
		TOTAL of M1					1,333,200.00
Muck Dump Area-2	Lower Jung Village Community.	Undeveloped cultivable land not approachable- Plot Land	27600	100	10	4	1,104,000.00
M2		Undeveloped cultivable land not approachable- Slope Land	9200	30	3	4	110,400.00
		TOTAL of M2					1,214,400.00
Nafra-Bichom Replacement Road in Community Land-K(C)	Lower Jung Community	Undeveloped Cultivable Land app by mot road	2700	50	5	4	54,000.00
		TOTAL of K(C)					54,000.00
Nafra-Bichom Replacement Road in Individual Land-K(I)	Lower Jung Community	Agricultural Land- Rainfed Terrace land app by motorable road	1400	120	12	4	67,200.00
		TOTAL OF K(I)					67,200.00
LOWER JUNG TOTAL							4,860,272.00

[13] The Lease price per year is estimated @ 10% of the land cost.

Label in Index Map	Name of the Village Community	Land Category	Area of the Land in m^2	Land Value per m2 (In Rs.)	Unit Lease Price per Annum per m^2 (In Rupees)	Lease Period in Years[13]	Total Lease Price Per Annum (In Rupees)
GRAND TOTAL							4,860,272.00

6.8.3 Estimate of Land and Property Acquired from Government

6.8.3.1 Estimate of Land and Property Permanently Acquired from Government

Table 6:15 Estimate of Price of Forest Land Diversion.

Label in Index Map 6.1	Name of the Govt. Dept.	Area of the Land in Sqm	Eco-Value Class	Forest Density	NPV[14] per ha. In Rs	Total Value (7*4)
1	2	4	5	6	7	8
B (L)	Department of Forest	59300	Class-V	Open Forest	657,000.00	3,896,010.00
B (R)	Department of Forest	79800	Class-V	Open Forest	657,000.00	5,242,860.00
D	Department of Forest	17600	Class-V	Open Forest	657,000.00	1,156,320.00
E	Department of Forest	8100	Class-V	Open Forest	657,000.00	532,170.00
E1	Department of Forest	3500	Class-V	Open Forest	657,000.00	229,950.00
F	Department of Forest	74300	Class-V	Open Forest	657,000.00	4,881,510.00
G	Department of Forest	2500	Class-V	Open Forest	657,000.00	164,250.00
J	Department of Forest	6400	Class-V	Open Forest	657,000.00	420,480.00
K(F)	Department of Forest	12400	Class-V	Open Forest	657,000.00	814,680.00
S	Department of Forest	5200	Class-V	Open Forest	657,000.00	341,640.00
	TOTAL	**296,400**				**17,679,870.00**

6.8.3.2 Estimate of Land and Property Temporarily Acquired on Lease from Government

Table 6:16 Estimate of Land to be temporarily acquired or leased from Government of Arunachal Pradesh.

Property Id No	Name of Ownership	Forest Category	Area of the Land in Sqm	Forest Density	Unit Price (NPV)	Total Price (In Rupees)
LS	Department of Forest	Class-V	20000	Open Forest	657,000.00	1,314,000.00
R	Department of Forest	Class-V	4800	Open Forest	657,000.00	315,360.00
T	Department of Forest	Class-V	1100	Open Forest	657,000.00	72,270.00
GRAND TOTAL			**25,900**			**1,701,630.00**

Note: The Forest cover on the alignment of headrace tunnel will not be affected. Hence, it is not considered in estimating the forest diversion cost.

[14] As per the NPV fixed by CEC constituted by honorable Supreme Court by Orders dated 28th Mar 2008 and 9th May 2008.

6.9 Summary of Estimate for Land Acquisition and Rehabilitation

Table 6:17 Summary of Estimate of Land Acquisition, Resettlement and Rehabilitation.

Reference Table No	Description	Estimate (in Rs)
Table 6:11	Estimate of Loss of Private Property due to Nafra Hydro Electric Project.	4,237,551.60
Table 6:12	Estimate of Loss to NCPL on loss of Plantation on its Leased Forest Plantation Area	592,800.00
Table 6:13	Estimate of Price of Acquiring Land Owned collectively by Village Communities due to Nafra Hydro Electric Project.	15,616,050.00
Table 6:14	Estimate of Lease Price for the Land Temporarily Acquired from the Village Community	4,860,272.00
Table 6:15	Estimate of Price of Forest Land Diversion	17,679,870.00
Table 6:16	Estimate of Forest Land to be temporarily acquired	1,701,630.00
Total Estimate		**44,688,173.60**

.

Chapter 7

LAND ACQUITION PROCESS & RESETTLEMENT AND REHABILITATION PLAN

7 LAND ACQUISITION PROCESS & RESETTLEMENT AND REHABILITATION PLAN

7.1 Land Acquisition Act 1894

Land needed for the project will be acquired under the LA Act of 1894. The Act was amended in 1984 and some of its norms related to the time/amount and procedures of compensation were liberalized. However, the Act in essence remains unchanged and is applicable to the whole country except the State of Jammu and Kashmir. The main features of the LA Act of 1894 are as under:

- The Act only deals with compensation and not rehabilitation of people whose lands have been acquired;
- The Act only considers payment of compensation to those individuals who have legal ownership rights;
- Under the Act, no compensation is payable to landless labourers, forest-land cultivators, forest produce collectors, artisans and shifting cultivators because they do not have any land record in the record of rights.

7.1.1 Salient Features of Land Acquisition Act

Land Acquisition Act, 1894: The salient features of the Act have been presented in Table 7:1.

Table 7:1 Salient Features Land Acquisition Act 1894

Sections	Description
4	Publication of Preliminary Notification and powers of officers to enter for survey
5	Payment for damage
5A	Hearing of Objections
6	Declaration that land is required for a public purpose
7	After declaration, Collector to make order for acquisition
8	Land to be marked out, measured and planned
9	Notice to persons interested
10	Powers to require and enforce the making of statements as to names and interests
11	Enquiry into measurements, value and claims and award by Collector
12	Award of Collector when to be final
13A	Correction of Clerical Errors, etc
16	Power to take possession
17	Special powers in cases of urgency (Not applied in this project)
18	Reference to court
23	Matters to be considered in determining compensation
24	Matters to be neglected in determining compensation

Table 7:2 Provisions under Part-VII of Land Acquisition Act 1894 dealing with Land Acquisition for Companies.

Sections	Description
38A	Industrial concern to be deemed Company for certain purposes.
39	Previous consent of appropriate Government and execution of agreement necessary.
40	Previous enquiry.
41	Agreement with appropriate Government.
42	Publication of agreement.

43	Sections 39 to 42 not to apply where Government bound by agreement to provide land for Companies.
44	How agreement with Railway Company may be proved.
44A	Restriction on transfer etc.
44B	Land not to be acquired under this Part except for certain purpose for private companies other than Government companies.

7.2 Land Acquisitions Process

The land acquisition process is to be initiated by requesting the Deputy Commissioner of Bomdila District through an application with details of the land required for Nafra Hydro Electric Project. A Sample copy of the application with detail information of the land and associated maps is produced in Appendix-4. The copy of this application should be provided to the EAC at Nafra under whose jurisdiction the project is located and to the Secretary Department of Power with whom Memorandum of Agreement is signed.

Article-3, Clause 3.1 of the Memorandum of Agreement between SEW and Government of Arunachal Pradesh states as follows:

"The site required for the construction, operation and maintenance of the project and for the associated works as will be assessed by the Company shall be transferred by the State Government to Company on lease basis against payment of land revenue as per approved rate of State Government. The period of lease will cease with the project getting reverted to the State Government on expiry of 40 years. The Company shall be entitled to mortgage the land to the lenders/financiers of the project with prior consent of the state government subject to the condition that such period of mortgage shall not exceed the lease period. The State Government shall acquire for the Company under the land acquisition Act 1894 as in force and as per Bengal Eastern Frontier Regulation 1873 (5 of 1873) at the expense of the Company such private lands within the State of Arunachal Pradesh, as may be required from time to time by the Company for the construction, operation and maintenance of the project."

Section 43 of the Land Acquisition Act 1894 states that the provisions of sections 39 to 42, both inclusive, shall not apply and the corresponding sections of Land Acquisition Act, 1870 (10 of 1870), shall be deemed never to have applied, to the acquisition of land for any Railway or other Company, for the purposes of which, [under any agreement with such Company, the secretary of State for India in Council, the Secretary of State, [the Central Government or any State Government] is or was bound to provide land].

Hence, the land acquisition process will be conducted as per the provisions under Land Acquisition Act 1894 and not under the Land Acquisition (Companies) Rules, 1963

7.2.1 Publication of Preliminary Notification

As per the agreement between SEW and Government of Arunachal Pradesh, the State Government is obliged to acquire land for the Nafra Hydro Electric Project as per the assessments made by the company. Hence, a notification to that effect under Section 4 of the Land Acquisition Act 1894 shall be published in the Official Gazette and in two daily newspapers circulating in that locality of which at least one shall be in the regional language. The Collector shall cause public notice of the substance of such notification to be given at convenient places in the said locality.

7.2.2 Hearing of Objections.

For the purpose of this section, a person shall be deemed to be interested in land who would be entitled to claim an interest in compensation if the land were acquired under this Act. Any person interested in any land which has been notified under section 4, sub-section (1), as being needed or likely to be

needed for the Nafra HEP project by the Company may within thirty days from the date of the publication of the notification, object to the acquisition of the land or of any land in the locality, as the case may be. Every objection under sub-section (1) shall be made to the Collector in writing, and the Collector shall give the objector an opportunity of being heard in person or by any person authorized by him in this behalf or by pleader and shall, after hearing all such objections and after making such further inquiry, if any, as he thinks necessary, either make a report in respect of the land which has been notified under section 4, sub-section (1), or make different reports in respect of different parcels of such land, to the appropriate Government, containing his recommendations on the objections, together with the record of the proceedings held by him, for the decision of that Government. The decision of the appropriate Government] on the objections shall be final.

7.2.3 Declaration that land is required for a public purpose

Subject to the proceedings of the Hearing to Objections under Section 5A, a declaration shall be made that the land is required for public purpose under the signature of a Secretary to such Government or of some officer duly authorized to certify its orders and different declarations may be made from time to time in respect of different parcels of any land covered by the same notification under section 4, sub-section (I)

Every such declaration shall be published in the Official Gazette and in two daily newspapers circulating in the locality in which the land is situated of which at least one shall be in the regional language, and the Collector shall cause public notice of the substance of such declaration to be given at convenient places in the said locality (the last of the dates of such publication and the giving of such public notice, being hereinafter referred to as the date of the publication of the declaration), and such declaration shall state the district or other territorial division in which the land is situate, the purpose for which It is needed, its approximate area, and, where a plan shall have been made of the land, the place where such plan may be inspected.

The said declaration shall be conclusive evidence that the land is needed for a public purpose or for a company, as the case may be; and, after making such declaration, the appropriate Government may acquire the land in manner hereinafter appearing.

7.2.4 Collector to take order for acquisition

Whenever any land shall have been so declared to be needed for public purpose, or for a Company, the appropriate Government or some officer authorized by the appropriate Government in this behalf, shall direct the Collector to take order for the acquisition of the land.

The Collector shall thereupon cause the land (unless it has been already marked out under section 4) to be market out. He shall also cause it to be measured, and (if no plan has been made thereof), a plan to be made of the same.

7.2.5 Notice to Persons Interested

The Collector shall then cause public notice to be given at convenient places on or near the land to be taken; stating that the Government intends to take possession of the land, and that claims to compensations for all interests in such land may be made to him.

Such notice shall state the particulars of the land so needed, and shall require all persons interested in the land to appear personally or by agent before the Collector at a time and place therein mentioned (such time not being earlier than fifteen days after the date of publication of the notice), and to state the nature of their respective interests in the land and the amount and particulars of their claims to compensation for such interests, and their objections (if any) to the measurements made under section

8. The Collector may in any case require such statement to be made in writing and signed by the party or his agent.

The Collector shall also serve notice to the same effect on the occupier (if any) of such land and on all such persons known or believed to be interested therein, or to entitled to act for persons so interested, as reside or have agents authorized to receive service on their behalf, within the revenue district in which the land is situate.

In case any person so interested resides elsewhere, and has no such agent, the notice shall be sent to him by post in letter addressed to him at his last known residence, address or place or business and registered under sections 28 and 29 of the Indian Post Office Act, 1898 (6 of 1898)].

The Collector may also require any such person to make or deliver to him, at a time and place mentioned (such time not being earlier than fifteen days after the date of the requisition), a statement containing, so far as may be practicable, the name of every other person possessing any interest in the land or any part thereof as co-proprietor, sub-proprietor, mortgagee, tenant or otherwise, and of the nature of such interest, and of the rents and profits (if any), received or receivable on account thereof for three years next preceding the date of the statement. Every person required to make or deliver a statement under this section 9 shall be deemed to be legally bound to do so within the meaning of sections 175 and 176 of the Indian Penal Code (45 of 1860).

7.2.6 Enquiry and award by Collector

On the day so fixed, or on any other day to which the enquiry has been adjourned, the Collector shall proceed to enquire into the objection (if any) which any person interested has stated pursuant to a notice given under section 9 to the measurements made under section 8, and into the value of the land [at the date of the publication of the notification under section 4, sub-section (1)], and into the respective interests of the persons claiming the compensation and shall make an award under his hand of-

(i) The true area of the land;

(ii) The compensation which in his opinion should be allowed for the land; and

(iii) The apportionment of the said compensation among all the persons known or believed to be interested in the land, or whom, or of whose claims, he has information, whether or not they have respectively appeared before him.

If at any stage of the proceedings, the Collector is satisfied that all the persons interested in the land who appeared before him have agreed in writing on the matters to be included in the award of the Collector in the form prescribed by rules made by the appropriate Government, he may, without making further enquiry, make an award according to the terms of such agreement.

7.2.7 Period within which Award to be made

The Collector shall make an award under section 11 within a period of two years from the date of the publication of the declaration and if no award is made within that period, the entire proceeding for the acquisition of the land shall lapse. In computing the period of two years referred to in this section, the period during which any action or proceeding to be taken in pursuance of the said declaration is stayed by an order of a Court shall be excluded.

7.2.8 Award of Collector when to be final

Such award shall be filed in the Collector's office and shall be final and conclusive evidence, as between the Collector and the persons interested, whether they have appeared before the Collector or not, of the true area and value of the land, and the apportionment of the compensation among the

persons interested. The Collector shall give immediate notice of his award to such of the persons interested as are not present personally or by their representatives when the award is made.

7.2.9 Correction of clerical errors

The Collector may, at any time but not later than six months from the date of the award, or where he has been required under section 18 to make a reference to the Court, before the making of such reference, by order, correct any clerical or arithmetical mistakes in the award or errors arising therein either on his own motion or on the application of any person interested or a local authority, provided that no correction, which is likely to affect prejudicially any person, shall be made unless such person has been given a reasonable opportunity of making a representation in the matter.

The Collector shall give immediate notice of any correction made in the award to all the persons interested. Where any excess amount is proved to have been paid to any person as a result of the correction made under sub-section (1), the excess amount so paid shall be liable to be refunded and in the case of any default or refusal to pay, the same may be recovered as an arrear of land revenue.

7.2.10 To take possession of Acquired Land and Lease it to the Company

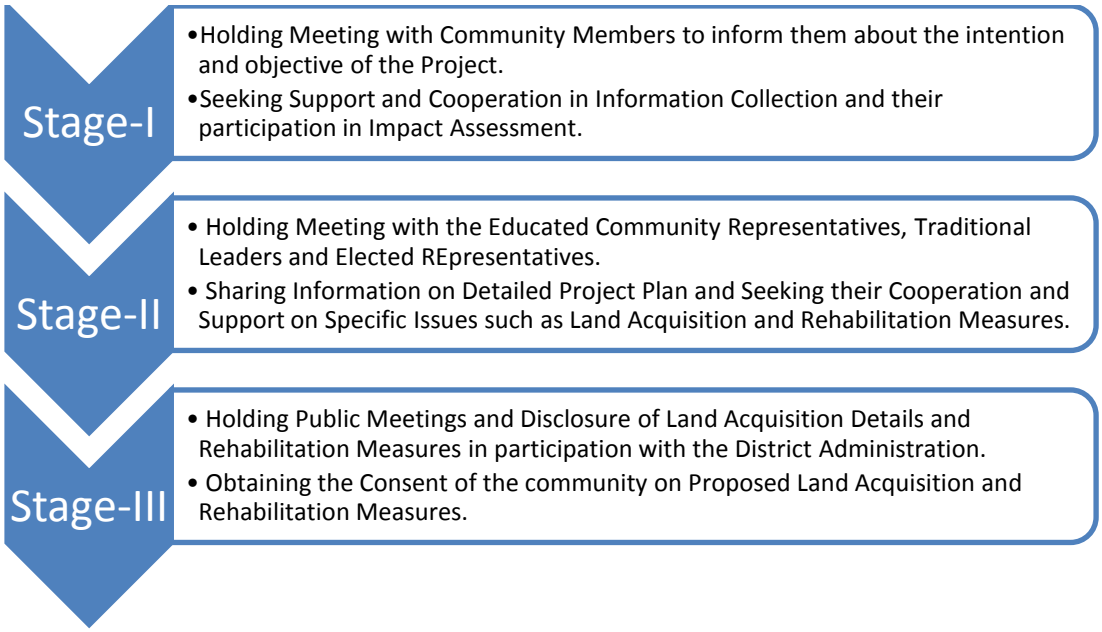
When the Collector has made an award under section 11, he may take possession of the land, which shall thereupon vest absolutely in the Government, free from all encumbrances. After taking possession of the required land, the Government of Arunachal Pradesh will transfer the possession of the land through a lease agreement made to this effect.

7.3 Resettlement Plan

As the project does not involve any displacement, a separate Resettlement and Rehabilitation Action Plan is not prepared. The Project Affected Families however will receive compensation as per the Land Acquisition Act and get benefits as per the MoA between SEW and the Government of Arunachal Pradesh (see Section 2.4.1 for details).

7.4 Community Consultations

Meeting with the community members and their representatives were held in each of the project affected villages to share information about the project and to seek their cooperation and support. The community consultations are planned in three stages.



As per this plan, preliminary consultations were held in all the project affected villages. We provide a sketch of this preliminary consultation here. The dissemination of details of the land acquisition and rehabilitation measures has also been initiated. The final consultations and Public Meetings will be held as per the legal and procedural requirements.

7.4.1 Community Consultation in Khellong Village:

A preliminary consultation with the community members of Khellong village was held at the school building of Khellong. The community members were informed about the proposed project. Cooperation was requested from them in order to participate in the social and environment impact assessment process.

After the details of the project design was worked out and land required for the project was identified, the second stage consultation was organized. In this stage, the community representatives such as Goanburah, Gram Panchayat Members, and Anchal Samiti members were involved. The people whose land is required for this project were also invited to this meeting. The detail of the land and property survey carried out in the project affected area was shared with them. A copy of the land and property identified to be affected by the project was also shared with them for their verification.

7.4.2 Community Consultation in Lower Jung Village

Similarly, consultation with the Lower Jung community was also conducted at different stages. The community members were requested to cooperate with the environment and social impact assessment process.

In the next stage, the property and land survey details that would be affected by the project was shared with them for their verification and further suggestions.

The community members were informed about the land acquisition process to be followed by the District Administration. The community members further verified the list of property and ownership of the identified land patches. Their suggestions were later incorporated into the report. The community members have cooperated in all these activities and ready to extend support for Nafra HEP project.

Chapter 8

SOCIAL IMPACT MITIGATION MEASURES

8 SOCIAL IMPACT MITIGATION MEASURES

The proposed project has a number of positive social and economic impacts. The negative impacts of the proposed project could be prevented through a careful implementation of the project. We propose the following measures to be taken for mitigating the negative impacts and maximization of the opportunities for positive impacts due to this project.

8.1 Convergence with Livelihood Generation:

1. The employment opportunity created by the construction of this project should be sustained through expanding livelihood options, modernization of the agriculture and allied sectors, technical training and skill development of the local workforce, and promoting entrepreneurships among local community. The Company's contribution towards local area development fund and the free electricity supply should be channelized in this direction.

8.2 Law & Order

2. The age-structure and sex-ratio imbalance caused in the local demography during the construction phase has possibility of causing certain social problems. Most common problems included in this category are drug and addiction to liquor, gambling, illicit relationships, and HIV/AIDS. The demand for liquor and other intoxicants may entice local people to engage in trade of illegal drugs and spurious liquors. Such practices should be prevented through stricter enforcement of law and order in the region.
3. A Police Post should be created at Nafra to enable close monitoring of the social behavior and enforcing law and order in the locality during the construction phase of the project.

8.3 Managing Migrated Population

4. There should be a reasonable degree of isolation between the migrant population and the local community to reduce the possibilities of tension between them. A separate labor colony should be planned with independent access of road and located at a reasonable distance from the habitations of the local communities.
5. The labor colony should have utility stores for meeting their requirements. This will reduce their dependence on the local market. This will also create reasonable isolation of the migrant population and reduce the interaction between them. In addition to this, it would help regulating the demand and supply equation and preventing price rise of the commodities. Such a step will reduce unnecessary economic burden that would otherwise come on the local community.

8.4 Protecting Customary Rights and Privileges

6. The customary privileges and rights of the local people over water channels should be maintained through appropriate regulation by the Government of Arunachal Pradesh subject to reasonable restrictions necessary for the operational requirements, safety and security of the project. Access to the reservoir for fishing should be created through making sites for fishing in appropriate locations.
7. Habitat enhancement measures should be designed to provide congenial habitat to the identified local species of fishes to promote their breeding and sustenance.
8. Plant species used for food by local people that would be submerged should be rehabilitated in an appropriate location before submergence.
9. Due care should be taken for protection of human rights, complying with procedural norms and remain transparent in its decision making.

8.5 Public Relation and Grievance Redressal

10. At local level, there should be regular interaction with local political and governance structure in dealing with issues of public concern. A local committee may be formed and there should be an independent Public Relation Cell within the Company to handle such issues.

8.6 Strengthening Partnership between Government and Private Developers

11. At the state level there should be a broad consensus between political parties and other governance bodies to formulate and implement a policy for strengthening public-private partnership ventures in developing key infrastructures.

8.7 Health & Sanitation

12. Precaution should be taken to monitor contagious and viral diseases that can have serious impact on public health. The local PHC at Nafra should be supplemented with adequate number of man-power, facilities and supplies to meet these challenges.
13. The company should provide the first-aid facilities and conduct regular health check-up of the labor employed in the project. It should comply with all the applicable legal provisions and cooperate in the regulatory mechanism under the labor and social welfare laws as applicable.
14. There should be a labor counseling cell to monitor and manage mental health of the labor force including the local communities and migrant labors.
15. HIV/AIDs detection test for all migrant labor should be mandatory before they are employed in the project. The awareness should be raised among the labor force and the local communities about AIDs.

8.8 Infrastructure Maintenance

16. Special Roads should be constructed for the movement of construction material wherever possible. If the road is shared with the general public, it should be improved to accommodate the additional axle and traffic load.
17. The narrow sections of the hill roads should be provided with additional signage for safety. Traffic pilots should be engaged with adequate training to ensure smooth movement of traffic.
18. As far as possible, the movements on construction material should be done in the public road at a time when the movement of the public is the least. This will prevent inconvenience to the public.
19. The public roads should be regularly maintained and debris spilling on the road during the transportation of the construction material should be cleaned in regular intervals so as to avoid inconveniences.
20. A comprehensive Infrastructure Audit should be made in a regular interval to review the condition and capacity of all major infrastructures including road, drinking water, health and sanitation facilities etc. Such audits will ensure identification of deficits and take appropriate steps.

8.9 Sharing of Local Resources

21. The local sources of water may be utilized by the Company for construction purpose only to the extent it does not adversely affect the local people.
22. The capacity building of the local institutions should be undertaken to enable them in effectively handling the additional responsibilities due to the implementation of this project. The Public Relation Cell within the Company will make a need assessment and make necessary arrangements for this as and when required.
23. The access of migrant population to the forest for fire-wood and other products with economic value should be regulated so that the privileges enjoyed by the local community are not impinged.

8.10 Habitat Rehabilitation

24. The quarry area, muck dump area and facility areas used during the construction stage should be appropriately rehabilitated. Necessary stabilization, aforestation, and landscaping should be made to reduce the impact of the project on aesthetics of the project area.

APPENDIX - 1

SURVEY TOOLS

NAFRA Hydro Electric Project-EIA Study
Project Affected Persons Questionnaire

Date of Survey							
				2	0	0	

Identification Number

											/			

1 Location

i) Village		iii) Hamlet		v) Taluka	
ii) Gram Panchayat:		iv) Block		vi) District	

2 Household Details

i)Name of the Head of the Household		
ii) Since when have you been living in the village?		Mention the year since when living in this structure / village
iii) Tribe		
iv) Clan		
v) Religion		Codes: 1. Hindu 2. Muslim 3. Christian 4. Buddhist 5. Jain 6. Tribal 7. Others (specify)
vi) Type of Family		Codes: 1. Joint 2. Extended 3. Nuclear 4. Single 5. Others (Specify)
vii) Mother Tongue		

3. Family Poverty Status

i. Below Poverty Line (BPL)	ii. Beneficiary of Public Distribution Schemes (PDS)

(Put Yes or No)

4. Identification Verification

Photo of HH

i. Ration card No	
ii. Voter's ID card No.	

5. Title holding Category

i. Non- Title Holder Codes: 1. Tenant 2. Share cropper 3. Squatter 4. Encroacher 5. Agricultural laborer 6. Others (Specify)		ii. Title Holder 1. Owner; 2. Lessee	

Codes for Relationship

1	Head of the House Hold	**2**	Wife	**3**	Husband	**4**	Son
5	Daughter	**6**	Son-in-law	**7**	Daughter-in-law	**8**	Grandfather
9	Grandmother	**10**	Grandson	**11**	Grand daughter	**12**	Grandson-in-law
13	Grand daughter-in-law	**14**	Brother	**15**	Sister	**16**	Brother-in-law
17	Sister-in-law	**18**	Father	**19**	Mother	**20**	Father-in-law
21	Mother-in-law	**22**	Uncle	**23**	Aunt	**24**	Cousin
25	Nephew	**26**	Niece	**27**	Any other (specify)		

6. Family Profile. (Start from Head of the Household)

Member Number	1	2	3	4	5	6	7	8	9	10	11	12	
6.1 Name													Write down the names of all person who live and eat together in this household starting with head
6.2 Relationship	**HH**												*Codes as given above*
6.3. Sex	**Is the NAME male or female?**												
	1	1	1	1	1	1	1	1	1	1	1	1	Male
	2	2	2	2	2	2	2	2	2	2	2	2	Female
6.4. Age	**How old was NAME on the last birthday?**												
													Record the age on last birthday
6.5. Marital Status	1	1	1	1	1	1	1	1	1	1	1	1	Married
	2	2	2	2	2	2	2	2	2	2	2	2	Unmarried
	3	3	3	3	3	3	3	3	3	3	3	3	Divorced
	4	4	4	4	4	4	4	4	4	4	4	4	Separated
	5	5	5	5	5	5	5	5	5	5	5	5	Widow/Widower
6.6. Education	**The class till which the person has been educated.**												
	1	1	1	1	1	1	1	1	1	1	1	1	Illiterate
	2	2	2	2	2	2	2	2	2	2	2	2	Primary (class 4)
	3	3	3	3	3	3	3	3	3	3	3	3	Secondary (5 - 10)
	4	4	4	4	4	4	4	4	4	4	4	4	Higher (graduate)
	5	5	5	5	5	5	5	5	5	5	5	5	Technical
	6	6	6	6	6	6	6	6	6	6	6	6	Vocational
6.7. Health	1	1	1	1	1	1	1	1	1	1	1	1	Handicap by birth
	2	2	2	2	2	2	2	2	2	2	2	2	Handicap due to other reasons
	3	3	3	3	3	3	3	3	3	3	3	3	Any other chronic health problems

Employment Status of the Family Members

6.8. Employment Status	**Is the NAME working?**												
	1	1	1	1	1	1	1	1	1	1	1	1	Yes
	2	2	2	2	2	2	2	2	2	2	2	2	No
6.9 Occupation *(This may have multiple entries)*	**The occupational activity at the place of job?**												
	1	1	1	1	1	1	1	1	1	1	1	1	Agriculture / Shifting Cultivation
	2	2	2	2	2	2	2	2	2	2	2	2	Agri Labour
	3	3	3	3	3	3	3	3	3	3	3	3	Non Agri Labour
	4	4	4	4	4	4	4	4	4	4	4	4	Business/Trade
	5	5	5	5	5	5	5	5	5	5	5	5	Govt. Service
	6	6	6	6	6	6	6	6	6	6	6	6	Private Service
	7	7	7	7	7	7	7	7	7	7	7	7	Forest Produce Collection
	9	9	9	9	9	9	9	9	9	9	9	9	Others
6.10 Non-Working Status *(To be filled for persons who are not working.)*	**What was the main reason for the NAME not working?**												
	1	1	1	1	1	1	1	1	1	1	1	1	No work available
	2	2	2	2	2	2	2	2	2	2	2	2	Seasonal inactivity
	3	3	3	3	3	3	3	3	3	3	3	3	Household family duties
	4	4	4	4	4	4	4	4	4	4	4	4	Old/young
	5	5	5	5	5	5	5	5	5	5	5	5	Handicapped
	6	6	6	6	6	6	6	6	6	6	6	6	Student
	9	9	9	9	9	9	9	9	9	9	9	9	Others
6.11 Income	**How much does the NAME earn in a month?**												
	1	1	1	1	1	1	1	1	1	1	1	1	Less than Rs.2000
	2	2	2	2	2	2	2	2	2	2	2	2	Rs.2000 - 3000
	3	3	3	3	3	3	3	3	3	3	3	3	Rs. 3000 - 4000
	4	4	4	4	4	4	4	4	4	4	4	4	Above Rs 4000

7. Source of Drinking Water

i. Type of sources:	ii. Ownership of source:
Codes: 1. Open Well, 2. Tube Well, 3 Tap or piped water, 4. River/Stream, 5. Other	Codes: 1. Community 2. Own
iv. Distance of source of water from house (m):	

8. Live Stocks

Category	Cow	Mithun	Goat	Sheep	Horse	Pigs	Chicken	Ducks	Other
Male									
Female									
Total									

9. Structural Details

A. Usage:

1. How old is the structure?
(Mention *the Year since you are operating from this structure)*

2 Number of months the structure is occupied?

3. What type of activities you conduct from the structure?

1.		5.		9.	
2.		6.		10.	
3.		7.		11.	
4.		8.		12.	

B. Typology of the Main Structure

Roof		**Wall**		**Floor**		**Boundary**		**No of Rooms**	**No. of Storeys**	**No. of Doors**	**No.of windows**
RCC/RBC	1	Brick	1	Concrete	1	Absent	Present				
Thatched	2	Wood Plastic	2	Mud	2	Brick	1				
Mud	3	Mud	3	Stone	3	Barbed Wire	2				
GI / Asbestos	4	Asbestos	4	Others	9	Wood	3				
Bamboo	5	Others	9			Others	9				
Others	9										

C. Measurement of the Structure (in mts)

Length:	**Breadth:**	**Area:**

D. Utilities (Additional structures.or Sub-Structures) in the Property

S.No.	**Utilities/Sub Strctures**	**Unit owned**	**Approx. Cost**
1.			
2.			
3.			
4.			
5.			
6.			
7.			

E. Where would you prefer to move from here?

S No	Place	Where (specify)	Distance in Kms from existing
1	Within the Locality		
2	Outside the Locality		

F. Do you have any alternative structure?
1 - Yes / 2 - No If Yes, where? [ ]

Place (specify)	Distance in Kms from existing Place

10 . Land Details

10.A Type of Land Codes: 1. Irrigated 2. Un-irrigated 3. Waste Land 9. Other (Specify) _____	

10.B For how many years is the land being cultivated by the household [More Than Years]

10.**C. Measurement of the Land (in mts)**

Length:	Breadth:	Area:

10.D. Productive Trees (Timber and Fruit Bearing)

Tree Type	Age of the Tree	Numbers	Anual Income from the Fruit Tree	Approximate Timber Value of the Trees

10.E. Utilities (Other than Trees)

S.No.	Utilities	Unit owned	Approx. Cost
1.	Dug wells		
2.	Hand Pump/Tube wells/ Lift Irrigation Points		
3.	Water Tap/Water Tank		
4.	Boundary Wall/Barbed Wire Fence		
5.	Cattle Shed/Crop Watch Tower		
6.	Others		
7.			

10.F What Crops you Grow?

Season	Sl. No.	Crop Name	Area cultivated (ha / acres)	Production (Kg per ha/acre)	Rate (in Rs./Kg*.)
Autumn Plant Kharif (Nov.-Mar)	1				
	2				
	3				
Spring Plant Rabi (July-Nov.)	1				
	2				
	3				
Summer Plant (Mar-July)	1				
	2				
	3				

Investigator Name	Name of Respondent	Supervisor Name

NAFRA HYDRO ELECTRIC PROJECT-EIA Study

Socio Economic Survey Questionnaire

Data Collection Date

				2	0	0	

Identification Number

								/			

Investigator Name	Respondents Name	Supervisor Name

I: Family Profile

Member Number	1	2	3	4	5	6	7	8	9	10	11	12	
1.1. Name													Write down the names of all persons who live and eat together in this household starting with head
1.2 Relationship	**HH**												*Write Codes as given in page-2*
1.3 Is the Name Male or Female	1	1	1	1	1	1	1	1	1	1	1	1	Male
	2	2	2	2	2	2	2	2	2	2	2	2	Female
1.4. Age	**How old was NAME on the last birthday?** *(Record the age on last birthday)*												
1.5. Marital Status	1	1	1	1	1	1	1	1	1	1	1	1	Married
	2	2	2	2	2	2	2	2	2	2	2	2	Unmarried
	3	3	3	3	3	3	3	3	3	3	3	3	Divorced
	4	4	4	4	4	4	4	4	4	4	4	4	Separated
	5	5	5	5	5	5	5	5	5	5	5	5	Widow/Widower
1.6. Education *(The class till which the person has been educated)*													
	1	1	1	1	1	1	1	1	1	1	1	1	Illiterate
	2	2	2	2	2	2	2	2	2	2	2	2	Primary (class 4)
	3	3	3	3	3	3	3	3	3	3	3	3	Secondary (5 - 10)
	4	4	4	4	4	4	4	4	4	4	4	4	Higher (graduate)
	5	5	5	5	5	5	5	5	5	5	5	5	Technical
	6	6	6	6	6	6	6	6	6	6	6	6	Vocational (ITI etc)
1.7 Health	1	1	1	1	1	1	1	1	1	1	1	1	Handicap by birth
	2	2	2	2	2	2	2	2	2	2	2	2	Handicap due to other reasons
	3	3	3	3	3	3	3	3	3	3	3	3	Any other chronic health problems

Employment Status of the Family Members

1.8 Is the Name Working?	1	1	1	1	1	1	1	1	1	1	1	1	Yes
	2	2	2	2	2	2	2	2	2	2	2	2	No
1.9 Occupational activity at the place of job *(This may have multiple entries)*	1	1	1	1	1	1	1	1	1	1	1	1	Agriculture/Shifting Cultivation
	2	2	2	2	2	2	2	2	2	2	2	2	Agri Labour
	3	3	3	3	3	3	3	3	3	3	3	3	Non Agri Labour
	4	4	4	4	4	4	4	4	4	4	4	4	Business/Trade
	5	5	5	5	5	5	5	5	5	5	5	5	Govt. Service
	6	6	6	6	6	6	6	6	6	6	6	6	Private Service
	7	7	7	7	7	7	7	7	7	7	7	7	Forest Produce Collection
	9	9	9	9	9	9	9	9	9	9	9	9	Others
1.10 What was the main reason for the NAME not working?	*To be filled for persons who are not working.*												
	1	1	1	1	1	1	1	1	1	1	1	1	No work available
	2	2	2	2	2	2	2	2	2	2	2	2	Seasonal inactivity
	3	3	3	3	3	3	3	3	3	3	3	3	Household family duties
	4	4	4	4	4	4	4	4	4	4	4	4	Old/young
	5	5	5	5	5	5	5	5	5	5	5	5	Handicapped
	6	6	6	6	6	6	6	6	6	6	6	6	Student
	9	9	9	9	9	9	9	9	9	9	9	9	Others
1.11 Since when the household is living in this village/structure?													Years

Codes for Relationship

1	Head of the House Hold	**2**	Wife	**3**	Husband	**4**	Son
5	Daughter	**6**	Son-in-law	**7**	Daughter-in-law	**8**	Grandfather
9	Grandmother	**10**	Grandson	**11**	Grand daughter	**12**	Grandson-in-law
13	Grand daughter-in-law	**14**	Brother	**15**	Sister	**16**	Brother-in-law
17	Sister-in-law	**18**	Father	**19**	Mother	**20**	Father-in-law
21	Mother-in-law	**22**	Uncle	**23**	Aunt	**24**	Cousin
25	Nephew	**26**	Niece	**27**	Any other (specify)		

II. Community Profile

2.1 Tribe Name Codes: 1. Sajolang (Miji) 2. Others		**2.2 Clan**	
2.3 Religion: Codes: 1. Indigenous (Tribal) 2. Hindu 3. Budhist 4. Muslim 5. Christian		**2.4 Mother Tongue**	

III: Economic Assets of the Household

3.1 Agricultural Land in Possession (Mention Units Hectre/Acres):

Owned		Leased Out/Share Crop		Leased In/Share Crop		Total	
Irrigated	Unirri-gated	Irrigated	Unirri-gated	Irrigated	Unirri-gated	Irrigated	Unirri-gated

3.2 Classification of Possessed Land

Classification	**Length (m) X Breadth (m)**	**In Acre**
Land under Residential Use		
Barren and uncultivable land		
Land for trees/orchard etc.		
Total cropped area		
Total		
Area sown more than once		

3.3 Built up Area for Houses Possessed:

Type	Residential	Commercial shops	Occupational Shed	Barns Animal Sheds	Others
Length (m) X Breadth (m)					
Total Area (Sq. Meter)					

3.4 Livestock and Poultry

Category	Cow	Mithun	Goat	Sheep	Horse	Pigs	Chicken	Ducks	Other
Male									
Female									
Total									

IV: Household Income Expenditure and Loans

4.1 Source of Annual Household Income (Mention Units)

Source	Agricultural Produce	Agricultural Byproducts	Milk	Livestock sale	Wages	Handicraft
	1	2	3	4	5	6
Income (In Rupees)						
Quantity Produced	Kg/Quintal	Kg/Quintal	Litters	Numbers	Days per Year	Numbers

Source	Self Employment	Service	Sale Property	Rent / Interest	Other Sources	Total Income
	7	8	9	10	11	12
Income (In Rupees)						
Quantity Produced	Kg/Quintal	Kg/Quintal	Litters	Numbers	Days per Year	Numbers

4.2 Annual Household Consumer Expenditure

Item	Food	Clothing	Foot wears	Electricity	Liquor	Smoking/ Tobacco
	1	2	3	4	5	6
Expenditure (In Rupees)						
Requirement Quantity	Kg/Quintal	Pairs/Year	Pairs/Year	Meter Units/month	Litters /Day	Numbers/Day

Item	House Repair	Fuel Wood	Utensils/ Equipments etc	Transport	Customs/ Festivals	Total Expenditure
	7	8	9	10	11	12
Expenditure (In Rupees)						
Requirement Quantity		Bundles/Month				

4.3 Household Loans *(Codes in Page-4)*

Sources	Loan Type	Purpose	Loan Period (Years)	Security type	Mode of payment	Borrowed amount	Principal Repaid	Interest Rate
Government								
Bank								
Money Lender								
Relative /Friends								
Others (specify)								

Codes

Loan Type	1. Short term (Upto 1 Year)-Mortgaged, 2. Short term (Upto 1 Year)-Unmortgaged, 3. Medium term (1 to 3 Years), 4. Long term (More than 3 Years), 5. Timeframe not fixed
Purpose	1. House Construction, 2. Marriage, 3. Food, 4. Custom and Worship, 5. Education, 6. Other
Security Type	1. Ornament, 2. Utensils, 3. Standing crop, 4. Land, 5. House, 6. Agricultural implements/ machinery, 7. Mithun, 8. Other Livestock such as Pigs cows etc.
Mode of Payment	1. Monthly, 2. Quarterly, 3. Half Yearly, 4. Yearly, 5. Not fixed

V: Perception of likely Impacts

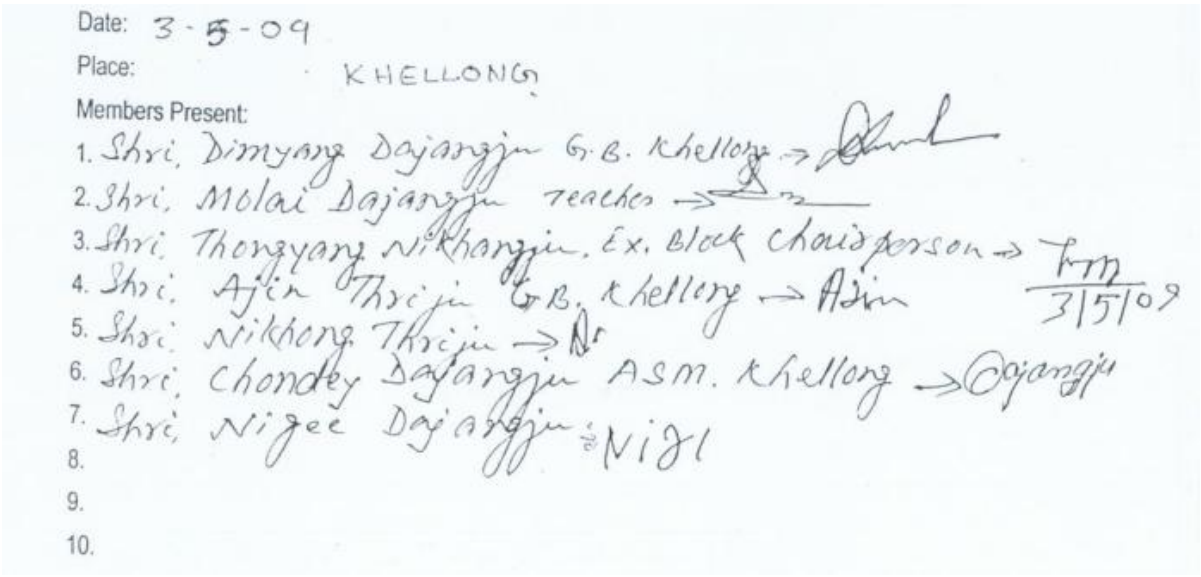
Give your opinion on what would be the effects of the Proposed Dam project near your village on the following. (Please tick √ where applicable)

Item	Possible Effects			
	Would Increase	Would Decrease	No change	Do not know
During Construction of the Hydro Electric Project				
1. Migration of local people outside for work				
2. Migration of outside people for to the locality for work.				
3. Diseases				
4. Forest area				
5. Soil Erosion				
6. Availability of Fuel wood				
7. Water Pollution				
8. Employment potential for Educated Youths				
9. Income for most of the village people				
10. Prominence of Nafra and Social prestige for its people				
11. Crimes in the locality				
12. Road & Transport				
13. Electricity Supply				
14. Trade and business				
After Completion of the Hydro Electric Project				
15. Water flow in small streams in the village				
16. Possibility of irrigation				
17. Forest area				
18. Soil Erosion				
19. Availability of Fuel wood				
20. Loss of local plants used for food				
21. Loss of local animals used for food				
22. Agricultural farmland				
23. Fodder Availability for domestic livestock				
24. Live stock Numbers				
25. Cash Crops (Ginger, Garlic, Groundnut, etc.)				
26. Fishing Opportunities				
27. Mosquito population				
28. Flood Hazard				
29. Occurrence of Drought				
30. Employment potential for Educated Youths				
31. Income for most of the village people				
32. Prominence of Nafra and Social prestige for its people				
33. Crimes in the locality				
34. Road & Transport				
35. Electricity Supply				
36. Trade and business				

APPENDIX - 2

PROJECT DETAILS WITH COMMUNITY MEMBERS DURING CONSULTATION WITH LOCAL COMMUNITIES

Meeting With Khellong Village Representatives and Project Affected Families


Date: 3-5-09
Place: KHELLONG
Members Present:
1. Shri. Dimyang Dajangju G.B. Khellong →
2. Shri. Molai Dajangju Teacher →
3. Shri. Thongyang Nikhanjju. Ex. Block Chairperson → 3/5/09
4. Shri. Ajin Thriju G.B. Khellong → Ajin
5. Shri. Nikhong Thriju →
6. Shri. Chondey Dajangju ASM. Khellong → Dajangju
7. Shri. Nijee Dajangju → Nijl
8.
9.
10.

A meeting was held with the project affected families belonging to Khellong Village to share information on the requirement of the land acquisition for Nafra Hydro Electric Project. Elected Representatives and the village head man (Gaonbura) were also involved and participated in this meeting.

The broad project layout and design was explained to them with the help of the index map showing location of different features of the project. They were consulted to identify the locations that fall within their territory and other details of properties and trees that are permanently fastened to their land.

The total land to be permanently acquired for the Nafra Hydro Electric Project from Khellong village territory is 15.98 ha. The details are provided in the table below:

Label in Index Map (location)	Property Identification Number	Name of the Village Community	Area of the Land in Ha.	Other Properties/ Trees
Submergence Area Left Bank	A (LB)	Khellong Village Community	10.78	• 4 Bamboo Plantations of 9m^2 each on this community land belong to Sri Nikhanju Thriju. • 2 Orange Plants on this community land belong to Sri Nikhanju Thriju. • 2 hill streams owned by Molai Dajangju
Quarry for Clay-Khellong	L(CK-1)	Khellong Village Community	3.2	

Label in Index Map (location)	Property Identification Number	Name of the Village Community	Area of the Land in Ha.	Other Properties/ Trees
Quarry for Clay-Khellong	L (CK-2)	Khellong Village Community	3.0	
TOTAL			15.98	

Following persons belonging to Khellong would lose possession of their land that would be acquired.

Label in Index Map (location)	**Property Identification Number**	**Name of the Title Holder**	**Village Name**	**Area of the Land in m^2**	**Other Properties/ Trees**
A (LB)	B1 to B6	Sri Ajin Thriju	Khellong	5000	• 5 Guava Trees • 4 Orrange Plants • 3 Lemon Plants
	BH1 to BH8				• Labour House of 71 m^2
	BS1 to BS4				• Store Room of 5 m^2
A (LB)	C1 to C4	Sri Nigee Dajangju	Khellong	237	
	N1 & N2				• 2 Hill streams
	B1 & B2				• 2 Bamboo Plantations of 9m^2 each.
A (LB)	D1 to D4	Sri Nigee Dajangju	Khellong	6589	
	B4a to B4b B5a to B5d B5a to B6d B7a to B7d				• 4 Bamboo Plantation (61m2 +54m2 +85m2 +46m2) of total area 146m2 on this land belong to Nigee Dajangju.
	Dh1 to Dh4 Dh5 to Dh8 Dh9 to Dh12 Dh13 to Dh16				• 4 Labour Sheds (14m2+17m2+9m2+12m2) of total 52m2 on this land belong to Sri Nigee Dajangju.

Label in Index Map (location)	Property Identification Number	Name of the Title Holder	Village Name	Area of the Land in m^2	Other Properties/ Trees
TOTAL				1,1826	

They were explained the process of land acquisition and were requested to cooperate in the process of verification of the details of the land measurements and its valuation. The unit rates for the loss of other properties were also discussed with them to arrive at a mutually agreed upon compensation for them.

The affected persons and community representatives were requested to provide their consent on cooperation in the land acquisition process.

Meeting With Lower Jung Village Representatives and Project Affected Families

A meeting was held with the project affected families belonging to Lower Jung Village to share information on the requirement of the land acquisition for Nafra Hydro Electric Project. Elected Representatives and the village head man (Gaonbura) were also involved and participated in this meeting.

The broad project layout and design was explained to them with the help of the index map showing location of different features of the project. They were consulted to identify the locations that fall within their territory and other details of properties and trees that are permanently fastened to their land.

The total land to be permanently acquired for the Nafra Hydro Electric Project from Lower Jung village territory is 6.94 ha. The details are provided in the table below:

Label in Index Map (location)	Property Identification Number	Name of the Village Community	Area of the Land in Ha.	Other Properties/ Trees
Submergence Area Right Bank	A (RB)	Lower Jung Village Community	3.72	Details of the Tree Counts to be Done
Staff Colony & Guest House	H	Lower Jung Community	3.22	Details of the Tree Counts to be Done
TOTAL			6.94	

The total land to be temporarily acquired on lease for the Nafra Hydro Electric Project from Lower Jung village territory is 24.6 ha. The details are provided in the table below:

Label in Index Map (location)	Property Identification Number	Name of the Village Community	Area of the Land in Ha.	Other Properties/ Trees
Muck Dump Area-1	M1	Lower Jung Village Community.	4.6	Details of Tree Counts to be Done
Muck Dump Area-2	M2	Lower Jung Village Community.	3.68	Details of Tree Counts to be Done
Labour Colony	N	Lower Jung Community	3.06	Details of Tree Counts to be Done
Facility Area-1	Q1	Lower Jung Village Community.	1.3	Details of Tree Counts to be Done

Label in Index Map (location)	Property Identification Number	Name of the Village Community	Area of the Land in Ha.	Other Properties/ Trees
Facility Area-2	Q2	Lower Jung Village Community	11.96	Details of Tree Counts to be Done
	TOTAL		24.6	

Following persons belonging to Lower Jung would lose possession of their land that would be acquired.

Label in Index Map (location)	**Property Identification Number**	**Name of the Title Holder**	**Village Name**	**Area of the Land in m^2**	**Other Properties/ Trees**
A (RB)	E1 to E4	Sri Sangchong Longthen	Lower Jung	2798	
	EH1 to EH4				• Labour Shed of 10m^2
A (RB)	H1 to H5	Sri Dongson Longthen	Lower Jung	6479	
	HH1 to HH4				• Labour Shed-1 of 23m^2
	HH5 to HH8				• Labour Shed-2 of 16m^2
	HH9 to HH12				• Labour Shed-3 of 5m^2
A (RB)	J3, J4, J5 and J6	Sri Dongsong Longthen	Lower Jung	6977	• Banana Plantation in whole plot
B(R)	J1, J2, J5, J6	Sri Dongsong Longthen	Lower Jung	5087	• Banana Plantation in whole plot
N	E1 to E4	Sri Sangchong Longthen	Lower Jung	2798	
	EH1 to EH4				• Labour Shed of 10m2
N	F1 to F4	Sri Sangchong Longthen		3092	• 1 Orange Plant • 1 Lemon Plant
N	G1 to G5	Sri Abul Longthen		3577	
TOTAL				3,0808	

They were explained the process of land acquisition and were requested to cooperate in the process of verification of the details of the land measurements and its valuation. The unit rates for the loss of other properties were also discussed with them to arrive at an mutually agreed upon compensation for them.

The affected persons and community representatives were requested to provide their consent on cooperation in the land acquisition process.

APPENDIX - 3

SURVEY MAPS OF LAND POCKETS TO BE ACQUIRED FOR NAFRA HYDRO ELECTRIC PROJECT

Bichum River
Church
House
Toilet
Stream
Shed
School
Tomb
Shed
Boulders
Nafra
Hut
Hut
Hut
Fence
Asphalt Road
Stream
Metalled Road
Island
Foot Path
Stream
Fence
QUARRY
AREA-2.0Ha
L(S)
R
K(C)
COLONY AREA
AREA-2.0Ha
990
1010
1030
1060
1050
1020
1040
1000
1030
980
1050
990
1020
1010
980
1000
1050
1130
1110
1090
1070
1050
1250
1230
1210
1190
1170
970
1020
1000
1050
980
970

NORTH

KEY PLAN

LEGEND

1. BUILTUP AREA LIMIT
2. Asphalt Road WITH CULVERT, CART TRACK/ Metalled Road, PATH WAY, PROPOSED ROAD
3. HOUSE, HUT, TEMPLE
4. WATER VALVE, BUND, CLIFF
5. RIVER, NALA, STREAM,RT ALIGNMENT
6. FENCE, BOULDERS, GEOLOGICAL POINT
7. KILOMETER STONE,CONTOURS, ROCK, ALIGNMENT.
8. TRAVERSE POINTS, BENCH MARKS/BM PILLAR

NOTE:—
1. ALL LEVELS ARE WITH REFERENCE TO M.S.L. AS MEASURED ALONG BRIDGE SITE AXIS AT ASSAM END IN NEARBY HILL O.L. = 650.700 m.
2. ALL LEVELS ARE IN MTS, UNLESS OTHERWISE MENTIONED.

CLIENT: SEW ENERGY LIMITED
6-3-871, Somajiguda Road
Begumpet, Hyderabad-500 016, AP, INDIA

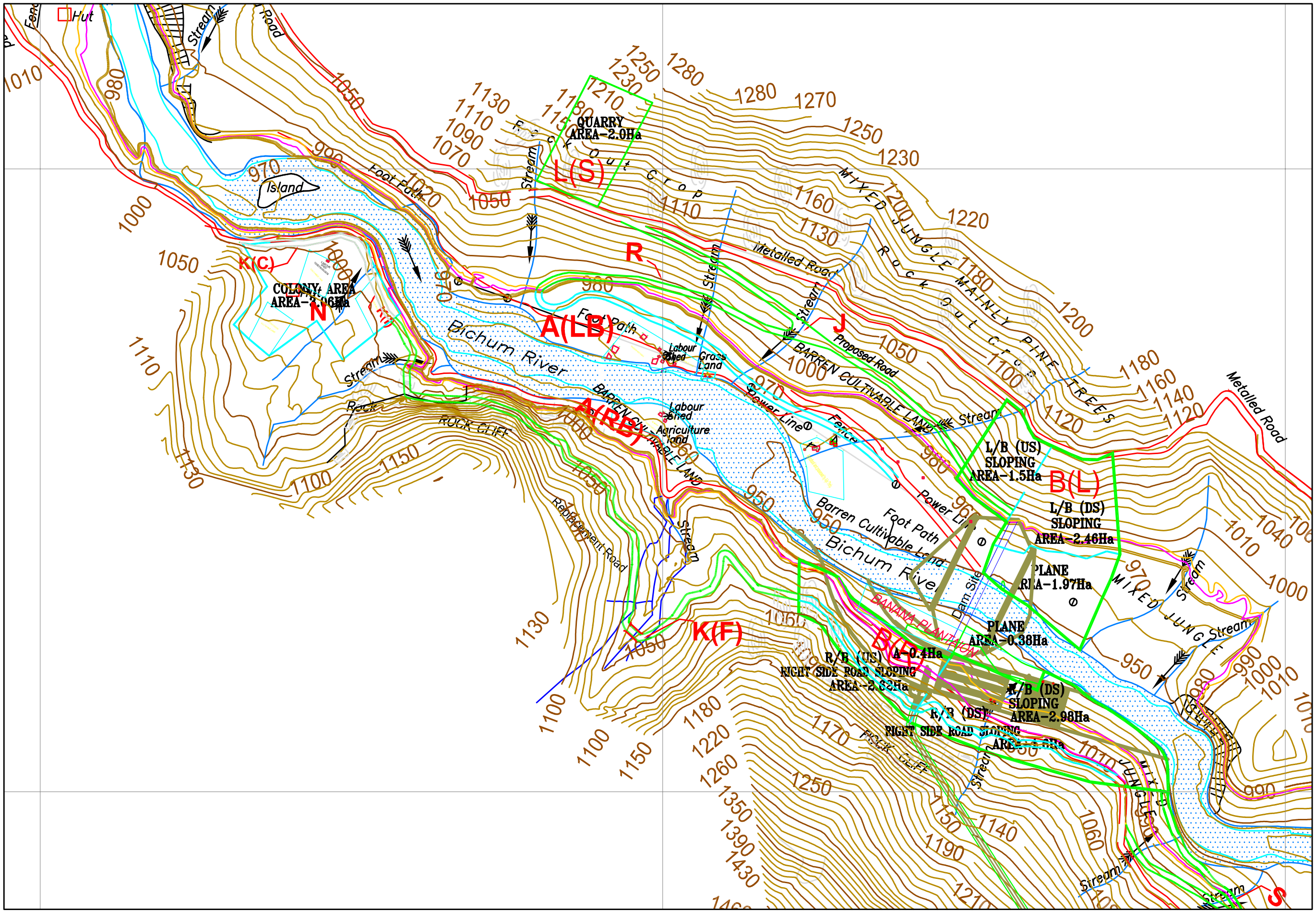
TITLE: DETAILED TOPOGRAPHIC SURVEY OF NAFRA HYDRO ELECTRIC PROJECT (2x48MW) IN ARUNACHAL PRADESH.
INDEX MAP

CAD FILE RECAP: SCALE 1:5000 OR 1cm=50m, CONTOUR INTERVAL = 10.0M

SURVEY FEB 2009

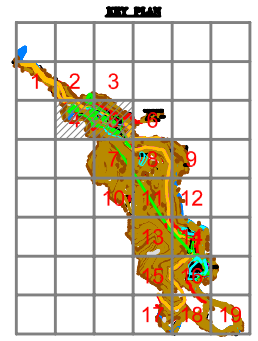
DRAWING NO. SEW/CSPL/INDEMAP/01 REV 0

SURVEYED PREPARED BY: CADEN SURVEYS PVT. LTD.
Survey & CAD Engineering Project Consultants
#K144/39, 11th Cross, 19th 'A' Main, 1st Block, Rajajinagar, Bangalore - 560 010
Phone:080 - 23126811 E-mail:info@cadensurvey.com



NORTH

KEY PLAN



LEGEND

1. BUILTUP AREA LIMIT
2. Asphalt Road WITH CULVERT, CART TRACK/ Metalled Road, PATH WAY, PROPOSED ROAD
3. HOUSE, HUT, TEMPLE
4. WATER VALVE, BOND, CLIFF
5. RIVER, NALA, STREAM/HUT ALIGNMENT
6. FENCE, BOULDERS, GEOLOGICAL POINT
7. KILOMETER STONE,CONTOURS, ROCK, ALIGNMENT.
8. TRAVERSE POINTS, BENCH MARKS/BM PILLAR

NOTES:-
1. ALL LEVELS ARE WITH REFERENCE TO DAT. BM LEVELED ALONG ROAD SIDE NEAR AT ABOUT 2KM U/S OF ADUTI VILL. EL. = 695.150 M.
2. ALL LEVELS ARE IN MTS, UNLESS OTHERWISE MENTIONED.

CLIENT	SEW ENERGY LIMITED 6-3-871, Somajiguda, Somajiguda Road Begumpet, Hyderabad-500 016, AP, INDIA
TITLE	DETAILED TOPOGRAPHIC SURVEY OF NAFRA HYDRO ELECTRIC PROJECT (2x48MW) IN ARUNACHAL PRADESH. INDEX MAP
CAD FILE NO/MAP	SCALE 1:5000 OR 1CM=50m CONTOUR INTERVAL = 10.0M
DESIGN FEB 2009	DRAWING NO. SEW/DPL/MODMAP /02 REV 0
SURVEYED PREPARED BY	CADEN SURVEYS PVT. LTD. Survey & Civil Engineering Project Consultants #K144/39, 11th Cross, 19th 'A' Main, 1st Block, Rajajinagar, Bangalore - 560 010 Phone:(080 - 23104811 Email:info@cadensurvey.com

NORTH

KEY PLAN

L E G E N D

1. BUILTUP AREA LIMIT
2. Asphalt Road WITH CULVERT, CART TRACK/ Metalled Road, PATH WAY, PROPOSED ROAD
3. HOUSE, HUT, TEMPLE
4. WATER VALVE, BOND, CLIFF
5. RIVER, NALA, STREAM,PIT ALIGNMENT
6. FENCE, BOULDERS, GEOLOGICAL POINT
7. KILOMETER STONE,CONTOURS, ROCK, ALIGNMENT.
8. TRAVERSE POINTS, BENCH MARKS/BM PILLAR

NOTES:-

1. ALL LEVELS ARE WITH REFERENCE TO M.S.L. AS LOCATED ABOVE. BENCH MARK AT ABOUT 200 M SOUTH SIDE, EL. = 000.000 M.
2. ALL LEVELS ARE IN MTS, UNLESS OTHERWISE MENTIONED.

CLIENT	SEW ENERGY LIMITED 6-3-871, Somajiguda, Ameerpet Road Begumpet, Hyderabad-500 016, AP, INDIA
TITLE	DETAILED TOPOGRAPHIC SURVEY OF NAFRA HYDRO ELECTRIC PROJECT (2x48MW) IN ARUNACHAL PRADESH. INDEX MAP
CAD FILE / DRAWN	SCALE 1:10000 OR 1CM=100m CONTOUR INTERVAL = 10.00
DESIGN / FEB 2009	DRAWING NO. SEW/CSPL/INDEXMAP/03 / REV 0
SURVEYED / PLOTTED BY	CADEN SURVEYS PVT. LTD. Survey & Civil Engineering Project Consultants #K14439, 11th Cross, 19th 'A' Main, 1st Block, Rajajinagar, Bangalore - 560 010 Phone:(080 - 23104011 E-mail:( )

R/B (US) A-0.4Ha
RIGHT SIDE ROAD SLOPING
AREA-2.32Ha
R/B (DS)
SLOPING
AREA-2.98Ha
R/B (DS)
RIGHT SIDE ROAD SLOPING
AREA-1.81Ha
ROCK CLIFF
Stream
JHANGLA
Stream
Stream
Rock Out Crop
Asphalt Road
MUCK DUMP YARD
CUM STACK YARD-1
AREA-4.6 Ha
FACILITY AREA
AREA-1.3 Ha
Q-1
M-1
Stream
Boulders
FACILITY AREA
Boulders
Hut
Hut
Shiva Shankar
Temple
Boulders
House
Hut
Hut
Pathway
Asphalt Road
Mud Road
Boulders & Sheet Rock
Mud Road
Boulders & Rock
Mud Road
HEAD
Asphalt Road
NORTH
KEY PLAN
LEGEND
1. BUILTUP AREA: LIMIT
2. Asphalt Road WITH CULVERT, CART TRACK/ Metalled Road, PATH WAY, PROPOSED ROAD
3. HOUSE, HUT, TEMPLE
4. WATER VALVE, BUND, CLIFF
5. RIVER, NALA, STREAM,HUT ALIGNMENT
6. FENCE, BOULDERS, GEOLOGICAL POINT
7. KILOMETER STONE,CONTOURS, ROCK, ALIGNMENT.
8. TRAVERSE POINTS, BENCH MARKS/BM PILLAR
NOTES:-
1. ALL LEVELS ARE WITH REFERENCE TO DAT. BM MENTED ALONG ROAD NEAR BUS STOP AT ABOUT 200 M BEFORE KMS. R.L. = 000.000 M.
2. ALL LEVELS ARE IN MTS, UNLESS OTHERWISE MENTIONED.
CLIENT
SEW
SEW ENERGY LIMITED
6-3-671, Banjara Hills, Greenlands Road
Begumpet, Hyderabad-500 016, AP, INDIA.
TITLE
DETAILED TOPOGRAPHIC SURVEY OF
NAFRA HYDRO ELECTRIC PROJECT (2x48MW)
IN ARUNACHAL PRADESH.
INDEX MAP
CAD FILE
SCALE
1:10000 OR 100=100m
CONTOUR INTERVAL = 10.00
DESIGN
FEB 2008
DRAWING NO.
SEW/DPL/MODEMAP/04
REV
0
SURVEYED & PREPARED BY
CADEN SURVEYS PVT. LTD.
Survey & GIS Engineering Project Consultants
#K144/39, 11th Cross, 19th 'A' Main, 1st Block,
Rajajinagar, Bangalore - 560 010
Phone:080 - 23124811 Email:info@cadensurveys.com

MUCK DUMP YARD
CUM STACK YARD-1
AREA-4.6 Ha

FACILITY AREA
AREA-1.3 Ha

Q-1

M-1

Boulders

I T Y A R E A

Shiva Shankar Temple

Hut

House

Pathway

Asphalt Road

Mud Road

Boulders & Sheet Rock

Boulders & Rock

Stream

Bichum River

Divya Nala

Khellong

Island

Rock Out Crop

S L I D E

NORTH

KEY PLAN

LEGEND

1. BUILTUP AREA: LMT
2. Asphalt Road WITH CULVERT, CART TRACK/ Metalled Road, PATH WAY, PROPOSED ROAD
3. HOUSE, HUT, TEMPLE
4. WATER VALVE, BUND, CLIFF
5. RIVER, NALA, STREAMLINE ALIGNMENT
6. FENCE, BOULDERS, GEOLOGICAL POINT
7. KILOMETER STONE,CONTOURS, ROCK, ALIGNMENT.
8. TRAVERSE POINTS, BENCH MARKS/BM PILLAR

NOTES:-

1. ALL LEVELS ARE WITH REFERENCE TO B.M.'S AS LOCATED ALONG.
2. ALL LEVELS ARE IN MTS, UNLESS OTHERWISE MENTIONED.

CLIENT: SEW ENERGY LIMITED

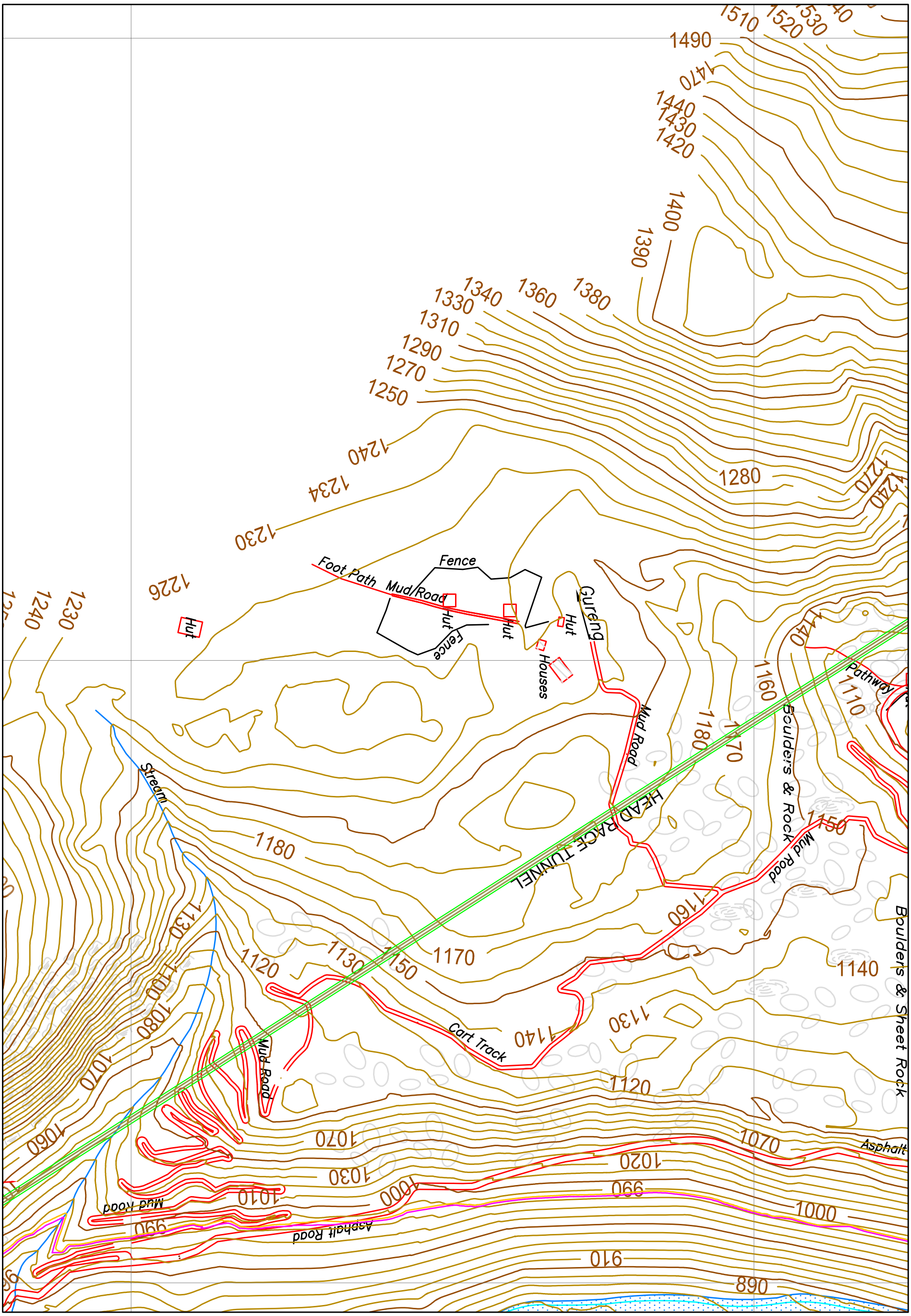
TITLE: REVISED TOPOGRAPHIC SURVEY OF NAFRA HYDRO ELECTRIC PROJECT (2x48MW) IN ARUNACHAL PRADESH.

INDEX MAP

CAD FILE/DWG: SCALE 1:1000 OR 1CM=10m CONTOUR INTERVAL = 10.00

DRAWING NO.: SEW/CSPL/INDEXMAP/05 REV: 0

SURVEYED & PREPARED BY: CADEN SURVEYS PVT. LTD.


1510
1520
1530
1490
1470
1440
1430
1420
1400
1390
1340
1360
1380
1330
1310
1290
1270
1250
1240
1234
1280
1230
1226
1240
1230
Foot Path
Mud Road
Fence
Hut
Houses
Gurung
Pathway
1160
1110
1180
1170
Boulders & Rock
Mud Road
1150
HEAD RACE TUNNEL
1760
1140
Stream
1180
1130
1150
1170
1120
1140
1130
Cart Track
1120
Mud Road
1070
1030
1020
1070
Asphalt
1010
1000
990
Asphalt Road
910
890
1300
1100
1080
1070
1060
990
Boulders & Sheet Rock
NORTH
INDEX PLAN
LEGEND
1. BUILDUP AREA LIMIT
2. ROAD WITH CLOSURE, ASPHALT ROAD/ MUD ROAD WITH PROPOSED ROAD
3. HOUSE, HUT, TEMPLE
4. WATER VALVE, BUND, CLIFF
5. RIVER, NALA, STREAM/HUT ALIGNMENT
6. FENCE, BOULDERS, GEOLOGICAL POINT
7. KILOMETER STONE/CONTOURS, ROCK, ALIGNMENT
8. TRAVERSE POINTS, BENCH MARKS/GM PILLAR
NOTES:
1. ALL LEVELS ARE WITH REFERENCE TO BASE BM LEVELS ADOPTED ON PLAN OF ADIT NO 3 (ADIT NO. 3) = 1000.00 M.
2. ALL LEVELS ARE IN MTS. UNLESS OTHERWISE MENTIONED.
CLIENT
SEW ENERGY LIMITED
TITLE
INDEX MAP
SCALE
DRAWING NO.
SEW/CSPL/NADDAMP/00
REV
0
CAD FILE
DESIGNED
CHECKED
APPROVED
SURVEYED
PLOTTED
GARDEN SURVEYS PVT. LTD.
Survey & Civil Engineering Project Consultants
Phone:+080-23124811 E-mail:
www.gardensurvey.com

Boulders & Sheet Rock
Pathway
Asphalt
Stream
Boulders & Rock
Mud Road
HEADRACE TUNNEL
Island
Hut
Houses
Fence
Cart Track
Asphalt Road
Bichum River
Mud Road
Stream
Hut
Stream
Hut
1110
1140
1150
1160
1170
1180
1130
1120
1000
1070
1020
990
910
890
880
870
850
840
830
1030
1010
1080
1100
1060
1230
1240
920
960
980
900
890
880
870
850
840
830
NORTH
KEY PLAN
LEGEND
1. BUILTUP AREA LIMIT
2. Asphalt Road WITH CULVERT, CART TRACK/ Metalled Road, PATH WAY, PROPOSED ROAD
3. HOUSE, HUT, TEMPLE
4. WATER VALVE, BOND, CLIFF
5. RIVER, NALA, STREAM,HUT ALIGNMENT
6. FENCE, BOULDERS, GEOLOGICAL POINT
7. KILOMETER STONE,CONTOURS, ROCK, ALIGNMENT.
8. TRAVERSE POINTS, BENCH MARKS/BM PILLAR
NOTES:
1. ALL LEVELS ARE WITH REFERENCE TO MEAN SEA LEVEL AS OBTAINED FROM SURVEY OF INDIA TOPO SHEET NO. 83 G/12 & 83 G/16.
2. ALL LEVELS ARE IN MTS, UNLESS OTHERWISE MENTIONED.
CLIENT
SEW ENERGY LIMITED
6-3-871, Bhaskara, Ameerpet Road Begumpet, Hyderabad-500 016, AP, INDIA
TITLE
DETAILED TOPOGRAPHIC SURVEY OF NAFRA HYDRO ELECTRIC PROJECT (2X48MW) IN ARUNACHAL PRADESH.
INDEX MAP
CAD FILE REFERENCE
SCALE
1:10000 OR 1CM=100m
CONTOUR INTERVAL = 10.0M
DRAWING NO.
SEW/CSPL/INDEXMAP /07
REV
0
SURVEYED PLOTTED BY
CADEN SURVEYS PVT. LTD.
Survey & Civil Engineering Project Consultants
#K14/39, 11th Cross, 19th 'A' Main, 1st Block, Rajajinagar, Bangalore - 560 010
Phone:(080 - 23124811 E-mail:(info@cadensurveys.com

Mud Road
Hut
Stream
Rock Cliff
Rock
Asphalt Road
Foot Path
Stream
Hut
Hut
Hut
Stream
MUCK DUMP YARD-2 Area 3.68 Ha
M-2
To Nafra
HEAD RACE TUNNEL
E
E1
Approach Road To Surge Shaft & Valve House
To Bicchom
SURGE SHAFT
D
Valve House
T
PENSTOCK
Switch Yard
Rope Way
Asphalt Road
Q-2
Rock
NORTH
KEY PLAN
LEGEND
1. BUILTUP AREA LIMIT
2. Asphalt Road WITH CULVERT, CART TRACK/ Metalled Road, PATH WAY, PROPOSED ROAD
3. HOUSE, HUT, TEMPLE
4. WATER VALVE, BUND, CLIFF
5. RIVER, NALA, STREAMLINES ALIGNMENT
6. FENCE, BOULDERS, GEOLOGICAL POINT
7. KILOMETER STONE,CONTOURS, ROCK, ALIGNMENT
8. TRAVERSE POINTS, BENCH MARKS/BM PILLAR
NOTES:-
1. ALL LEVELS ARE WITH REFERENCE TO M.S.L. BM LOCATED ALONG ROADSIDE NEAR POWER HOUSE AT ABOUT 300 M SOUTH SIDE. R.L. = 830.000 M.
2. ALL LEVELS ARE IN MTS, UNLESS OTHERWISE MENTIONED.
CLIENT: SEW ENERGY LIMITED
TITLE: DETAILED TOPOGRAPHIC SURVEY OF NAFRA HYDRO ELECTRIC PROJECT (2x48MW) IN ARUNACHAL PRADESH.
INDEX MAP
SCALE
CAD FILE DETAILS
1:10000 OR 1CM=100m
CONTOUR INTERVAL = 10.00M
DRAWING NO. SEW/DSPL/INDEXMAP/DS
REV 0
SURVEYED PLOTTED BY
CADEN SURVEYS PVT. LTD.

SURGE SHAFT

Approach

To Bichom

E1

D

Valve House

T

PENSTOCK

Switch Yard

Power House

F

Q-2

FACILITY AREA

PLANE AREA 11.96Ha

(TOTAL AREA -24.65Ha)

Deviation Road

Asphalt Road

Rope way

Stream

TAIL RACE CHANNEL

PERMANENT STAFF COLONY&GUEST HOUSE AREA-3.22 Ha

H

G

Approach Road To Power House

To Bichom

Tomb

Stream

Bichum River

Foot Path

Asphalt Road

Rock

Rock

NORTH

KEY PLAN

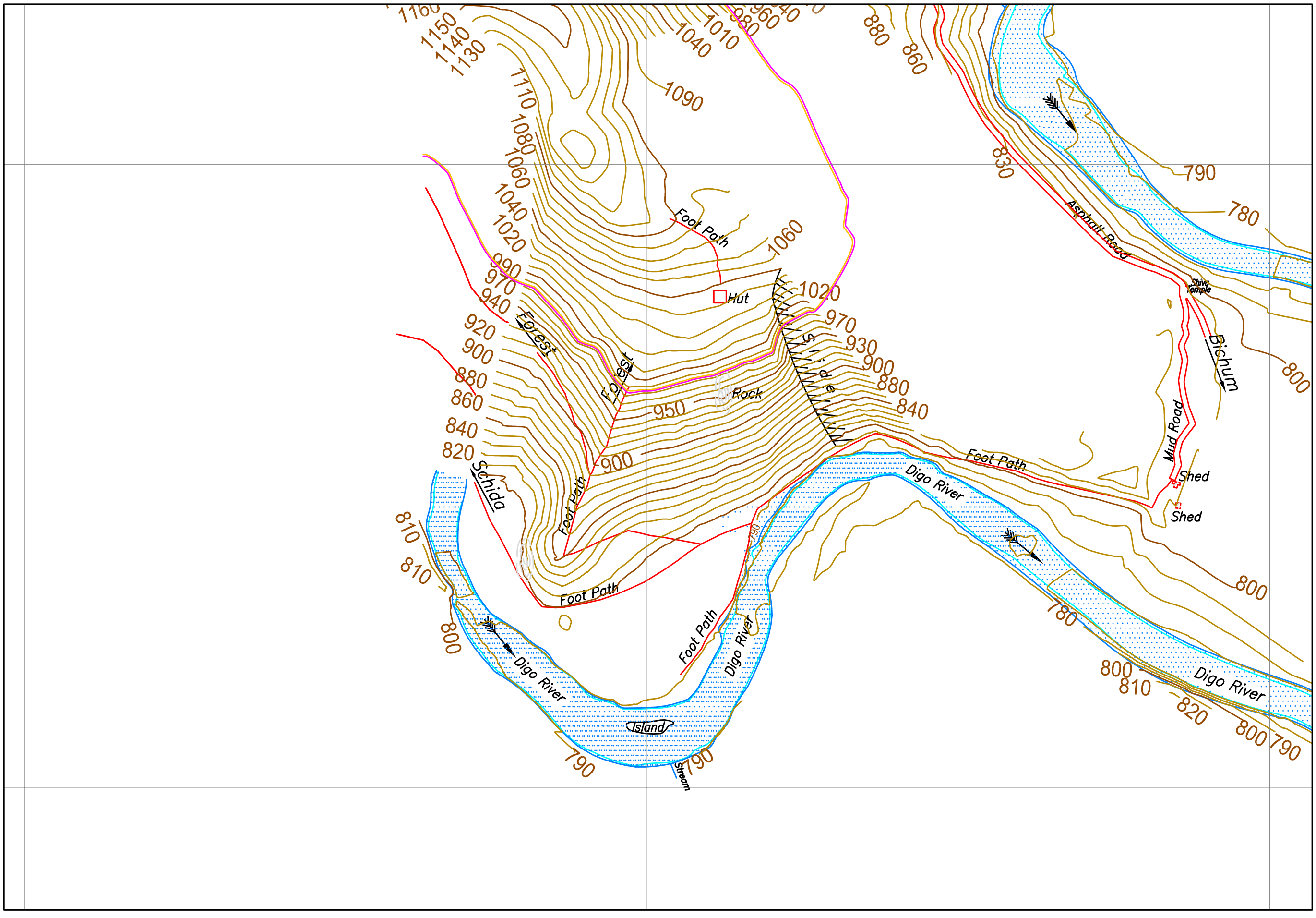
LEGEND

1. BUILTUP AREA: LMT
2. Asphalt Road WITH CULVERT, CART TRACK/ Metalled Road, PATH WAY, PROPOSED ROAD
3. HOUSE, HUT, TEMPLE
4. WATER VALVE, BUND, CLIFF
5. RIVER, NALA, STREAM/HT ALIGNMENT
6. FENCE, BOULDERS, GEOLOGICAL POINT
7. KILOMETER STONE,CONTOURS, ROCK, ALIGNMENT.
8. TRAVERSE POINTS, BENCH MARKS/BM PILLAR

NOTES:-

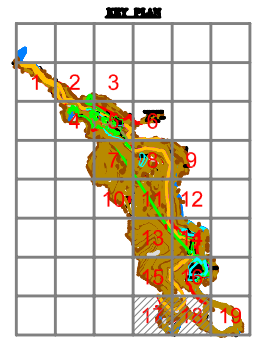
1. ALL LEVELS ARE WITH REFERENCE TO DAT. BM LOCATED ALONG ... AT ABOUT 200 M DOWN CHE. EL. = 000.00 M.
2. ALL LEVELS ARE IN MTS, UNLESS OTHERWISE MENTIONED.

CLIENT	SEW ENERGY LIMITED 6-3-871, Somajiguda, Greenlands Road Begumpet, Hyderabad-500 016, AP, INDIA.
TITLE	DETAILED TOPOGRAPHIC SURVEY OF NAFRA HYDRO ELECTRIC PROJECT (2x48MW) IN ARUNACHAL PRADESH. INDEX MAP
CAD FILE REFERENCE	SCALE 1:10000 OR 1CM=100m CONTOUR INTERVAL = 10.00M
DESIGN FEB 2008	DRAWING NO. SEW/CSPL/INDEXMAP/00 — REV 0
SURVEYED PLOTTED BY	CADEN SURVEYS PVT. LTD. Survey & Civil Engineering Project Consultants #K1440(9), 11th Cross, 19th 'A' Main, 1st Block, Rajajinagar, Bangalore-560 010 Phone:080 - 23124811 E-mail:info@cadensurveys.com



NORTH

KEY PLAN



L E G E N D

1. BUILTUP AREA: LIMIT
2. Asphalt Road WITH CULVERT, CART TRACK/ Metalled Road, PATH WAY, PROPOSED ROAD
3. HOUSE, HUT, TEMPLE
4. WATER VALVE, BUND, CLIFF
5. RIVER, NALA, STREAM,HUT ALIGNMENT
6. FENCE, BOULDERS, GEOLOGICAL POINT
7. KILOMETER STONE,CONTOURS, ROCK, ALIGNMENT.
8. TRAVERSE POINTS, BENCH MARKS/EM PILLAR

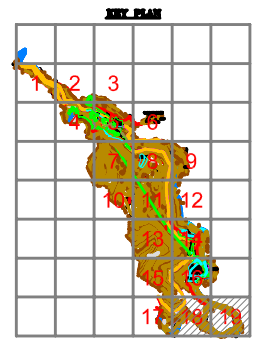
NOTES:-

1. ALL LEVELS ARE WITH REFERENCE TO DATA ON ADJOINING AGRO. BENCH MARK AT ABOUT 300 M DOWN SIDE. R.L. = 000.000 M.
2. ALL LEVELS ARE IN MTS, UNLESS OTHERWISE MENTIONED.

CLIENT	SEW ENERGY LIMITED 6-3-871, Somajiguda, Greenlands Road Begumpet, Hyderabad-500 016, AP, INDIA
TITLE	DETAILED TOPOGRAPHIC SURVEY OF NAFRA HYDRO ELECTRIC PROJECT (2x4MW) IN ARUNACHAL PRADESH. INDEX MAP
CAD FILE NO/DWG	SCALE 1:10000 OR 1cm=100m CONTOUR INTERVAL = 10.00
VERSION FEB 2008	DRAWING NO. SEW/DPL/INDEXMAP/10 REV 0
SURVEYED & PREPARED BY	CADEN SURVEYS PVT. LTD. Survey & GIS Engineering Project Consultants #K144/39, 11th Cross, 19th 'A' Main, 1st Block, Rajajinagar, Bangalore - 560 010 Phone: 080 - 23124811 Email: info@caden.com

NORTH

KEY PLAN



L E G E N D

1. BUILTUP AREA: LIMIT
2. Asphalt Road WITH CULVERT, CART TRACK/ Metalled Road, PATH WAY, PROPOSED ROAD
3. HOUSE, HUT, TEMPLE
4. WATER VALVE, BUND, CLIFF
5. RIVER, NALA, STREAM,HUT ALIGNMENT
6. FENCE, BOULDERS, GEOLOGICAL POINT
7. KILOMETER STONE,CONTOURS, ROCK, ALIGNMENT.
8. TRAVERSE POINTS, BENCH MARKS/BM PILLAR

NOTES:-

1. ALL LEVELS ARE WITH REFERENCE TO DAT. IN MEANS SEA LEVEL DERIVED FROM FT AUGUST 1970 IS TAKEN AS R.L. = 000.000 M.
2. ALL LEVELS ARE IN MTS, UNLESS OTHERWISE MENTIONED.

CLIENT	SEW ENERGY LIMITED 6-3-871, Somajiguda, Ameerpet Road Begumpet, Hyderabad-500 016, AP, INDIA
TITLE	DETAILED TOPOGRAPHIC SURVEY OF NAFRA HYDRO ELECTRIC PROJECT (2x48MW) IN ARUNACHAL PRADESH. INDEX MAP
CAD FILE REFERENCE	S C A L E 1:10000 OR 1CM=100m CONTOUR INTERVAL = 10.00
SESSION FEB 2009	DRAWING NO.: SEW/DPL/INDEMAP/11 — REV: 0
SURVEYED PLOTTED BY	CADEN SURVEYS PVT. LTD. Survey & Civil Engineering Project Consultants #K144/39, 11th Cross, 19th 'A' Main, 1st Block, Rajajinagar, Bangalore - 560 010 Phone:080 - 23104811 E-mail:info@cadensurvey.com

APPENDIX - 4

DOCUMENTS CERTIFYING UBIT PRICE FOR LAND AND FRUIT BEARING TREE FROM CONCERNED DISTRICT OFFICIALS

GOVERNMENT OF ARUNACHAL PRADESH
DEPARTMENT OF LAND MANAGEMENT
ITANAGAR.

No.LR-43/61(Vol-II)/1292

Dated the Itanagar ..., Nov/08.

To,

The Deputy commissioner,
West Kameng District,
Bomdila, (A.P.)

Sub:- Approval of fixation of Land Value.

Sir,

With reference to your letter No.BR-2532/133/05-06/134 dtd. 11th Aug'08 on the subject mentioned above, I am directed to convey govt. approved for fixation of land value as shown detailed below :-

WEST KAMENG DISTRICT

CLASSIFICATION OF LAND	Rate per Sqm.
Commercial plot in Market area	Rs.550/-
Residential plot in urban/township area	Rs.250/-
Residential plot in rural area	Rs.80/-
Industrial plots	Rs.600/-
Irrigated agricultural land (Motorable)	Rs.200/-
Agricultural Rain fed terrace land approachable by motorable road	Rs.120/-
Irrigated agricultural land not approachable by motorable road	Rs.100/-
Agricultural rain fed Terrance road land not approachable by motorable road	Rs.80/-
Horticulture land approachable by motorable road	Rs.200/-
Horticulture land not approachable by motorable road	Rs.120/-
Undeveloped cultivable flat land not approachable by motorable road	Rs.100/-
Undeveloped cultivable flat land not approachable by motorable road	Rs.70/-
Undeveloped cultivable slope land not approachable by motorable road	Rs.30/-
Undeveloped cultivable steep slop land not approachable by motorable road	Rs.80/-
Undeveloped cultivable flat land approachable by motorable road	Rs.50/-
Undeveloped cultivable steep slope land approachable by motorable road	Rs.30/-
Barren/Uncultivable land	Rs.20/-

This issue with the approval of the Government.

Yours faithfully,

Memo NO.BR-2537/133/2008/354-364 Dated Bomdilathe 17th Nov/08

Copy to :-

1. The ADC Singchung/Dirang for information and aecessary action.
2. The S.D.O,Thrizino/Rupa for information and necessary action.
3. The E.A.C. Bhalukpong/Nafra/Kalaktang for information and necessary action.
4. The Circle Officer, Bolemu/ Jamiri/Shergaon/ Thembang for information and necessary action.
5. O/C

(L. Tsering)CO(LM)
for Deputy Commissioner,
West Kameng district,
Bomdila.

5th Floor, Tower C, Building No. 8,
DFL Cyber City, Phase II, Gurgaon, India, 122 002

Tel : +91 124 4501100/ 4552800
Fax : +91 124 4380043
Web : www.smec.com.au

SL No	Name of Crop plant	Longivety in year	Age of Plant	Remaining Longivety	Total value of Plant Product for whole life (Av.)	Maintenance cost for Plant Av. per Plant	Net value per plant for remaining life	Rem
1-	Orange/Lemon/Guava (+)	35 year	(i) 1-2 years	33 years	26,400/=	150×33 = 4,950/=	21,450.00	
			(ii) 5-6 years	29 years	23,200/=	150×29=4350/=	18,850.00	
			(iii) 7-8 years	27 years	21,600/=	150×27=4050/=	17,550.00	
			(iv) 9-10 years	25 years	20,000/=	150×25=3750/=	16,250.00	
2-	Peach/Pomegranate	35 years	(i) 1-2 years.	33 years.	23,100/=	100×33=3,300/=	19,800.00	
			(ii) 5-6 years	29 years.	20,300/=	100×29=2900/=	17,400.00	
			(iii) 7-8 years	27 years.	18,900/=	100×27=2700/=	16,200.00	
			(iv) 9-10 years.	25 years	17500/=	100×25=2500/=	15,000.00	
3-	Walnut	45 years	(i) 1-2 years.	43 years	43,000/=	100×43=4300/=	38700.00	
			(ii) 5-6 years	39 years.	39,000/=	100×39=3900/=	35,100.00	
			(iii) 7-8 years.	37 years	37,000/=	100×37=3700/=	33,300.00	
			(iv) 9-10 years.	35 years	35,000/=	100×35=3500/=	31,500.00	
			(v) 11-12 years.	33 years	33,000/=	100×33=3,300/=	29,700.00	

1/6/2009

Sub-Divisional Horticulture Officer
Nafra
West Kameng Dist.
Arunachal Pradesh