June' 2019

SOCIAL IMPACT ASSESSMENT STUDY FOR THE PURPOSE OF PROPOSED LAND ACQUISITION IN DISTRICT HAMIRPUR AND KANGRA FOR DHAULASIDH HYDRO ELECTRIC PROJECT (66 MW)

Under H.P. Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Social Impact Assessment and Consent) Rules, 2015

Draft Report

(Volume A: Executive Summary & Main report)

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Table of Contents

List of Tables

List of Figures

List of Maps

Abbreviations

BPL	Below Poverty Line
CA	Chartered Accountant
CHC	Community Health Centre
CPRs	Common Property Resources
CS	Company Secretary
CWC	Central Water Commission
Dept.	Department
DSHEP	Dhaulasidh Hydro Electric Project
EIA	Environmental Impact Assessment
FC	Financial Charges
FRL	Full Reservoir Level
Govt.	Government
GP	Gram Panchayat
GSI	Geological Survey of India
HEP	Hydro Electric Project
HP Rules 2015	Himachal Pradesh Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Social Impact Assessment and Consent) Rules, 2015
HPS	Hydro Power Station
HP SIAU	Himachal Pradesh Social Impact Assessment Unit
HR	Human Resources
IDC	Interest During Construction
IPH	Irrigation and Public Health Department
L2	Level 2 Health Facility
L3	Level 3 Health Facility
LADF	Local Area Development Fund
NGO	Non-Governmental Organization
NHM	National Health Mission
OBC	Other Backward Classes
PAFs	Project Affected Families
PAPs	Project Affected Persons
PDFs	Project Displaced Families
PHC	Primary Health Centre
PMAY	Pradhan Mantri Awas Yojana
PWD	PublicWorks Department
RTFCTLARR Act 2013	The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013
R&R	Rehabilitation and Resettlement
SC	Scheduled Castes

SIA	Social Impact Assessment
SIMP	Social Impact Management Plan
SJVN	Satluj Jal Vidyut Nigam
ST	Scheduled Tribes
TRT	Tail Race Tunnel

Glossary

- **Act** means: The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013(30 of 2013).

- **Administrator**meansanOfficerappointedforthepurposeofrehabilitationand resettlement of affected families under sub-section(1)of Section 43 of the Act.

- **Affected Area** means such area as may be notified by the appropriate government for the purposes of land acquisition.

- **Affected Family includes:**

  i. A family whose land or other immovable property has been acquired.

  ii. A family which does not own any land but member(s) of such family maybe agricultural labourers, tenants including any form of tenancy or holding of usufructright, share-croppers or artisans or who may be working in the affected area, for three years, prior to acquisition of the land, whose primary source of livelihood stand affected by the acquisition of land.

  iii. Thescheduledtribesandothertraditionalforestdwellerswhohavelostany of their forest rights recognized under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (2 of 2007)due to the acquisition of land.

  iv. Familywhoseprimarysourceoflivelihoodforthreeyearspriortotheacquisitionofthe landisdependentonforestsorwater bodies and includes gatherers of forest produce, hunters, fisher folk and boatmen and such livelihoods is affected due to acquisition of land.

  v. A member of the family who has been assigned land by the State Government or the Central Government under any of its schemes and such land is under acquisition.

  vi. A family residing on any land in the urban areas for preceding three years or more prior to the acquisition of the land or whose primary source of livelihood for three years prior to the acquisition of the land is affected by the acquisition of such land.

- **Agricultural Land** means land used for the purpose of:
  i. Agriculture or horticulture.
  ii. Dairy farming, poultry farming, pisciculture, sericulture, seed farming breeding of livestock or nursery growing medicinal herbs.

iii. Raising of crops, trees, grass or garden produce; and
iv. Land used for the grazing of cattle.

- **Below poverty line or BPL Family** refers to families falling below the poverty line as defined by the Planning Commission of India, from time to time, as well as those included in the BPL list of Himachal Pradesh.

- **Central Government** refers to Government of India.

- **Collector** means the collector of a revenue district, and includes a deputy commissioner and any officer especially designated by the appropriate Government to perform the functions of a collector under the Act 2013.

- **Commissioner** means the commissioner for Rehabilitation and Resettlement appointed under sub-section (1) of section 44 of the Act 2013.

- **Compensation** refers to the amount to be paid as compensation under various provisions of the Act 2013, for private property, structures and other assets acquired for the project, including rehabilitation and resettlement entitlements.

- **Cost of acquisition** includes:

(i) Amount of compensation, which includes solatium, any enhanced compensation ordered by the–Land Acquisition and Rehabilitation& Resettlement Authority or the Court and interest payable thereon and any other amount determined as payable to the affected families by such authority or court.
(ii) Demurrage to be paid for damages cost to the land and standing crops in the process of acquisition.
(iii) Cost of acquisition of land and building for settlement of displaced or adversely affected families.
(iv) Cost of development of infrastructure and amenities at the resettlement areas.
(v) Cost of Rehabilitation and Resettlement as determined in accordance with the provisions of the Act 2013.
(vi) Administrative cost:

A. For acquisition of land, including both in the project site and out of project area lands, not exceeding such percentage of the cost of compensation as may be specified by the appropriate Government.
B. For rehabilitation and resettlement of the owners of the land and other affected families whose land has been acquired or proposed to be acquired or other

families affected by such acquisition.

(vii) Cost of undertaking the Social Impact Assessment study.

- **Displaced Family** means any family, who on account of acquisition of land has to be relocated and resettled from the affected area to the resettlement area.

- **Family** includes a person, his or her spouse, minor children, minor brothers and minor sisters dependent on him:
  Provided that widows, divorcees and women deserted by families shall be considered as separate families.

- **Land** includes benefits to arise out of land, and things attached to the earth or permanently fastened to anything attached to the earth.

- **Land acquisition** means acquisition of land under The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act,2013.

- **Landless** means such person or class of persons who may be: Considered or specified as such under any state law for the time being in force; or In a case of landless not being specified under clause (i), as may be specified by the appropriate Government;

- **Land owner** includes any person-

  (i) Whose name is recorded as the owner of the land or building or part thereof ,in the records of the authority concerned; or

  (ii) Any person who is granted forest rights under the Scheduled Tribes and other Traditional Forest Dwellers(Recognition of Forest Rights) Act,2006 (2 of 2007) or under any other law for the time being in force; or

  (iii) Who is entitled to be granted Patta rights on the land under any law of the State including assigned lands;or

  (iv)Any person who has been declared as such by an order of the court or authority;

- **Marginal farmer** means a cultivator with a nun-irrigated landholding upto one hectare or irrigated landholding up to one-half hectare.

- **Market value** means the value of landdeterminedinaccordancewithSection26of the Act 2013.

- **Notification** means a notification published in the Gazette of India or, as the case

may be, the Gazette of a state and the expression "notify" shall be construed accordingly.

- **Project** means the Dhaulasidh Hydro Electric Project (66MW).
- **Public purpose** means the activities specified under sub-section(1) of Section2 of the Act 2013.
- **Rehabilitation and Resettlement (R &R) means** carrying out rehabilitation and resettlement as perRFCTLARRAct2013.
- **Requiring Body** here means Satluj Jal Vidyut Nigam (SJVN) Limited.
- **ScheduledAreas**meansthescheduledareasasdefinedinsection2oftheprovisionsof the Panchayats (Extension to the Scheduled Areas) Act, 1996 (40 of 1996).
- **Small farmer** means a cultivator with an un-irrigated landholding upto two hectares or with an irrigated land holding upto one hectare, but more than the holding of a marginal farmer.
- **Social Impact Assessment** means an assessment made under subsection(1) of Section 4 of the Act.
- **Social Impact Management Plan** means the plan prepared as part of Social Impact Assessment Process under sub-section (1) of Section 4 of the Act.
- **State Government or "Government"** means the Government of Himachal Pradesh
- **Tenants**arethosepersonshavingbonafidetenancyagreementsforthreeyearspriorto the acquisition of the land, with a property owner with clear property titles, to occupy a structure or land for residence, business or other purposes.
- **Vulnerablegroups**includepersonssuchasdifferentlyabled,widows,andwomen headed household, persons above sixty years of age, Scheduled Caste and Scheduled Tribes and other groups as maybe specified by the State Government.
- **Women Headed Household** means a family headed by a woman and does not have a male earning member. This woman maybe a widow, separated or deserted woman.

Executive Summary

Project and Public Purpose

M/s Satluj Jal Vidyut Nigam Ltd. Intends to develop the Dhaulasidh Hydroelectric Project (66 MW) on Beas river in Himachal Pradesh as a run of river type scheme and is planned to be operated as a peak power station. The project is located in the Indus basin in Hamirpur and Kangra district and has been conceived by the Govt. of HP long back. The studies regarding alternatives using discharge data at Sujanpur Tira and Nadaun, preparation of DPR, EIA & Socio-economic studies etc. have already been conducted. Two alternatives of 50 MW and 80 MW with different dam heights in the preliminary feasibility studies have been considered. The project was awarded to SJVN on 27th October, 2008 for investigation, DPR preparation, land acquisition, design, construction, operation and maintenance of Dhaulasidh HEP.

The project is aimed at bridging the gap in power supply in the Northern Region and increasing the State's revenue by exploiting maximum energy resources with minimum hazardous and minimum social-environmental impacts on the local habitants.

Expected power generation of Dhaulasidh HEP would be 258.31 GWH per year. The total project cost is estimated to be 789.64 crores. The expected revenue from the project would be approximately 108 crores annually in a 90% dependable year. The project is estimated to generate a total of employment of 600 persons during its peak construction phase which would include 500 workers and about a 100 technical staff. This employment would be generated for skilled, semi-skilled and unskilled labourers. As per the HP govt. rules, 70% of the employment should be reserved for the residents of Himachal Pradesh.

The strategy followed in Himachal Pradesh for exploitation of hydroelectric power is to produce as much energy as possible with minimum cost and with minimum environment negative impacts. The speedy exploitation of hydroelectric power potential will definitely improve the economic health of the State because 12 percent free power plus 1.5% LADF (Local Area Development Fund) of the project cost, on all new installations will increase the resources of the state to a significant extent. The need for the project also arises from the need, to fulfill a steady increase in peak electricity demand and the growing energy deficit in the Northern Region.

As per Section 2 sub-section 1(b) of the RTFCTLARR Act, 2013 the Dhaulasidh Hydro-Electrical Project (66 MW) is well justified under the definition of infrastructure projects (energy generation) for public purpose.

Location

The dam site is proposed to be located about 12 km downstream of the PWD bridge over river Beas at Sujanpur-Tihra. Further the dam site and power house are about 4 km Sujanur-Tihra-Nadaun road MDR 36. It is further approachable on foot from the left abutment of the bridge

over Salasi Khad via village Amli. The project site is located at a distance of about 90 km from Una, which is the nearest broad gauge railway station.

The nearest rail head is at Una. Likewise, nearest airport is at Chandigarh located about 200 km from the project site. A metalled road of about 4 km has to be constructed to approach the project site from RCC Bridge on Salasi Khad near Jihan Village.

The dam site is located at longitude 76°26'30.7" E and latitude 31°48'23.1"N. The existing approach to the damsite is through a small forest kucha footpath from the RCC bridge on the Salasi Khad near Jihan Village. The site is located about 4 km from the bridge. Presently there are no existing facilitiesat or near the site. This forest route is proposed to be developed into the approach road for the project.

Size and attribute of land acquisition

Out of total 332.87 hectare of land require for project, 246.8062 hectare (74%) is private land, 28.32 hectare (9%) is government land and 57.74 hectare (17%) is forest land.It covers a total 47 villages under project impact out of which private land is being acquired in 40 villages.

The details of the 40 villages where Private land is being acquired are: village Balehu, Mathaan, Laungan, Bhadariana Bhaleth, Ropa. Miharpir, Gahllian. Chauki. Haar, Gurauru Boohla, Tihra. Birh Khas, Kaachh, Miana. Suianpur. Rivah, Bharmarh, Bhgerha Buhla, Pargana, Ball Ghirthan, Palahi, Gaagla, Darhla, Samona, Sarohal, Tehsil Sujanpur & Jangle Mehfuja Mehduda Jeehan. Tehsil Naduan. District Hamirpur and village Bulli, Tipri, Kiyorh. Chorwki, Sub Tehsil Majheen, Dalli, Bhalunder, Daadu. Bherhi Nichali, Paprola, Baag, Birh, Liyunda, Sai, Alampur Sub-'Tehsil Alampur. Distt Kangra. They fall in 19 Gram Panchayats under two districts namely Hamirpur and Kangra, three Tehsils namely Sujanpur, Nadaun, Alampur and Khundian.

Total 3684 titleholders are losing their land under acquisition out of which 2473 are from district Hamirpur and 1211 are from district Kangara. 1 PAF from Sujanpur, 5 from Chawki, 7 from Pargana are getting displaced due to acquisition.

Further information on land being acquired and PAPs have been discussed in detail under chapter 3 and 4.

Alternatives considered

The Alternates for various components of the project have been discussed in detail in chapter 1 under examination of Alternatives. The location of the dam and power house and its basic design features have been finalized considering optimum power generation, topographical and geotechnical features, existing projects on the upstream, economy, submergence and other relevant factors such as displacement and land acquisition.

Out of the total land requirement 332.87 Ha for the project 246.8062 Ha (74%) is private land which is to be acquired while the remaining 86.06 Ha (26%) is Government and Forest Land. Although the share of private land seems to form the majority of the total land requirement it is mainly because the PAFs are having ownership of land right on the river banks and in many areas on the river bed itself. Most of the private land being acquired is coming under submergence of the proposed reservoir. Moreover only 13 PAFs are getting displaced from the proposed acquisition which comparatively a very low figure considering the scale and magnitude of the project and acquisition. On further Analysis out of the total private land of 246.8062 Ha being acquired only 9% land is cultivable and the remaining 91% land is uncultivable.

Conclusively, the proposed acquisition is the least displacing alternative for the project. Furthermore, only 1% (approx.) of the total land required for the project would be used to construct all ancillary facilities for the project during its construction and post construction phases. The remaining 99% of the land would be coming under submergence. Hence all the efforts have been made to minimize acquisition of private land as well as minimal displacement due to the project activities.

Social Impacts

Acquisition of land proposed for the project will have a direct and indirect bearing on livelihood, employment, income, production, health, well-being and quality of life of the community, socio-cultural systems and environment.

There is a general optimism for the upcoming Dhaulasidh HEP project in the area. The study found that 93% of the primary stakeholders were willing to surrender their land for acquisition provided appropriate compensation is paid and only 7% resisted the acquisition process. During the FGDs with Panchayats, the villagers and secondary stakeholders were also found to have a very positive opinion towards the project as it would bring an overall development to the entire area in terms of infrastructure development (both Social and Physical) and increase in employment and business opportunities. Also, they anticipated the increase in land prices of the area which would be a beneficial factor for them.

However, they were also apprehensive about the negative impacts that may rise from the project if not properly mitigated. There were concerns regarding the rise in disputes among stakeholders for receiving the compensation and that the vulnerable groups may be left out or be cheated. Another possible impact is that on receiving the compensation amount, there would be a change in the financial condition of the PAFs which in turn would alter their purchasing capacity and would also increase the risk of fund miss-management as many of the landowners are not properly educated, especially regarding financial management. The project area may also experience rise in cases of frauds and cheats once the compensation amount is distributed. There

are also chances of changes in cultural practices and traditions because of changes in the spending pattern.

Due to the acquisition, there would also be loss of public infrastructure like cremation grounds, existing irrigation facilities including IPH Infrastructure and also loss of common property resources like drinking water sources, Gharats, forests, grazing grounds etc.
A total of 29 private structures are getting lost under the proposed acquisition which will result in displacement of 13 PAFs and a livelihood loss for 12 PAFs. In these structures there are 13 residential houses, 19 Shops, 1 aramill, 1 office, 1 cowshed, 11 toilets, 2 kitchens and 5 stores. Among other assets attached to the land under acquisition, a total of 77,724 fruit bearing trees, 17,280 non-fruit bearing trees are also getting impacted due to the proposed acquisition.

Simlarly 80 public assets are getting lost under the proposed acquisition for the DSHEP. These include 1 Govt. Primary school, 1 anganwadi, 1 Mahilla Mandal, 2 temples, Sewerage system of Sujanpur, 29 cremation grounds, 25 water supply infrastructure including IPH Schemes, pumphouses and tubewells, 1 Gharat, 2 Bauris, 1 well and 15 electric poles. The details of the loss to infrastructure and assets has been discussed in chapter 4. The PAPs as well as the villagers were concerned about how alternates to public infrastructure and common property resources would be provided to them by the acquiring body such that it would not hamper their daily routine. The villagers have dependency on the adjoining grazing land and forest for cattle fodder and firewood.

During the construction phase of the project, the stakeholders had a positive outlook towards the project as it would generate good direct and indirect employment and business opportunities for them. Due to in migration they would witness increased consumption of goods which would benefit the local economy. However, they also showed concerns regarding the in migration of labour for the project as it would raise the pressure on existing infrastructure like health facilities, educational facilities, roads etc. There may be chances of rise in conflicts among the locals and the in-migrants and the stakeholders also opined that there are chances in rise in crime rates and anti-social activities in the area because of migration. The area may also witness cultural mixing. Further, there would also be problem of traffic, air and noise pollution because of the heavy transport vehicles, material transport and construction. The area may also witness rise in health problems due to increased pollution levels.

During the post construction phase, the stakeholders opined that the area may witness reduced pollution and better living environment. Due to funds like LADA the area would also witness further development. A cultural stability may also be witnessed during this stage. However, they also highlighted some negative impacts which may arise during this phase such as, due to drop in construction activities there would be less employment and business opportunities for locals and may also lead to unemployment to the temporary work force involved in the project.

The area may witness sudden fall in local economy and low consumption of goods and services due to out migration of the temporary workers involved in construction stage. Consequently, People may face difficulty in maintaining the living standards set forth due to the increased income level during construction phase.

Impact of fog: There would also be considerable rise in humidity levels during summers and increased frequency and lasting hours of fog during winters. Consequently, this would alter the productivity of crops and fertility of soil in the area. The fog may also impact the health of the locals and consequently would increase expenditure on human and animal health on account of increased fog & infestation of diseases and pest. However, during summer people may get relief from heat due to cool climate.

Increased Incidences of water related diseases: The construction of the proposed reservoir would enhance the potential breeding sites for various diseases vectors. There are chances that incidence of malaria may increase as a result of the construction and operation of the proposed project. In addition to the construction of the reservoir, factors such as Aggregation of Labour, Excavation, Inadequate facilities in labour camp, muck disposal sites, too may lead to the increased incidence of malaria in and around the project area if not properly mitigated:

Muck Disposal: Normally muck disposal is done at low lying areas, which get filled up due to stacking of muck. This can sometimes affect the natural drainage pattern of the area leading to accumulation of water or partial flooding of some area which can provide ideal breeding habitat for mosquitoes. Moreover, muck disposal sites are vulnerable to dust/air pollution and also prone to unchecked open dumping of waste from the vicinity, thereby degrading the local environment.

** Special Note: During the field survey, people from village Jol (Jangal Panchayat, district Kangra) approached Team SIA and shared their concern about their lands and structures getting impacted by the upcoming DSHEP project. According to them, during the survey conducted by Department of Agricultural Economics, CSK HP Krishi Vishvavidyalaya, Palampur in 2010 for SIA of DSHEP, they were told that their houses may come under acquisition for the upcoming scheme and they should move to some other location.*
Since during monsoons, rivulet water reaches their residential structures therefore the villagers are concerned that after construction of Dam the water would definitely reach their lands and structure leaving them vulnerable with increased risk of submergence.
It is therefore suggested that the project authorities relooks into this situation.

Mitigation measures

To cope up with the possible challenges and difficulties, the following mitigation measures have been proposed:

➢ Social Measure

1. If there is any dispute between the stakeholders, then this dispute should be resolved first and make sure that the compensation is given to the legal owner.
2. Provide funds for Construction of the 2 temples being lost under acquisition at Alampur and Laungani
3. Construction of Community halls in all villages and Panchayats of the project area
4. Construction, repair and up gradation of building/structures used as Mahila Mandal, Yuvak Mandal Gram Panchayat Offices.
5. Efforts should be made for the upliftment of women and marginal sections like Backward Classes categories by ensuring their participation in decision making and enhancing their traditional skills and by developing new skills
6. To provide job for family members for Project affected persons and families
7. Promotion of sports through construction of sports complexes and provide training to youth
8. Assistance/ Loan from other ongoing development scheme

➢ Infrastructure measures

1. Upgradation of village roads and link roads to all weather pucca roads throughout the gram Panchayats of the project area.
2. Construct proper drainage facilities to all panchayats of the project area
3. Provide streetlights throughout the Gram panchayats of the project area.
4. Provide electricity at special subsidised rates to all panchayats of the project area.
5. Provision of health facilities such as PHCs, Dispensaries, hospital, Ambulance and Ambulance road to villages and panchayats of the project area.
6. Provide Irrigation facilities such as lift irrigation in all villages and panchayats of the project area
7. Provision of drinking water facilities in all villages and panchayats of the project area.
8. **School and Scholarships** –construction of schools to impart quality education for the children and have special scholarship programs for students of the PAFs in the affected area
9. Technical education institutions and vocational training centres for the project area and surroundings
10. **All weather Roads –** As per the SIA team's observation and demand of the villagers, All Weather Roads and bridges may be built and maintained in the area.

Some of them are suggested below as per the survey and FGDs-

1. **Bridge along with the river -** It is suggested that the requiring body undertakes a proper structural stability study of the following mentioned roads, culverts and bridges as whether they would be able to withstand the rise in water levels and consequently plan alternatives to restore the connectivity in the area if the need arises:
    - Hamirpur-sujanpur bridge near sankat mochan temple
    - Bhaleth-Syor bridge
    - Main bridge connecting Sujanpur tirah with Alampur
    - Sandhol Sujanpur culvert at abour 1 km from Tirah bridge
    - Bridge on Sandhol sujanpur road abour 2 km from Tirah bridge
    - Bridge connecting Palahi with puar
    - Bridges connecting Puar with Jangal behri and Jangal Beri with Kheri
    - Buli Tipri Road

11. Provide alternate cremation grounds wherever they are coming under acquisition.
12. **Drainage System-** Proper drainage facilities in the affected gram Panchayats need to be provided.

➢ Rehabilitation & Resettlement Measures and livelihood restoration Measures

1. For PAFs getting displaced and also for land looser who opt for land as compensation for acquired land, the requiring body should provide land preferably in the same Gram Panchayat or in neighbouring Gram Panchayat.
2. Appropriate compensation to be provided to PAFs whose houses are being acquired and additional compensation for the inconvenience caused due to relocation under relevant sections of the act.
3. Many of the Panchayats feel that the circle rates of land for computation of compensation is very low. Therefore, have requested to revise and increase the circle rates of land before computation of compensation.
4. For PAFs loosing structures other than residential houses should be paid appropriate compensation
5. For the 12 PAFs whose livelihoods are getting affected, measures to restore their livelihood to the existing level or better should be taken.
6. Business opportunities for local villagers in upcoming project and otherwise such as contracts for construction, supply and transportation.
7. Vocational training centres for income restoration.
8. Provide Skill upgradation trainings to the working-class population under various government schemes
9. Job opportunities in upcoming HEP project for project affected villagers.

➢ Environmental Measures

I) Afforestation and plantation in the project area

II) Measures for reducing noise pollution and vehicular traffic

Noise pollution and traffic may be minimized by:

a) Defining specific hours of the day for entry of heavy transport vehicles.
b) Regulating the number of heavy vehicles that can enter/leave the project site in one day.
c) Strict instructions to the drivers to minimize the use of horns.
d) Complete ban on pressure horns on transport vehicles.
e) Staggered timings of entry and exit of transport vehicles evenly throughout the day in order to avoid unnecessary overload on the roads and traffic situations.
f) Strict instructions to drivers of heavy vehicles to give regular overtake passes on priority to small vehicles and adhering to speed limits.

III) Measures suggested to reduce Air Pollution

Air pollution arising due to dust during transportation, construction, excavation, mining and dumping may be mitigated by affectively covering the construction site, transport vehicles such as trucks, tippers etc. mining & dumping sites. Also, regular water spray throughout the day in the project area will also help in reducing air pollution.

IV) Measures suggested to reduce Water Pollution, Water borne Diseases and increased humidity.

1) Water pollution may be minimized by strictly assuring that during excavation and mining minimalistic dumping occurs in the river.
2) The dumping site should be created away from the river banks in order to avoid the dump entering the river especially during rains and monsoons.
3) The storage units of construction material especially sand and aggregate should also be place away from the river banks.
4) Standing water especially after creation of reservoir should be sprayed regularly to avoid water borne diseases.
5) Increased humidity due to the reservoir may be minimize by afforestation. However special care should be taken to plant local trees instead of alien decorative trees. Also, only those varieties of trees should be planted that reduce humidity and help keep surroundings comparatively cooler

V) Measures to reduce Risk of Land Slides Due to increase in Water Levels

The competent authorities may make sure to build embankment walls/retaining walls etc. at vulnerable locations in order to check the river course and minimize risk to landslides due to increased water levels in the river.

➢ Other Mitigation Measures

A) Promotion of Tourism: The area can be developed as a tourist destination as well as hub for water related activities /sports, rafting, camping etc.

B) Promotion of Fisheries: The project will provide congenial conditions for development of fisheries. Training can also be imparted in Pisciculture to the interested persons in the affected area along with issuing of fishing license.

C) Promotion of Animal Husbandry will be helpful to small and marginal farmers for increasing their income. A milk cooperative can be promoted in the area which will benefit not only the project affected families but also the entire area.

D) Forming and Strengthening Self-Help Groups (SHGs) to provide opportunities for women to come together and form SHGs and strengthen the existing ones with proper training and to facilitate them to earn their livelihoods through the credit offered under various schemes. Handicraft, dairy, shawl making, stitching and embroidery etc. can be introduced.

E) Institutional linkages and skill upgradation for income restoration: Requiring body can play a proactive role to mobilize affected family members to get some vocational/ skills training opportunities and also support in establishing forward and backward linkages for raw materials, inputs, besides marketing and credit facilities.

F) Project-based Employment: Preference toProject-related employment opportunities such as work under the project construction, maintenance, supply and transportation contracts can be given to the affected families.

G) Local Area Development Committee

In order to utilise the Local Area Development Fund (LADF) properly in the project area, a Local Area Development Committee (LADC) can be formed comprising various stakeholders such as government departments, members from project affected families, requiring body officials etc.

H) Revision of Circle rates

Many of the PAPs and PAFs feel that the existing circle rates of their land is very low. They have therefore requested to revise and increase the circle rates before the compensation is calculated.

I) Organizing Awareness Camps & Financial Literacy Camps for PAPs and PAFs for better financial management.

Assessment of social costs and benefits

The estimated compensation for the proposed acquisition of 246.8062 Ha land works out to Rs 300.3 crores.

For 77,724 fruit bearing trees and 17,280 non-fruit bearing trees under impact of acquisition, a total compensation of Rs 44.04 crores is estimated.

Rehabilitation and resettlement cost of Rs.4.12 crores is estimated, which includes 13 PAFs living in residential structures going under acquisition.

Thus, after including 10% miscellaneous cost, the total cost for land acquisition including R&R is estimated as Rs. 383.31 crores.

On analysis, the social costs and benefits of the project at large clearly outweigh the social costs of the project affected families. The compensations provisions to be paid under the RTFCTLARR Act, 2013 keep in mind that the losses and inconvenience caused to the PAPs and PAFs getting affected by the project are generously compensated. The Act not only compensates for the land that is being acquired but also for the Structures and assets attached to it. Further the Act compensates for the standing crops and trees (both fruit and non-fruit bearing). In-case of displacement, the act provides additional compensation as subsistence and transportation allowance for relocation. For loss of livelihood, the act provides to compensate the PAP for re-establishing his livelihood either by providing him alternate employment source or one-time assistance.

During the study it was observed that the project has a general acceptance in the area. In-fact most of the Primary and secondary stakeholders are looking forward for the project to be implemented as it would bring an overall development in the area. Even from the survey 93% of the primary stakeholders are willing to give their consent for the acquisition provided their issues are resolved. The issues have been discussed under social Impacts and mitigation measures. During FGDs the panchayats were also in favour of the project as they were optimistic about the development of their gram panchayats through funds like LADF and CSR.

The people in the affected area are hopeful about the increase in employment opportunities, land price, and increased scope for small and medium business ventures. They are also expecting

better road network and drainage facilities, higher frequency and better-quality transportation services, improved infrastructural facilities and the area will become a landmark in the HEP Map of Himachal Pradesh.

On the Macro level, the project compliments the strategy followed by the Govt. of Himachal Pradesh for exploitation of hydroelectric power to produce as much energy as possible with minimum cost and with minimum environment negative impacts. The speedy exploitation of hydro-electric power potential will definitely improve the economic health of the State because 12 percent free power plus 1.5% LADF (Local Area Development Fund) of the project cost, on all new installations will increase the resources of the state to a significant extent. The need for the project also arises from the need, to fulfill a steady increase in peak electricity demand and the growing energy deficit in the Northern Region.

It can therefore be concluded that the project benefits will be extended to the people of the affected area, district and state. If the proposed Mitigation Plan is followed, it will help mitigate the social impacts by minimizing the negative impacts and amplify the positive impacts, thereby overshadowing the adverse social costs.

1 Detailed Project Description

1.1 Project Background

The 66 MW Dhaulasidh Hydro Electric Project (DSHEP) is under construction by the Satluj Jal Vidyut Nigam Limited (SJVNL), a public sector undertaking of the Govt. of India and Govt. of Himachal Pradesh. The proposed project will be a run of, the river project on the river Beas, with a dam near famous temple Dhaulasidha at Sonotu and nearby villages, namely, Jungle Jihan on the left bank and Bulli on the right bank in district Hamirpur and Kangra, respectively. The back water of the proposed dam may go to Bir Bagehra above Sujanpur Tihra which is nearly 15 -16 km from the actual dam site. There will be two main khuds joining the dam area, Pung khud near Bhaleth and Neugal khud near Sujanpur Tihra. Both these khuds are perennial in nature. The catchment of Neugal khud is more than Pung khud. The creation of dam will shift the water in these two khuds and some villages situated along these khuds will be affected. The dam area will lie along the Hamirpur- Palampur & Nadaun-Sujanpur national highways and partially also along the Sujanpur Tihra- Sandhol state highway.[1]The project is to harness the hydel potential of Beas River.[2]

The project has been planned at about 10 km. downstream of Sujanpur TihraBridge. The project has been planned with a small pondage to utilize it for peaking purpose during lean period. The live storage of 6.87MCM is sufficient to provide adiurnal peaking of minimum 3 hours.[3] The project is expected to acquire 28.30hectares (ha) of government land,57.7364 ha of forest land and 246.8062Ha of private land, for various project appurtenances. Hence, the total land area to be acquired for the development of this project is 332.87ha.Catchment Area at Dam Site is 958000 Ha and Power House Area is 1.3 Ha.[4]The Project is proposed to generate 253.18GWh of electric energy annually in 90% dependable year. DSHEP has been planned to be operated as a peak power station. Incoming water will be stored in the reservoir during the lean period flows and released at full load when the reservoir is filled up. It generates high energies while operated

[1](DEPARTMENT OF AGRICULTURAL ECONOMICS, 2011)
[2](Department of MPP and Power, 2019)
[3](Prof. S. K. Sharma, 2016)
[4](SMEC, 2011)

as a peaking plant as compared to the Run-of-the River scheme. Further, this will also help in catering to the high peak power demand in Himachal Pradesh.[5]

1.1.1 Developers Background

SJVN is a well-established ISO 9001 and ISO 14001 certified company. It is multi-disciplinary organization and has acquired sufficient expertise for planning and executing Hydro Power Projects. Beginning from a single hydropower project company, SJVN today has a footprint in a Hydroelectric Projects in Himachal Pradesh, Uttrakhand and in the neighboring countries of Nepal and Bhutan.

SJVN Limited, a Mini Ratna, Category-I and Schedule – 'A' CPSE under administrative control of Ministry of Power, Govt. of India, was incorporated on May 24, 1988 as a joint venture of the Government of India (GOI) and the Government of Himachal Pradesh (GOHP). SJVN is now a listed Company having shareholders pattern of 62.44 % with Govt. of India,26.85% with Govt. of Himachal Pradesh and rest of 10.71 % with Public.[6]

1.1.1.1 Subsidiaries

- **SJVN Arun -3 Power Development Company Pvt. Ltd**. (SAPDC)–Fully owned subsidiary incorporated in Nepal for implementation of 900 MW Arun-3 Project in Nepal.
- **SJVN Thermal Private Limited** –Fully owned subsidiary incorporated for execution of 1320 MW Buxar Thermal Power Project in Bihar.

1.1.1.2 Joint Ventures

- **Cross Border Power Transmission Company Limited (CPTC)-**To construct and maintain 86 km long, 400 kV D/C transmission line from Muzaffarpur Nepal connection point and a bay extension at Muzaffarpur Sub Station.
- **Kholongchhu Hydro Energy Limited**-for execution of 600 MW Kholongchu Hydro Electric Project in Bhutan. Infrastructure works viz roads and bridges for the project are in progress and bids invited for main civil works.

1.1.1.3 Financial Performance

The total Income of the Company for the FY 2017-18 was Rs. 2587.07 Crore and earned profit after Tax at Rs.1224.88 Crore. SJVN has paid total dividend (excluding Dividend Tax) of Rs. 864.56 Crore for FY 2017-18.

[5](SMEC, 2011)
[6] (Company Profile: SJVN Limited, 2019)

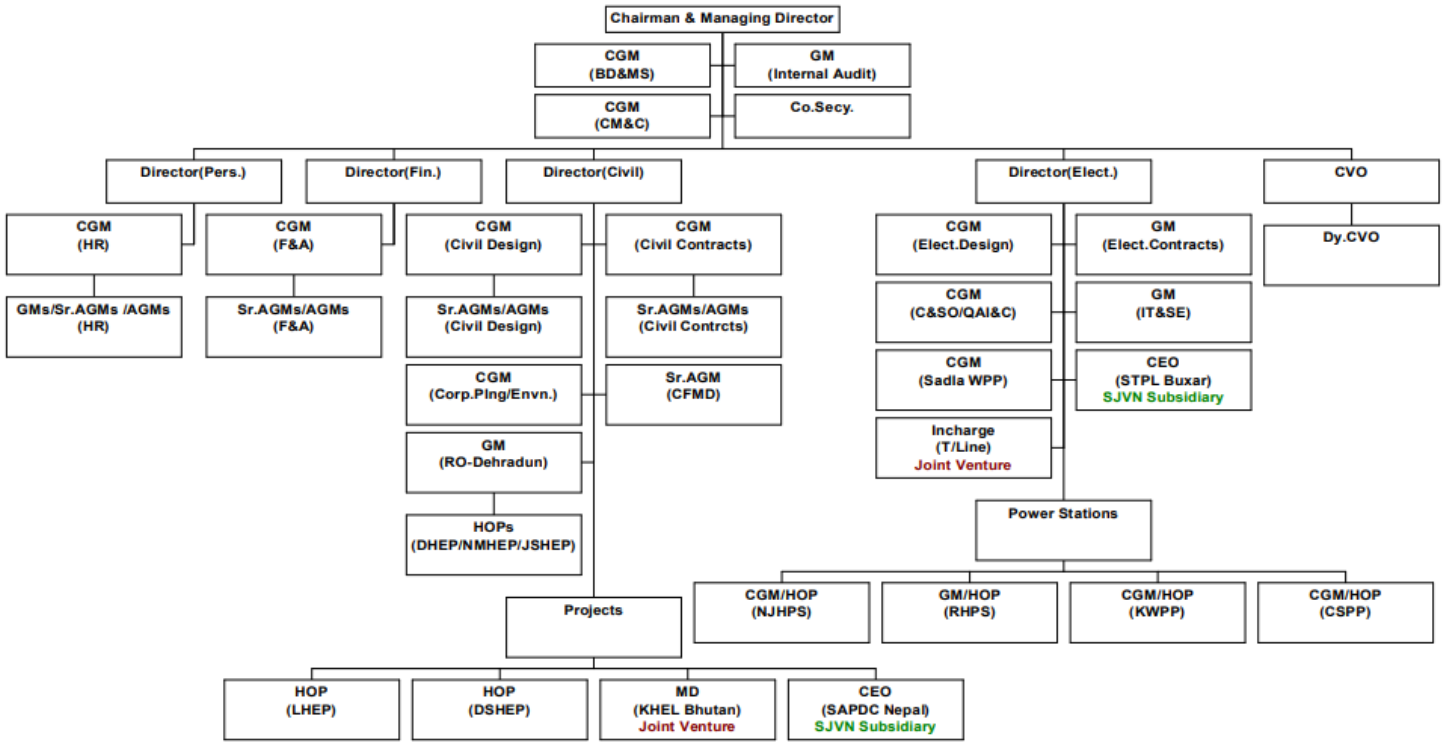
SJVN – A Mini Ratna Company

SJVN Limited was conferred with "Mini Ratna: Category-I" status by the Government of India in the year 2008.

SJVN – Schedule 'A' Company

Meeting the criteria laid down by the Department of Public Enterprises, SJVN on qualifying both qualitative and quantitative parameters was upgraded as Schedule 'A' PSU in 2008.

Figure 1: Organizational Structure-SJVN



Note:
•Projects shall mean Projects in Investigation, Pre-Construction and Construction Stage.

**Source: SJVN Company Profile.*

1.1.2 Governance and management structure

An efficient and result-oriented organization aided by computer software for PERT and CPM will be set up, to achieve the objective of commissioning of the project within a period of 43 months excluding pre-construction period. A Master Control Network for the entire project will be developed which will be monitored at the level of the project head to check slippages and shortages of any deliverables, man power, equipment and materials ensuring their make-up in the

minimum possible duration. Each component will be further broken into various sub activities and a work breakdown structure will be prepared for effective control over the basic activities.

The construction organization will be headed by the General Manager with four Deputy General Managers in charge of:

a) Civil works of dam and spillway with appurtenant works

b) Civil works of powerhouse and appurtenant works including penstock

c) Repair and maintenance works of roads and buildings, construction power, environment and workshop, etc.

d) Installation of the powerhouse equipment and other auxiliary installations.

One quality control unit headed by the Quality Assurance Manager will be operated which will be taking care of all the quality control aspects, the project site laboratory testing, etc and will be reporting directly to General Manager of the Project. A safety officer to take care of safety aspects of the works during construction and an environmental officer will be positioned reporting directly to General Manager.

Additional categories of technical and non-technical staff will be inducted based on the worksites and various shift working.

The design and engineering works will be carried out by the Design and Engineering Consultant.

A core group of engineers having experience in investigation, design, construction and O & M of hydroelectric projects particularly in the Himalayan region, will be established at the head office. The broad functions of this core group will be as below:

• Provide technical support in investigation, analysis of data, and supply of relevant data to the Engineering Consultant and other involved parties

• Technical interaction with the concerned Central and State Government Agencies like Central Water Commission, Central Electricity Authority, Geological Survey of India, India Meteorological Department and other engineering consultants etc.

• Liaison with the retainer Design and Engineering Consultant and broad checking of their design and construction drawings

• Liaison with the Construction Organization and Contractor

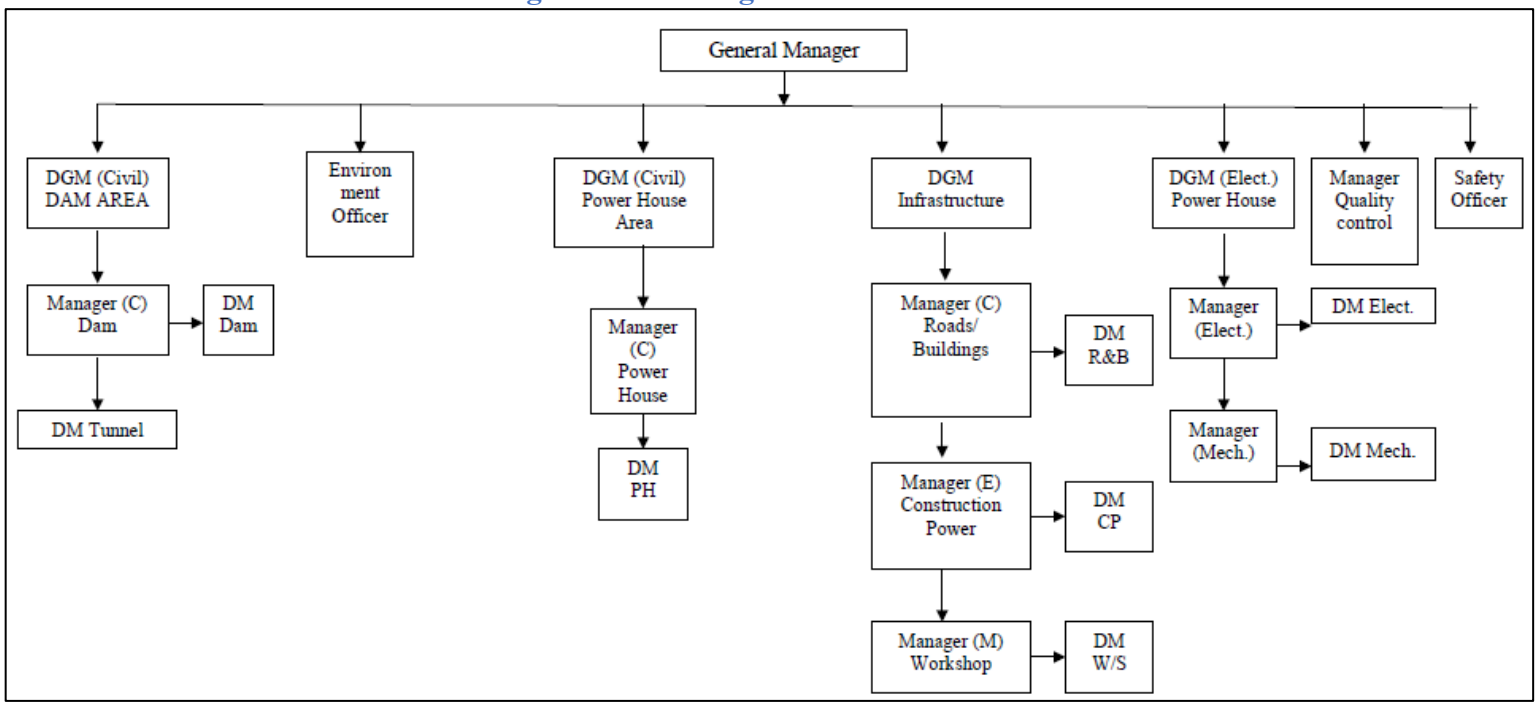
• Carry out plant design and other field designs and to provide full technical support to the construction organization

• Prepare schemes for quality control and inspection and to oversee that the same are executed satisfactorily

• Prepare testing and commissioning schedules and O & M manuals in collaboration with the manufacturers of mechanical and electrical equipment

A chart showing the setup of the project's field organization is given below:

Figure 2: Field organization structure



**Source: DPR, DSHEP*

1.2 Project Rationale

Himachal Pradesh is blessed with vast hydroelectric power potential in its five major rivers. The Government of Himachal Pradesh intends to acquire the land at 25 villages of district Hamirpur and 15 villages of Kangara district for construction of Dhaulasidh Hydro Electric Project (66MW) in order to harness optimal hydel potential river of Beas. This is run of river type development proposed scheme and SJVN Limited is the implementing agency for the same.

The strategy followed in Himachal Pradesh for exploitation of hydroelectric power is to produce as much energy as possible with minimum cost and with minimum environment negative impacts. The speedy exploitation of hydro electric power potential will definitely improve the economic health of the State because 12 percent free power plus 1.5% LADF (Local Area Development Fund) of the project cost, on all new installations will increase the resources of the state to a significant extent. The need for the project also arises from the need, to fulfill a steady increase in peak electricity demand and the growing energy deficit in the Northern Region.[7]

[7](Department of MPP and Power, 2019)

As per Section 2 sub-section1(b) of the RTFCTLARR Act, 2013 the Dhaulasidh Hydro-Electric Project (66 MW) is justified well under the definition of infrastructure projects (energy generation) for public purpose.

Therefore, in exercise of powers conferred by rule 3 of the Himachal Pradesh Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Social Impact Assessment and Consent) Rules, 2015, a social impact assessment study is to be conducted for the land which is being acquired.

1.3 Project Details

1.3.1 Project Size

The project envisages the construction of a 70.75 m high concrete gravity dam (above the deepest foundation level) at latitude N 31˚ 48’ 23.1” and longitude E 76˚ 26’ 30.7” with FRL at 520 m. The deepest river bed level at the proposed dam location is 472 m. The water from the diversion dam will be led to a dam toe surface power house located on the left bank of river though 2 nos. penstocks of 4.3m dia and finally discharged back into the river through a small tail race channel. The normal tail water level at the power house location is EL 473.30m. The project is planned with an installed capacity of 66 MW (2x33MW) and utilises a gross head of 46.37 m & pondage of 95.87 MCM at FRL.Given below are the details of design, dimension and capacity of various components of the project:

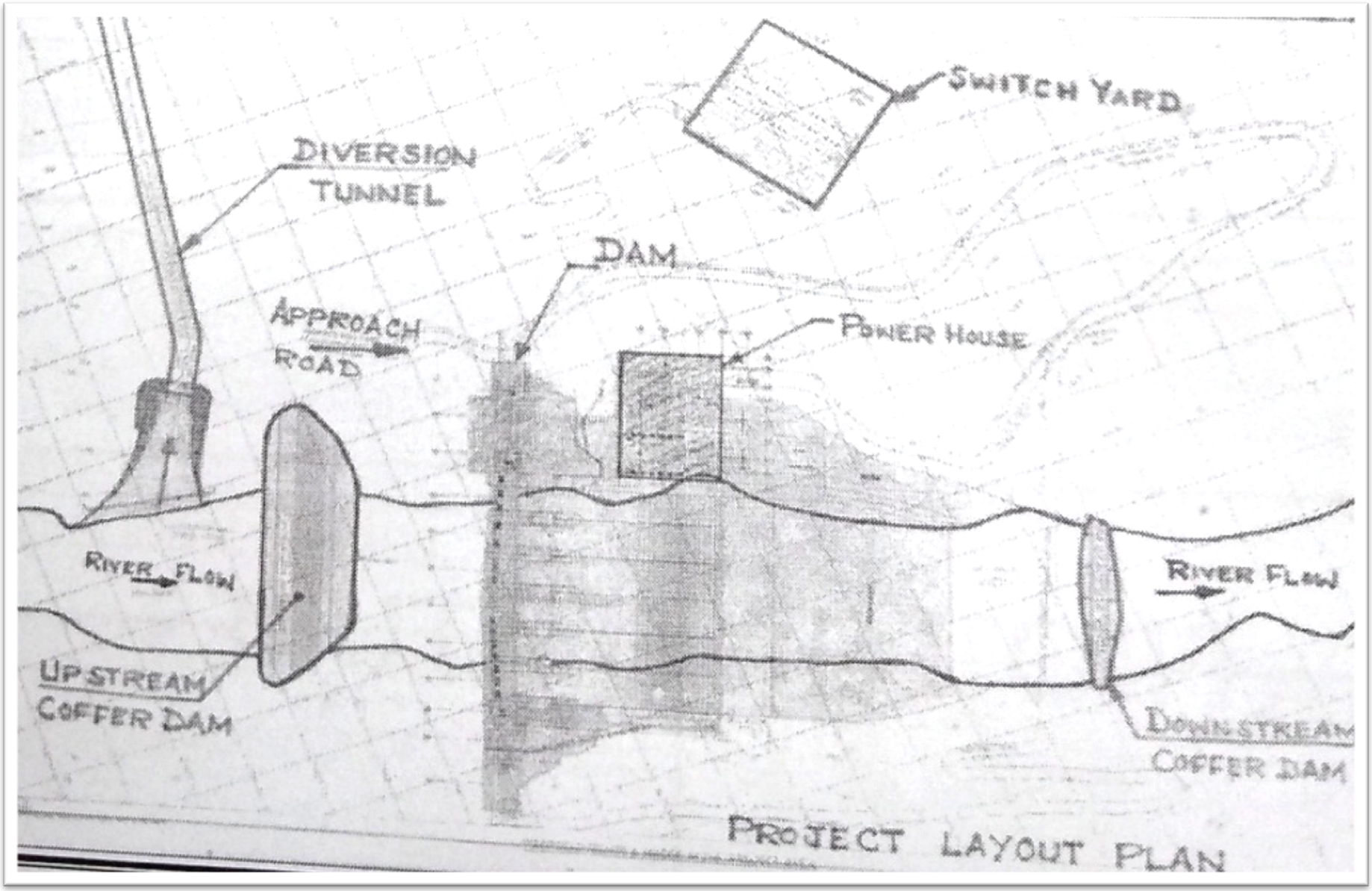
Table 1-1: DhaulasidhHEP Project Size and Design

S. No.	Component	Location	Design	Dimensions	Capacity
1.	River Diversion Tunnel	Left Bank of River	Upstream Cofferdam: semi-permanent, plum concrete / colcrete. Downstream Cofferdam: single row of Jet Grouting upto rock.	Diameter: 10.20 m Length: 227.71m	1000 cu.m/sec
2.	Dam	Village: Jangal Jihan	Concrete gravity	Height: 70.75m Length of Dam at Top: 195.14m Length of spillway section: 90m	Gross pondage: 88.07 Mm^3 Live pondage: 6.91 Mm^3 (between MDDL 519 m and FRL

S. No.	Component	Location	Design	Dimensions	Capacity
					520 m)
3.	Intake structure	Face of NOF dam blocks 3 and 4	2Nos.	The top width of the dam (power intake block): 12.0 m. The total length of the power dam: 33.0 m	80.67 cumecs
4.	Penstock		2 Nos.	Diameter: 4.30 m Centre line at EL. 502.15 m. Service gate size: 3.75m (W) x 4.3m (H) at a distance of 8.5 m from the dam axis	
5.	Surface Powerhouse	left bank of the river	Deep seated dam toe power station	70.75 m high	2 units of 33 MW

**Source: DPR, DSHEP*

Map 1-1: General Layout Plan, Dhaulasidh



1.3.2 Location

Proposed project is located on Beas river basin in Himachal Pradesh with District Hamirpur falling on its left Bank and District Kangara on its right bank. However the catchment area has boundaries with states of Jammu and Kashmir in the North, Uttar Pradesh in the Southeast, China on East, Haryana in the South and Punjab in the West.

The dam is located near famous temple Dhaulasidha and villages, namely, Jungle Jihan on the left bank and Bulli on the right bank in district Hamirpur and Kangra, respectivelyat Longitude 76°26'30.7" Eand Latitude 31°48'23.1" N.

The Following Map provides the location and extent the project. Table 1-2 provides the list of villages falling in Hamirpur and Kangara District where the Land Acquisition is taking place.

Table 1-2: List of Project Villages

S. No	Hamirpur District	Kangara District
1.	Sujanpur	Alampur
2.	Balla Girthan	Baag
3.	Loungani	Sai
4.	Mathaan	Bhalunder
5.	Mihadpura	Bir
6.	Sarohal	Badu
7.	Chauki	Dali
8.	Ropa	Layunda
9.	Batehu	Nichali Bheri
10.	Bhadriana	Paprola
11.	Bharmad	Chowki
12.	Gaagla	Kiyod
13.	Garodu Bulla	Tippri
14.	Haar	Bulli
15.	Thira	
16.	Kaach	
17.	Miyana	
18.	Birh Khas	
19.	Bagehra Bulla	
20.	Riah	
21.	Darla	
22.	Gaahlian	
23.	Samouna	
24.	Palahi	
25.	Pargana	
26.	Jangal Jeehan	

Map 1-2: Location of Project Area

1.3.2.1 Access to project area

The project site is located at about 200 km from the state capital Shimla and the nearest railhead (broad gauge) is about 93 km at Una in Una district and nearest airport is Gaggal in Kangara district at 83km from site. Presently the dam site can be approached by small foot track, about 4 km from RCC bridge on Salasi Khad near Jihn village. Nearest villages from Dam Site is Jungle Jihan on the left bank and Bulli on the right bank in district Hamirpur and Kangra, respectively.Dam and Power House site is approx. 12Km. downstream of the Sujanpur and 16Km. upstream from Nadaun. A metalled road of about 4 km has to be constructed to approach the project site from RCC bridge on Salasi Khad near Jihan village.[8]Nearest urban area is Sujanpur at a distance of 37km.

Hamirpur is well connected by road from Chandigarh, Shimla and Pathankot. Access from Chandigarh is via NH-21 through Rupnagar – Kiratpur – Nangal – Una - Amb and further from Amb-Kaloha-Nadaun – Hamirpur through NH-70.

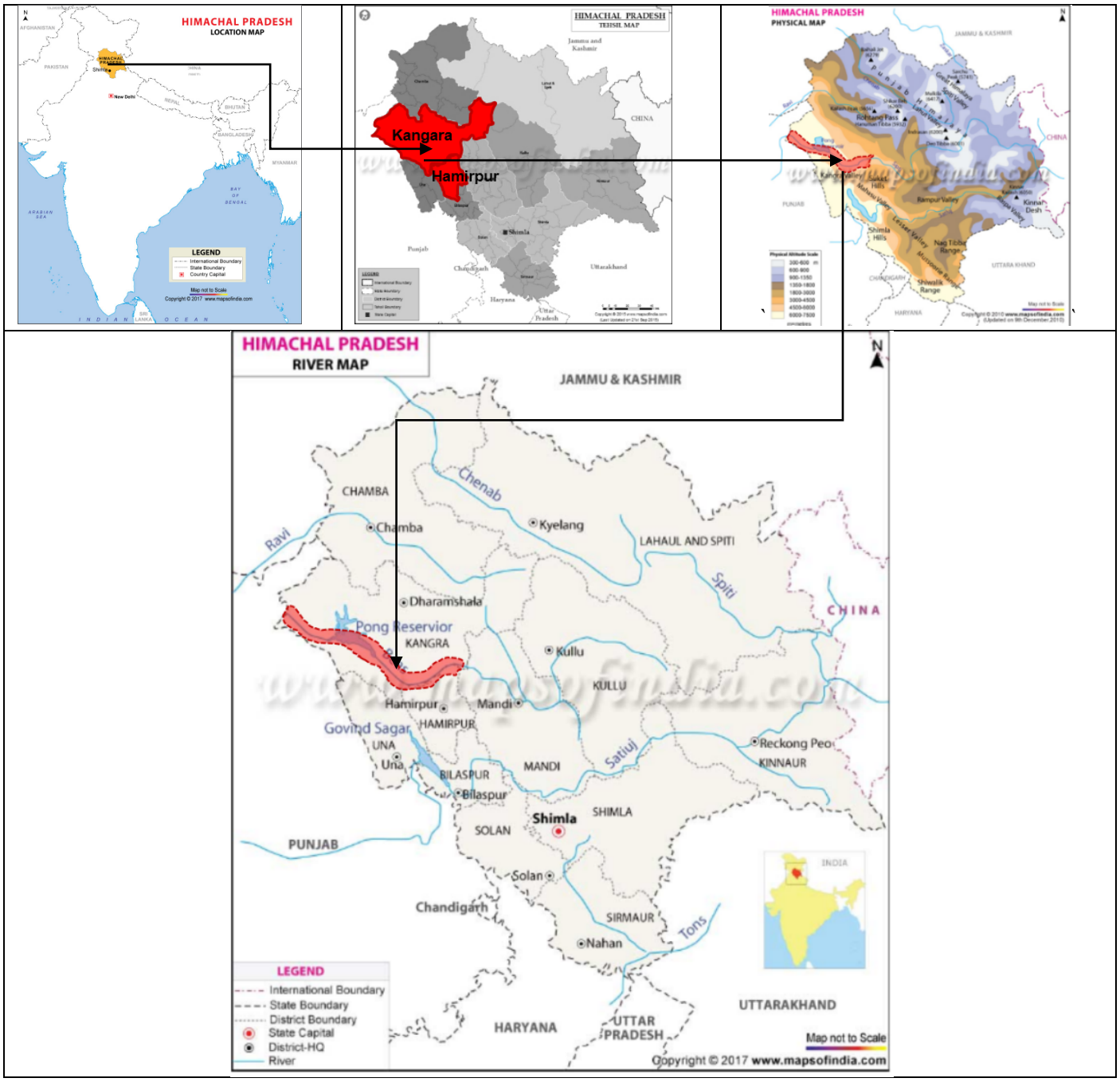
There is another route connecting Una to Hamirpur via State Highway. This road takes off from Una via Bangana – Barsar – Saloni – Bhota - Hamirpur. Double laning of this state highway is currently under progress by C&C Constructions.

Hamirpur is also accessible by road from Shimla and Pathankot. Access from Shimla is Via NH-88 through Bilaspur and from Pathankot via NH-20 to Gaggal and then taking NH-88 to Nadaun and Hamirpur.

Figure 3: Double Laning of State Highway from Una-Bangana-Barsar-Salon-Bhota

[8](SMEC, 2011)

Map 1-3: Location of Proposed Project Area



1.3.2.2 Physical features

The entire catchment area of Beas River lies in the Himachal Pradesh whose altitude varies from 500 m to 6000 m above sea level. The physiography of state of Himachal Pradesh can be divided into three zones. They are the outer Himalayas or the Shivaliks, the inner or the middle

Himalayas and the greater Himalayas or the Alpines. The Shivaliks include the districts of Hamirpur, Kangra, Una, Bilaspur, and the lower parts of Solan, Sirmaur and Mandi. The altitude of lower Himalayas ranges between 350 m to 1500 m and the annual rainfall in this zone ranges between 150 cm to 175 cm. The middle region includes the parts of Sirmaur, Mandi and parts of Kangra, Shimla and Chamba which experiences rainfall between 75 cm to 100 cm. This zone remains under snow for almost five to six months. The Alpine zone is at an altitude of 4,500 m and beyond and comprises of the Kinnnaur and Pangi tehsils of Chamba and some parts of Lahaul and Spiti[9].

1.3.2.3 Climate

The climate varies from semi-tropical to semi-arctic from place to place depending on the altitude of the region. The months from April to June are pleasant and comfortable at higher altitude and humid in the lower hills. The months of July to September are the months of rainfall. Himachal Pradesh experiences average annual rainfalls of about 160 cm. The winter season begins from October to February and is very severe. Heavy snowfall occurs during this season[10].

1.3.2.4 Seismicity

Seismic forces assume importance and play a critical role in design of gravity dams like 70.75 m high dam of Dhaulasidh HEP. The project area lies in the Himalayas which are known as seismic belt.

Nearest seismogenic sources to the sites are Main Central Thrust (MCT), Sundernagar Fault and Main Boundary Thrust. The project area is seismically active as several earthquakes are reported from this region.

The area being in high Seismic Zone, the site-specific seismic studies are proposed to be carried out during the detailed design stage. The present analysis for the DPR stage design has been done using the coefficients derived from IS 1893 – 1984 (Fourth Edition)/ IS 1893-2002 (Part I)

IS 1893-1984 places Dhaulasidh Dam in seismic zone five (5) and gives all dams an importance factor of 3.

[9](SMEC, 2011)
[10](SMEC, 2011)

1.3.3 Capacity and Outputs

The computed discharge series for 28 years for Dhaulasidh dam site has been used to determine power benefit from the project. As per Government of India (GoI) notification for tariff, energy generated at 90% dependable year has been considered for determination of tariff. Installation of 66 MW capacity comprising 2 units of 33 MW each with Vertical Axis Francis type turbine is proposed. The annual energy that would be available in a 90% dependable year is given below:

- Annual Energy Generation (GWh) 264.59 (with 10% overloading)
- Annual Load Factor (%) 43.79
- Design energy for tariff at 95% availability in a 90% dependable year has been worked out as 258.31 GWh (10% overloading).

Given below in the table is details of total capacity and output of various components of the project:

Table 1-3: Capacity and Output of DhaulasidhHydro Electric Project

Hydrology	
Catchment Areaat DamSite	9580 km2
Average Discharge Available in 90%dependableyear	175 cumec
Annual Inflow/ Annual Runoff	584mm/ 5591MCM
Standard Project Flood	12,000 cumecs
ProbableMaximumFlood(PMF)	17674 cumecs
Average Annual Rainfall	1320mm
Reservoir	
Maximum Water Level (MWL)	522.50m
FullReservoirLevel(FRL)	520.00m
MinimumDrawDownLevel (MDDL)	519m
Minimum Operating Level	512m
GrossStorageatFRL	95.87MCM
DeadStorage+ Sediment Storage + Inactive Storage	89.0 MCM
LiveStorage	6.87 MCM
Area under submergence at FRL	713.21 Ha

A) Diversion Arrangement	
Diversion tunnel	
Shape	D- shape
Diameter	10.2m
Length	227.71m
Diversion Discharge	1000 cumecs
Concrete Lining Thickness	300mm
Upstream Coffer Dam	
Type	Plum Concrete Semi Permanent
Maximum Height	18m
Length	124.20 m
Crest Elevation	490.0 m
Downstream coffer dam	
Type	Rockfill type with inner concrete wall
Maximum Height	2m
Length	73.40m
Crest Elevation	473.0m
Dam	
TypeofDam	Straight Concrete Gravity Dam
TopElevation oftheDam	523.0 m
AverageRiverBedLevel at DamSite	472m
DamHeightaboveFoundation Level	70.75m
LengthofDamat Top	195.14m
TopWidthofDam	8.00m
Deepest Foundation Level	452.25m
Freeboard at FRL	3.0m
Spillway	
DesignFlood(PMF)	17,674 cumecs
TypeofSpillway	Breast wall Sluice Spillway (Orifice Flow)
Length of Spillway	90.0m
No. of Bays	Six(06)
Bay Width	10.0m

Routed Outflow	17,000 cumecs
Spillway Gates	10 m (W) X 14m (H)
Crest Level	485.0 m
Energy Dissipation Arrangement	
Energy Dissipation Type	Solid Roller Bucket
Invert of Bucket	457.0m
Radius of the Bucket	22m
Lip Elevation and Angle	463.44m, 45º
Intake	
Location	Dam Blocks 2 and 3
Type	Dam Intake
Invert Level	500.0m
Number	2
Nominal Discharge Through Each Opening	80.67 cumecs
Intake gate Size	3.75m (W) X 4.3m (H)
Trash Rack Opening	5.5m (W) X 4.8m (H); 5 Panels 2 nos.
Sill Elevation of Trash rack	499.0m
Penstock	
Type	Surface
Number	2
Diameter	4.3m
Length of each penstock	60.50m
Grade of steel	ASTM-537 Class II
Maximum Discharge Through Each Penstock	80.67 cumecs
Maximum Velocity	5.56 m/s
Liner Thickness	14mm
PowerHouse	
Type	Dam Toe Surface on the Left Bank
Power House Size	55.80 m (L) X 23.16 m(W) X 47.72m(H)
C.L. of Turbine	469.50 m
Type of Turbine	Vertical Francis
Maximum Tail Water Level	492.0m

Normal Tail Water Level	473.30m
Minimum Tail Water Level	472.30m
Rated Head	45.33m
No of Unit	2
Rated Discharge	80.67 cumecs
Installed Capacity	66 MW
Specific Speed (Metric MK W)	326.42
Type of Switch Yard	Open (Size 67.60mX49.80m)
Tail RaceTunnel	
Type	Open Trapezoidal Channel
Discharge	161.34 cumecs
Length of Tunnel	69m
Base Width	15m
Power Benefits	
Peaking Capacity	66 MW with 10% Overload
Annual Energy in 50% Dependable Year	338.76 354.26 (with 10% overloading)
Load factor for Operation (Annual/ Lean Period) for 50% Dependable Year	58.59%/34.62%
Annual Energy in 50% Dependable Year on 95% machine availability	330.65 346.07 (with 10% overloading)
Annual Energy in 90% Dependable Year	253.18 264.59 (with 10% overloading)
Load factor for Operation (Annual/ Lean Period) for 90% Dependable Year	43.79%/16.84%
Annual Energy in 90% Dependable Year on 95% machine availability	247.25 258.31 (with 10% overloading)

**Source: DPR, DSHEP.*

1.3.4 Project cost and risks

The capital structure of the project is proposed to have 70% Loan Component and 30% Equity Component. The interest rate of 11.5% per annum is considered. Financing Costs are taken at 0.5% of debt. The project is estimated to cost INR 497.67 Cr. including IDC and financing charges at November, 2010 price level. The breakdown of the cost estimates is given below:

Table 1-4: Dhaula-Sidh Project Cost

Cost Estimates and Financial Aspect	
Civil Works Including HM Works	244.99 Cr.
Electro Mechanical Works (Excluding cost of transmission line to the pooling station)	88.39 Cr.
Total Basic Cost Including direct and indirect charges	438.72 Cr.
Interest During Construction	57.21 Cr.
Financing Charges	1.74 Cr.
Total Cost Including IDC and Financing Charges	**497.67 Cr.**
Levelized Tariff At 90% Dependable Year For 95% Machine Availability	
After considering 12% free power and 1% for local area development (levelized)	Rs. 4.47/kWHr
Project Internal Rate of Return for 35 Years	11.28%
Levelized Tariff At 50% Dependable Year For 95% Machine Availability	
After considering 12% free power and 1% for local area development (levelized)	Rs 3.34/kWHr
Basic Cost Per MW Installed	**6.65 Cr.**

**Source: DPR, DSHEP*

The uncertainty of operating in a geotechnical environment, underground structures with attendant uncertainties, construction floods, the complex construction logistics and methods involved, and the large and expensive machinery engaged, all contribute to a high risk environment. Delays and cost overruns occur at an unfortunately regular frequency, particularly in tunneling and dam foundations.

Following are the broad range of risks during the construction and implementation of the project:

1. Lack of physical performance by contractors
2. Delayed completion
3. Failure of equipment to meet functional guarantees
4. Environmental issues
5. The political process and cultural heritage risks

All risks must be identified early so that appropriate mitigation strategies can be put in place with responsibilities and actions identified and audited to ensure that the risks are clearly understood and appropriate mitigation methods can be adopted during all phases of the project including design, procurement, construction, impoundment, commissioning and the long-term operation and maintenance.

1.4 Examination of Alternatives[11]

The proposed site has been selected after necessary investigation of hydrological, geological and topographical conditions. The Dhaulasidh project site gives very limited options for optimizing the dam location in view of the meandering loop of the river along a very gentle profile of the river in the stretch. From the preliminary topographical studies, the choice for the alignment for the dam fell on the narrowest section in the gorge designated as N-N axis. This axis was taken up for detailed topographical and geological investigations. A wide range of investigation techniques have been carried out to collect the required topographical, geological and geotechnical data viz. topographical survey, surface geological mapping, exploratory drilling, drifting, laboratory testing and in-situ rock mechanics testing for various component of the project. Foundation conditions largely depend upon the geological character and thickness of the strata which are to carry the weight of the dam.

The geological investigations and studies extensively undertaken on this narrowest alignment revealed that the foundation conditions for a high concrete gravity dam along this narrowest alignment at N-N axis were found to be unsuitable because of presence of softer/weaker rock strata (claystone/siltstone) at shallow depth foundation which on saturation condition are expected to be soften and lead to a differential settlement in the dam foundation. The general trend of the rock is a NW-SE direction with a dip of 250-300towards downstream slightly oblique to the dam axis and almost normal to the river flow.

Subsequently another alternative alignment about 20m downstream of N-N axis, designated as N1-N1 was studied. After comparing the relative merits of both the axes with reference to the reliability of the foundation and necessary foundation treatment, the final choice was made in favour of N1-N1 axis for construction of a concrete gravity dam with a central sluice spillway.

N-N axis – The N-N alignment is located at the narrowest section in the gorge. The length of the dam at this location would be 198m at top. Exploratory drilling was carried out to a maximum depth of 86.80m (above the height of dam structure) in the center of the river bed to study the nature of the foundation below the river bed level. The geological investigations revealed the existence of recurring claystone bands at shallower depth in the foundation parallel to the attitude of the rock strata dipping at 250-350 towards downstream direction. These claystone bands pass underneath the N-N alignment at a depth varying from 10 to 15m from the deepest foundation level. The cover over the weaker zone consists of fresh, medium hard to hard and compact sandstone. A number of tests were conducted both in the field and in the laboratory in order to determine the physical and engineering properties of the foundation rocks. The average compressive strength of the fresh dry sandstone was in general about 194 to 337kg/cm2. In the case of clay stone, the dry compressive strength varied from 100 to 250 kg/cm2. The existence of thick claystone band in the dam foundation has been the guiding factor in optimizing the dam location.

[11](SMEC, 2011)

Foundation (dental) treatment on a very large scale for replacement of the material in the clay band is found to be extremely difficult and costly due to its gentle inclined disposition passing underneath the dam base at much lower depths and as it involved removal of a very thick covering of sandstone rocky bed. On account of this, the N-N axis is not considered suitable for a gravity dam since it would involve costly grouting and strengthening treatments of foundation.

N1-N1 axis - Based on the findings at axis N-N, another site at about 20m d/s of N-N axis was studied. The length of the dam at this axis is nearly the same as N-N axis. The foundation of the dam at this axis just manages to steer clear from the effect of clay bands. However, some minor dental treatment and structural modifications in the dam structure would be required. Overall cost of the dam at N1-N1 will be less than the dam at N-N site because of foundation treatment problems.

To avoid the founding of the dam on formations of different deformation modulus and structural compliance, the dam axis has been proposed to N1-N1 location. With this arrangement, the rigid concrete gravity dam will be on a more uniform foundation which will result in the even distribution of loads required for a rigid concrete gravity dam.

However, for the Layout of the project the HPSEB, Govt. of Himachal Pradesh had conducted the toposheet studies with some reconnaissance survey in late 90's and tentatively formulated two alternatives with minimal displacement and also keeping in mind the engineering parameters.

These alternatives have been discussed in detail below:

Alternative-I: The alternative - I envisaged ± 55 m high Concrete Gravity Dam, 4 kms downstream of confluence of Slasi khad and Beas river and having small storage of 6000 ha-m. At FRL of 524.00 m and MDDL of 500.00 m with Intake on left bank, it feeds two Francis Turbines of 25 MW each to a surface Powerhouse with an installed capacity of 50 MW. The anticipated annual energy generation of power house was 210 Gwh.

Alternative II: This alternative envisaged ± 80 m high Concrete Gravity Dam at same location identified in alternative – I i.e. 4 kms downstream of confluence of Slasi khad and Beas river having storage of 37000 ha-m. At FRL of 550.56 m and MDDL of 520.56 m with Intake on left bank, it feeds two Francis Turbines of 40 MW each to a surface Powerhouse with an installed capacity of 80 MW. The anticipated annual energy generation of powerhouse was assessed to be 378 Gwh.

It was concluded that, in alternative – I with FRL at 524.0 m, the submergence will be less where as in alternative – II with 80 m high dam, the Sujanpur Tira bridge is likely to get submerged along with part of Sujanpur Tira and Alampur habitation.

Alternative layout studied: It envisages the construction of the Straight Gravity dam at the same location and of the same height. However, instead of providing a power house at the toe of

the dam, ,it is proposed to divert the water by providing a small water conductor system comprising of a reservoir intake, 7.5m dia circular shape HRT of 97.15m length and 6.10m dia pressure shaft bifurcating into two branch of 4.30m dia each and carrying the water back to the river on the other side of the loop through an underground power house on the left bank and a small tail race tunnel. The normal tail water level at the power house location is EL 469.50m. The project is planned with an installed capacity of 70 MW (2x35MW) and utilises a gross head of 50.50 m & pondage of 100 MCM at FRL. The approximate elevation at the proposed power house site is ± 468 m.

A techno-economic study for both the layouts has been carried out. This study reveals that though the Alternative layout yields higher energy benefits by having higher installed capacity, it comes at a higher price i.e higher tariff. It means that increase in the energy benefits for Alternative layout are not commensurate with the increase in the Project costs which is resulting in the higher cost of returns as compared to Final layout. Hence, on Techno-economic reasons, Final layout is found to be more economical as compared to Alternative layout and has been taken up for the Detailed study.

1.5 Phases of project construction

Dhaulasidh power project is proposed to be completed in 43 months this excludes 11 months of pre-construction activities. The major project works involved are the following:

(i) Diversion tunnel

(ii) Upstream and Downstream Coffer dam

(iii) Concrete gravity dam with six bays gated spillways

(iv) Intake Structure & Penstocks

(v) Power House

(vi) Tail Race Channel

(vii) Switchyard

(viii) Hydro-Mechanical Works

(ix) Electro-Mechanical Works

It is planned to complete the main construction and commissioning of the Dhaulasidh Hydro-Electric Project, excluding pre-construction activities in a period of 3.0 years and 7 months. The pre-construction activities (infrastructure works) are proposed to be completed over a period of 11 months. The tender for the Dhaulasidh H E Project, Mobilisation, Access Roads and Bridges, Construction Camp, Colonies, installation of Aggregate Processing Plant and Batching Plants will be completed during the pre-construction stage.

Completion of the Dam construction is critical component for the completion of the Project. Selection of the construction equipment has been made to achieve the objective of completion of the Dam and Power house in the least possible time. The method of construction and the equipment planned for various components of the project shall ensure that all construction activities including pre-construction activities such as mobilization, construction of access roads and establishment of the construction camp, can be completed within a period of 54 months allowing 1.0 month time for reservoir filling, testing and carrying out the pre-commissioning tests on all the units. **However, the construction planning will be finally carried out by the contractor suiting to the site conditions after award of the works**.

1.5.1 Working period

In view of the rain fall pattern in the area, the monsoon period is considered from June to September. Thus, there will be a clear 8 months construction period in a calendar year for the execution of open works particularly the dam, the intake, and the power house. During monsoon there would be some clear days when open works can be carried out to some extent. The works will be carried out round the clock in three shifts of 8-hour each during the working season.

1.5.2 Working hours

The cycle time of operations is the criteria for hourly / daily output of machinery / work force. However actual progress of work is dependent upon several other factors such as power interruptions, minor break downs, times for meals and other needs of work force, stray rains, etc. Hence it is general practice to consider 50 min. as the actual working time per hour. Further where the work is carried out in more than one shift, there is further reduction in daily production hours due to time required for change in shift and for daily maintenance needs of plant & machinery. Equipment planning has been done on the number of working days available. 200 working days have been considered as available in a year based on 25 working days in a month and 8 working months for surface works.

For Equipment Planning aspects, CEA/CWC has recommended, following scheduled working hours in a year with 200 working days for all over-ground construction activities.

- Single Shift work / day = 200 x 6 = 1200 hrs.
- Two Shift work / day = 200 x 11 = 2200 hrs.
- Three Shift work / day = 200 x 15 = 3000 hrs.

Since the production capacity would be affected during the monsoon months especially for the supplies/ services and muck disposal etc, suitable reduction in the progress has been taken into account.

1.6 Core Design Features and Size and Type of Facilities

The location of the dam and its basic design features have been finalised considering optimum power generation, topographical and geotechnical features, existing projects on the upstream, economy, submergence and other relevant factors. The site is ideally suited for the construction of a concrete dam.

1.6.1 Dam

Dhaulasidh H.E. Project which intercepts a total catchment area of 9580 sq. km. will have a concrete gravity type dam, 70.75m high above the deepest foundation, and 195.14m long at the top. The overall length of the main spillway section of the dam is 90 m comprising six numbers sluice spillway bays, each of 10m width, with crest elevation at El. 485.0 m. An auxiliary spillway of length 10m is provided on the right side of the main spillway. The overall length of the non overflow section of the dam would be 86.14m extending towards the right and the left bank from the spillway end. The sluices will be operated upto the discharge of 17,100 cumecs. The dam would provide a gross pondage of 88.07 Mm3 and live pondage of 6.91 Mm3between MDDL 519 m and FRL 520 m to enable the power generation envisaged under the project, to cater to diurnal variations in power requirements.

- The dam height is fixed such that the reservoir is created upstream of dam to direct river flows for optimum utilization of water for power generation.
- The reservoir capacity i.e., live storage pondage is equal to the total volume of water required for power generation to meet diurnal variations.
- The dam is designed for discharging a routed flood discharge of around 17,000 cumecs corresponding to PMF inflow which is 17,674 cumec.
- The structure is designed to be safe against overturning and sliding and the stresses are within permissible limits.
- The seepage from the reservoir across the dam axis is minimized and uplift pressure on the dam is reduced.

1.6.2 Spillway

The spillway is located centrally in the river portion. Due to the physical constraints at the dam site and to minimize the height of the dam, a radial gated spillway with breast wall has been selected which is a common design feature of many dams in the Himalayas for better management of sediment. The flood discharged through the sluice spillway under the breast wall / radial gate flows over the ogee crest and enter a solid roller bucket which dissipates energy by the interaction of ground roller and surface roller.

The overall length of the spillway is 90 meters with 6 nos. sluice bays of 10 meters each and piers of 6 meters width each. The crest elevation of the sluice spillway has been kept at El 485.00 m. The sluice spillway has been designed for a peak routed flood of around 17,000 m3/s which

corresponds to PMF inflow of 17,674 cumecs. The minimum draw down level (MDDL) has been kept at El.519.00 m.

If the reservoir level gets silted upto the crest level, there is possibility of boulders rolling down over the spillway glacis coupled with high velocities of the order of 20m/s. To avoid any damage to the spillway surface due to rolling boulders, suitable protective arrangement has been proposed by way of providing 0.4 m thick, high strength silica fume M50 grade of concrete on spillway crest and downstream glacis.

An auxilliary spillway is provided in one of the blocks (Block no 10) to pass the floating material in the reservoir towards downstream side. The size of the spillway is 4m x 3m and it has been designed to pass a discharge of 37 cumecs. A vertical fixed wheel gate is provided on the same spillway. The crest level of the spillway is kept at EL 517.0m.

1.6.3 **Waterway**

The waterway has been calculated for a peak inflow flood of 17,674 m3/s, corresponding to PMF. In the waterway computations, 80% of the maximum water head (i.e. head between the crest elevation and MWL) has been taken as the design head and other suitable assumptions as per standard practice have been made. Based on the calculations and considering the requirement of storage above crest level for optimum peaking power generation, 6 bays each of 10 m width with gate height of 14 m have been proposed. Considering the size of gates, the pier width has been proposed to be 6 m each with a contraction joint in the center of the pier. The total waterway works out to be 90m.

1.6.4 **Intake works**

Two nos straight Intake are proposed on the face of NOF dam blocks 3 and 4 for diverting the water from the reservoir to the dam toe power house on the left bank. An approach channel shall be dug upstream of the intake structure to allow free entry of the water. The top width of the dam in the power intake block is 12.0 m. The total length of the power dam is 33.0 m Each intake structure will comprise one opening in the body of the dam to convey a discharge of 80.67 cumecs for power draft at rated head through 4.3 m diameter penstock embedded in the body of the dam. In order to avoid the deposition of the sediments in front of the intakes, intake structure has been located within the influence (zone) of the spillways. The crest level at intake is EL. 500m i.e. 15m above the sluice sill level.

Metal trash racks are proposed to be provided in front of the intakes for preventing entry of floating debris of size larger than 75 mm. Trash rack structure would be straight in plan projecting 10.03m from dam axis. The flow area for each intake conduit is divided into two spans of 5.50m (clear) each by providing 1.0m wide RCC piers. The top of trash rack structure is kept at EL. 523.00m while its seating is at EL 499.0m resulting in the total height of trash rack to 24.0m. The total height of trash rack has been divided into five equal parts to facilitate its lifting and maintenance. To facilitate cleaning of the racks through mechanical device, trash rack

structure is inclined to 10 deg. from vertical up to the top of the dam. A top slab provided at EL.523.0 m will be used as an operating platform for maintenance and cleaning of trash racks. Trash rack cleaning machine will be kept on the operating platform.

The entrance to each of the intake conduit shall be provided with a smooth bellmouth to minimise head loss and prevent adverse hydraulic conditions.

It is proposed to provide one emergency gate and one service gate for each intake conduit. These gates shall be of vertical fixed wheel type gates to stop the flow in the penstock during repair/ maintenance. The service gate shall be operated with the help of suitable capacity electrically operated rope drum hoist which shall be located on a platform supported by trestles. One set of emergency gate shall be used for each intake and shall be operated with the help of lifting beam and crane, moving on a rail track at El 523.00. These intake gates shall be meant for openings of size 3750 mm wide and 4300 mm high and shall be operative either in fully open or fully closed positions. These gates shall be designed for full reservoir level (EI. 520.00 m) and shall be capable of going down in flowing condition for full head and of being lifted with no water on the downstream side.

Maximum 30% clogging of trash rack area is assumed. The velocity of water through the trash rack at the design discharge of 80.67m3/sec is 0.37 m/sec against maximum permissible velocity of 1.5m/sec.

1.6.5 **Penstock**

For flexibility of operation and maintenance ie, two penstocks of 4.30 m diameter, one from each intake have been provided with centre line at EL. 502.15 m. The intake conduit is provided with a bell mouth opening at the entrance and a service gate of size 3.75m (W) x 4.3m (H) at a distance of 8.5 m from the dam axis. A transition from 3.75 m (W) x 4.30m (H) rectangular to 4.30 m circular is provided after the gate over a length of 4.50 m. After the transition, the steel lined penstock emanates from the dam body and takes a vertical bend of 51.34 Degrees. An anchor block is provided at this location on the dam body to resist the forces coming due to vertical bend. After the vertical bend, the penstock is carried over the dam face/ trench encased in concrete upto the lower vertical bend at EL.469.50 From the lower vertical bend at 469.50, pressure shaft continues horizontally upto MIV to feed each unit of turbine of 33 MW. For details Drawing No.: 1254-C31 and 1254-C32 may be referred. The economic diameter of the pressure shaft has been worked out as 4.30m.

1.6.6 **Powerhouse Complex**

The powerhouse of Dhaulasidh Hydro-Electric Project will be a deep-seated dam toe power station located on the left bank of the river. The surface power house is geologically well located. Side slope of the power house area is stable and no instability at the slope is observed during geological studies. Access to the powerhouse will be via an approach road to be constructed to power house area from the road coming to the dam top.

Hard Rock is exposed at the power house location. Slope stabilization measures such as rock bolts and reinforced shotcrete with proper drainage arrangement will be required to be applied to the excavation batters on the sides of Power station

The powerhouse will consist of a watertight substructure founded on bedrock and a free-standing superstructure. The substructure will be constructed of mass concrete into which the draft tubes will be embedded. The superstructure will be constructed with reinforced concrete walls for SPF conditions and checked for PMF conditions. Above, the powerhouse will be either a portal frame steel structure with steel sheet cladding or a reinforced concrete frame structure with brick walls or steel cladding and a steel truss roof.

The powerhouse layout is governed by the requirements of the generating equipment which consists of two conventional vertical axis Francis turbines, two generators and various items of associated equipment.

The size of the powerhouse has therefore been determined by considering the dimensions of the generating equipment, and the space required for their operation and maintenance. Each floor will be accessible by stairs and a personnel lift.

An electric, overhead travelling crane of approximately 150/25/5tonne lifting capacity will be provided in the powerhouse. The crane will traverse the full length of the Loading/Service Bay and the Machine Hall. An access walkway to the travelling crane will be provided along the full length of the building. The access to this walkway will be via a ladder at one end of the building.

Two nos single phase main transformers are located on the roof of control room between D & E lines.

1.6.7 **Service bay**

The entrance to the powerhouse shall be at Service bay at EL.492.0 m. The length of Service Bay has been kept as 18.00 m with a view to permit simultaneous assembly of various components, mainly generating units in order to reduce the time of erection of the units.

The Service Bay shall have facilities for assembly/disassembly of various equipment including stator, rotor, main inlet valve, transformers, etc. for which an EOT crane of 150 T/25 T/5 T (top of crane rails at EL 502.70 m) has been provided.

For access to various floors, a staircase block (from EL.492.0m to 465.42 m) including a lift has been provided between ‘D’ Line and ‘E’ Line adjacent to service bay by the side of the entrance to the powerhouse. Another staircase block (from EL. EL.492.0m to 474.67m) has been provided between ‘C’ line and ‘D’ line to access Machine hall from Service bay. Suitable provision for emergency exits and ventilation shall be made during Detailed Engineering and design.

1.6.8 **Tail race channel**

Water exiting from the turbines will be discharged through the draft tubes into the tailbay which extends from the substructure of the powerhouse as an upward sloping concrete lined channel to about 34 m downstream of the powerhouse before being released into an open trapezoidal channel into the Beas River. The invert level at the downstream end of the tail bay will be at EL 472 to provide sufficient submergence of the turbine runners set at EL 469.50m.

By providing an upward sloping draft tube and tail water bay, it is ensured that the turbine runners are always submerged irrespective of the downstream tail water conditions. The tail bay will be lined with reinforced concrete. The tail water released from the tail bay is led to a trapezoidal channel with 15m bottom width formed by extended Left Training wall of Dam on one side and Rock cut face on the other side. The Tail Race Channel is about 69 m long. The shape and size have been fixed from free flow considerations.

1.6.9 **Reservoir**

The Dhaulasidh reservoir stores water for diversion through an intake located in the body of the dam followed by a 60.50m long penstock connected to a 66 MW power station located on the toe of the dam on the left bank. The reservoir is formed by a 70.75m high concrete gravity dam with a gated spillway and it has been sized to restrict the FRL at EL 520 m to minimize the R&R aspects and avoid the submergence of Sujanpur Tihra bridge on the upstream. The river Beas has a very mild slope of approx. 1:300 and the construction of even a low height structure will result in the submergence of a significant part of the upstream area.

The submergence at EL 520.0m is 713.21 ha which increases to 2563 ha at EL 540.0m. Limiting the submergence at EL 520.0m will involve very minimal R&R aspects since very nominal habitation comes under this area apart from some agricultural land. However, submergence at EL 540.0 will affect habitation in 20 villages namely Sanotu, low lying areas of Sujanpur Tihra and Alampur, Loungi, Malhan, Bhadrana, Chaunki etc which falls within this area. The Sujanpur Tihra Bridge with its Deck Elevation at EL 524.0 will also get submerged. Considering this significant submergence above EL 520.0m resulting in likely local population resistance/huge compensations for agricultural land and resettlement issues which will offset the additional energy benefits, it has been decided to fix the FRL at EL 520.0m

The live storage capacity between FRL and MDDL has been fixed to allow the power station to be operated as a run-of-river with limited diurinal storage capacity. The active storage volume between FRL and MDDL required for a 3-hour operation at maximum live capacity is 6.91 x 106 m3. In the monsoon season, when the natural inflow into the reservoir is in excess of the design discharge of the penstock, the reservoir will remain at FRL allowing the power station to operate continuously for extended periods of time as long as sufficient flows are available to generate power in single or both the turbines.

In the non-monsoon season the reservoir level will fluctuate between the Full Reservoir Level (FRL) and the Minimum Draw Down Level (MDDL) with the planned capacity and as per water availability, the power station may operate for 3.00 hours with both machines or 6.00 hr. with one machine until the water level in the reservoir depletes to MDDL, level and during the remaining time of the day the power station will be shut down till the reservoir is refilled upto FRL. This will be a continuous process to be repeated every day.

Since the reservoir capacity is considerable and capacity inflow ratio is high, the reservoir size will have a moderating effect and reservoir attenuation will take place.

The reservoir capacity at FRL is approximately 95.87 million m3, and the capacity at dam crest level (EL 523m) is approximately 120 million m3. This means that the flood storage is approximately 24.13 million m^3.

The PMF peak inflow volume in one hour minus the spillway discharge volume at FRL for one hour is only about 0.2 times the flood storage volume. The design inflow hydrograph for the PMF event has a peak with 7 hours duration having flow greater than 17,000 cumecs. This suggests that approximately, only 1.4 times the flood storage volume will pass through the reservoir during the peak 7 hours of the PMF event. The implication of this is that the reservoir flood storage will have a moderating effect on the flood capacity and there would be a substantial reservoir attenuation.

Flood Routing studies using Modified Pul's method have been carried out for the maximum peak event, considering all the gates operative and the reservoir at FRL during the start of the flood event. The results shows that the peak of 17,674 cumecs is moderated by around 4.0% and the routed outflow of around 16,959 cumecs is discharged from the spillway at EL 522.50m.

The flow velocities in the reservoir will be very low, even during floods, much below the critical settling velocities for silt particles to settle down. This starts at entry point of the river into the reservoir and progresses downstream with time.

The average cross-sectional area in the reservoir near the dam is around 6000 sq.m at FRL giving a flow-through velocity of 0.0267 m/sec for design discharge of 161.27m3/sec which is far below 0.3 m/sec. for a conventional desilting chamber to settle and flush out silt particles of size 0.3 mm and above. A maximum 10 daily average discharge in 26-year series is 2018 cumecs, for which the flow velocity will be 0.30 m/s less than the critical velocity for silt particles of 0.3 mm to settle. Further, the length of the reservoir is 19.23 km which is more than sufficient for the particles to settle in the reservoir. It implies that reservoir will act a good desilting arrangement and hence no separate desilting arrangement has been proposed in the water conductor system.

1.6.10 River diversion arrangement

For the purpose of managing the river for construction of concrete dam, a diversion tunnel is proposed to be located on the left bank of the concrete gravity dam. The location and the alignment of the diversion tunnel have been kept on the basis of the topographical and geological data. The diversion tunnel will have a finished diameter of 10.20 m to pass 1000cumecs, corresponding to a lean season flood of 1 in 25 years There is a big river loop, after 500m downstream of the dam axis and the outlet of the diversion tunnel has been proposed on other side of this river loop. The length of the tunnel connecting the river loop is 227.71m. The diversion arrangement presently has been designed for non-monsoon flows only giving a total working season of 8 months. The inlet and exit portals are located at El 472.50 m and 468.50 m respectively.

1.6.11 Hydraulic design of diversion tunnel & coffer dam

Hydraulic design of the diversion tunnel has been done considering the tunnel running almost full for the design diversion discharge of 1000 m3/s. The total losses including the friction loss, entrance loss, bend loss, gate slot loss and exit loss etc. have been computed and the maximum water level required at the upstream coffer dam to cater for the diversion requirement has been arrived. The maximum water level behind the upstream cofferdam is at El.489.15 m. Keeping a free board of 0.85m, the top of the upstream cofferdam is at EL 490.00 m.

The upstream Cofferdam shall be of a semi-permanent nature built with plum concrete / colcrete and suitably faced with concrete/masonry on both the upstream and downstream slopes. It is a semi-permanent structure which can last more than one season with some minor restorations caused by the overtopping of the coffer dam.

The plum concrete shall constitute 60% of concrete of M-15 grade and 40% of boulders varying in size from 150 mm to 300 mm. The boulders / rock used in the colcrete shall have a maximum size of 300 mm and the mortar used for injection shall be 1:3 mix cement mortar Plasticizer of Standard Quality shall be required to be used. The masonry work on both the faces and top of the cofferdam shall be with mortar mix of 1:5. It is provided with stepped spillway for energy dissipation during floods. The D/S of the cofferdam shall be protected with apron constructed out of big boulders or concrete block for a length of 10.0m. The seepage control measure from the foundation shall consist of jet grouting.

Since, the water has been discharged to the other side of loop; there would not be any back-water effect at the dam site as far as the surface flow of water is concerned. However, it is anticipated that there would a considerable seepage of sub-surface water into the excavated pit if a positive cut-off is not provided. Hence, a very low D/s Cofferdam (rock fill) of maximum height 2.0m with inner core of colcrete has been suggested along with a single row of jet grouting upto rock to prevent the seepage into the excavated pit.

1.6.12 Power evacuation system

The power generated at Dhaulasidh Hydro Electric Project will be evacuated through Dhaulasidh HEP - Hamirpur power grid 220 Kv D/C line to the nearest pooling station which in turn will be transmitted to the National Grid.

Pooling point shall be finalized by the State Transmission Utility (STU) i.e. Himachal Pradesh Transmission Corporation Limited considering other generating stations to be developed in Himachal Pradesh by the other developers.

1.7 Need for ancillary infrastructural facilities

Development of adequate infrastructure is a pre-requisite for timely implementation of the project. Establishment of proper infrastructure considering the existing facilities in the nearby area and the requirement of different worksites for various activities goes a long way in speedy execution of the works minimizing delays in project completion. Following infrastructure facilities will be required for construction of the Project:

- Access roads in the Project area to various work sites, camps, offices, muck disposal area, job facility sites, etc.
- Bridges and Cross-drainage work.
- Residential buildings for the Project staff & offices including their electricity and provision of water supply, sanitation & drainage works.
- Non-residential buildings
- Telecommunication network
- Construction Power

1.7.1 Roads and bridges

Dhaulasidh project site is well connected by PWD road up to village Jihan. However, access roads to work sites will be required. The requirement of access roads to the work sites from the existing road shall be as under:

i) New Project road from existing road: The existing road near the project site on left side and nearest connecting village is Jihan. It is proposed to construct new project road from the existing road (bifurcating near to Salasi khad bridge) having length of about 4.0 km (refer drawing no 1254-IW-01).

ii) Approach road to Right bank via Temporary Bridge: An approach road from left bank to right bank via temporary bridge at EL 492.0 m will be required of length 1.5 km bifurcating from approach road to Powerhouse (refer drawing no.1254-IW-02).

iii) Power house: Approximately 1 km of road is required to access dam toe Power house bifurcating from approach road to diversion tunnel outlet and about 0.5 km length of road for Switchyard from the New Project road near dam top on left bank (refer drawing no.1254-IW-01).

iv) Other approach roads:

1) Approach roads to Quarry sites/Borrow areas
2) Approach road to inlet portal diversion tunnel
3) Haul roads to dumping areas for muck disposal
4) Approach roads to explosive magazine, Crusher, B&M plant, Stores, Workshops Penstock fabrication yard, Sheds etc.
5) Temporary Bridge for access to the right bank

Construction and improvement of the Roads (widening of curves/bends on existing road from Hamirpur to Salasi Khad Bridge), Bridges (if required) and Cross - drainage works will be a priority and is planned to be completed during the pre-construction stage. In all, about 12.35 km length of approach road is required to be constructed.

Table 1-5: Requirement of new roads for construction of project

S. No	Description	Length (m)
1.	Project road upto dam site	4000
2.	Dam top to outlet Diversion Tunnel	2750
3.	Road to inlet Diversion Tunnel	1200
4.	Access road for Left & Right bank	1500
5.	Road to Power House	900
6.	Road to Switchyard	500
7.	Other Misc. roads	1500
Total		**12350**

**Source: DPR, DSHEP*

1.7.2 Telecommunication facilities

The different work sites of the project offices, stores, laboratories, workshops and residences etc will be connected by a telecommunication network. The telecommunication facilities will also be provided between the project and the outside. An internal automatic telephone exchange (EPABX) with 50 lines capacity will be provided for communication within and outside the project. All important sites of the works, offices and residences of senior officers will be connected by telephone.

Permanent colonies will also be provided with a CHF wireless link to keep contact with other power stations and sub-stations in the grid. Most part of Himachal Pradesh is presently connected with different parts of the world through a satellite communication network, for which an earth satellite station with electronic exchange exists. The same network will be extended to

the project area for telecommunication with outside agencies. Suitable number of mobile phones / walky- talkies would also be provided.

1.7.3 Muck disposal areas

Construction of the project involves generation of muck from various work sites for which disposal areas at appropriate locations in line with the topographic conditions will be required

The muck quantity expected to be generated from various work sites is tentatively assessed to be as under:

Table 1-6: Quantity of muck generated

S. No	Structures	Approximately Muck Quantity Cum (Lacs)
1	Dam works, River diversion, Intake & Penstock	5.30
2	Power house, Tail race channel etc.	1.00

*Source: DPR, DSHEP

Muck disposal areas will be identified near the respective working sites. These will be developed by providing stable slopes and adequate berms, so that muck flow in to the river is avoided.

1.7.4 Miscellaneous

During construction of the project, safety is an essential job requirement to be ensured, for which adequate arrangements for lighting, security etc. will be made in the project area. Adequate preventive measures against accidents will be taken as prescribed in various BIS codes. The project work sites will have restricted entry and visitors will only be allowed on permits issued by the project authority. All work force and other project personnel will be provided with identity cards and passes issued by the Project authority which will be checked at the entry check posts located at suitable places.

1.8 Work force requirements

For the execution of the project necessary infrastructure needs to be created like construction of bridges and approach roads, office buildings, colonies, workshops, water supply and sewerage disposal system followed by construction of various project components like diversion tunnel, coffer dam, concrete gravity dam, intake structure and penstocks, surface power house, tail race channel etc.

The total number of permanent Operating and Maintenance staff required for the project is estimated to be about 40. However, during peak construction stage, requirement of 500 workers and 100 technical staff will be generated.

Manpower for the construction of Civil, Hydro-mechanical and Electro-mechanical works will be required to be provided by the Contractor. The total no. of engineers, officers and workers of

various disciplines to be deployed by the contractor will be planned commensurate with the construction programme. For the contractor staff the area will be provided near project site. Labour to be deployed during construction stage will also be accommodated near work sites.

1.9 Details of Environmental Impact Assessment

A Comprehensive EIA study for the project was being conducted, to assess the adverse impacts on various aspects of environment. Given below are the findings of the study:

Table 1-7: Details of EIA conducted

S. No	Parameter	Project Phase	Activity	Impact
1.	Land and environment	Construction Phase	In-migration	The congregation of labour force is likely to create problems of sewage disposal, solid waste management and felling of trees for meeting fuel requirements, etc. to accommodate and facilitate the in-migrants.
2.			Quarrying operations	With the passage of time, rock from the exposed face of the quarry under the action of wind and other erosional forces, get slowly weathered and after some time, they become a potential source of landslide. Thus, it is necessary to implement appropriate slope stabilization measures to prevent the possibility of soil erosion and landslides at the quarry sites.
3.			Operation of construction equipment	The storage site for various construction equipment and material should be so located that it leads to minimum disturbance to flora, fauna and human population in the area.
4.			Soil erosion	The runoff from the construction sites will flow towards river Beas or its tributaries. For some distance downstream of major construction sites there is a possibility of increased sediment levels leading to reduction in light penetration which may have an impact on the primary biological productivity of the affected stretch of the receiving water body. Some adverse impacts are anticipated on streams and nallahs, which have low flows during lean season.
5.			Muck	As per the existing proposal for the

S. No	Parameter	Project Phase	Activity	Impact
			disposal	construction of Dhaulasidh hydroelectric project about 0.63 Mm^3 of muck is to be generated. Considering swelling factor as 40%, total quantity of muck to be handled is 0.882 Mm^3. It is proposed that 0.118 Mm^3 of muck shall be utilized for various project works. Hence for the balance quantity (0.764 Mm^3) of muck disposal appropriate sites shall be designated.
6.			Construction of roads	The project construction would entail significant vehicular movement. Construction of roads in such area can give rise to erosion hazards due to net downhill movement of soil aggregates. It may also lead to removal of trees on slopes and re-working of the slopes in the immediate vicinity of road, which may lead to landslides, soil erosion, gully formation, etc.
7.	Water Quality	Construction Phase	Inmigration	The total quantum of sewage generated is expected to be of the order of 0.134 mld. The BOD load contributed by domestic sources will be about 108 kg/day. Normally, during project construction phase, the labour population is concentrated at 2 locations. Thus, the sewage/BOD loading would outfall into river Beas at 2 to 3 locations. The sewage is proposed to be treated before disposal to avoid deterioration of water quality of the receiving water body
8.			Effluent from crushers	No major adverse impacts, are anticipated due to small quantity of effluent and large volume water available for dilution in river Beas. To minimise the impact, it is proposed to treat the effluent before disposal to ameliorate even the marginal impacts likely to accrue on this account.
9.		Operation phase	Effluent from project colony	About 50 families (total population of 250) will be residing in the area. About 0.04 mld of sewage will be generated. The total BOD

S. No	Parameter	Project Phase	Activity	Impact
				loading will be of the order of 12 kg/day. It is proposed to provide biological treatment facilities including secondary treatment for the sewage so generated
10.	Terrestrial flora	Construction Phase	Increased human interferences	Workers and other population groups residing in the area may use fuel wood (if no alternate fuel is provided) for whom firewood/coal depot could be provided.
11.	Terrestrial fauna	Construction/ Operation Phase	Acquisition of forest land	Some of the forest patches of the Dhaulasidh HEP in Hamirpur district are reported to serve as a good habitat for various wild faunal species. Out of these wild animals (mammal, birds, reptiles and amphibians), few species are endangered and of vulnerable category and are legally protected under Wildlife Protection Act (1972) in various schedules. Therefore, it is very much necessary to protect these wild animals during the construction and operation of the Dhaulasidh HEP.
12.	Aquatic ecology	Construction/ Operation Phase	Fisheries	A total of 20 species of 05 families of fish were found to be reported from the stretch of Beas River under the area of Daula Sidh HEP. The Mahseer (*Tor tor; Tor putitora*) is one of the important freshwater game fish of Himalayan rivers and is endangered and migratory; therefore, its protection is very important.
13.		Operation phase	damming of river	The dam will change the fast-flowing river to a quiscent lacustrine environment. The creation of a pond will bring about a number of alterations in physical, abiotic and biotic parameters both in upstream and downstream directions of the proposed dam site. The micro and macro benthic biota is likely to be most severely affected as a result of the proposed project.
14.			Migratory fish species	The obstruction created by the dam would hinder migration of species especially the Mahseers (from downstream to upper reaches) and *Schizothorax* sp. (from upper

S. No	Parameter	Project Phase	Activity	Impact
				reaches to the lower reaches). These fishes undertake annual migration for feeding and breeding.
15.	Noise levels	Construction phase		Increased noise levels due to vehicular movement and construction activities.
16.	Air quality	Construction phase		Increased air pollution due to fuel consumption during operation of various construction equipment and emissions from various crushers

1.10 Applicable legislations and policies

1.10.1 Preparation of Social Impact Assessment Study

Section 4 of the RTFCTLARR Act, 2015 mandates that whenever the appropriate government intends to acquire land for a public purpose, it shall consult the concerned Panchayat at village level or ward level, in the affected area and carry out a Social Impact Assessment study in consultation with them, in such manner and from such date as may be specified by such Government by notification. (Section 4 of Act)

Rule 3 sub-section (1) of the HP RTFCTLARR Rules, 2015 states that the State Government shall, for the purpose of the Act, issue a notification for carrying out Social Impact Assessment in accordance with Part-B of FORM-I of these rules regarding the commencement of Social Impact Assessment and the same shall be made available in both Hindi and English to the concerned Panchayat or Municipality or Municipal Corporation, as the case may be, and in the concerned offices of the District Collector, the Sub-Divisional Magistrate and the Tehsil. A wide publicity will also be made in the affected area through publication in at least two daily newspapers circulated in the area, and also by affixing the notification at conspicuous places within the affected areas. Besides this, the notification shall also be uploaded on the website of the State Government: (HP RTFCTLARR Rules, 2015)

1.10.2 Process of land Acquisition[12]

- The government shall conduct a Social Impact Assessment (SIA) study, in consultation with the gram sabha in rural areas (and with equivalent bodies in case of urban areas).

[12] (Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013)

- After this, the SIA report shall be evaluated by an expert group. The expert group shall comprise two non-official social scientists, two experts on rehabilitation, and a technical expert on the subject relating to the project.
- The SIA report will be examined further by a committee to ensure that the proposal for land acquisition meets certain specified conditions.
- A preliminary notification indicating the intent to acquire land must be issued within 12 months from the date of evaluation of the SIA Report.
- Subsequently, the government shall conduct a survey to determine the extent of land to be acquired.
- Any objections to this process shall be heard by the Collector. Following this, if the government is satisfied that a particular piece of land must be acquired for public purpose, a declaration to acquire the land is made.
- Once this declaration is published, the government shall acquire the land.
- No transactions shall be permitted for the specified land from the date of the preliminary notification until the process of acquisition is completed

1.10.3 The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013[13]

The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, (RTFCTLARR Act, 2013) replaces the Land Acquisition Act, 1894, which existed from colonial times. The new RTFCTLARR Act is an attempt to revamp and make the land acquisition process more effective by addressing the major lacunae in the old Land Acquisition Act.

The act seeks to harmonies the interests of land owners, industrialization/ growth of real estate and infrastructure industries and bring in transparency in the process of land acquisition. The objective of the act is thus in line with the requirements of modern times. The act, inter alia, contains provisions pertaining to mandatory rehabilitation and resettlement of those whose lands are acquired and payment of fair compensation to them. Significantly, the act provides for enhanced compensation to land owners in cases of land acquisition by the government for public purposes or for Public Private Partnership (PPP) projects that may aggregate to up to four times the market value in rural areas and up to twice the market value in urban areas. The Act has been

[13] (Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013)

hailed as beneficial and necessary to protect the interest of land holders and other affected persons.

1.10.3.1 Key Features of RTFCTLARR Act

The Act specifies provisions for land acquisition as well as R&R. Some of the major changes from the current provisions are related to (a) The process of land acquisition; (b) Rights of the people displaced by the acquisition; (c) Method of calculating compensation; and (d) Requirement of R&R for all acquisitions.

1.10.3.2 Compensation to Land Owners:

The compensation for land acquisition shall be determined as per the provisions of the RTFCTLARR Act, 2013.

1.10.3.3 Process of Rehabilitation and Resettlement

Resettlement and Rehabilitation are two different activities.

- Resettlement is associated with the physical relocation or putting them to a new resettlement colony.
- Rehabilitation is associated with the restoration of the livelihood of the PAPs. Both these aspects put together involves the complete physical, social and cultural restoration.

The RTFCTLARR Act requires R&R to be undertaken in case of every acquisition. Once the preliminary notification for acquisition is published, an administrator shall be appointed. The Administrator shall conduct a survey and prepare the R&R scheme. This scheme shall then be discussed in the local bodies in case of urban areas. Any objections to the R&R scheme shall be heard by the administrator. Subsequently, the administrator shall prepare a report and submit it to the Collector. The Collector shall review the scheme and submit it to the Commissioner appointed for R&R. Once the Commissioner approves the R&R scheme, the government shall issue a declaration identifying the areas required for the purpose of R&R. The administrator shall then be responsible for the execution of the scheme. The Commissioner shall supervise the implementation of the scheme.

1.10.4 HP RTFCTLARR Rules 2015[14]

The Himachal Pradesh Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Social Impact Assessment and Consent) Rules, 2015 were notified vide Notification of dated 09thApril,2015 and published in the Rajpatra (e-Gazette), Himachal Pradesh as required under section 112 of the Right to Fair Compensation and

[14] (The Himachal Pradesh Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Social Impact Assessment and Consent) Rules, 2015)

Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (Act No. 30 of 2013).

They extend to the whole of the State of Himachal Pradesh

Himachal Pradesh Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Social Impact Assessment and Consent) Rules, 2015based on the Central Act, 2013 lays out the procedure for carrying out the social impact assessment study for the purpose of land acquisition in the State of Himachal Pradesh. The highlights of the rules are (A) Conducting SIA and SIMP in accordance with Form II and III (B) Conducting Public Hearings (C) Consent.

1.10.4.1 (A) Conducting SIA and SIMP

i. Form II: The Social Impact Assessment Report shall be submitted to the State Government within a period of six months from the date of its commencement and shall include the views of the affected families recorded in writing. This form elaborates the structure and the content of the SIA report.
ii. Form III: The Social Impact Management Plan enlists the ameliorative measures required to be undertaken for addressing the impact of the project and shall be submitted along with the Social Impact Assessment Report. This form provides a guideline on the content of the SIMP.
iii. The Form II and Form III are enclosed with this report in Appendix.

1.10.4.2 (B) Conducting Public Hearing -

i. Public hearings shall be organised in the affected areas to bring out the main findings of the Social Impact Assessment, seeking feedback on the findings and to seek additional information and views for incorporating the same in the final report.
ii. The date and venue of the public hearing will be announced and publicized three weeks in advance through public notifications and posters in all the villages within a radius of five kilo meters of the land proposed to be acquired, by advertisement in local newspapers, broadcasting in radio, and through direct communication with Gram Panchayat or Municipal Ward representatives besides uploading the information on the website of the State Government.
iii. The Social Impact Assessment report and the Social Impact Management Plan shall be made available in both Hindi and English to the concerned Panchayat or Municipality or Municipal Corporation, as the case may be, at village level or ward level in the affected areas and in the offices of the District Collector, the Sub-

Divisional Magistrate, Tehsildars and shall also be uploaded on the website of the State Government.

iv. Representatives from the Requiring Body, designated Land Acquisition and Rehabilitation and Resettlement Functionaries, Public representatives, Local Voluntary Organisations and media shall also be invited to attend the public hearings.

v. The proceedings of the public hearing shall be video recorded and transcribed accordingly. This recording and transcription shall be submitted along with the final Social Impact Assessment Report and Social Impact Management Plan.

1.10.4.3 (C) Consent

The State Government, through the concerned District Collector shall obtain prior consent of the affected land owners in Part-A of Form-IV. At the same time State Government shall take necessary steps for updating the records relating to land rights, title in the land and other revenue records in the affected areas, so that the names of land owners, occupants of the land and individuals be identified for initiating the prior consent process and land acquisition.

1.10.4.3.1 a) Consent of the Gram Sabha–

i. The District Collector shall in consultation with the representatives of the Gram Panchayat notify the date, timing and venue for holding the meeting of Gram Sabha in the affected areas three weeks in advance and conduct public awareness campaigns to motivate members of the Gram Sabhas to participate in the said meeting.

ii. The names and signatures of all the members who attended the meeting shall be taken and kept in the records.

iii. The quorum shall be the same as prescribed in the Himachal Pradesh Panchayati Raj Act, 1994 (Act No. 4 of 1994), of the total members of the Gram Sabha for considering the consent as valid.

iv. A resolution shall be passed with majority, in Part-B of Form-IV giving or withholding consent for the proposed acquisition and the resolution shall contain the negotiated terms and conditions for Rehabilitation and Resettlement, compensation, impact management and mitigation that the Requiring Body has committed and which have been signed by the District Collector or by the designated district officer along with the representative of the Requiring Body.

1.10.4.3.2 b) Consent of the Affected Land owners.

A signed declaration shall be obtained during affected land owners meeting in the presence of district officers, competent authority of requiring body and SIA team, whether he or she gives or

withholds consent for the acquisition of land involved. This entire meeting will also be video recorded and complete proceedings will be documented in writing.

The outcome of the consent process will be made available in the office of Gram Panchayat and on the web site of the State Government.

2 Team composition, Approach, Methodology and Schedule of the Social Impact Assessment

2.1 Team Details

The composition of Social Impact Assessment team is given inTable 2-1which is responsible to carry out the Social Impact Assessment Study. Each member of the team is an expert in his field and has undertaken numerous such studies before.

Table 2-1: SIA Team Details

S. No	Name	Qualification	Gender	Expertise
1	Dr. Ranveer Singh	PhD economic & M. Phill in Agriculture economist	Male	Retd as HOD of Agri-economics research centre, HPU Shimla, SIA Expert, Baseline survey for the entire Satluj basin was completed under him.
2	Raman Sharma	MA Sociology	Male	Expert in Survey & Data Analysis, Impact Assessment & Community Mobilization
3	Jitender Sharma	MBA	Male	Expert Social Mobilization
4	Viral Misra	B. Tech Civil Engg, Masters in Planning with specialization in Urban and Regional planning	Male	Expert in Urban & Regional Planning, EIA, SIA and R&R (Project Manager and Team Leader)
5	Gauri Srivastava	B. Arch, Masters in Planning with specialization in Urban Planning & Housing	Female	Expert in Housing & R&R and gender expert (Project coordinator)
6	M.R. Sharma	Bachelors in Social work	Male	Survey & Statistical Researcher
7	Pratibha	Master of Arts	Female	Survey & Statistical Researcher, and Gender Specialist
8	Sachin Chauhan	M.Com	Male	I.T. expert and data analyst
9	Meenakshi Bharadwaj	M.A Sociology	Female	Investigator & Gender Specialist

Following is the list of field surveyors who participated in the Field survey:

Table 2-2: List of Surveyors

S. No	Name	Qualification	Gender	Designation
1	Labh Singh	MSW	Male	Surveyor
2	Parveen	MSW	Male	Surveyor
3	Rakesh Kumar	B. Com	Male	Surveyor
4	Vishal Thakur	B.A.	Male	Surveyor
5	Mukesh Kumar	Diploma (ITI)	Male	Surveyor
6	Pankaj	B.Sc.	Male	Surveyor
7	Vijay Kumar	Diploma (Mechanical)	Male	Surveyor
8	Mohammad	Sociology	Male	Surveyor
9	Rahul	MSW	Male	Surveyor
10	Rahul	Sociology	Male	Surveyor
11	Rajendar Thakur	MBA	Male	Surveyor

2.2 Description and Rationale for the Methodology and Tools Used

2.2.1 Aim

The aim of the study is to conduct a social impact assessment study in accordance to Himachal Pradesh Right to Fair Compensation and Transparency in Land Acquisition Rehabilitation and Resettlement (Social Impact Assessment and Consent) Rules, 2015.

2.2.2 Objective

The following are the objectives of the Study:

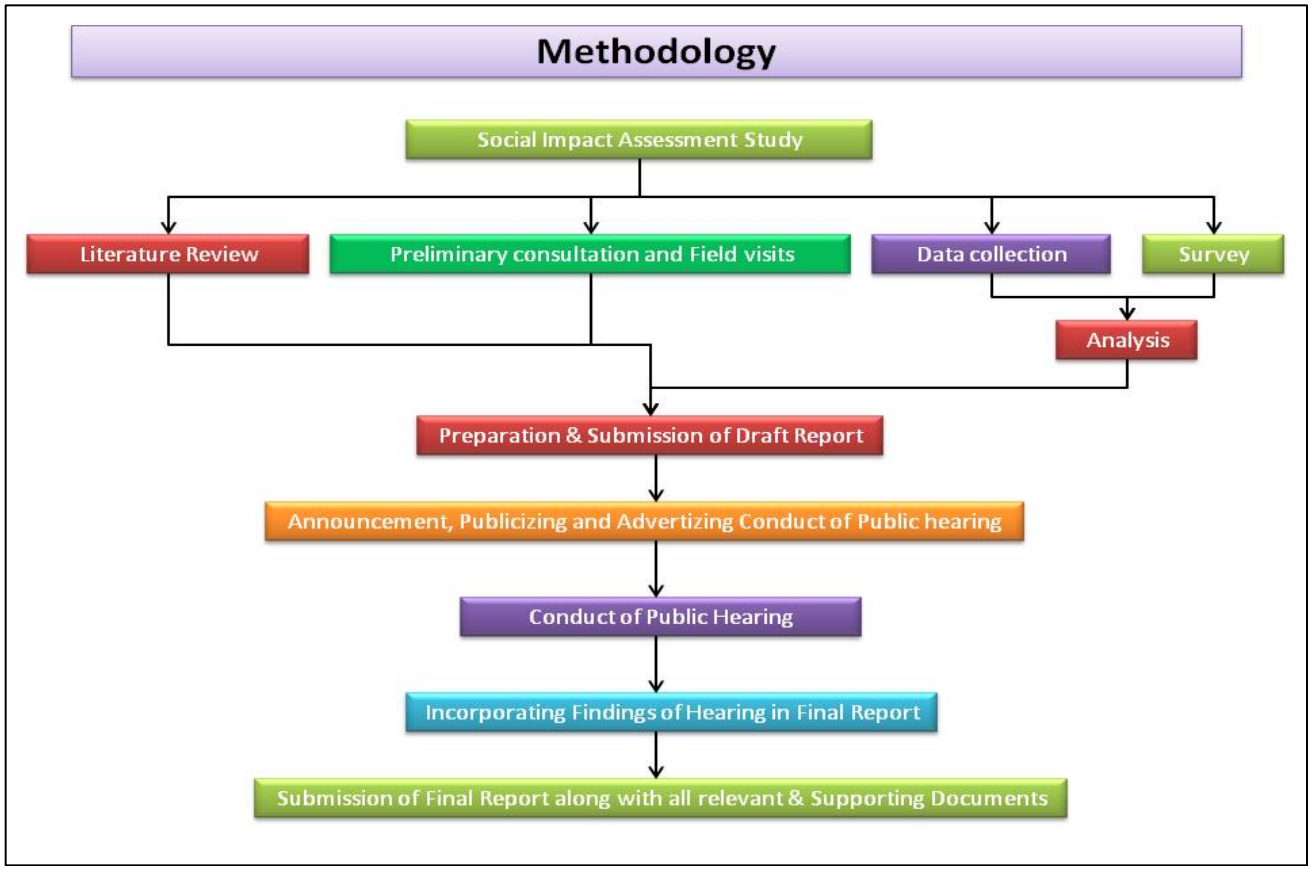
1. Assessment as to whether the proposed acquisition serves the public purpose as per the criteria listed under section 2 of RTFCTLARR Act, 2013.
2. Estimation of affected families and the number of families among them likely to be displaced.
3. Extent of land, public and private, houses, settlements and other common properties likely to be affected by the proposed acquisition.
4. Whether the extent of land proposed for acquisition is the absolute bare minimum extent needed for the project.
5. Whether land acquisition at alternate place has been considered and found not feasible.

6. Study of social impacts of the project, and nature and cost of addressing them and the impact of these cost on the overall costs of the project vis-à-vis the benefits of the project.
7. Preparation of socio-economic and cultural profile of the affected area and resettlement site (if any) as per FORM-II of the HPRTFCTLARR rules,2015.
8. Preparation of a Social Impact Management Plan as per Form III of HPRTFCTLARR rules,2015.

2.2.3 Approach and Methodology

The methodology adopted to conduct social impact assessment and to prepare SIMP is described below. The SIA was prepared in accordance with the RTFCTLARR Act 2013 and HP RTFCTLARR Rules, 2015. Figure below presents the approach and methodology of SIA study in the form of flow chart.

Figure 4: Study Methodology



**Source: Team SIA*

Given below is the detailed methodology that will be adopted to carry out the study.

1. **Analyze Project Context**

- Literature Review
- Secondary data

2. **Identification and Analysis of Stakeholders**

- Secondary data
- Primary data

✓ Site Analysis

✓ Primary Survey (Qualitative and Quantitative Analysis of Various Social, Economic and Environmental Parameters through Indicator Analysis)

3. **Identify Social factors and variables**

- Primary Survey (Qualitative and Quantitative Analysis)
- Focus Group Discussion (Stakeholder Representatives, Concerned Authorities/ Officers)
- Stakeholder Consultation

4. **Data Analysis and Priority Assessment**

- Analysis of Primary and Secondary Data Collected
- Inferences drawn from Focus Group Discussions
- Inferences drawn from Stakeholder Consultation
- Observations from Site Survey

5. **Consult Stakeholders and Develop Mitigation Plans**

- Conducting FGDs and Public Hearings
- Development of Mitigation Plans in pursuance of findings and inferences from FGDs and Public Hearings

6. **Implement Mitigation Plans and Public participation**

- In coordination with implementing agency, concerned authorities/ officers and public participation

7. **Ensure Monitoring with Active Stakeholder Participation and Modify It**

2.2.4 Rationale for The Methodology

Carrying SIA is a time bound study and concerns interest of people who are financially, economically, socially dependent on the land getting acquired for the upcoming project. Above methodology is adopted to carry out the study and ensure, in consultation with institutions of local self-governance and Gram Sabhas established under the Constitution, a humane, participative, informed and transparent process for land acquisition for the upcoming Dhualasidh Hydro Power Project and provide just and fair compensation to the affected families whose land has been proposed to be acquired or are affected by this acquisition and make adequate provisions for such affected persons for their rehabilitation and resettlement and for ensuring that cumulative outcome of the acquisition should be that affected persons become partners in development leading to an improvement in their post-acquisition social and economic status.

2.2.4.1 Identification of the Stakeholders to be Consulted for SIA

A list of all major stakeholders was prepared which would directly or indirectly be affected by the project. The list was then finally divided into three broad categories namely:

1) **Primary Stakeholders:** These included the titleholders of the land to be acquired, their families, those who claim their partnership in the property and those having any kind of livelihood/dependency on the land being acquired.
2) **Secondary Stakeholders:** These includebusiness entities, civil societies/ political/religious/NGOs, Yuvak and Mahila Mandals and local residents of the area. These stakeholders would not be affected by the acquisition directly but there may be an indirect impact on them due to the project.
3) **Institutional Stakeholders:** They include Government; Semi-Government institutes such as Panchayats, DC Office, Police etc. which may directly or indirectly be involved or be impacted by this project.

Identification of the stakeholders is followed by Desk Review. Documents such as RTFCTLARR Act 2013 and HP RTFCTLARR Rules, 2015, R&R Policy, Revenue Maps, District Census Hand Book, District Gazetteer, Maps, Government Employment Schemes and service sectors in which people in the project area areinvolved were collected from government

and non-government sources and reviewed. Collection and review of such pertinent data was primarily to develop understanding about the socio-economic conditions of the concerned area and availability of infrastructure facilities and service delivery system.

2.3 Tools to Collect Information for The Social Impact Assessment

Information to carry out the study was collected from both Primary and Secondary Sources. These sources are discussed in detail in following section:

- **Data from Secondary Sources**

Secondary sources information was collected from a number of quarters such as from Census data, Statistical hand books, concerned departments and other literature. These sources of information complemented the primary data which was elicited through field survey from the affected people and other stakeholders. An understanding was created about the physical, social, economic and cultural set-up of the project area before undertaking detailed field investigations.

- **Primary Source**

Primary data was collected through house hold surveys, field visits and FGDs. Questionnaires and schedules for household survey and focused group discussions were prepared by SIA team and pre tested before finalization to check any possible gap. The questionnaire was administered by professional surveyors/enumerators who were imparted with training by the team leader of SIA. They were taken to the project site for a day for knowing the project area. The emphasis was laid on quality of the data so that the conclusion arrived at would be authentic and reliable. Data collected from the survey was digitized after due scrutiny and logical checks for processing and production of output tables.

- **Preparation of Study tools**

In order to collect authentic information about the primary stakeholdersand intensity of impact on them a structured questionnaire was prepared. The questionnaire covered wide range of qualitative and quantitative information. A draft questionnaire was developed and submitted to the HP SIAU for suggestions and modification. The questionnaire was finalized after pre-testing in the field.

Schedules were prepared to conduct Focused Group Discussions with various stakeholders at Panchayat level to collect information regarding status of available social and physical infrastructure in villages, loss of any common property due to acquisition, education status, health status, employment status, role of women in decision making, etc. including positive and negative project impacts perceived by various stakeholders, their suggestions to enhance the positive impacts and mitigate the negative impacts.

- **Primary Survey**

A survey of primary stakeholders was carried out with the help of a pre structured questionnaire. The aspects covered in the questionnaire were identification particulars of PAFs, social profile, family details, occupation, source of income, family expenditure, household assets, information on affected structure, commercial/self-employment activities, employment pattern, opinion and views of PAFs on project and resettlement and rehabilitation. Most part of the questionnaire has been pre-coded except those reflecting the opinion and views of PAFs, which have been left open-ended.

Figure 5: Pictures Taken During Primary Survey

Figure 5: Pictures Taken During Primary Survey





- **Focused Group Discussion**

One of the aspects of the study was consultations with stakeholders, people's representatives and community leaders. Consultations opened up the line of communication between the stakeholders and the SIA Team. This helped in identifying the impacts perceived by the community.

Figure 6: Pictures Taken During Focused Group Discussions




- **Supervision of Data Collection and Ground Verification**

Supervision of data collection was undertaken by the Core team members and simultaneously ground verification was conducted for five percent of the households covered under socio-economic survey.

2.4 Sampling methodology

For the study, the team aimed to cover all the PAFs as per the list obtained from the Revenue Department. The primary data was generated using both quantitative and qualitative techniques:

- **Quantitative Techniques:** Pre-tested structured questionnaires for HH Survey among primary stakeholders.
- **Qualitative Techniques:** The qualitative techniques included Participatory Rural Appraisal (PRA), Livelihood Analysis, Preference Ranking, Focus Group Discussion (FGD) and Public Consultations.

2.5 Overview of information and data sources used

SIA and SIMP was prepared based on following data and statistics, information collected through field visits and stakeholder consultations as per FORM-II of Right to Fair Compensation and Transparency in Land Acquisition Rehabilitation and Resettlement (Social Impact assessment and Consent) Rules, 2015. Given below are the detail of data sources used to collect the necessary data:

Table 2-3: Overview of information and data sources used

S. No	Information	Primary Source	Secondary Source
A	**Socio-economic and cultural parameters**		
1.	Demographic details of the population in the project area		Census,2011
	Age, gender, caste, religion	Field Survey	Census,2011
	Literacy, health and nutritional status	Field Survey	Census,2011
2.	Poverty levels	Field Survey, FGDs	
3.	Vulnerable groups	Field Survey	
4.	Kinship patterns and women's role in the family	Field Survey	
5.	Social and cultural organization.	FGDs	
6.	Administrative organization.	FGDs	Concerned Government Departments
7.	Political organization.	FGDs	Concerned Government Departments
8.	Civil society organizations and social	FGDs	Concerned Government

S. No	Information	Primary Source	Secondary Source
	movements.		Departments
9.	Land use and livelihood	Field Survey, Field survey	Land Records, Jamabandi Documents
	Agricultural and non-agricultural use	Field Survey, Field survey	Land Records, Revenue Maps, Jamabandi Documents
	Livestock	Field Survey	
	Formal and informal work and employment.	Field Survey, FGDs	SECC data
	Household division of labour and women's work	Field Survey	
	Migration	Field Survey, FGDs	
	Household income levels	Field Survey	
	Livelihood preferences	Field Survey, Stake holder consultation	
	Food security	Field Survey, Stake holder consultation, FGDs	
10.	Local economic activities	Field Survey, Stake holder consultation, FGDs	
	Formal and informal, local industries	Field Survey, Stake holder consultation, FGDs	
	Access to credit	Field Survey, Stake holder consultation, FGDs	
	Wage rates	Field Survey, Stake holder consultation, FGDs	
	Specific livelihood activities women are involved in	Field Survey, Stake holder consultation, FGDs	
11.	Factors that contribute to local livelihoods	Stake holder consultation, FGDs	
	Access to natural resources	Stake holder consultation, FGDs, Field Survey	
	Common property resources Private assets	Stake holder consultation, FGDs, Field Survey	
	Roads, transportation	Stake holder consultation, FGDs, Field Survey	
	Irrigation facilities	Stake holder consultation,	

S. No	Information	Primary Source	Secondary Source
		FGDs, Field Survey	
	Access to markets	Stake holder consultation, FGDs, Field Survey	
	Livelihood promotion programmes	Stake holder consultation, FGDs, Field Survey	
	Co-operatives and other livelihood-related associations	Stake holder consultation, FGDs, Field Survey	
	Quality of the living environment	Stake holder consultation, FGDs, Field Survey	
	Perceptions, aesthetic qualities, attachments and aspirations	Field Survey, Stake holder consultation, FGDs	
	Settlement patterns	Field Survey, FGDs	Land Records, Revenue Maps, Jamabandi Documents
	community and civic spaces	FGDs, Stake holder consultation	
12.	Sites of religious and cultural meaning	FGDs, Field Survey	
	Physical infrastructure (including water supply sewerage systems etc.)	Stake holder consultation, FGDs, Field Survey	
	Public service infrastructure (schools, health facilities, anganwadi centers, public distribution system)	Stake holder consultation, FGDs, Field Survey	
	Safety, crime, violence	Stake holder consultation, FGDs, Field Survey	
	Social gathering points for women.	Stake holder consultation, FGDs, Field Survey	
B	**Key impact areas**		
	Impacts on land, livelihoods and income	Field Survey, FGDs	
	Level and type of employment	Field Survey, FGDs	
	Intra-household employment patterns	Field Survey, FGDs	
	Income levels	Field Survey, FGDs	
1	Food Security	Field Survey, FGDs	
	Standard of living	Field Survey, FGDs	
	Access and control over productive resources	Field Survey, FGDs	
	Economic dependency, or vulnerability	Field Survey, FGDs	

S. No	Information	Primary Source	Secondary Source
	Disruption of local economy	Field Survey, FGDs	
	Impoverishment risks	Field Survey, FGDs	
	Women's access to livelihood alternatives	Field Survey, FGDs	
2	Impact on physical resources	Stake holder consultation, FGDs, Field Survey	
	Impacts on natural resources, soil, air, water, forests	Stake holder consultation, FGDs, Field Survey	
	Pressure on land and common property natural resources for livelihoods	Stake holder consultation, FGDs, Field Survey	
3	Impacts on private assets, public services and utilities	Stake holder consultation, FGDs, Field Survey	
	Capacity of existing health and education facilities	Stake holder consultation, FGDs, Field Survey	
	Capacity of housing facilities	Stake holder consultation, FGDs, Field Survey	
	Pressure on supply of local services.	Stake holder consultation, FGDs, Field Survey	
	Adequacy of electrical and water supply, roads, sanitation and waste management system	FGDs, Field Survey	
	Impact on private assets such as bore wells, temporary sheds etc.	Field Survey, FGDs	
4	Health impacts	Field Survey, FGDs, Stakeholder Consultation	
	Health impacts due to project activities with a special emphasis on: (i) Impact on women's health (ii) Impact on the elderly	Field Survey, FGDs, Stakeholder Consultation	
5	Impacts on culture and social cohesion	Field Survey, FGDs, Stakeholder Consultation	
	Demographic changes		Census Data
	Shifts in the economy-ecology balance	Field Survey, FGDs, Stakeholder Consultation	
	Impacts on the norms, beliefs, values and cultural life	Field Survey, FGDs, Stakeholder Consultation	
	Crime and illicit activities	Field Survey, FGDs,	

S. No	Information	Primary Source	Secondary Source
		Stakeholder Consultation	
	Stress of dislocation	Field Survey, FGDs, Stakeholder Consultation	
	Impact of separation of family cohesion	Field Survey, FGDs, Stakeholder Consultation	
6	Impact at different stages of the project cycle.	Field Survey, FGDs, Stakeholder Consultation	
	Pre-construction phase • Interruption in the delivery of services • Drop in productive investment • Land speculation • Stress of uncertainty	Field Survey, FGDs, Stakeholder Consultation	
	Construction phase • Displacement and relocation • Influx of migrant construction workforce • Health impacts on those who continue to live close to the construction site	Field Survey, FGDs, Stakeholder Consultation	
	Operation phase • Reduction in employment opportunities compared to the construction phase • Economic benefits of the project • Benefits on new infrastructure	Field Survey, FGDs, Stakeholder Consultation	
	De-commissioning phase • Loss of economic opportunities • Environmental degradation and its impact on livelihoods	Field Survey, FGDs, Stakeholder Consultation	
	Direct and indirect impacts	Field Survey, FGDs, Stakeholder Consultation	

S. No	Information	Primary Source	Secondary Source
	Differential impacts • Vulnerability mapping and impact on women, children, the elderly and the different abled	Field Survey, FGDs, Stakeholder Consultation	
	Cumulative impacts • Measurable and potential impacts of other projects in the area along with the identified impacts for the project in question • Impact on those not directly in the project area but based locally or even regionally.	Field Survey, FGDs, Stakeholder Consultation	

**Source: Team SIA*

2.6 Schedule of consultations with key stakeholders and brief description of public hearings conducted

Public hearings will be conducted after submission of the draft report and consequently the schedules of consultations with key stakeholders and description will be incorporated in the final report.

3 Land Assessment

This chapter focuses on the details of total land to be acquired by the Dhaulasidh HEP including the location, total land requirement for various activities under the project and intended use of the land to be purchased under different panchayats. Available maps and primary sources including the primary survey are used to explore the nature, present use and classification of the land. A brief description on the ownership pattern, transfer and use of land for the last three years was also assessed.

3.1 Information from the Land Inventories and Primary Sources

The details of the total land required for DSHEP in different panchayats across Hamirpur and Kangara district is given in the below table:

Table 3-1: Land Inventories (Ha)

District	Tehsil	Panchayat	S.No	Village	Total Owners	Private Land Under Acquisition	Government Land Required for Project	Forest Land Required for Project	Total Land Required for Project	No of Families Getting Displaced
						In Hectares				
Hamirpur	Sujanpur	Sujanpur	1	Sujanpur	453	5.28	0.5914	0	5.87	1
			2	Balla Girthan	504	3.31	0	0	3.31	Nil
		Karot	3	Loungani	159	7.12	5.8867	0	13.00	Nil
			4	Mathaan	43	2.39	4.7539	0	7.14	Nil
			5	Balehu	26	4.14	1.1405	2.3539	7.63	Nil
			6	Dhaner	_	0.00	0.4819	0	0.48	Nil
			7	Baari	_	0.00	0.0806	0.2458	0.33	Nil
		Banal	8	Sarohal	68	2.54	0	0	2.54	Nil
		Chamiyana	9	Bharmad	2	4.01	0	0	4.01	Nil
			10	Garodu Bulla	9	0.02	0.0826	0	0.11	Nil
		Darla	11	Gaagla	77	2.52	0.8486	0	3.37	Nil
			12	Chauki	40	1.09	0	0	1.09	5
			13	Ropa	22	0.39	0.4992	0	0.89	Nil
			14	Mihadpura	24	0.35	1.296	0	1.64	Nil
			15	Bhadriana	148	2.80	1.2864	0	4.08	Nil
			16	Miyana	57	1.66	0.1382	0	1.80	Nil
			17	Haar	27	0.10	1.6915	0	1.80	Nil
			18	Darla	127	4.10	0.071	0	4.17	Nil

District	Tehsil	Panchayat	S.No	Village	Total Owners	Private Land Under Acquisition	Government Land Required for Project	Forest Land Required for Project	Total Land Required for Project	No of Families Getting Displaced
						In Hectares				
			19	Gaahlian	64	1.74	0.0749	0	1.81	Nil
			20	Matiyaal	_		0.839	0	0.84	Nil
			21	Kharsal	_	0	0.6854	0	0.69	Nil
		Tihra	22	Thira	25	0.67	1.8528	0	2.52	Nil
		Bhagehda	23	Bagehra Bulla	52	30.05	0	0	30.05	Nil
		Dhabriana	24	Riah	91	15.14	0	0	15.14	Nil
		Jol	25	Kaach	2	0.02	0	0	0.02	Nil
			26	Birh Khas	11	1.24	0	0	1.24	Nil
			27	Samouna	111	5.34	0.5434	0	5.89	Nil
			28	Palahi	162	37.95	0.3341	0	38.29	Nil
			29	Pargana	149	3.34	0.2304	0	3.57	7
	Nadaun	Choru	30	Jangal Mehdooda Mehfooja Jeehan	20	12.28	0	14.3808	26.66	Nil
Kangara	Alampur	Alampur	31	Alampur	19	0.30	0.3889	1.687	2.37	Nil
			32	Baag	201	46.91	0.0188	0	46.93	Nil
		J Roop Nagar	33	J Roop Nagar		0	2.5	0	2.50	Nil
		Jangal	34	Sai	63	0.08	0.0664	0.4096	0.56	Nil
			35	Bir	16	0.15	0	0	0.15	Nil
		Lahru	36	Bhalunder	202	3.13	0.0252	3.6226	6.78	Nil
		Kuhan	37	Dali	61	2.13	0.037	0	2.17	Nil
		Sakoh	38	Layunda	28	0.12	0	0	0.12	Nil
		Balakroopi	39	Dadu	63	2.32	0	1.4062	3.73	Nil
			40	Nichali Bheri	212	10.45	0.4171	1.3051	12.17	Nil
			41	Paprola	58	0.25	0	0.6382	0.89	Nil
	Majheen	Tipri	42	Chowki	130	17.97	0.291	2.0775	20.34	Nil
			43	Kiyod	66	0.20	0	0	0.20	Nil
			44	Tippri	28	1.74	0	0	1.74	Nil
			45	Bulli	64	10.85	1.1663	3.1461	15.17	Nil
			46	Bandour	_	0.00	0	25.692	25.69	Nil

District	Tehsil	Panchayat	S.No	Village	Total Owners	Private Land Under Acquisition	Government Land Required for Project	Forest Land Required for Project	Total Land Required for Project	No of Families Getting Displaced
						In Hectares				
		Kuhan	47	Kuhan Khas	–	0.00	0	0.7717	0.77	Nil
Total					**3684**	**246.8062**	**28.32**	**57.74**	**332.87**	**13**

**Source: Department of Land Records & Revenue*

Out of total 47 villages under project impact, in 40 villages private land is being acquired.

Out of total 332.87 hectare of land require for project, 246.8062 hectare (74%) is private land, 28.32 hectare (9%) is government land and 57.74hectare (17%) is forest land.

Total 3684 titleholders are losing their land under acquisition out of which 2473 are from district Hamirpur and 1211 are from district Kangara.1 PAF from Sujanpur, 5 from Chawki, 7 from Pargana are getting displaced due to acquisition.

3.2 Entire area of impact under the influence of theproject

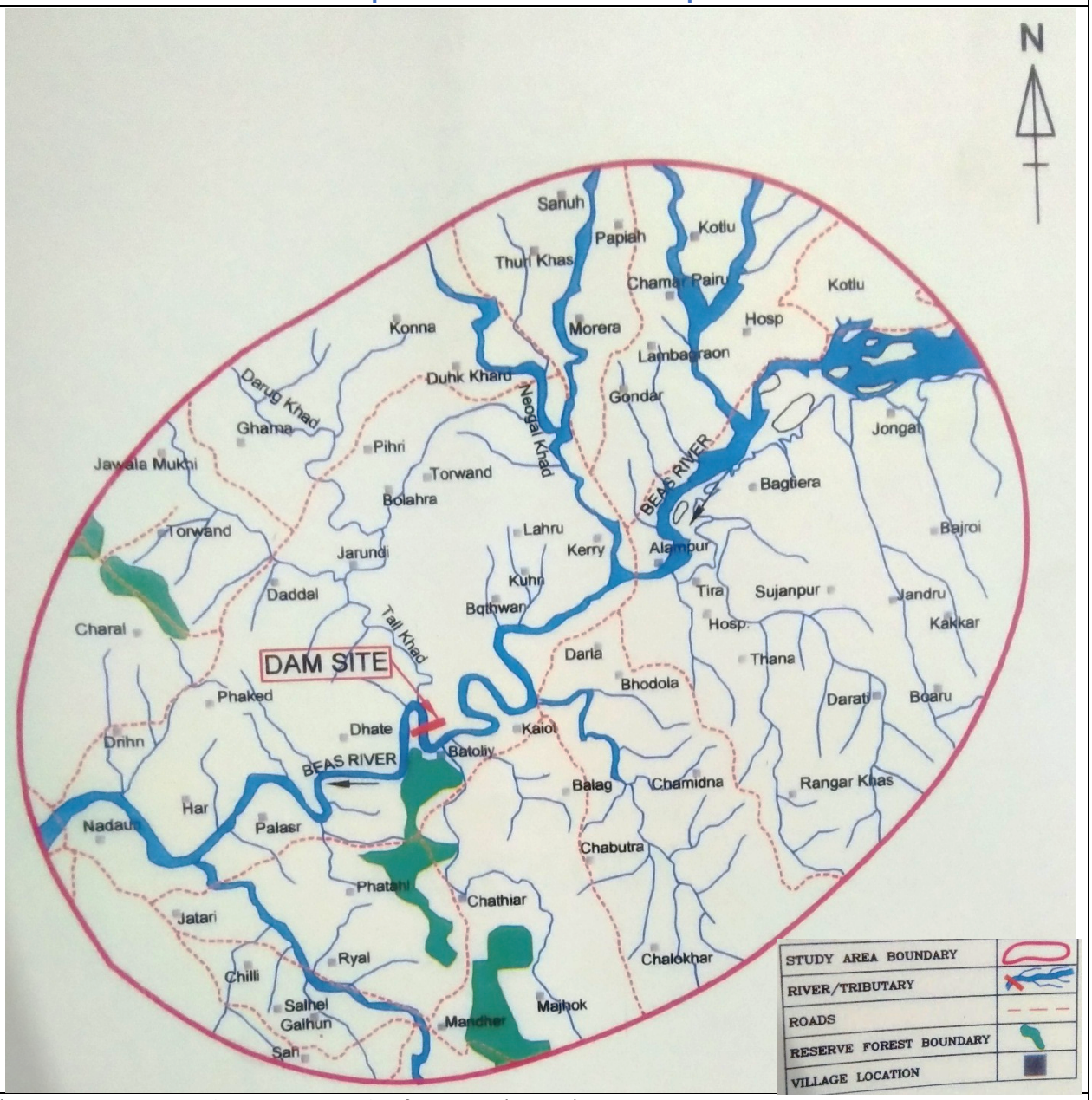
The total land requirement for DSHEP is 332.87 Ha. Entire private land is getting submerged. Out of the total forest land, 10.11% is required for the construction of Dam complex and nearby facilities, 7.07% will be utilized for the construction of new roads. Out of the total government land required for project, 91.26% will be submerged, 8.47% will be used as dumping sites and remaining will be utilized for construction of new roads for better connectivity of project site. Table given below shows the total government and private land under impact and its intended use:

Table 3-2:Area requirement Under Various Project Components (Ha)

S. No.	Component	Forest Land	Government Land	Private Land	Total
1	Diversion Tunnel	0.20	-	-	0.20
2	Dam Complex and nearby facilities	5.84	-	-	5.84
3	Power House	0.30	-	-	0.30
4	Pen Stock	0.75	-	-	0.75
5	Tail Race	0.50	-	-	0.50
6	Pot Head Yard	0.40	-	-	0.40
7	Dumping site	1.08	2.40	-	3.48
8	Road Bridges	4.08	0.07	-	4.15
9	Submergence	44.60	25.85	246.8062	316.64
Total		**57.74**	**28.32**	**246.8062**	**332.87**

**Source: DPR, DSHEP.*

Map 3-1: Entire Area Under Impact



**Source: Environmental Management Plan for DSHEP (66MW)*

Figure 7: Area under impact

**Source: Field Survey.*

3.3 Total Land requirement for the project

The selected land measures 332.87 Ha in total.It covers a total of 46 villages across two districts namely Hamirpur and Kangara. Given below is the breakup of the total land requiredin both the districts:

Table 3-3: Total Land requirement for project (Ha)

District	Tehsil	Panchayat	S.No	Village	Private Land Under Acquisition	Government Land	Forest Land	Total Land
Hamirpur	Sujanpur	Sujanpur	1	Sujanpur	5.28	0.5914	0	5.87
			2	Balla Girthan	3.31	0	0	3.31
		Karot	3	Loungani	7.12	5.8867	0	13.00
			4	Mathaan	2.39	4.7539	0	7.14

District	Tehsil	Panchayat	S.No	Village	Private Land Under Acquisition	Government Land	Forest Land	Total Land
			5	Balehu	4.14	1.1405	2.3539	7.63
			6	Dhaner	0.00	0.4819	0	0.48
			7	Baari	0.00	0.0806	0.2458	0.33
		Banal	8	Sarohal	2.54	0	0	2.54
		Chamiyana	9	Bharmad	4.01	0	0	4.01
			10	Garodu Bulla	0.02	0.0826	0	0.11
		Darla	11	Gaagla	2.52	0.8486	0	3.37
			12	Chauki	1.09	0	0	1.09
			13	Ropa	0.39	0.4992	0	0.89
			14	Mihadpura	0.35	1.296	0	1.64
			15	Bhadriana	2.80	1.2864	0	4.08
			16	Miyana	1.66	0.1382	0	1.80
			17	Haar	0.10	1.6915	0	1.80
			18	Darla	4.10	0.071	0	4.17
			19	Gaahlian	1.74	0.0749	0	1.81
			20	Matiyaal		0.839	0	0.84
			21	Kharsal	0	0.6854	0	0.69
		Tihra	22	Thira	0.67	1.8528	0	2.52
		Bhagehda	23	Bagehra Bulla	30.05	0	0	30.05
		Dhabriana	24	Riah	15.14	0	0	15.14
		Jol	25	Kaach	0.02	0	0	0.02
			26	Birh Khas	1.24	0	0	1.24
			27	Samouna	5.34	0.5434	0	5.89
			28	Palahi	37.95	0.3341	0	38.29
			29	Pargana	3.34	0.2304	0	3.57
	Nadaun	Choru	30	Jangal Mehdooda Mehfooja Jeehan	12.28	0	14.3808	26.66
Kangara	Alampur	Alampur	31	Alampur	0.30	0.3889	1.687	2.37
			32	Baag	46.91	0.0188	0	46.93
		J Roop Nagar	33	J Roop Nagar	0	2.5	0	2.50
		Jangal	34	Sai	0.08	0.0664	0.4096	0.56

District	Tehsil	Panchayat	S.No	Village	Private Land Under Acquisition	Government Land	Forest Land	Total Land
			35	Bir	0.15	0	0	0.15
		Lahru	36	Bhalunder	3.13	0.0252	3.6226	6.78
		Kuhan	37	Dali	2.13	0.037	0	2.17
		Sakoh	38	Layunda	0.12	0	0	0.12
		Balakroopi	39	Dadu	2.32	0	1.4062	3.73
			40	Nichali Bheri	10.45	0.4171	1.3051	12.17
			41	Paprola	0.25	0	0.6382	0.89
	Kundian	Tipri	42	Chauki	17.97	0.291	2.0775	20.34
			43	Kiyod	0.20	0	0	0.20
			44	Tippri	1.74	0	0	1.74
			45	Bulli	10.85	1.1663	3.1461	15.17
			46	Bandour	0.00	0	25.692	25.69
		Kuhan	47	Kuhan Khas	0.00	0	0.7717	0.77
Total					**246.8062**	**28.32**	**57.74**	**332.87**

**Source: Satluj Jal Vidyut Nigam (SJVN)*

3.4 Land Already Purchased, Alienated, Leased/Acquired, And the Intended Use for Each Plot of Land Required for The Project

The Requiring Body has not purchased or taken lease of any land for the project activities.
A total of 1165 khasras having a total area of 246.8062 Ha is getting acquired for DSHEP. All the private land under acquisition will be submerged and only 4 kasras in Village Jangal Mehdooda Mehfooja Jeehan of district Hamirpur, having a total area of 9.95 Ha are a part of Dam and Power House site. Given below are the details of these khasras:

Table 3-4: Use of Acquired Land

District	Panchayat	Village	Khasra No	Titleholder	Area (Ha)	Type of Land
Hamirpur	Choru	Jangal Mehdooda Mehfooja Jeehan	1/1 31/1 57/1 57/1/1 Total-4	Ripu Daman Singh s/o Raja Rajinder Singh s/o Raja Mohinder Singh r/o Bela Mouja Jalari	0-22-20 9-25-04 0-35-85 0-11-39 9-94-48	GairMumkin Daria GairMumkin Daria Gair Mumkin Khad Banjar Kadim

**Source: Satluj Jal Vidyut Nigam (SJVN)*

3.5 Quantity and location of land proposed to beacquired for theproject

DhaulasidhHEP requires acquisition of 246.8062Ha of private land across40 villages of Hamirpur and Kangara districts comprising a total of 1165 khasras. Given below is a detailed list of quantity and location of the land proposed for acquisition:

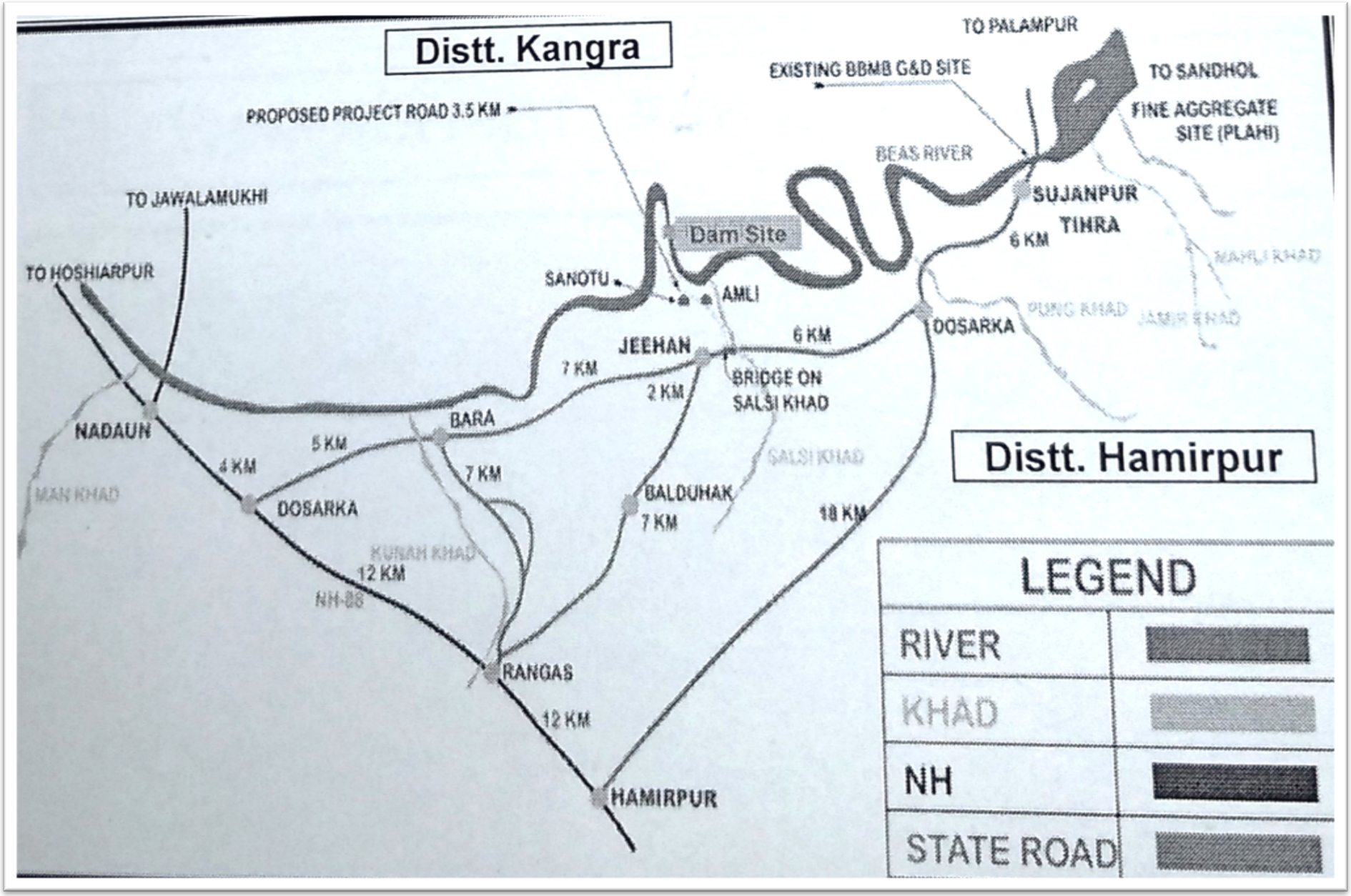
Table 3-5: Quantity of Land Under Acquisition

District	Tehsil	Panchayat	S. No	Village	No of Khasras	Private Land Under Acquisition (Ha)
Hamirpur	Sujanpur	Sujanpur	1.	Sujanpur	46	5.28
			2.	Balla Girthan	25	3.31
		Karot	3.	Loungani	65	7.12
			4.	Mathaan	29	2.39
			5.	Balehu	16	4.14
		Banal	6.	Sarohal	14	2.54
		Chamiyana	7.	Bharmad	6	4.01
			8.	Garodu Bulla	4	0.02
		Darla	9.	Gaagla	64	2.52
			10.	Chauki	4	1.09
			11.	Ropa	15	0.39
			12.	Mihadpura	7	0.35
			13.	Bhadriana	28	2.80
			14.	Miyana	18	1.66
			15.	Haar	4	0.10
			16.	Darla	31	4.10
			17.	Gaahlian	16	1.74
		Tihra	18.	Thira	4	0.67
		Bhagehda	19.	Bagehra Bulla	15	30.05
		Dhabriana	20.	Riah	39	15.14
		Jol	21.	Kaach	1	0.02
			22.	Birh Khas	5	1.24
			23.	Samouna	38	5.34
			24.	Palahi	80	37.95
			25.	Pargana	48	3.34

District	Tehsil	Panchayat	S. No	Village	No of Khasras	Private Land Under Acquisition (Ha)
	Nadaun	Choru	26.	Jangal Mehdooda Mehfooja Jeehan	22	12.28
Kangara	Alampur	Alampur	27.	Alampur	4	0.30
			28.	Baag	79	46.91
		Jangal	29.	Sai	5	0.08
			30.	Bir	2	0.15
		Lahru	31.	Bhalunder	45	3.13
		Kuhan	32.	Dali	30	2.13
		Sakoh	33.	Layunda	4	0.12
		Balakroopi	34.	Dadu	17	2.32
			35.	Nichali Bheri	79	10.45
			36.	Paprola	6	0.25
	Majheen	Tipri	37.	Chowki	160	17.97
			38.	Kiyod	11	0.20
			39.	Tippri	9	1.74
			40.	Bulli	70	10.85
Total					**1165**	**246.8062**

**Source: Satluj Jal Vidyut Nigam (SJVN)*

Map 3-2: Location for Proposed Acquisition



3.6 Nature, Present Use and Classification of Land

Out of the total private land which is getting acquired across both the districts under the project, 91% is uncultivated and only 9% is cultivated. In Hamirpur district out of the total land under acquisition 91% of land is uncultivated and 9% of land under acquisition is cultivated. Similarly, in Kangara district also out of the total land under acquisition91% of land is uncultivated and 9% of land is cultivated. Table below gives cropping pattern and types of crops in both the districts:

Table 3-6: Present Use of Land Under Acquisition

Category	Type of Land	Hamirpur	Kangara	Total
		Area (Ha)		
Cultivated	Barani Ek Fasli	2.83	1.89	4.71
	Barani Do Fasli/ Avval	5.54	5.07	10.61
	Nehri Avval/ Kohli	0.08	0.00	0.08
	Nehri Dom/ Kohli Doyam	5.19	1.92	7.11
	Orchards	0.00	0.28	0.28
	Total Cultivated	**13.63**	**9.15**	**22.78**
Uncultivated	Behad Banjar, Banjar Jadeed	4.20		4.20
	Banjar Kadeem	6.52	4.14	10.67
	Ghasni	23.39	17.34	40.73
	Gair Mumkin Bheth, Khadd,Gharat/ Kuhal, Khatekal	10.38	27.19	37.57
	Gair Mumkin Nala	2.03	0.00	2.03
	Gair Mumkin Dariya Sappad, Patthar	89.63	38.58	128.21
	Total Uncultivated	**136.15**	**87.26**	**223.41**
Total		**149.78**	**96.41**	**246.8062**

**Source: Satluj Jal Vidyut Nigam (SJVN)*

3.6.1 Irrigation Pattern

No proper irrigation facility was found in the project area during the survey. Farmers are mainly dependent on rainfall and in few cases, irrigation is carried out at miniscule level through pump houses.

25 of these Water Tank/IPH Scheme/pump -houses are getting impacted due to acquisition.

3.7 Size of Holdings, Ownership Patterns

Out of total 3684 title holders in district Hamirpur and Kangara whose land/property is getting acquired for the project. Table given below shows a distribution of village wise khasras having single and joint owners:

Table 3-7: Holding Size and Pattern

District	Tehsil	Panchayat	S.No	Village	No of Khasras	Private Land Under Acquisition	Total Owners LR	No of Single owners	Multiple Owners
Hamirpur	Sujanpur	Sujanpur	1	Sujanpur	46	5.28	453	5	448
			2	Balla Girthan	25	3.31	504	0	504
		Karot	3	Loungani	65	7.12	159	6	153
			4	Mathaan	29	2.39	43	1	42
			5	Balehu	16	4.14	26	3	23
		Banal	6	Sarohal	14	2.54	68	1	67
		Chamiyana	7	Bharmad	6	4.01	2	2	0
			8	Garodu Bulla	4	0.02	9	0	9
		Darla	9	Gaagla	64	2.52	77	1	76
			10	Chauki	4	1.09	40	0	40
			11	Ropa	15	0.39	22	2	20
			12	Mihadpura	7	0.35	24	3	21
			13	Bhadriana	28	2.80	148	1	147
			14	Miyana	18	1.66	57	3	54
			15	Haar	4	0.10	27	0	27
			16	Darla	31	4.10	127	3	124
			17	Gaahlian	16	1.74	64	0	64
		Tihra	18	Thira	4	0.67	25	0	25
		Bhagehda	19	Bagehra Bulla	15	30.05	52	1	51
		Dhabriana	20	Riah	39	15.14	91	13	78
		Jol	21	Kaach	1	0.02	2	0	2
			22	Birh Khas	5	1.24	11	0	11
			23	Samouna	38	5.34	111	5	106
			24	Palahi	80	37.95	162	9	153
			25	Pargana	48	3.34	149	8	141
	Nadaun	Choru	26	Jangal Mehdooda Mehfooja Jeehan	22	12.28	20	1	19
Kangra	Alampur	Alampur	27	Alampur	4	0.30	19	3	16
			28	Baag	79	46.91	201	8	193
		Jangal	29	Sai	5	0.08	63	0	63

District	Tehsil	Panchayat	S.No	Village	No of Khasras	Private Land Under Acquisition	Total Owners LR	No of Single owners	Multiple Owners
			30	Bir	2	0.15	16	0	16
		Lahru	31	Bhalunder	45	3.13	202	12	190
		Kuhan	32	Dali	30	2.13	61	2	59
		Sakoh	33	Layunda	4	0.12	28	1	27
		Balakroopi	34	Dadu	17	2.32	63	6	57
			35	Nichali Bheri	79	10.45	212	16	196
			36	Paprola	6	0.25	58	0	58
	Majheen	Tipri	37	Chouki	160	17.97	130	12	118
			38	Kiyod	11	0.20	66	0	66
			39	Tippri	9	1.74	28	2	26
			40	Bulli	70	10.85	64	0	64
Total					**1165**	**246.8062**	**3684**	**130**	**3554**

**Source: Land Records, Revenue Department*

As shown in the table above out of total 3684titleholders in 40 villages under acquisition, only 130 have single ownership and 3554 have joint ownership.

Table 3-8: Ownership Pattern

S. No	District	Total Owners	Joint Ownership	Single ownership
1	Hamirpur	2473	2405	68
2	Kangara	1211	1149	62
Total		3684	3554	130

**Source: Land Records, Revenue Department*

There is a preponderance of marginal land holdings in the entire project area. Out of total 3684 titleholders, 96% have land having area less than 0.25Ha, 2.74% have land having area between 0.25 ha to 0.5Ha, 0.6% have land with area between 0.5Ha to 1.0 Ha which is getting acquired for the project.

Table 3-9: Size of Holdings

Category	No of Holdings	Percentage
Sum of Marginal (Below .25 Ha)	3540	96.09%
Sum of Marginal (0.25 ha to 0.5Ha)	101	2.74%
Sum of Marginal (0.5Ha to 1.0 Ha)	23	0.62%

Category	No of Holdings	Percentage
Sum of Small (1.0 Ha to 2.0) Ha	16	0.43%
Sum of Semi Medim (2.0 Ha to 4.0 Ha)	2	0.05%
Sum of Medium (4.0 Ha to 10.0 Ha)	2	0.05%
Count of Large (above 10.0 Ha)	0	0.00%
Total	**3684**	100.00%

**Source: Department of Land Records & Revenue*

3.8 Land Distribution and Number of Residential Houses

There are total 2473 and 1211 titleholders in Hamirpur and Kangara districts respectively. Total 644 Khasras having a total area of 149.59Ha from district Hamirpur and 521 Khasras having a total area of 96.6Ha from district Kangara are getting acquired for the DSHEP Project. Total 10 residential structureswith 13PAFsare coming under acquisition, 5 from district Hamirpur and 5 from district Kangara.

Table given below gives a detailed distribution of land (village wise) in both the districts:

Table 3-10: Land Distribution and Number of Residential Structures

District	Tehsil	Panchayat	S.No	Village	Total Owners LR	No of Khasras	Private Land Under Acquisition	No ofResidential Structures	No of PAFs
Hamirpur	Sujanpur	Sujanpur	1	Sujanpur	453	46	5.28	1	1
			2	Balla Girthan	504	25	3.31	Nil	Nil
		Karot	3	Loungani	159	65	7.12	Nil	Nil
			4	Mathaan	43	29	2.39	Nil	Nil
			5	Balehu	26	16	4.14	Nil	Nil
		Banal	6	Sarohal	68	14	2.54	Nil	Nil
		Chamiyana	7	Bharmad	2	6	4.01	Nil	Nil
			8	Garodu Bulla	9	4	0.02	Nil	Nil
		Darla	9	Gaagla	77	64	2.52	Nil	Nil
			10	Chouki	40	4	1.09	Nil	Nil
			11	Ropa	22	15	0.39	Nil	Nil
			12	Mihadpura	24	7	0.35	Nil	Nil
			13	Bhadriana	148	28	2.80	Nil	Nil
			14	Miyana	57	18	1.66	Nil	Nil

District	Tehsil	Panchayat	S.No	Village	Total Owners LR	No of Khasras	Private Land Under Acquisition	No ofResidential Structures	No of PAFs
			15	Haar	27	4	0.10	Nil	Nil
			16	Darla	127	31	4.10	Nil	Nil
			17	Gaahlian	64	16	1.74	Nil	Nil
		Tihra	18	Thira	25	4	0.67	Nil	Nil
		Bhagehda	19	Bagehra Bulla	52	15	30.05	Nil	Nil
		Dhabriana	20	Riah	91	39	15.14	Nil	Nil
		Jol	21	Kaach	2	1	0.02	Nil	Nil
			22	Birh Khas	11	5	1.24	Nil	Nil
			23	Samouna	111	38	5.34	Nil	Nil
			24	Palahi	162	80	37.95	Nil	Nil
			25	Pargana	149	48	3.34	4	7
	Nadaun	Choru	26	Jangal Mehdooda Mehfooja Jeehan	20	22	12.28	Nil	Nil
Kangara	Alampur	Alampur	27	Alampur	19	4	0.30	Nil	Nil
			28	Baag	201	79	46.91	Nil	Nil
		Jangal	29	Sai	63	5	0.08	Nil	Nil
			30	Bir	16	2	0.15	Nil	Nil
		Lahru	31	Bhalunder	202	45	3.13	Nil	Nil
		Kuhan	32	Dali	61	30	2.13	Nil	Nil
		Sakoh	33	Layunda	28	4	0.12	Nil	Nil
		Balakroopi	34	Dadu	63	17	2.32	Nil	Nil
			35	Nichali Bheri	212	79	10.45	Nil	Nil
			36	Paprola	58	6	0.25	Nil	Nil
	Kundian	Tipri	37	Chowki	130	160	17.97	5	5
			38	Kiyod	66	11	0.20	Nil	Nil
			39	Tippri	28	9	1.74	Nil	Nil
			40	Bulli	64	70	10.85	Nil	Nil
Total					**3684**	**1165**	**246.8062**	**10**	**13**

**Source: Satluj Jal Vidyut Nigam (SJVN), Field Survey*

3.9 Land Prices and recent changes in ownership and transfers

The circle rates for the last three years (2016-17, 2017-18 and 2018-19) were obtained from the Revenue Department for the below mentioned categories:[15]

1. **Category-I (0-25 mtr):** Property/Land in which any point of the concerned Khasra Number or part thereof is land up to a distanceof 25 meters from a road.
2. **Category-II(20% < Base Rate)(25-50 mtr):** Property/Land in which no point of the concerned Khasra Number or part thereof is 25 to 50 meters from such road.
3. **Category-III(40% < Base Rate)(50-100 mtr):**Property/Land in which no point of the concerned Khasra Number or part thereof is 50 to 100 meters from such road.
4. **Category-IV(50% < Base Rate)(100-1000 mtr):** Property/Land in which no point of the concerned Khasra Number or part thereof is 100 to 1000 meters from such road.
5. **Category-V(60% < Base Rate)(>1000 mtr):** Property/Land in which no point of the concerned Khasra Number or part thereof is 1000 meters or more from such road.

The various rates are available for each sub-category of cultivated and non-cultivated lands situated at varied distance from the National Highway, State Highway or Other Roads.
The prices for cultivated and non-cultivated lands in different villages under the respective Patwar Circle are presented in the below table. The presented circle rates are highest among the prevailing rates over the last three years.

Table 3-11: Highest Circle Rate 2017 to 2020 (District Kangara)

District Kangra			Area in Sq. m									
Sr.No	**Village**	**Road type**	**Category-1 (0-25)**		**Category-II (25-50)**		**Category-III(50-100)**		**Category-IV(100-1000)**		**Category-V(>1000)**	
					(20%< Base Rate)		**(40%< Base Rate)**		**(50%< Base Rate)**		**(60%< Base Rate)**	
			Cult	**Uncult**	**Cult**	**Uncult**	**Cult**	**Uncult**	**Cult**	**Uncult**	**Cult**	**Uncult .**
1.	Tipri	Other road	1500	1250	1200	1000	900	750	750	**625**	600	500
2.	Bulli	Other road	1500	1250	1200	1000	900	750	750	**625**	600	500
3.	Kiyod	Other road	1500	1250	1200	1000	900	750	750	**625**	600	500
4.	Chowki	Other road	1500	1250	1200	1000	900	750	900	**750**	600	500
5.	Bir	Other road	1172	977	938	782	703	586	586	488	469	391
6.	Nichali Bheri	Other road	185	154	148	123	111	92	92	77	74	62

[15](Himachal Pradesh Department of Revenue, n.d.)

District Kangra			Area in Sq. m									
Sr.No	Village	Road type	Category-1 (0-25)		Category-II (25-50) (20%< Base Rate)		Category-III(50-100) (40%< Base Rate)		Category-IV(100-1000) (50%< Base Rate)		Category-V(>1000) (60%< Base Rate)	
			Cult	Uncult	Cult	Uncult	Cult	Uncult	Cult	Uncult	Cult	Uncult.
7.	Sai	Other road	1172	977	938	782	703	586	586	488	469	340
8.	Paprola	Other road	1019	849	815	679	611	509	509	424	408	340
9.	Alampur	Other road	980	817	784	654	588	490	490	408	392	327
10	Baag	Other road	980	817	784	654	588	490	490	408	392	327
11	Dali	Other road	302	252	242	202	181	151	151	126	121	101
12	Bhulander	Other road	185	154	148	123	111	92	92	77	74	62
13	Layunda	Other road	852	710	682	568	511	426	426	355	341	284
14	Dadu	Other road	185	154	148	123	111	92	92	77	74	62

**Source: Department of Revenue and Land Records*

Table 3-12: Highest Circle Rate 2017 to 2020 (District Hamirpur)

District Hamirpur			Area in Sq. m									
Sr.No.	Village	Road type	Category-1 (0-25)		Category-II (25-50) (20%< Base Rate)		Category-III(50-100) (40%< Base Rate)		Category-IV(100-1000) (50%< Base Rate)		Category-V(>1000) (60%< Base Rate)	
			Cult	Uncult	Cult	Uncult	Cult	Uncult	Cult	Uncult	Cult	Uncult.
1	Jangal Jeehan	State Highway	1650	1375	1320	1100	990	825	825	**688**	660	550
		Other road	600	500	480	400	360	300	300	**250**	240	200
2	Sujanpur	Class-II	8250	7100	6816	5680	5112	4260	4260	3550	3408	2840
3	Balla Girthan	Class-II	7320	6100	5856	4880	4392	3660	3660	3050	2928	2440
4	Riyah	Other road	600	500	480	400	360	300	300	250	240	200
5	Tihra	Other road	858	715	686	572	515	429	429	358	343	286
6	Baghera Bulla	Other road	900	750	720	600	540	450	450	375	360	300
7	Samouna	Other road	480	400	384	320	288	240	240	200	192	160
8	Palahi	Other road	660	550	528	440	396	330	330	275	264	220

District Hamirpur			Area in Sq. m									
Sr.No.	Village	Road type	Category-1 (0-25)		Category-II (25-50) (20%< Base Rate)		Category-III(50-100) (40%< Base Rate)		Category-IV(100-1000) (50%< Base Rate)		Category-V(>1000) (60%< Base Rate)	
			Cult	Uncult	Cult	Uncult	Cult	Uncult	Cult	Uncult	Cult	Uncult.
9	Pargana	Other road	600	500	480	400	360	300	300	250	240	200
10	Kaach	Other road	624	520	499	416	374	312	312	260	250	208
11	Bir Khas	Other road	660	550	528	440	396	330	330	275	264	220
12	Darla	State Highway	1584	1320	1267	1056	950	792	792	660	634	528
		Other road	930	575	744	620	558	465	465	388	372	310
13	Miharpura	State Highway	1320	1100	1056	880	792	660	660	550	528	440
		Other road	840	700	672	560	504	420	420	350	336	280
14	Miana	Other road	540	450	432	360	324	270	270	225	216	180
15	Gaagla	Other road	540	450	432	360	324	270	270	225	216	180
16	Haar	Other road	540	450	432	360	324	270	270	225	216	180
17	Chowki	Other road	540	450	432	360	324	270	270	225	216	180
18	Loungani	Other road	600	500	480	400	360	300	300	250	240	200
19	Mathaan	Other road	600	500	480	400	360	300	300	250	240	200
20	Balehu	Other road	600	500	480	400	360	300	300	250	240	200
21	Ghalian	State highway	960	800	768	640	576	480	480	400	384	320
		Other road	720	600	576	480	432	360	360	300	228	240
22	Ropa	Other road	720	600	576	480	432	360	360	300	228	240
23	Sarohal	State highway	960	800	768	640	576	480	480	400	384	320
		Other road	720	600	576	480	432	360	360	300	228	240
24	Bhaderiana	Other road	720	600	576	480	432	360	360	300	228	240
25	Bharmar	Other road	600	500	480	400	360	300	300	250	240	200

District Hamirpur			Area in Sq. m									
Sr.No.	Village	Road type	Category-1 (0-25)		Category-II (25-50) (20%< Base Rate)		Category-III(50-100) (40%< Base Rate)		Category-IV(100-1000) (50%< Base Rate)		Category-V(>1000) (60%< Base Rate)	
			Cult	Uncult	Cult	Uncult	Cult	Uncult	Cult	Uncult	Cult	Uncult.
26	Garodu bullah	Other road	480	400	383	320	288	240	240	200	192	160

**Source: Department of Revenue and Land Records*

The SIA team did not come across any changes in the ownership over a period of last three years. As compared to the list provided by the HP SIAU, the only exception is in case of death of any landowner, the ownership of land has got automatically transferred to their children/wife. These changes in ownership have not been recorded with the Revenue Department till date.

Many of the current landowners shared that after the marriage of their sister/s, the brothers are the practical owners of the land as they are protecting the land and also producing agricultural products. According to many respondents, it is one of main sources of their livelihoods and dividing the land further would leave them economically vulnerable. They also shared that the sisters are engaged in farming on the land of their marital family. Although in many cases, the sisters have verbally transferred the ownership to their brothers, none of the transfers are registered with the Revenue Department.

4 Estimation and Enumeration of Affected Families and Assets

4.1 Directly affected persons

The proposed acquisition of 246.8062Ha private land is directly affecting3684 people across 40 villages of Hamirpur and Kangara districts. Given below is a list of numbers of people getting directly affected by the acquisition in each village:

Table 4-1: Directly Affected PAPs

District	Tehsil	Panchayat	S.No	Village	Total Owners	No of Khasras	Area (Ha)
Hamirpur	Sujanpur	Sujanpur	1	Sujanpur	453	46	5.28
			2	Balla Girthan	504	25	3.31
		Karot	3	Loungani	159	65	7.12
			4	Mathaan	43	29	2.39
			5	Balehu	26	16	4.14
		Banal	6	Sarohal	68	14	2.54
		Chamiyana	7	Bharmad	2	6	4.01
			8	Garodu Bulla	9	4	0.02
		Darla	9	Gaagla	77	64	2.52
			10	Chouki	40	4	1.09
			11	Ropa	22	15	0.39
			12	Mihadpura	24	7	0.35
			13	Bhadriana	148	28	2.80
			14	Miyana	57	18	1.66
			15	Haar	27	4	0.10
			16	Darla	127	31	4.10
			17	Gaahlian	64	16	1.74
		Tihra	18	Thira	25	4	0.67
		Bhagehda	19	Bagehra Bulla	52	15	30.05
		Dhabriana	20	Riah	91	39	15.14
		Jol	21	Kaach	2	1	0.02
			22	Birh Khas	11	5	1.24

District	Tehsil	Panchayat	S.No	Village	Total Owners	No of Khasras	Area (Ha)
			23	Samouna	111	38	5.34
			24	Palahi	162	80	37.95
			25	Pargana	149	48	3.34
	Nadaun	Choru	26	Jangal Mehdooda Mehfooja Jeehan	20	22	12.28
Kangara	Alampur	Alampur	27	Alampur	19	4	0.30
			28	Baag	201	79	46.91
		Jangal	29	Sai	63	5	0.08
			30	Bir	16	2	0.15
		Lahru	31	Bhalunder	202	45	3.13
		Kuhan	32	Dali	61	30	2.13
		Sakoh	33	Layunda	28	4	0.12
		Balakroopi	34	Dadu	63	17	2.32
			35	Nichali Bheri	212	79	10.45
			36	Paprola	58	6	0.25
	Kundian	Tipri	37	Chouki	130	160	17.97
			38	Kiyod	66	11	0.20
			39	Tippri	28	9	1.74
			40	Bulli	64	70	10.85
Total					**3684**	**1165**	**246.8062**

**Source: Satluj Jal Vidyut Nigam (SJVN)*

Out of total 3684 titleholders, 18 (0.5%) are losing their houses in acquisition and they demanded for cash compensation against their structure.

**Note: It should be mentioned here that, the final estimation of the land losers losing 100% land/ loosing part of their land/ loosing sheltershould be conducted by the competent authorities of the State govt.*

4.1.1 Tenants/ Occupiers

No tenants in the land proposed for acquisition were reported during survey. All the affected families use the houses for staying with their families and the land to be cultivated by themselves.

4.1.2 Schedule tribes and traditional forest dwellers

There is no affected family falling in the ST category or traditional forest dwellers who have lost any of their forest rights.

4.1.3 Dependence on common property resources

During interviews and FGDs it was found that most of the villagers had dependency on the forest land being acquired, for collection of fodders and fire wood. Also, this land is used for grazing by the villagers. Many villagers demanded alternatives to be provided for the forest land being acquired. Also, 29 Cremation grounds across 19 project villages will be lost under the acquisition, for which the villagers have requested to provide them with alternate cremation grounds.

Apart from PAPs, most of the panchayats including villagers whose land is not being acquired also had high dependency on the forest being acquired for the purpose of fodder and fire-wood. During FGDs with Panchayats this issue was one of the major concerns of the villagers from the proposed acquisition. Similarly, they were concerned about the cremation grounds that will be submerged by the project. They have demanded to be provided with equivalent alternative forest resources and alternative cremation grounds to meet their requirements.

Also, acquisition of 25 water Tank/IPH Scheme/pump-houses across 18 project villages is another major concern of PAPs as well as other villagers.

Sewerage system in village Sujanpur of Hamirpur district is also getting impacted due to acquisition.

1 Government primary school and 1 Anganwadi is also coming under acquisition in Laungani Village of Hamirpur district.

2 Temples, one from Laungani Village (Hamirpur district) and one from Alampur village (Kangara district) is getting impacted due to acquisition.

15 electric poles in Pargana village of Hamirpur district are coming under acquisition.

Apart from this, 2 bowlis in Bulli and Kiyodh villages of Kangara district, 1 well and 1 Gharat in Bulli village and village footpath in Balunder village are also coming under acquisition.

A detailed village-wise inventory of private and public assets on land is given in table 4-5.

4.1.4 Land Assigned by State Government

There are no people who have been assigned land by the State Government under any of its schemes and such land is under acquisition

4.1.5 Dependence on land for livelihood

The PAPs were found to carry out Agriculture/horticulture activities on the land under acquisition, however the activity was not found to be very intense as a majority of the landholdings were found to be on or near to the river bed. Out of the total 246.8062 Ha of land under acquisition, only 22.78 Ha (9%) land is cultivable and 223.41 Ha (91%) land is uncultivated. Although primary agriculture did not form a major economic activity of the PAPs, but a combination with livestock rearing horticulture activities, grazing, collection of fuel woods and fodder generate a substantial economic support for them. For the PAPs loosing structures along with land, most of them had shops along with residential structure which serves as a major source of their livelihood.A total of 12 PAFs who have their shops and aramils on the land coming under acquisition will be losing livelihood. Given below is a village wise list of these PAFs:

Table 4-2: PAFs Losing Livelihood

District	Tehsil	Panchayat	S. no	PAP Name	No. of structure	Type	PAFs loosing Livelihood
Hamirpur	Sujanpur	Jol	1.	Pargana	7	2 shops 1 shop 4 shops 4 shops 2 shops 3 shops 2 shops and 2 stores	10
Kangra	Khundian	Tipri	2.	Chowki	2	1 Aramill 1 shop	2
Total					**9**		**12**

**Source: Field Survey*

4.2 Inventory of Productive Assets and Significant Land

During the primary survey a detailed inventory of available assets with PAPs was prepared by SIA team like vehicles, house hold equipment, utilities on their land, livestock, trees, etc. Status of available assets not only indicates standard of living in the area but is also an indicator of affordability of the PAPs. Given bellow is a detailed inventory of various available assets with 3210 respondents who are getting affected by the project:

Table 4-3: Inventory of Productive Assets

S. No	Category	Description	No. Of PAPs	% of PAP
1.	Vehicle	Truck	35	1.09%
2.		Three-Wheeler	9	0.28%
3.		Cycle	16	0.50%
4.		Trolleys	6	0.19%
5.		Bike/ Scooter	400	12.46%
6.		Car	351	10.93%
7.		Tractor	11	0.34%
8.		Tempo Traveler	4	0.12%
9.	House Hold Equipment	Radio	75	2.34%
10.		Geyser	332	10.34%
11.		Microwave/ Oven	17	0.53%
12.		Mobile Phones	3127	97.41%
13.		Computer	18	0.56%
14.		Refrigerator	3093	96.36%
15.		TV	3117	97.10%
16.		Table Fan	600	18.69%
17.		Room Heater	320	9.97%
18.		Air Conditioner	46	1.43%
19.		Washing Machine	1630	50.78%
20.		Ceiling Fan	2849	88.75%

**Source: Field Survey*

Table given below lists down all the livestock owned by the PAPs in the project area.

Table 4-4: Inventory of Livestock

Livestock	Count
Cow	367
Buffalo	1249
Sheep	61
Pig	2
Goat	38
Poultry Birds	1
Dogs	14
Ox	6

**Source: Field Survey*

Almost 7724fruit bearing trees are getting affected by the proposed acquisition and almost 17280 non-fruit bearings trees are under the impact of acquisition. A total of 29 private structures are coming under acquisition including 2kitchens, 7 toilets and1cowshed. Table below is a detailed village wise inventory of public and private assets on land under acquisition:

Table 4-5: Inventory of Assets on Land

District	Tehsil	Panchayat	S. No.	Villages	Structures	Cowsheds	Independent toilet structures	Independent Kitchen structures	Fruit bearing trees	Non-fruit bearing trees	Remarks	Water Tank/IPH Scheme/pump -houses	Cremation ground	Other
					Private Assets							Public Assets		
Hamirpur	Sujanpur	Sujanpur	1	Sujanpur	**1**	-	-	-	**300**	**45**	residential structure	**2**	**2**	1 Sewerage system
			2	Balla Ghirthan	-	-	-	-	**995**	**2194**	-	-	-	-
		Darla	3	Bhadaryana Bhaleth	-	-	-	-	**202**	**685**	-	**2**	**1**	-
			4	Gahlian	-	-	-	-	**159**	-	-	-	-	-
			5	Ropa	-	-	-	-	-	-	-	-	-	-
			6	Miyana	-	-	-	-	**5**	**825**	-	**1**	**1**	-
			7	Mihadpura	-	-	-	-	-	**180**	-	**1**	-	-
			8	Chowki	-	-	-	-	-	-	-	-	-	-
			9	Darla	-	-	-	-	**230**	**572**	-	**1**	-	-
			10	Haar	-	-	-	-	-	**140**	-	-	-	-
			11	Gagla	-	-	-	-	**205**	**250**	-	-	-	-
		Karot	12	Balehu	-	-	-	-	-	-	-	-	**1**	-
			13	Mathaan	-	-	-	-	-	**72**	-	-		-
			14	Loungani	-	-	-	-	**169**	**1466**	-	**2**	-	1 mahila Mandal office, 1 govt primary school, 1 anganwadi and 1 temple
		mi	15	Bharmad	-	-	-	-	**551**		-	-	**7**	-

District	Tehsil	Panchayat	S. No.	Villages	Structures	Cowsheds	Independent toilet structures	Independent Kitchen structures	Fruit bearing trees	Non-fruit bearing trees	Remarks	Water Tank/IPH Scheme/pump -houses	Cremation ground	Other
					Private Assets							Public Assets		
			16	Graudhu Buhla	-	-	-	-	**15**	**50**	-	-	**3**	-
		Jol	17	Kaach	-	-	1	1	-	-	residential including 1 shop, pucca	-	-	-
			18	Pargana	**10**	**1**	**4**	-	**133**	**297**	1 structure Ex-servicemen truck tempo Union, 11 houses, 21 Shops, 1 kitchen+store, 10 toilets, 1 cowshed	**2**	**1**	15 electric poles
			19	Palahi	-	-	-	-	**225**	**908**	-	**2**	**1**	-
			20	Birh Khas	-	-	-	-	-	**8**	-	-	-	-
			21	Samouna	-	-	-	-	**80**	**1161**	-	-	-	-
		Dhabriana	22	Riah	**1**	-	-	-	**69**	**1091**	residential structure	**2**	**1**	-
		Banal	23	Sarohal	-	-	-	-	**2**	**165**	-	-	-	-
		Tihra	24	Tihra	-	-	-	-	**20**	**100**	-	-	-	-
		Bhageda	25	Baghera Buhla	-	-	-	-	-	**32**	-	**1**	-	-

District	Tehsil	Panchayat	S. No.	Villages	Structures	Cowsheds	Independent toilet structures	Independent Kitchen structures	Fruit bearing trees	Non-fruit bearing trees	Remarks	Water Tank/IPH Scheme/pump -houses	Cremation ground	Other
					Private Assets							Public Assets		
	Nadaun	Choru	26	Jangal Mehfuja Mahduda Jeehan	-	-	-	-	**40**	**220**	-	-	-	-
Kangra	Khundian	Tipri	27	Bulli	-	-	-	-		**749**	-		**1**	1 Baudi, 1 well, 1 gharat
			28	Tippri	-	-	-	-	-	**305**	-	-	-	
			29	Kiyod	-	-	-	-	**270**	**950**	-	-	-	1 Baudi
			30	Chowki	**7**	-	2	1	**65**	**556**	1 aramill, 6 houses	**1**	**1**	-
	Alampur	Kuhan	31	Dalli	-	-	-	-	**1035**	**571**	-	**1**	-	-
		Lahru	32	Balunder	-	-	-	-	**30**	**2210**	-	-	**1**	Village Footpath
		Balakroopi	33	Daddu	-	-	-	-	**114**	**225**	-	**1**	**1**	-
			34	Nichli bheri	-	-	-	-	**245**	**687**	-		**1**	-
			35	Paprola	-	-	-	-	**100**		-	**1**	**1**	-
		Jangal	36	Bir	-	-	-	-			-	**2**	**2**	-
			37	Sai	-	-	-	-	**2465**	**296**	-	**1**	**1**	-
		Alampur	38	Alampur	-	-	-	-	-	**270**	-	-	**1**	1 sidhi vinayak temple
			39	Baag	-	-	-	-	-	-	-	**1**	**1**	-
		Sakoh	40	Lyunda	-	-	-	-	-	-	-	**1**	-	-

District	Tehsil	Panchayat	S. No.	Villages	Structures	Cowsheds	Independent toilet structures	Independent Kitchen structures	Fruit bearing trees	Non-fruit bearing trees	Remarks	Water Tank/IPH Scheme/pump -houses	Cremation ground	Other
					Private Assets							Public Assets		
TOTAL					19	1	7	2	7724	17280	-	25	29	-
Source: Field Survey														

During the field survey, people from village Jol (Jangal Panchayat, district Kanagara) approached Team SIA and shared their concern about their lands and structures getting impacted by the upcoming DSHEP project.

According to them, during the survey conducted by Department of Agricultural Economics, CSK HP Krishi Vishvavidyalaya, Palampur in 2010 for SIA of DSHEP, they were told that their houses may come under acquisition for the upcoming scheme and they should move to some other location.

Since during monsoons, rivulet water reaches their residential structures therefore the villagers are concerned that after construction of Dam the water would definitely reach their lands and structure leaving them vulnerable with increased risk of submergence.

Thus, we conducted field survey and FGD in the village and found that 10 residential structures, 4 toilets, 8 cowsheds and 4 Gharats might get impacted due to the upcoming DSHEP project.

It is suggested that the requiring body should conduct an in-depth study to ensure the scale of impact on village Jol due to the construction of reservoir.

5 Socio-Economic And Cultural Profile

5.1 Demographic details of the population in project villages

As per Census of India 2011, the total population in the 40 villages where land is being acquired for upcoming DSHEP is 49269 and the total number of households is 11573. Out of the total population in these villages there are 22665 (46%) are males and26604 (54%) are females. Detailed distribution of households and population is given in the table below:

Table 5-1: Demographic Details of Project Area

District	Name	No House Holds	Total Population	Total Males	Total Females
Hamirpur	Sujanpur	8924	38064	17362	20702
Hamirpur	Bagehrah Buhla	199	772	340	432
Hamirpur	Bir Khas	78	331	157	174
Hamirpur	Samona	60	258	116	142
Hamirpur	Palahi	30	146	68	78
Hamirpur	Kachh	44	193	100	93
Hamirpur	Pargna	59	238	115	123
Hamirpur	Riah	24	99	47	52
Hamirpur	Darla	134	587	278	309
Hamirpur	Meharpura	96	415	204	211
Hamirpur	Mayana	21	98	47	51
Hamirpur	Har	0	0	0	0
Hamirpur	Gahlian	14	64	29	35
Hamirpur	Ropa	15	74	41	33
Hamirpur	Bhadrana	47	228	111	117
Hamirpur	Sarohal	62	322	157	165
Hamirpur	Mathan	12	63	33	30
Hamirpur	Laungni	60	278	141	137
Hamirpur	Balehu	38	183	84	99
Hamirpur	Bharmar	45	206	86	120
Hamirpur	Garoru Buhla	18	77	40	37
Hamirpur	Gagal	57	251	120	131
Hamirpur	Jihn	57	245	121	124
Hamirpur	Chauki	64	234	111	123
Hamirpur	Balla Ghirthan	16	83	40	43

District	Name	No House Holds	Total Population	Total Males	Total Females
Hamirpur	Tihra	63	265	116	149
Kangara	Bag	6	22	10	12
Kangara	Chowki	52	223	104	119
Kangara	Tipri	28	118	53	65
Kangara	Buli	33	114	56	58
Kangara	Kiyodh	39	186	93	93
Kangara	Dali	20	68	32	36
Kangara	Bhalundar	138	527	237	290
Kangara	Dadu	18	66	28	38
Kangara	Bheri Nichli	65	223	94	129
Kangara	Bir	190	815	383	432
Kangara	Sai	198	841	398	443
Kangara	Paprola	55	257	119	138
Kangara	Alampur	406	1682	827	855
Kangara	Liunda	88	353	167	186
		11573	49269	22665	26604

**Source: Census, 2011.*

5.1.1 Demographic Details of Project Affected People

As per primary survey, the total population of 2546 project affected households of40 villages where land is being acquired for upcoming DSHEP is 10946. Out of the total 10946 people 5545 (51%) are males and 5401 (49%) are females. Sex ratio in project affected households is 974. Detailed distribution of households and population is given in the table below:

Table 5-2:Demographic Details of Project Affected People

District	Village	Total Females	Total Males	Total Population	No of House Holds
Hamirpur	Bageda Bulla	34	50	84	20
Hamirpur	Balehu	35	37	72	17
Hamirpur	Ballah Girtha	542	543	1085	252
Hamirpur	Barmaud	95	133	228	53
Hamirpur	Bhadrayana	213	227	440	102
Hamirpur	Birh Khas	2	5	7	2
Hamirpur	Chauki	71	67	138	32
Hamirpur	Darla	175	216	391	91

District	Village	Total Females	Total Males	Total Population	No of House Holds
Hamirpur	Gagala	141	153	294	68
Hamirpur	Garodu Bhulla	18	12	30	7
Hamirpur	Ghaliyaan	39	51	90	21
Hamirpur	Haar	40	39	79	18
Hamirpur	Jihen	36	32	68	16
Hamirpur	Kaash	3	4	7	2
Hamirpur	Loungani	223	263	486	113
Hamirpur	Mahal Palai	264	270	534	124
Hamirpur	Mathaan	114	132	246	57
Hamirpur	Mehadpura	52	59	111	26
Hamirpur	Miyana	85	96	181	42
Hamirpur	Mouja Sujanpur	441	417	858	200
Hamirpur	Pargana	266	285	551	128
Hamirpur	Riyah	158	145	303	70
Hamirpur	Ropa	19	24	43	10
Hamirpur	Samona	238	223	461	107
Hamirpur	Sarohal	93	111	204	47
Hamirpur	Tihra	19	26	45	10
Kangara	Aalampur	38	26	64	15
Kangara	Bhalunder	193	211	404	94
Kangara	Birh	47	66	113	26
Kangara	Bulli	117	138	255	59
Kangara	Chowki	163	141	304	71
Kangara	Dadu	117	133	250	58
Kangara	Dali	269	282	551	128
Kangara	Keyodh	176	154	330	77
Kangara	Liunda	28	24	52	12
Kangara	Mahal Baag	290	236	526	122
Kangara	Nichali Bhehdi	388	356	744	173
Kangara	Paporla	54	53	107	25
Kangara	Sai	52	70	122	28
Kangara	Tipri	53	35	88	20
Total		**5401**	**5545**	**10946**	**2546**

**Source: Field Survey.*

5.1.2 Sex Ratio

According to Census 2011, sex ratio across these 40 villages is 1173 females per thousand males which is more than both, state average of 972 and State's Rural sex ratio of 986. Child sex ratio of project villages is 880 which is less than both, state's child sex ratio of 909 and the state's rural average of 986.Out of the total population falling in the age group of 0 to 6 years, 53% are males and 47% are females[16]. Given below is a village wise detailed distribution of child population:

Table 5-3: Child Population in Project Area

S. No.	District	Village	Child Population (Population in the age group 0-6 Person)		
			Total	Male	Female
1	Hamirpur	Sujanpur	4391	2322	2069
2	Hamirpur	Bagehrah Buhla	81	44	37
3	Hamirpur	Bir Khas	37	24	13
4	Hamirpur	Samona	30	11	19
5	Hamirpur	Palahi	25	15	10
6	Hamirpur	Kachh	26	17	9
7	Hamirpur	Pargna	26	12	14
8	Hamirpur	Riah	16	9	7
9	Hamirpur	Darla	55	26	29
10	Hamirpur	Meharpura	41	23	18
11	Hamirpur	Mayana	3	0	3
12	Hamirpur	Har	0	0	0
13	Hamirpur	Gahlian	7	3	4
14	Hamirpur	Ropa	7	6	1
15	Hamirpur	Bhadrana	30	12	18
16	Hamirpur	Sarohal	37	15	22
17	Hamirpur	Mathan	6	3	3
18	Hamirpur	Laungni	20	11	9
19	Hamirpur	Balehu	25	14	11
20	Hamirpur	Bharmar	27	17	10
21	Hamirpur	Garoru Buhla	7	4	3
22	Hamirpur	Gagal	30	14	16
23	Hamirpur	Jihn	21	8	13
24	Hamirpur	Chauki	21	10	11
25	Hamirpur	Balla Ghirthan	6	5	1
26	Hamirpur	Tihra	32	13	19

[16](Census, 2011)

S. No.	District	Village	Child Population (Population in the age group 0-6 Person)		
			Total	Male	Female
27	Kangara	Bag	1	1	0
28	Kangara	Chowki	32	19	13
29	Kangara	Tipri	10	5	5
30	Kangara	Buli	12	8	4
31	Kangara	Kiyodh	23	16	7
32	Kangara	Dali	8	3	5
33	Kangara	Bhalundar	57	31	26
34	Kangara	Dadu	8	4	4
35	Kangara	Bheri Nichli	24	12	12
36	Kangara	Bir	92	52	40
37	Kangara	Sai	95	57	38
38	Kangara	Paprola	26	11	15
39	Kangara	Alampur	181	107	74
40	Kangara	Liunda	35	20	15
Total			**5611**	**2984**	**2627**

**Source: Census, 2011.*

5.1.3 Social Groups

According to Census 2011, there are total 13205 schedule cast persons out of which 6473 are males and 6732 are females in the project area. Also, there are 48persons belonging to schedule tribein 40 project villages out of which 28 are males and 20 are females.

Table 5-4: Social Groups in Project Villages

District	Name	SC			ST		
		Total	Male	Female	Total	Male	Female
Hamirpur	Sujanpur	10055	4920	5135	44	25	19
Hamirpur	Bagehrah Buhla	292	133	159	0	0	0
Hamirpur	Bir Khas	160	76	84	0	0	0
Hamirpur	Samona	19	11	8	0	0	0
Hamirpur	Palahi	0	0	0	0	0	0
Hamirpur	Kachh	8	5	3	0	0	0
Hamirpur	Pargna	128	65	63	0	0	0
Hamirpur	Riah	79	33	46	0	0	0
Hamirpur	Darla	159	79	80	0	0	0
Hamirpur	Meharpura	183	92	91	0	0	0
Hamirpur	Mayana	0	0	0	0	0	0

District	Name	SC			ST		
		Total	Male	Female	Total	Male	Female
Hamirpur	Har	0	0	0	0	0	0
Hamirpur	Gahlian	0	0	0	0	0	0
Hamirpur	Ropa	15	10	5	0	0	0
Hamirpur	Bhadrana	32	17	15	0	0	0
Hamirpur	Sarohal	122	61	61	0	0	0
Hamirpur	Mathan	10	8	2	0	0	0
Hamirpur	Laungni	70	40	30	0	0	0
Hamirpur	Balehu	15	9	6	0	0	0
Hamirpur	Bharmar	0	0	0	0	0	0
Hamirpur	Garoru Buhla	36	21	15	0	0	0
Hamirpur	Gagal	12	6	6	0	0	0
Hamirpur	Jihn	54	31	23	3	2	1
Hamirpur	Chauki	20	9	11	0	0	0
Hamirpur	Balla Ghirthan	0	0	0	0	0	0
Hamirpur	Tihra	78	31	47	0	0	0
Kangara	Bag	0	0	0	0	0	0
Kangara	Chowki	3	1	2	0	0	0
Kangara	Tipri	73	37	36	0	0	0
Kangara	Buli	48	25	23	0	0	0
Kangara	Kiyodh	167	81	86	0	0	0
Kangara	Dali	0	0	0	0	0	0
Kangara	Bhalundar	141	66	75	1	1	0
Kangara	Dadu	0	0	0	0	0	0
Kangara	Bheri Nichli	0	0	0	0	0	0
Kangara	Bir	177	86	91	0	0	0
Kangara	Sai	155	75	80	0	0	0
Kangara	Paprola	44	19	25	0	0	0
Kangara	Alampur	665	335	330	0	0	0
Kangara	Liunda	185	91	94	0	0	0
Total		**13205**	**6473**	**6732**	**48**	**28**	**20**

**Source: Census, 2011.*

5.1.3.1 Social Groups in Project Affected People

As per the primary survey, out of total 10946 PAPs, 8015 (83%) fall in the general category, 2538 (23%) of them belong to other backward class and 393 (4%) are schedule castes. There are no

Schedule Tribes in the PAPS. Given below in the table is a detailed village wise distribution of PAPs into different social groups across 40 villages where land is getting acquired for the upcoming Dhaulasidh HEP:

Table 5-5: Social Groups in PAPs

District	Village	General	OBC	SC	Total
Hamirpur	Bageda Bulla	62	22		84
Hamirpur	Balehu	72			72
Hamirpur	Ballah Girtha	364	721		1085
Hamirpur	Barmaud	160	68		228
Hamirpur	Bhadrayana	440			440
Hamirpur	Birh Khas	7			7
Hamirpur	Chauki	116		22	138
Hamirpur	Darla	380	11		391
Hamirpur	Gagala	289	5		294
Hamirpur	Garodu Bhulla	30			30
Hamirpur	Ghaliyaan	90			90
Hamirpur	Haar	79			79
Hamirpur	Jihen	68			68
Hamirpur	Kaash	7			7
Hamirpur	Loungani	484	2		486
Hamirpur	Mahal Palai	517	16		533
Hamirpur	Mathaan	242	4		246
Hamirpur	Mehadpura	111			111
Hamirpur	Miyana	111	70		181
Hamirpur	Mouja Sujanpur	209	650		859
Hamirpur	Pargana	355		196	551
Hamirpur	Riyah	213	90		303
Hamirpur	Ropa	43			43
Hamirpur	Samona	278	183		461
Hamirpur	Sarohal	127	77		204
Hamirpur	Tihra	45			45
Kangara	Aalampur	64			64
Kangara	Bhalunder	325		79	404
Kangara	Birh	71	42		113
Kangara	Bulli	255			255
Kangara	Chowki	272		32	304
Kangara	Dadu	250			250
Kangara	Dali	340	211		551

District	Village	General	OBC	SC	Total
Kangara	Keyodh	274	19	37	330
Kangara	Liunda	41	11		52
Kangara	Mahal Baag	239	287		526
Kangara	Nichali Bhehdi	687	30	27	744
Kangara	Paporla	100	7		107
Kangara	Sai	110	12		122
Kangara	Tipri	88			88
Total		**8015**	**2538**	**393**	**10946**

**Source: Field Survey.*

5.1.4 Literacy

As per the census of India 2011, literacy rate of Himachal Pradesh is 83% and literacy rate of Himachal Pradesh Rural is 82%. Out of the total population of49269 in project area 37434 (76%) of population is literate which is less than the state's overall average and state's rural average. Out of this 2367 literate population 19035 (51%) are female and18399(49%) are male. Among the remaining illiterate population of 11835 (24%), 7569 (64%) are female and4266(36%) are male[17]. Given below in the table is a detailed village wise distribution of literacy status:

Table 5-6: Literacy Status in Project Area

S. No	District	Village	Literates			Illiterates		
			Total	Male	Female	Total	Male	Female
1	Hamirpur	Sujanpur	28593	14004	14589	9471	3358	6113
2	Hamirpur	Bagehrah Buhla	609	285	324	163	55	108
3	Hamirpur	Bir Khas	261	130	131	70	27	43
4	Hamirpur	Samona	203	100	103	55	16	39
5	Hamirpur	Palahi	108	50	58	38	18	20
6	Hamirpur	Kachh	141	73	68	52	27	25
7	Hamirpur	Pargna	179	95	84	59	20	39
8	Hamirpur	Riah	68	33	35	31	14	17
9	Hamirpur	Darla	477	243	234	110	35	75
10	Hamirpur	Meharpura	336	171	165	79	33	46
11	Hamirpur	Mayana	81	46	35	17	1	16
12	Hamirpur	Har	0	0	0	0	0	0
13	Hamirpur	Gahlian	50	25	25	14	4	10
14	Hamirpur	Ropa	58	32	26	16	9	7
15	Hamirpur	Bhadrana	180	95	85	48	16	32

[17](Census, 2011)

S. No	District	Village	Literates			Illiterates		
			Total	Male	Female	Total	Male	Female
16	Hamirpur	Sarohal	249	129	120	73	28	45
17	Hamirpur	Mathan	50	28	22	13	5	8
18	Hamirpur	Laungni	219	117	102	59	24	35
19	Hamirpur	Balehu	135	64	71	48	20	28
20	Hamirpur	Bharmar	145	61	84	61	25	36
21	Hamirpur	Garoru Buhla	61	34	27	16	6	10
22	Hamirpur	Gagal	192	96	96	59	24	35
23	Hamirpur	Jihn	194	110	84	51	11	40
24	Hamirpur	Chauki	201	100	101	33	11	22
25	Hamirpur	Balla Ghirthan	66	30	36	17	10	7
26	Hamirpur	Tihra	211	99	112	54	17	37
27	Kangara	Bag	19	9	10	3	1	2
28	Kangara	Chowki	166	82	84	57	22	35
29	Kangara	Tipri	89	42	47	29	11	18
30	Kangara	Buli	83	43	40	31	13	18
31	Kangara	Kiyodh	130	65	65	56	28	28
32	Kangara	Dali	49	26	23	19	6	13
33	Kangara	Bhalundar	405	202	203	122	35	87
34	Kangara	Dadu	51	22	29	15	6	9
35	Kangara	Bheri Nichli	178	80	98	45	14	31
36	Kangara	Bir	665	319	346	150	64	86
37	Kangara	Sai	683	331	352	158	67	91
38	Kangara	Paprola	214	104	110	43	15	28
39	Kangara	Alampur	1364	690	674	318	137	181
40	Kangara	Liunda	271	134	137	82	33	49
Total			**37434**	**18399**	**19035**	**11835**	**4266**	**7569**

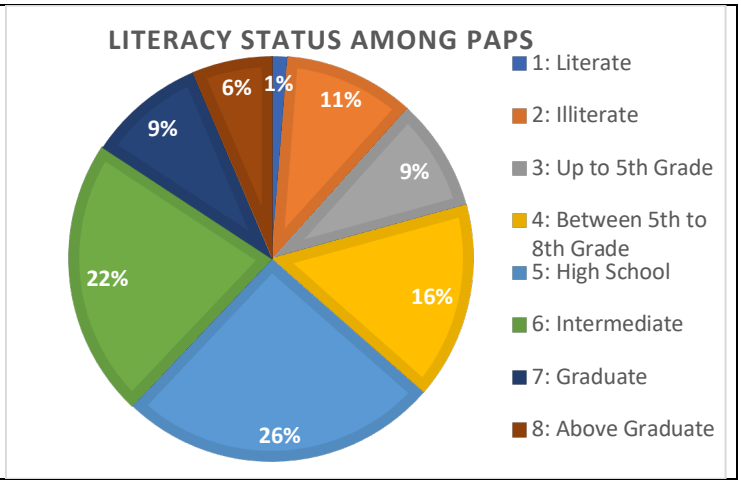
**Source: Census, 2011.*

5.1.4.1 Literacy Status of PAPs

As per the Field survey, out of the total 10946 PAPs , 2804 (26%) are high school passouts, 2430 (22%) are intermediate pass outs, 1718 (16%) have done schooling between 5th to 8th grade, 990 (9%) have done schooling upto 5th grade, 1024 (9%) of them are graduates, 698 (6%) are post graduates, 138 (1%) are literates and 1144 (11%) are illiterates. Given below in the table is the status of literacy among PAPs:

Table 5-7: Literacy Status of PAPs

Row Labels	Female	Male	Total
1: Literate	58	80	138
2: Illiterate	850	294	1144
3: Up to 5th Grade	625	365	990
4: Between 5th to 8th Grade	952	766	1718
5: High School	1240	1564	2804
6: Intermediate	932	1498	2430
7: Graduate	451	573	1024
8: Above Graduate	293	405	698
Total	**5401**	**5545**	**10946**



**Source: Field Survey*

5.2 Economic Profile

As per the Census 2011, out of total 10946 people in project villages, 28042 (57%) is the total work force (Main + Marginal). Out of this workforce of28042, 15225 (54%) are females and 12817 (46%) are males.[18]

Table 5-8: Work Force in Project Area

S. No	District	Name	Total Population	Work Force (Main+ Marginal)		
				Total	Males	Females
1	Hamirpur	Sujanpur	38064	21878	9874	12004
2	Hamirpur	Bagehrah Buhla	772	342	150	192
3	Hamirpur	Bir Khas	331	150	67	83
4	Hamirpur	Samona	258	122	50	72
5	Hamirpur	Palahi	146	69	30	39
6	Hamirpur	Kachh	193	98	53	45
7	Hamirpur	Pargna	238	118	67	51
8	Hamirpur	Riah	99	25	21	4
9	Hamirpur	Darla	587	411	197	214
10	Hamirpur	Meharpura	415	157	124	33
11	Hamirpur	Mayana	98	39	28	11
12	Hamirpur	Har	0	0	0	0
13	Hamirpur	Gahlian	64	51	21	30
14	Hamirpur	Ropa	74	62	30	32

[18](Census, 2011)

S. No	District	Name	Total Population	Work Force (Main+ Marginal)		
				Total	Males	Females
15	Hamirpur	Bhadrana	228	158	79	79
16	Hamirpur	Sarohal	322	267	133	134
17	Hamirpur	Mathan	63	48	26	22
18	Hamirpur	Laungni	278	218	104	114
19	Hamirpur	Balehu	183	142	59	83
20	Hamirpur	Bharmar	206	142	53	89
21	Hamirpur	Garoru Buhla	77	68	36	32
22	Hamirpur	Gagal	251	126	62	64
23	Hamirpur	Jihn	245	186	94	92
24	Hamirpur	Chauki	234	81	58	23
25	Hamirpur	Balla Ghirthan	83	57	25	32
26	Hamirpur	Tihra	265	15	11	4
27	Kangara	Bag	22	12	7	5
28	Kangara	Chowki	223	125	53	72
29	Kangara	Tipri	118	65	25	40
30	Kangara	Buli	114	68	30	38
31	Kangara	Kiyodh	186	100	42	58
32	Kangara	Dali	68	32	10	22
33	Kangara	Bhalundar	527	323	120	203
34	Kangara	Dadu	66	23	9	14
35	Kangara	Bheri Nichli	223	86	30	56
36	Kangara	Bir	815	431	197	234
37	Kangara	Sai	841	393	169	224
38	Kangara	Paprola	257	127	53	74
39	Kangara	Alampur	1682	1069	551	518
40	Kangara	Liunda	353	158	69	89
Total			**49269**	**28042**	**12817**	**15225**

**Source: Census, 2011.*

5.2.1 Main Working Population

As per the Census 2011, out of the total 28042work force in project villages,11528 (41%) fall in the category of Main Working Population that is people who are employed for more than 180 daysin a year. Out of this 11528, 7041 (61%) are males and 4487 (39%) are females. Given below

in the table is a village wise classification of main working population into different categories like cultivators, agricultural labourers, house hold industries population and others.[19]

Table 5-9:Main Working Population in Project Area

S. No.	District Name	Name	Total Work Force (Main +Marginal)	Main Cultivator Population			Main Agricultural Labourers Population			Main Household Industries Population			Main Other Workers Population			Total Main Working Population		
				Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
1.	Hamirpur	Sujanpur	21878	8986	5339	3647	3407	936	2471	207	97	110	134	102	32	5238	4204	1034
2.		Bagehrah Buhla	342	288	139	149	91	23	68	77	12	65	4	4	0	116	100	16
3.		Bir Khas	150	60	41	19	6	2	4	0	0	0	14	11	3	40	28	12
4.		Samona	122	42	39	3	2	1	1	0	0	0	1	1	0	39	37	2
5.		Palahi	69	20	18	2	0	0	0	0	0	0	0	0	0	20	18	2
6.		Kachh	98	25	22	3	0	0	0	0	0	0	0	0	0	25	22	3
7.		Pargna	118	17	16	1	0	0	0	0	0	0	1	1	0	16	15	1
8.		Riah	25	22	18	4	0	0	0	0	0	0	0	0	0	22	18	4
9.		Darla	411	252	110	142	156	32	124	0	0	0	0	0	0	96	78	18
10.		Meharpura	157	153	124	29	32	18	14	5	5	0	2	1	1	114	100	14
11.		Mayana	39	38	27	11	12	2	10	0	0	0	0	0	0	26	25	1
12.		Har	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13.		Gahlian	51	10	9	1	0	0	0	0	0	0	0	0	0	10	9	1
14.		Ropa	62	11	9	2	0	0	0	0	0	0	0	0	0	11	9	2
15.		Bhadrana	158	85	43	42	56	16	40	0	0	0	0	0	0	29	27	2
16.		Sarohal	267	32	26	6	0	0	0	0	0	0	0	0	0	32	26	6
17.		Mathan	48	13	10	3	9	6	3	1	1	0	0	0	0	3	3	0
18.		Laungni	218	64	58	6	35	32	3	13	11	2	0	0	0	16	15	1
19.		Balehu	142	40	34	6	21	18	3	7	6	1	0	0	0	12	10	2
20.		Bharmar	142	141	53	88	109	21	88	0	0	0	0	0	0	32	32	0
21.		Garoru Buhla	68	67	36	31	55	24	31	0	0	0	1	1	0	11	11	0
22.		Gagal	126	62	47	15	12	6	6	1	1	0	0	0	0	49	40	9
23.		Jihn	186	105	51	54	69	19	50	0	0	0	0	0	0	36	32	4
24.		Chauki	81	49	38	11	0	0	0	0	0	0	0	0	0	49	38	11
25.		Balla Ghirthan	57	6	5	1	0	0	0	0	0	0	0	0	0	6	5	1

[19](Census, 2011)

S. No.	District Name	Name	Total Work Force (Main +Marginal)	Main Cultivator Population			Main Agricultural Labourers Population			Main Household Industries Population			Main Other Workers Population			Total Main Working Population		
				Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
26		Tihra	15	15	11	4	0	0	0	3	2	1	0	0	0	12	9	3
27	Kangara	Bag	12	7	5	2	0	0	0	0	0	0	0	0	0	7	5	2
28		Chowki	125	44	40	4	9	8	1	0	0	0	1	1	0	34	31	3
29		Tipri	65	15	12	3	2	0	2	0	0	0	0	0	0	13	12	1
30		Buli	68	6	4	2	0	0	0	0	0	0	0	0	0	6	4	2
31		Kiyodh	100	45	37	8	3	0	3	0	0	0	0	0	0	42	37	5
32		Dali	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33		Bhalundar	323	67	52	15	1	1	0	0	0	0	0	0	0	66	51	15
34		Dadu	23	6	6	0	0	0	0	0	0	0	0	0	0	6	6	0
35		Bheri Nichli	86	24	20	4	0	0	0	2	2	0	0	0	0	22	18	4
36		Bir	431	167	126	41	38	17	21	4	1	3	2	2	0	123	106	17
37		Sai	393	111	89	22	13	10	3	0	0	0	0	0	0	98	79	19
38		Paprola	127	26	22	4	0	0	0	0	0	0	0	0	0	26	22	4
39		Alampur	1069	301	252	49	24	13	11	2	2	0	5	5	0	270	232	38
40		Liunda	158	106	53	53	7	1	6	0	0	0	0	0	0	99	52	47
Total			**28042**	**11528**	**7041**	**4487**	**4169**	**1206**	**2963**	**322**	**140**	**182**	**165**	**129**	**36**	**6872**	**5566**	**1306**

**Source: Census, 2011.*

Out of the total Main working population, 4169 (36%) are cultivators, 322 (3%) are agricultural labourers, 165 (1%) are involved in household industries and 6872 (60%) are categorized as other workers.

Table 5-10: Classification of Main Working Population in Project Area

S. No.	Category	Total	Male	Female
1	Main Cultivator Population	4169	1206	2963
2	Main Agricultural Labourers Population	322	140	182
3	Main Household Industries Population	165	129	36
4	Main Other Workers Population	6872	5566	1306
5	Total Main Working Population	**11528**	**7041**	**4487**

5.2.2 Marginal Workers

As per the Census 2011, out of total 28042work force in project villages, 16514 (59%) persons are marginally employed that is employed for less than 180 days every year. Out of this 16514, 5776 (35%) are males and 10738 (65%) are females. Given below in the table is a village wise classification of marginal working population into different categories like cultivators, agricultural labourers, house hold industries population and others.[20]

Table 5-11: Marginal Workers in Project Area

S. No.	District Name	Name	Total Work Force (Main +Marginal)	Cultivator Population			Agricultural Labourers Population			Household Industries Population			Other Workers Population			Total Marginal Working Population		
				Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
	Hamirpur	Sujanpur	21878	12892	4535	8357	10194	3347	6847	313	123	190	98	57	41	2287	1008	1279
2.		Bagehrah Buhla	342	54	11	43	15	5	10	11	2	9	1	0	1	27	4	23
3.		Bir Khas	150	90	26	64	62	11	51	3	0	3	1	0	1	24	15	9
4.		Samona	122	80	11	69	69	3	66	0	0	0	0	0	0	11	8	3
5.		Palahi	69	49	12	37	23	9	14	0	0	0	0	0	0	26	3	23
6.		Kachh	98	73	31	42	18	9	9	1	1	0	2	2	0	52	19	33
7.		Pargna	118	101	51	50	28	12	16	1	1	0	0	0	0	72	38	34
8.		Riah	25	3	3	0	1	1	0	0	0	0	0	0	0	2	2	0
9.		Darla	411	159	87	72	131	75	56	0	0	0	0	0	0	28	12	16
10		Meharpura	157	4	0	4	2	0	2	0	0	0	0	0	0	2	0	2
11		Mayana	39	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0
12		Har	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13		Gahlian	51	41	12	29	33	5	28	0	0	0	0	0	0	8	7	1
14		Ropa	62	51	21	30	44	14	30	0	0	0	0	0	0	7	7	0
15		Bhadrana	158	73	36	37	71	34	37	0	0	0	0	0	0	2	2	0
16		Sarohal	267	235	107	128	177	53	124	1	0	1	0	0	0	57	54	3
17		Mathan	48	35	16	19	23	8	15	12	8	4	0	0	0	0	0	0
18		Laungni	218	154	46	108	139	44	95	15	2	13	0	0	0	0	0	0
19		Balehu	142	102	25	77	86	19	67	16	6	10	0	0	0	0	0	0
20		Bharmar	142	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0
21		Garoru Buhla	68	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0
22		Gagal	126	64	15	49	55	11	44	0	0	0	0	0	0	9	4	5

[20](Census, 2011)

S. No.	District Name	Name	Total Work Force (Main +Marginal)	Cultivator Population			Agricultural Labourers Population			Household Industries Population			Other Workers Population			Total Marginal Working Population		
				Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
23		Jihn	186	81	43	38	69	34	35	0	0	0	4	1	3	8	8	0
24		Chauki	81	32	20	12	14	7	7	0	0	0	0	0	0	18	13	5
25		Balla Ghirthan	57	51	20	31	48	20	28	3	0	3	0	0	0	0	0	0
26		Tihra	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	Kangara	Bag	12	5	2	3	4	1	3	0	0	0	0	0	0	1	1	0
28		Chowki	125	81	13	68	80	13	67	0	0	0	1	0	1	0	0	0
29		Tipri	65	50	13	37	50	13	37	0	0	0	0	0	0	0	0	0
30		Buli	68	62	26	36	62	26	36	0	0	0	0	0	0	0	0	0
31		Kiyodh	100	55	5	50	50	2	48	0	0	0	0	0	0	5	3	2
32		Dali	32	32	10	22	32	10	22	0	0	0	0	0	0	0	0	0
33		Bhalundar	323	256	68	188	254	68	186	2	0	2	0	0	0	0	0	0
34		Dadu	23	17	3	14	11	0	11	6	3	3	0	0	0	0	0	0
35		Bheri Nichli	86	62	10	52	51	0	51	0	0	0	0	0	0	11	10	1
36		Bir	431	264	71	193	245	61	184	7	2	5	3	0	3	9	8	1
37		Sai	393	282	80	202	249	53	196	1	1	0	4	4	0	28	22	6
38		Paprola	127	101	31	70	95	25	70	0	0	0	0	0	0	6	6	0
39		Alampur	1069	768	299	469	569	176	393	53	28	25	16	6	10	130	89	41
40		Liunda	158	52	16	36	0	0	0	0	0	0	1	1	0	51	15	36
Total			**28042**	**16514**	**5776**	**10738**	**13057**	**4170**	**8887**	**445**	**177**	**268**	**131**	**71**	**60**	**2881**	**1358**	**1523**

**Source: Census, 2011.*

Out of the total marginal working population of 16514, 13057 (79%) are cultivators, 445 (3%) are agricultural labourers, 131(1%) are involved in household industries and 2881 (17%) are doing some other work.

Table 5-12: Classification of Marginal Workers in Project Area

S. No.	Category	Total	Male	Female
1	Main Cultivator Population	13057	4170	8887
2	Main Agricultural Labourers Population	445	177	268
3	Main Household Industries Population	131	71	60
4	Main Other Workers Population	2881	1358	1523
5	Total Main Working Population	**16514**	**5776**	**10738**
**Source: Census, 2011.*				

5.2.3 Non-Working Population

As per the Census 2011, out of total l49,269 people in project villages, 21,227 (43%) fall in the category of non-working population. Out of this 21,227 non-working population, 46% (9848) are males and 54% (11,379) are females.

Table given below shows a village wise distribution of non-working population in the project area:

Table 5-13: Non-Working Population in Project Area

S. no	District	Name	No_HH	TotalPopulation	Non-working Population		
					Total	Male	Female
1	Hamirpur	Tira Sujanpur	8924	38064	16186	7488	8698
2	Hamirpur	Bagehrah Buhla	199	772	430	190	240
3	Hamirpur	Bir Khas	78	331	181	90	91
4	Hamirpur	Samona	60	258	136	66	70
5	Hamirpur	Palahi	30	146	77	38	39
6	Hamirpur	Kachh	44	193	95	47	48
7	Hamirpur	Pargna	59	238	120	48	72
8	Hamirpur	Riah	24	99	74	26	48
9	Hamirpur	Darla	134	587	176	81	95
10	Hamirpur	Meharpura	96	415	258	80	178
11	Hamirpur	Mayana	21	98	59	19	40
12	Hamirpur	Har	0	0	0	0	0
13	Hamirpur	Gahlian	14	64	13	8	5
14	Hamirpur	Ropa	15	74	12	11	1
15	Hamirpur	Bhadrana	47	228	70	32	38
16	Hamirpur	Sarohal	62	322	55	24	31
17	Hamirpur	Mathan	12	63	15	7	8
18	Hamirpur	Laungni	60	278	60	37	23
19	Hamirpur	Balehu	38	183	41	25	16
20	Hamirpur	Bharmar	45	206	64	33	31
21	Hamirpur	Garoru Buhla	18	77	9	4	5
22	Hamirpur	Gagal	57	251	125	58	67
23	Hamirpur	Jihn	57	245	59	27	32
24	Hamirpur	Chauki	64	234	153	53	100
25	Hamirpur	Balla Ghirthan	16	83	26	15	11
26	Hamirpur	Tihra	63	265	250	105	145
27	Kangara	Bag	6	22	10	3	7

S. no	District	Name	No_HH	TotalPopulation	Non-working Population		
28	Kangara	Chowki	52	223	98	51	47
29	Kangara	Tipri	28	118	53	28	25
30	Kangara	Buli	33	114	46	26	20
31	Kangara	Kiyodh	39	186	86	51	35
32	Kangara	Dali	20	68	36	22	14
33	Kangara	Bhalundar	138	527	204	117	87
34	Kangara	Dadu	18	66	43	19	24
35	Kangara	Bheri Nichli	65	223	137	64	73
36	Kangara	Bir	190	815	384	186	198
37	Kangara	Sai	198	841	448	229	219
38	Kangara	Paprola	55	257	130	66	64
39	Kangara	Alampur	406	1682	613	276	337
40	Kangara	Liunda	88	353	195	98	97
41	Total		11573	49269	21227	9848	11379

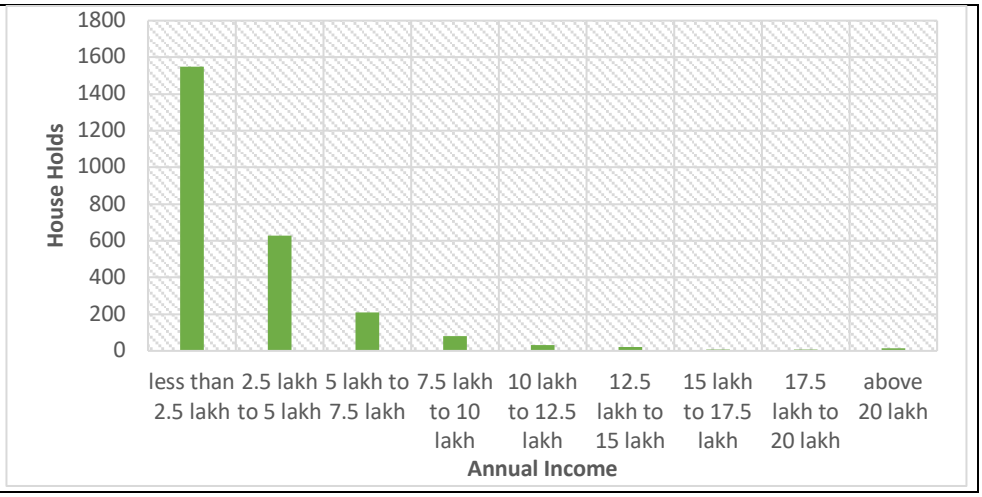
**Source: Census, 2011.*

5.3 Income and Poverty Levels

As per the Fieldsurvey, out of total 2546 project affected households, 1547 (61%) have annual house hold income less than 2.5 lakhs rupees. Almost 630 (25%) have house hold income between 2.5lakh to 5 lakh rupees annually. 210 (8%) of them have their house hold income between 5lakh to 7.5 lakh annually, almost 79 (3%) have it between 10lakh to 12.5lakh and remaining 3% have it more than 12.5 lakh.Almost 96 (4%) of the House Holds in the project area fall in the category of BPL households.

Table 5-14: Annual House Hold Income of PAPs

Annual House Hold Income	No of House Holds
less than 2.5 lakh	1547
2.5 lakh to 5 lakh	630
5 lakh to 7.5 lakh	210
7.5 lakh to 10 lakh	79
10 lakh to 12.5 lakh	33
12.5 lakh to 15 lakh	20
15 lakh to 17.5 lakh	8
17.5 lakh to 20 lakh	6
above 20 lakh	13
Total	2546



**Source: Field Survey.*

Indebtedness: As per the analysis of survey data of primary stakeholders it was found that the indebtedness is low among the PAPs. Only 24 people shared about taking loans. Out of these 24, 7 took a house loan and 7 took a loan for business purpose, 3 each took a loan for agriculture and marriage purpose and 2 each took a loan for education and vehicle.

Table 5-15: Indebtedness Among PAF

Purpose of Loan	No of PAF
Home lone	7
Agriculture	3
Marriage Purpose	3
Business	7
Education	2
Vehicle	2
Total	**24**

**Source: Field Survey*

5.4 Vulnerable groups

Vulnerable groups are the groups which would be vulnerable under any circumstances (e.g. where the adults are unable to provide an adequate livelihood for the household for reasons of disability, illness, age, gender or some other characteristic), and groups whose resource endowment is inadequate to provide sufficient income from any available source.[21]

The vulnerable groups include- Women, old age,physical and mental disability, People suffering from some major illness etc. Sometimes each group faces multiple barriers due to their multiple vulnerabilities. For example, in a patriarchal society, disabled women face increased discrimination of being a woman and being disabled.

The table given below summarizes the status of vulnerable households/ individuals in the project area:

Table 5-16: Vulnerable Groups in Project Area

S. No	Vulnerable Groups	Count
1.	Women Headed Households	857
2.	Households Headed by physically handicapped person	22
3.	BPL Population	432
4.	Widow Women	763

[21](Aggarwal)

S. No	Vulnerable Groups	Count
5.	Divorced Women	8
6.	PWD Females	27
7.	PWD Males	44
8.	People Suffering from Polio	3
9.	People Suffering from Paralysis	2
10.	Mentally Challenged	6
11.	SC Category	393
12.	Elderly Persons	1744

**Source: Field Survey*

Out of the total 2546 households, 857 (34%) are headed by females. 22 (1%) households are headed by a physically handicapped person in the project area.
Also, among the PAPs, 432 (4%) belong to BPL category. State's average percentage of BPL population is 8.06% and state's rural average is 8.48%[22].
763 women are widows, 8 women are divorced, 27 females and 44 males are physically challenged and 11 persons are suffering from major illness including Polio, Paralysis and Mental Un-stability.393 people belong to SC category.1744 persons are above 60 years of age.

5.5 Land use and livelihood

Out of the total land of 246.8062 Ha under acquisition, 22.7 Ha (9%) of land is cultivated and 223.41 Ha (91%) of land is uncultivated.In the table given below is the district wise distribution of cultivated/uncultivated land under acquisition:

Table 5-17: Land use in Project Area

Type	Hamirpur	Kangara	Total
Cultivated	13.6282	9.1512	22.7794
Uncultivated	136.15	87.26	223.41
Total	149.7783	96.4118	246.8062

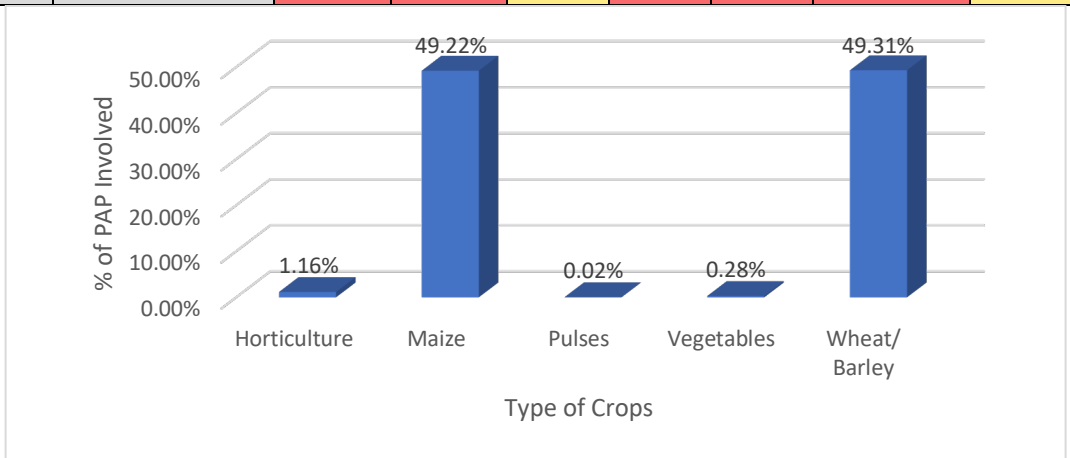
**Source: Field Survey*

Cropping pattern of an economy indicates the relative importance given by the farmers, to various crops, at a given point of time. The cropping pattern in a region changes in accordance to changes in economic, institutional, infrastructural and technological factors alongwith limited land resources. Out of the total PAFs in the project area, only522 (21%)house-holds are using their land for cultivation which is one of their sources of livelihood as well. Out of these 21%, almost 98.5% of them are involved in multi-cropping as per the season. Given below are details of various crops grown by the PAPs involved in farming during different seasons:

[22](Planning Commission)

Table 5-18: Major Crops in Project Area

Season	Crop Category	Crop1	Crop2	Crop3	Crop4	Crop5	Crop6	Grand Total
Agriculture								
Rabi	Maize	0.14%	0.26%	0.00%	0.00%	0.00%	0.00%	0.40%
Rabi	Vegetables	0.00%	0.02%	0.02%	0.07%	0.00%	0.00%	0.12%
Rabi	Wheat/ Barley	47.44%	1.59%	0.02%	0.00%	0.09%	0.00%	49.15%
Kharif	Maize	0.09%	46.71%	1.82%	0.09%	0.00%	0.09%	48.82%
Kharif	Pulses	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.02%
Kharif	Vegetables	0.00%	0.00%	0.00%	0.00%	0.02%	0.14%	0.17%
Kharif	Wheat/ Barley	0.00%	0.09%	0.07%	0.00%	0.00%	0.00%	0.17%
Horticulture								
Horticulture	Banana	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%
Horticulture	MANGO	0.00%	0.00%	0.59%	0.17%	0.05%	0.12%	0.92%
Horticulture	Orange	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%
Horticulture	PEAR	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%	0.05%
Horticulture	Gooseberry	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.02%
Horticulture	Catechu	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.07%
Horticulture	Black Plum	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.05%



**Source: Field Survey*

Major crops of Rabbi season (October to February) are Wheat, Maize and Vegetables. In Kharif season (July to September) Maize, pulses, vegetables are grown mostly.

Less than 2% of the PAPs are involved in Horticulture withBanana, Mango, Orange, Pear, Gooseberry and Catechu as main products.

5.6 Local economic activities

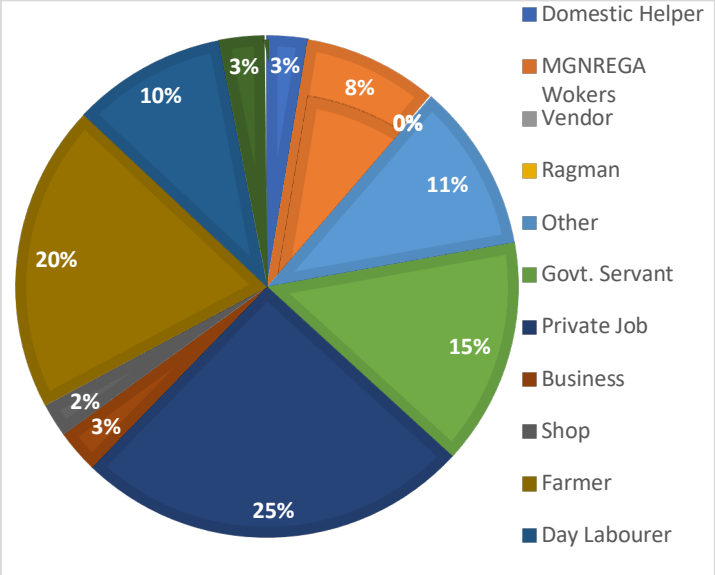
Out of total 10946 PAPs, 5732 (52%) are working. Out of this 52%, 1458 (25.44%) are doing private job, 1138 (19.8%) are farmers, 839 (14.64%) are government servants, 567 (9.89%) are day labourers, 492 (8.58%) are working under MGNREGA, less than 3% each aredoing some other work like domestic helpers, business, private shop and driver. Remaining working population is working as factory workers, vendors, ragmans, factory workers or doing something else. Given below is a list of main economic activities in the project area.

Table 5-19: Local Economic Activities in Project Area

S. No	Economic Activity	Female	Male	Total	% of Total Working Population
1	Domestic Helper	112	38	150	2.62%
2	MGNREGA Wokers	442	50	492	8.58%
3	Vendor	5	1	6	0.10%
4	Ragman	1		1	0.02%
5	Other	334	288	622	10.85%
6	Govt. Servant	150	689	839	14.64%
7	Private Job	128	1330	1458	25.44%
8	Business	21	138	159	2.77%
9	Shop	11	113	124	2.16%
10	Farmer	504	634	1138	19.85%
11	Day Labourer	30	537	567	9.89%
12	Driver	10	155	165	2.88%
13	Factory Worker	6	5	11	0.19%
Total		**1754**	**3978**	**5732**	**100.00%**

**Source: Field Survey*

Figure 8: Local Economic Activities in Project Area



5.7 Factors that contribute to local livelihoods

Many social and natural factors contribute to the choices and availability of livelihood options like education, sex ratio, social status of women, availability of infrastructure, including agro-climatic conditions, institutional conditions of an area, availability of natural resources, connectivity to neighboring areas, location and topography.

In rural Himachal Pradesh, the land ownership distribution presents a typical character, in that a vast majority of farmers are marginal and a very few can be regarded big by any standard. The distribution follows a skew pattern. An important feature of Himachal Pradesh's agrarian structure

is the continuing predominance of the small level peasantry, both in number and area. Moreover, due to hilly topography average productivity of land per hectare is much lower than that of the plains. Consequently, farmers usually don't completely depend on agriculture for their livelihood.

Similarly, the study found that all the PAFs had atleast one family member working in sector other than agriculture. Also,out of 246.8062 Ha of land under acquisition, only 9% is cultivated hence

Since 20% of the PAPs are farmers therefore climatic conditions and factors affecting agriculture hold key factor affecting the local livelihood. Climatic conditions are the primary influents controlling the distribution of agricultural patterns. The influences of climate on human activity are so vital and varied that farmers have consciously sought to know and understand it for the sake of their survival.

The literacy rate in project area almost 90%, out of which 15% are graduates and post graduates. Looking at the economic scenario, more than 40% of the PAPs are employed in jobs both government and private, 5% are running their own business, and remaining 35% have availing opportunities in various other secondary and tertiary sectors. Moreover, the project area is well connected to major towns like Hamirpur, Kangara, Bilaspur, Mandi and Shimla.

Conclusively, the project area has many opportunities other than agriculture which are being availed by the local population. Also, during construction and post construction phases of the project an estimated employment of 500 workers and 100 technical staff would be generated where preference will be given to the PAPs.

5.8 Kinship patterns

In Himachal Pradesh, land rights are only passed onto from one generation to the next. As per the state rules, any migrant cannot buy a land in the "Devbhoomi". Therefore, the land here is an ancestral property and it only gets distributed to the children/wife equally unless their Will says otherwise.

In many cases, it is observed that the names of the present land owners not yet updated with the Revenue Department even after the demise of the original landowner. In case of death of any landowner, the ownership of land gets automatically transferred to their children/wife.

During the primary survey, many of the current landowners in project area shared that after the marriage of their sister/s, the brothers are the practical owners of the land as they are protecting the land and also producing agricultural products. According to many respondents, it is one of major sources of their livelihoods and dividing the land further would leave them economically

vulnerable. They also shared that the sisters are engaged in farming of the land of their marital family. Although in many cases, the sisters have verbally transferred the ownership to their brothers, none of the transfers are registered with the Revenue Department.

5.9 Administrative, political and civil society organizations

The following organizations were found to have their footprint in the project area

Administrative Organization

1. Panchayat
2. Patwar office
3. IPH
4. Electricity Department
5. Agriculture Department
6. Public Works Department (PWD)
7. SJVN

Political Organization

1. BJP
2. Congress
3. CPM

Community based and Civil Society Organization

Dhabriana Panchayat

1. Mahila Mandal Chamarkad (Ward No. 2)
2. Mahila Mandal Thana (Ward no. 3)
3. Mahila Mandal Dhamdiyana (Ward no. 4)
4. Mahila Mandal Maihladu (Ward no. 1)
5. Yuvak Mandal Thana

Darla Panchayat

1. Mahila Mandal Miharpur
2. Mahila Mandal Mayana
3. Mahila Mandal Chauki (1)
4. Mahila Mandal Chauki (2)
5. Mahila Mandal Darla Dogra
6. Mahila Mandal Darla Upper
7. Mahila Mandal Kharshal
8. Mahila Mandal Dariya

9. Mahila Mandal Lower Darla
10. Mahila Mandal Bhadriyana
11. Mahila Mandal Jaswal Basti Bhadriyana
12. Mahila Mandal Kajoti
13. Mahila Mandal Ropa
14. Mahol Yuvak Mandal Bhelot
15. Baleth Co-operative society
16. Chamunda – Co-operative society

Aalampur Panchayat

1. Lakshmi Mahila Mandal (Ward no. 3)
2. Kusharyal Mahila Mandal (Ward no. 4)
3. Rajshat Mahila Mandal (Ward no. 4)
4. Shiv Mahila Mandal (Ward no. 7)
5. Nari Jagriti Mahila Mandal (Ward no. 5)
6. Anand Mahila Mandal (Ward no. 2)
7. Lakshmi Narayan Mahila Mandal (Ward no. 1)
8. Nari Shakti Mahila Mandal (Ward no. 6)

Chauru Panchayat

1. Mahila Mandal Village Tharu (Ward No. 1)
2. Mahila Mandal Village Jamnori (Ward No. 1)
3. Shiv Mahila Mandal Village Saannai (Ward No. 1)
4. Mahila Mandal Village bhadeyter (Ward No. 2)
5. Mahila Mandal Village Bhumvlu (Ward No. 3)
6. Mahila Mandal Village Jehan (Ward No. 3)
7. Mahila Mandal Village Vasool (Ward No. 4)
8. Mahila Mandal Village Amalahdu (Ward No. 4)
9. Mahila Mandal Village Tikkaru Barota (Ward No. 5)
10. Mahila Mandal Village Gadiyana (Ward No. 5)
11. Mahila Mandal Village Choha Chukrana (Ward No. 6)
12. Yuvak Mandal Bhadetar Village Jihan
13. Shiv Shakti Self Help Group Village Jihen
14. Hari Om Self Help Group Village Jihen

Jangal Panchayat

1. Shiv Shakti Mahila Mandal (Bead)
2. Mahila Mandal Bhalot (Sai)
3. Mahila Mandal Uppar Jogal
4. Vishavkarma Mahila Mandal (Sai)

5. Nari Jagriti Mahila Mandal (Sai)
6. Jai Mata Mahila Mandal (Maloum)
7. Om Bheem Ram Ambedkar Mahila Mandal (Bead)
8. Sudama Sabha Mahila Mandal (Bead)
9. Lakshmi Mahila Mandal Basehad (Bead)
10. Kabir Panthi Mahila Mandal (Sai)
11. Mehra Mahila Mandal Bead (Jogal)
12. Nari Utthan Mahila Mandal (Sai)
13. Yuvak Pragtisheel Club Jogal
14. Satya Lakshmi Narayan Club Jogal (Sai) Self Help Group
15. Jai Mahavir Yuva Club (Sai) Self Help Group
16. Dhar Chatotriyan Sehkaar Krishi So Sathti Jogal Self Help Group

Sakoh Panchayat

1. Mahila Mandal Jihen (Ward No. 1)
2. Aarti Mahila Mandal Jihen (Ward No. 1)
3. Mahila Mandal Andrana (Ward No. 2)
4. Sai Mahila Mandal Jol (Ward No. 2)
5. Pragti Mahila Mandal Liyunda (Ward No. 3)
6. Kailash Mahila Mandal Liyunda (Ward No. 3)
7. Shanti Mahila Mandal Sakah (Ward No. 4)
8. Mahila Mandal Karunthi Moshwar (Ward No. 4)
9. Jagriti Mahila Mandal Karunthi (Ward No. 5)
10. Muskaan Mahila Mandal Karunthi (Ward No. 5)
11. Santoshi Self Help Group (Ward No. 1)
12. Durga Self Help Group (Ward No. 5)
13. Durga Self Help Group (Ward No. 2)

Kuhan Panchayat

1. Nari Jagriti Mandal (Uparli Kuhan)
2. Nari Jagriti Mandal (Auoch Khud)
3. Nari Jagriti Mandal (Auoch Kana)
4. Nari Jagriti Mandal (Khas Kuhan)
5. Yuvak Mandal Auoch (Auoch)
6. Bhartiya Yuva Morcha Janta Patry (Kuhan)
7. Chagar Sudhar Samiti Committee (Kuhan)

Lahru Panchayat

1. Jagriti Mahila Mandal (Dol)
2. Sada Mahila Mandal (Sada)

3. Anusuchit Mahila Mandal (Bhaludar)
4. Samanya Mahila Mandal (Bhaldar)
5. Lakshmi Mahila Mandal (Lahdu)
6. Anusuchit Mahila Mandal (Lahdu)
7. Kabir Panthi Mahila Mandal (Lahdu)
8. Chagar Sudhar Samiti Committee (Lahdu)

Panchayat Jol

1. Aanganvadi Kendra Jol
2. Aanganvadi Kendra Samona
3. Aanganvadi Kendra Plaahi
4. Aanganvadi Kendra Pargana
5. Mahila Mandal kaach Plaahi
6. Mahila Mandal Plaahi Samona
7. Mahila Mandal Aman Thati
8. Mahila Mandal Shiv Shakti Pargana
9. Mahila Mandal Kranti Jol
10. Mahila Mandal Prabhabi Jol
11. Mahila Mandal Bhardu Somana
12. Mahila Mandal Asha Jol
13. Mahila Mandal Somana

5.10 Regional Dynamics and Historical Change Processes

Sujanpur Tira located on the left bank of Beas river is the largest settlement falling in the Project area and is about 180 Kms from the State capital Shimla. It is about 25 kms from districtheadquarter Hamirpur and 60 kms from District Headquarter Kangra. It is connected by SH 39 to Hamirpur where it later Joins NH88 to be connected to Shimla. Similarly,it is connected by SH 39 to Kangra upto Saloh where it then merges into NH 20 to be continued to Kangra. The Beas river forms the district boundary Kangra and Humirpur Districts.

Sujanpur Tira is well-connected to all the major towns of Himachal Pradesh and of the country in all the directions through road network. It is at 35 km from Palampur, Joginder Nagar (79 km) and about 120 km from Dharamshala. Today over 200 buses cross this town to connect various other cities, villages and towns besides regular taxis. The nearest railway station is Maranda (near Palampur) where narrow gauge runs up to Pathankot on one side and Jogindernagar to the other. On one side it is connected to Una-Nangal by road, the other side it is connected towards Kangra, Pathankot ; To Mandi-Manali and Ladakh and one side to Shimla. Its geographical locations connect this town with almost every direction through web of tarred road network.

About three decades ago, Sainik School was inaugurated in Sujanpur Tira which is located in the green ground in middle of the town. This has increased the importance of the town.

History

Tira Sujanpur is also called Sujanpur Tira or Sujanpur Tihra is a beautiful town inhabited by Maharaja Sansar Chand Katoch who was the King of Kangra and later shifted from Kangra to Sujanpur Tira after the war with Muslim kings who wanted to capture Kangra fort. Maharaja Sansar Chand constructed his palaces, temples and courts (called Baradari) on the peak of hillock called Tira overlooking Sujanpur's famous Chaugan, hence the name of the town is Sujanpur Tira. In the middle of this beautiful town there is one square kilometer green ground popularly called in Pahari language 'Chaugan' (which remains green throughout the year). Now part of the ground is occupied by the Sanik School. The ground is a meeting place for most of the town people, ladies, men, children for evening walk and for playing all types of games. Most famous Holi fair also takes place on this ground which lasts almost 2–3 weeks during the month of March.

Based on the caste system each side of 'Chaugan' is occupied by Brahmins, merchants (Vaishyas), Kashtriyas and Shudras. The concept is now waning off. The town has two famous temples constructed by the king which are Bansiwala (For Lord Krishna) on one side of the ground, and Narvdeshwar on the other side towards the river Beas. One of the famous temple at Tira was destroyed during the 1905 Kangra earthquake, as also the most of the palace buildings. Archaeological Department has tried to restore some of the monuments but not to an extent desired. It is more like whitewashing done by Archaeological Department. Many of the invaluable Kangra paintings were collected by erstwhile commissioner E.N.Mangatrai and some were returned to the museum in Chandigarh.

People of Sujanpur Tira (earlier probably called Sajjanpur due to people being nice, honest and religious-minded) are very hospitable and helpful. The people are educated and most of them know how to read and write. This town has produced many scientists, administrators, professors, doctors. Once upon a time it was the most educated town in Kangra and Himachal at large. The ruins still remind us the old paintings which exists on the temples and palaces though the passage of time and atmospheric attacks have sullened them a lot. Whatever were left were destroyed by locals by whitewashing due to their innocence.

While Sujanpurtira produced many professionals and writers, a few of them really earned name. Dr. Ishwar Das was the first IAS of 1953 batch who retired as Chief Secretary of Madhaya Pradesh; Dr Sant K. Bhatnagar a Kharagpur IITian achieved eminence in the field of Rubber Technology internationally and authored many scientific papers and religion books; Professor Uttam Chand Mahajan who achieved eminence in Astrology and wrote four books after retiring from active service as Principal, Government College, Hamirpur. Professor U.C. Mahajan's latest

book covering critical commentary of Mirza Ghalib covering almost 900 pages was published just before his demise in April,2014. Sh S R Bhardwaj of Brahampuri Mohallah went on to become an IAS officer and retired as Labour Commissioner Himachal Pradesh in 1987. Another eminent son of the soil was Shri. Ram Rattan Dewan who completed Bsc. Agriculture from Agriculture college Layalpur, now in Pakistan. After completing his studies he joined the government job as an agriculture specialist and through dint of his hard work he reached the post of Deputy Director of Agriculture (Himachal Pradesh) and retired as such. Another star who achieved eminence in short time is Tarun Bhatnagar, who completed his B.E Computer Engineering from top school of USA viz; University of Michigan and MBA from Booth school of Management, University of Chicago. Tarun Bhatnagar works as Director in Google in Headquarter located in San Francisco, USA

The Table below summarizes the historical importance and geographical features of the project affected villages

Table 5-20: Historical importance and geographical features of Project affected villages in Hamirpur District

Sr. No.	Village	Panchayat	Height (mt above msl)	Latitude (N)	Longitude (E)	Topography	Historical importance
1.	Jungle Jihan	Chorhu	670.2	31°46’45.1”	076°26’27.9”	Hilly	Famous for dairy products
2.	Balehu	Karot	542.1	31°47’47.2”	076°27’36.8”	Plain	Ancestors came from Kutlehar
3.	Baari	Karot	608.2	31°48’01.3”	076”28’07.7”	Plain	-
4.	Mathan	Karot	515.4	31°48’28.2”	076°27’55.4”	Plain	-
5.	Laungni	Karot	518	31°48’19.9”	076°27’53.3”	Plain	Water supply scheme
6.	Bhadryana	Darhla	528.3	31°48’22.5”	076°28’36.7”	Plain	Old natural water spring (chhrurhu)
7.	Gahliyan	Darhla	534	31°46’24.6”	076°28’25.9”	Hilly	Remains of fort
8.	Ropa	Darhla	536.4	31°48’24.6”	076°28’43.8”	Hilly	-
9.	Sarohal	Banal	638	31°48’03.9”	076°29’04.4”	Hilly	King Sansar Chand nagri
10.	Gurorhu	Chambiana	518	31°48’35.2”	076°29’34.8”	Hilly	-
11.	Tikkar	Dehra	561	31°48’25.4”	076°29’08.2”	Hilly	-
12.	Miana	Darhla	516	31°48’53.4”	076°28’43.8”	Plain	Remains of old fort and named after one caste Katoch (mian)
13.	Miharhpur	Darhla	522	31°48’15.1”	076°28’44.8”	Hilly	Old Hanuman temple
14.	Chauki	Darhla	521.4	31°49’01.0”	076°28’37”	Plain	-
15.	Darhla	Darhla	534	31°49’16.2”	076°28’36.3”	Plain	-
16.	Gaagla	Darhla	538.8	31°49’30.8”	076°28’26.8”	Plain	-
17.	Haar	Darhla	-	-	-	-	-
18.	Miyana	Darhla	555	31°49’25.7”	076°28’34.4”	Plain	-
19.	Balla	Sujanpur	573.5	31°48’21.9”	076°29’30.4”	Hilly	-

	Girthan*						
20.	Sujanpur	Sujanpur	550.5	31°50'01.4"	076°30'15.4"	Plain	International holi fair and big ground
21.	Tihra	Tihra	700.2	31°49'43.9"	076°30'46.9"	Hilly	Capital of Sansar Chand
22.	Palahi	Jol	550.2	31°51'10.4"	076°32'05.5"	Plain	
23.	Samona	Jol	550.2	31°51'10.4"	076°32'05.5"	Plain	Old Shiv temple
24.	Bir Bagerha	Bir Bagerha	562.0	31°51'27.4"	076°32'07.7"	Plain	-

Table 5-21: Historical importance and geographical features of Project affected villages in Kangra District

Sr. No.	Village	Panchayat	Height (mt above msl)	Latitude (N)	Longitude (E)	Topography	Historical importance
1	Bulli	Tipri	528.2	31°48'22.3"	076°27'28.8"	Plain	Ferrying site
2	Tipri	Tipri	537.6	31°49'20.5"	076°27'23.1"	Hilly	Kacheri of king
3	Kayod	Tipri	534	31°49'10.2"	076°27'34.4"	Hilly	-
4	Chawki	Tipri	518.4	31°48'55.1"	076°27'55.9"	Plain	-
5	Dalli	Kuhan	532.3	31°49'44.8"	076°28'33.4"	Plain	Old time famous for growing vegetables
6	Bhalunder	Lahru	555.3	31°50'01.0"	076°28'43.7"	Plain	Guga temple, Ferrying site
7	Daadu	Balkrupi	NA	NA	NA	Hilly	-
8	Nichali Bherhi	Balkrupi	728.5	31°50'39.0"	076°29'25.3"	Hilly	-
9	Paprola	Alampur	565.7	31°51'03.8"	076°29'57.5"	Hilly	Stone for treating weak children
10	Alampur	Alampur	549.3	31°50'32.6"	076°30'26.9"	Plain	Named after king Alam Chand & old ferrying site. Famous for serving fish dish in the dhabas and fried fish
11	Baag	Alampur	531.6	31°50'33.9"	076°30'44.8"	Plain	Orchard of King Rajinder Chand
12	Liyunda	Sakoh	596.4	31°52'10.1"	076°31'10.4"	Plain	Staying place of Wazeer of king JaiSingh
13	Sai	Jangal	570.9	31°51'27.0"	076°30'10.1"	Plain	Used to be a part of Alampur named after Alam Chand

5.11 Quality of the living Environment

The project area lies on the foothills of the lower Himalayan belt. The region is blessed with rich green environment with deciduous forests and rural background. The main economy of the project area is agrarian. Being in the lower Himalayan belt, the area does not face any extremes of

temperature in summers nor winters. The average annual temperature ranges from 22-26° C with peak summer temperature reaching around 35-40 °C and the peak minimum temperature reaching 2-5°C during winters. The area also harbors a good amount of wildlife. During the surveys it was observed that the area frequently witnesses sittings of wild animals like wild bores, antelopes, red jungle fowl (Jungli murga), foxes, rabbits etc. Conclusively, the overall the quality of living environment as per rural standards of the state can be categorized as good with ample resource of water from Beas, clean air and thick forest cover.

6 Social Impacts

6.1 Framework and approach to identifying impacts

SIA seeks to assess, in advance, the social repercussions that are likely to follow from projects undertaken to promote development, such as dams, mines, industries, highways, ports, airports, urban development and power projects. It is a tool that can help decision-makers to foresee the likely negative impacts of their actions so that steps necessary to prevent or at least to contain them could be taken in time. As an aid to the decision-making process, SIA provides information on social and cultural factors that need to be taken into account in any decision that directly or indirectly affects the lives of people in the project area.

According to Inter-Organizational Committee on Principles and Guidelines for Social Impact Assessment (IOCPGSIA 2003), a conventional way of conceptualizing social impacts changes to the following:

- People's way of life – that is, how they live, work, play and interact with one another on day to day basis;
- Their culture – that is, their shared beliefs, customs, values and language or dialect;
- Their community – its cohesion, stability, character, services and facilities;
- Their political system – the extent to which people are able to participate in decisions that affect their lives, the level of democratization that is taking place, and the resources provided for this purpose;
- Their environment – the quality of the air and water people use; the availability and quality of food they eat; the level of hazard or risk, dust and noise they are exposed to; the adequacy of sanitation, their physical safety, and their access to and control over resources;
- Their health and wellbeing – health is a state of complete physical, mental, social and spiritual wellbeing and not merely the absence of diseases or infirmities;
- Their personal and property rights – particularly whether people are economically affected, or experience personal disadvantage which may include a violation of their civil liberties;
- Their fears and aspirations – their perceptions about their safety, their fears about the future of their community, and their aspirations for their future and future of their children;
- The process of conducting Social Impact Assessment was designed in a manner which involved all stakeholders in systematic approach to assess the impact of proposed acquisition. The framework & approach to identifying the impacts is shown in following steps.
- Step 1: Background study and case studies
- Step 2: Identification of different PAPs
- Step 3: Preparation of Field survey questionnaire
- Step 4: Conduction of Field survey and FGDs with various Stakeholders

- Step 5: Analysis of data collected
- Step 6: Identifying various impacts and their intensity in project area.

6.2 Description of impacts at various stages of the project

Acquisition of land proposed for the hydro-electric project will have a direct and indirect bearing on livelihood, employment, income, production, health & well-being and quality of life of the community, socio-cultural systems and environment. It may raise doubts and fears about property rights and aspirations. Development projects affect different groups differently.
Many people tend to benefit while some loose. Often, impacts are particularly severe for vulnerable groups viz. women-headed households, widows, persons with physical or mental disability, BPL families, people belonging to reserved categories and elderly persons.

There is a general optimism for the upcoming Dhaulasidh HEP project in the area. The study found that 93% of the primary stakeholders were willing to surrender their land for acquisition provided appropriate compensation is paid and only 7% resisted the acquisition process. During the FGDs with Panchayats, the villagers and secondary stakeholders were also found to have a very positive opinion towards the project as it would bring an overall development to the entire area in terms of infrastructure development (both Social and Physical) and increase in employment and business opportunities. Also, they anticipated the increase in land prices of the area which would be a beneficial factor for them.

However, they were also apprehensive about the negative impacts that may rise from the project if not properly mitigated. There were concerns regarding the rise in disputes among stakeholders for receiving the compensation and that the vulnerable groups may be left out or be cheated. Also, since on receiving the compensation amount, there would be a change in the financial condition of the PAFs which in turn would alter their purchasing capacity and would also increase the risk of fund miss-management as many of the landowners are not properly educated, especially regarding financial management. The project area may also experience rise in cases of frauds and cheats once the compensation amount is distributed. There are also chances of changes in cultural practices and traditions because of changes in the spending pattern.

Due to the acquisition, there would also be loss of both private assets and public infrastructure like residential and commercial structures, cremation grounds, roads, existing water and irrigation facilities including IPH Infrastructure, and also loss of common property resources like drinking water sources like dugwells and tubewells, forests, grazing grounds, temples etc. A total of 29 private structures are getting lost under the proposed acquisition which will result in displacement of 13 PAFs and a livelihood loss for 12 PAFs. In these structures there are 13 residential houses,

19 Shops, 1 aramill, 1 office, 1 cowshed, 11 toilets, 2 kitchens and 5 stores. Among other assets attached to the land under acquisition, a total of 77,724 fruit bearing trees, 17,280 non-fruit bearing trees are also getting impacted due to the proposed acquisition.

Simlarly 80 public assets are getting lost under the proposed acquisition for the DSHEP. These include 1 Govt. Primary school, 1 anganwadi, 1 Mahilla Mandal, 2 temples, Sewerage system of Sujanpur, 29 cremation grounds, 25 water supply infrastructure including IPH Schemes, pumphouses and tubewells, 1 Gharat, 2 Bauris, 1 well, village footpath at Bhalunder and 15 electric poles. The village wise details of the loss to infrastructure and assets has been discussed in chapter 4. The PAPs as well as the villagers were concerned about how alternates would be provided to them by the acquiring body such that it would not hamper their daily routine. The villagers also have dependency on the adjoining grazing land and forest for cattle fodder and fuelwood.

During the construction phase of the project, the stakeholders had a positive outlook towards the project as it would generate good direct and indirect employment and business opportunities for them. Due to in migration they would witness increased consumption of goods which would benefit the local economy.

Migration

The construction phase of any project is rather an unsettled stage characterized by uncertainties and often disorders. The basic problem relates to management of large population which migrate to the construction area in search of jobs. The project is estimated to generate a total empoyment of 600 which would include 500 workers and about a 100 technical staff during its peak construction phase. Taking an average household size of 4 it is estimated that about 2400 persons will inhabit the area during the construction phase, which is expected to last for about 3-4 years.
Those who would migrate to this area are likely to come from various parts of the country having different cultural, ethnic and social backgrounds. Such a mixture of population has its own advantages and disadvantages. The advantages include exchange of ideas and cultures between various groups of people which would not have been possible otherwise. Due to longer stay of this population in one place, a new culture, having a distinctive socio-economic similarity would develop which will have its own entity.

The benefits however, are not certain and depend on several factors. Often, they are directly related to the way construction phase is handled by the project authorities and their sensitivity to various socio-economic problems that could develop during this phase.

Aggregation of labour: Most of the labour would live in dormitories provided by contractor. Improperly planned labour camps generally tend to become slums, with inadequate facilities for potable water supply and sewerage treatment and disposal. This could lead to outbreak of epidemics of water borne diseases. Proper sanitary facilities needs to be provided in these camps. A proper surveillance and immunization schedule needs to be developed for the labour population migrating into the project area.

The locals and PAPs also showed concerns regarding the in migration of labour for the project as it would raise the pressure on existing infrastructure like health facilities, educational facilities, roads etc. There may be chances of rise in conflicts among the locals and the in-migrants and the stakeholders also opined that there are chances in rise in crime rates and anti-social activities in the area because of migration. The area may also witness cultural mixing.

Increased Incidences of water related diseases: The construction of the proposed reservoir would enhance the potential breeding sites for various diseases vectors. There are chances that incidence of malaria may increase as a result of the construction and operation of the proposed project. In addition to the construction of the reservoir, factors such as Aggregation of Labour, Excavation, Inadequate facilities in labour camp, muck disposal sites, too may lead to the increased incidence of malaria in and around the project area if not properly mitigated.

Muck Disposal: Normally muck disposal is done at low lying areas, which get filled up due to stacking of muck. This can sometimes affect the natural drainage pattern of the area leading to accumulation of water or partial flooding of some area which can provide ideal breeding habitat for mosquitoes. Moreover, muck disposal sites are vulnerable to dust/air pollution and also prone to unchecked open dumping of waste from the vicinity, thereby degrading the local environment.

Soil Erosion/increased Siltation: Heavy siltation may reduce the photosynthetic activity to some extent. This is likely to have an adverse impact on the primary productivity of the affected stretch of river beas and its tributaries. Since river Beas has sufficient flow the impact on this account are not expected to be significant. However, some adverse impacts are anticipated on the streams and nallahs which have flow during lean season.

Impact of fog

Due to construction of reservoir there would be considerable rise in humidity levels during summers and increased frequency and lasting hours of fog during winters. Consequently, this would alter the productivity of crops and fertility of soil in the area. This will have more severe effect in some villages like Bulli, Laungni, Balehu, Mathan, Dalli, Gaagla and Bhalunder. The fog

may also impact the health of the locals and consequently would increase expenditure on human and animal health on account of increased fog & infestation of diseases and pest. However, during summer people may get relief from heat due to cool climate.

Impact on bridges, roads and culverts

As per the requiring body no bridges are going to be impacted from the proposed dam-reservoir as the water level in the reservoir is going to remain well below the safe limits. As per the study there are 6 bridges, 1 culvert and 1 road which fall in close vicinity of the reservoir area and are vulnerable to impact.

Further, there would also be problem of traffic, air and noise pollution because of the heavy transport vehicles, material transport and construction. The area may also witness rise in health problems due to fog, construction and quarrying activities.

During the post construction phase, the stakeholders opined that the area may witness reduced pollution and better living environment. Due to funds like LADA the area would also witness further development. A cultural stability may also be witnessed during this stage. However, they also highlighted some negative impacts which may arise during this phase such as, due to drop in construction activities there would be less employment and business opportunities for locals and may also lead to unemployment to the temporary work force involved in the project.

The area may witness sudden fall in local economy and low consumption of goods and services due to out migration of the temporary workers involved in construction stage. Consequently, People may face difficulty in maintaining the living standards set forth due to the increased income level during construction phase.

Table below summarizes various possible social, economical and cultural impacts found by the study at different stages of project cycle:

Table 6-1: Impacts During Various Stages of Project

Stage	Social Impacts	Economic Impacts	Cultural Impacts
Pre-Construction Stage	• Disputes among stakeholders for receiving compensation may arise. • Doubts and fear of the upcoming changes such as rise in water levels, humidity, increased landslides etc. • Loss of cremation grounds • Loss of temples • Loss of common property such as water resources, gharats, etc will have adverse effect on quality of life.	• Prices of land in surrounding area may increase due to upcoming project. • Sudden change in financial condition of the PAFs due to the compensation awarded, their purchasing capacity may change and would also increase the risk of fund miss-management. • Loss of infrastructure such as	With change of spending pattern of people getting benefitted due to upcoming project, there would be an impact on cultural practices and traditions.

Stage	Social Impacts	Economic Impacts	Cultural Impacts
		existing irrigation facilities, etc will have negative impact on the economy of project affected and surrounding areas. The acquisition of forest land will negatively impact the villagers since they have high dependency for collection of fodder and fuelwood.	
Construction Stage	In-migration of construction workers and technical staff will increase burden on existinghealth care centers, hygiene. Migration may increase pressure on the existing Educational Institutes also. Social divide may be created between people who are getting benefitted from the project and people who remain unaffected. Living standards of the habitants may improve due to the overall development of the area because of the upcoming project. A sense of safety and security may decrease among locals as a result of in-migration. Conflict may rise with outsiders and area may see rise in crime and anti-social activities. The area may witness rise in health problems and diseases due to construction, quarrying. Heavy transportation during construction phase may lead to increased air and noise pollution in the adjoining villages.	Increased employment and business opportunities for the locals and PAFs. Increased disposable income with the locals. Increased economic activities and consumption patterns. Due to in-migration the area would witness increased consumption of goods and services thereby benefitting the local business. Negative Impact on productivity of crops and fertility of land due to increased humidity and fog.	Due to In-migration people will come from other states and bring their own culture, beliefs, religious practices, clothing patterns etc. which may impact existing cultural practices and traditions of the local habitants.

Stage	Social Impacts	Economic Impacts	Cultural Impacts
Post-Construction Stage	Pollution caused by construction activities will reduce and the area may witness better living environment. People may face difficulty in maintaining the living standards set forth due to the increased income level during construction phase. apprehensions about the substantial increase in the population of snakes and other dangerous reptiles, the insect-pests; etc after the construction of dam and persistent fog. Impact on health and health expenditure on humans and animals due to increased humidity and persistent fog Change in micro-climate of the area due to fog and humidity.	Due to drop in construction activities there would be less employment and business opportunities for locals and may also lead to unemployment to the temporary work force involved in the project. The area may witness sudden fall in local economy due to out migration of the temporary workers involved in construction stage. Due to funds like LADA area may witness further improvement in infrastructure development even after construction phase. Risk of accidents and landslides. Decrease in productivity of crops and fertility of soil due to persistent fog.	Cultural stability maybe seen during this phase.

**Source: Field Survey*

6.3 Indicative list of impacts areas

The impacts can be positive or negative. In this project it has been found through surveys and discussions that people expect land acquisition will give them better monetary compensation which in-turn would help them in improving their well-being. Though the affected families felt that the loss of land and livelihood etc. would be irreparable. The objective of the household survey was to generate an inventory of social impacts on the project affected families, type and ownership of property, type of impact and its magnitude and details of affected property. The major findings and magnitude of impacts are discussed in the following sections.

6.3.1 Impacts on Landowners

The proposed project requires land for catchment area, Muck Disposal, roads, establishment of power sub-stations, construction of administrative buildings, etc. Under the current proposed acquisition 3684 titleholders are having a total ownership over 1165 khasras with a total area of 246.8062 Ha. Out of these 3664 (99%) owners are marginal landholder, 16 small, 2 semi-medium

and 2 medium land holders. Only 1 land owner responded that he does not own any other land in the same or any other panchayat apart from what was coming under acquisition.

A total of 29 structures are getting lost under the proposed acquisition which will result in displacement of 13 PAFs and a livelihood loss for 12 PAFs. In these structures there are13 residential houses, 19 Shops, 1 aramill, 1 office of the ex-servicemen truck union, 1 cowshed, 11 toilets, 2 kitchens and 5 stores. Among other assets attached to the land under acquisition, a total of 77,724 fruit bearing trees, 17,280 non-fruit bearing trees are also getting impacted due to the proposed acquisition. Table 6-2 gives the village wise details of residential structures coming under acquisition.

Out of the total private land of 246.8062 Ha being acquired only 9% land is cultivable and the remaining 91% land is uncultivable. Therefore, the practice of agriculture on the land being acquired was not found to be intense. Infact, although the share of private land seems to form the majority of the total land requirement it is mainly because the PAFs are having ownership of land right on the river banks and in many areas on the river bed itself.

The anticipated impacts will be loss of land which will deprive the affected families of their agricultural income, income from Shops and alter the way of life. Further, the project involves construction work which will affect the adjacent landowners and others due to air and water pollution.

6.3.2 Impacts on livelihoods and income

The PAPs were found to carry out Agriculture/horticulture activities on the land under acquisition, however the activity was not found to be very intense as a majority of the landholdings were found to be on or near to the river bed. Only 22.78 Ha of the total area under acquisition is cultivable land. Although primary agriculture did not form a major economic activity of the PAPs, but a combination with livestock rearing, horticultureactivities and collection of fodder and fuel-wood generate a substantial economic support for them. The study also found that many of the stakeholders have at least one family member working in the service sector which serves as their main source of income. For the PAPs loosing structures along with land, most of them had shops along with residential structure which serves as a major source of their livelihood. Details of income of PAFs have already been discussed in above chapter.

12 PAFs would be losing livelihood from the proposed acquisition. 19 Shops and 1 aramill. Among other assets attached to the land under acquisition, a total of 77,724 fruit bearing trees, 17,280 non-fruit bearing trees are also getting impacted due to the proposed acquisition.

Also, no tenants/lessees were found during the survey. the stakeholders reported that since the landholding size is small, all agriculture/horticulture work is carried out by the family itself. No cases of seasonally employing agriculture labour was reported during the study.

Given below is a table listing out major agriculture/ horticulture production in the affected area:

Table 6-2: Agriculture/ Horticulture Production in Affected Area

Category	Crop	Total Production in Kg
Agriculture	Maize	349557
	Pulses	40
	Vegetables	1330
	Wheat/ Barley	368509
	Total	**719436**
Horticulture	Banana	175
	Black Plum	100
	Catechu	295
	Gooseberry	30
	Mango	3620
	Orange	50
	Pear	100
	Total	**4370**
Grand Total		**723806**

**Source: Field Survey.*

6.3.3 Impacts on physical resources

6.3.3.1 Loss of Private Assets

Residential structures located near the river channel would be affected due to the proposed construction activity or submergence. A total of 29 structures are getting lost under the proposed acquisition which will result in displacement of 13 PAFs and a livelihood loss for 12 PAFs. In these structures there are 13 residential houses, 19 Shops, 1 aramill, 1 office, 1 cowshed, 11 toilets, 2 kitchens and 5 stores. Among other assets attached to the land under acquisition, a total of 77,724 fruit bearing trees, 17,280 non-fruit bearing trees are also getting impacted due to the proposed acquisition.

The table below gives the details of each private structure along with location and ownership details being lost due to the proposed acquisition.

Table 6-3: Loss of structures

District	Tehsil	Panchayat	S. no	Village	PAP Name	No. of structure	Description	PAFs getting Displaced	PAFs loosing Livelihood
	Sujanpur	Jol	1.	Pargana	Rato ram	1	2 shops	0	1
			2.		Preetam Chand S/o Nathu Ram	1	1 shop	0	1
			3.			1	1 cowshed		
			4.		prakash chand, jagdev, ramesh chand, Ramchand	1	4 houses and 4 shops	4	4
			5.			1	4 toilets		
			6.			1	2 toilets		
			7.		The Ex-servicemen tempo-truck union	1	office	0	0
			8.		Om Prakash S/o Tokha Ram	1	4 shops	0	1
			9.			1	1 toilet		
			10.		Sitaram S/o Gian Chand	1	1 house and 2 shops	1	1
			11.		Babaram S/o Lt. Shamboo Ram	1	1 house	1	0
			12.		Mayadevi Wd/o Lt. Jaguram	1	house	1	1
			13.			1	3 shops		
			14.			1	toilet		
			15.		Madanlal S/o Shanka, karam chand S/o Shankar	1	2 shops and 2 stores	0	1
			16.	Kaach	Babaram S/o Lt. Shamboo Ram	1	1 kitchen+ store	0	0
			17.			1	1 toilet		
		Sujanpur	18.	Sujanpur	Karam Chand S/o Harbaj Singh	1	1 house	1	0
		Dhabriana	19.	Riyah	Manohar LalS/o Khajana	1	Store	0	0
Kangra	Khundian	Tipri	20.	Chowki	Sanjeev Kumar S/o Patiram	1	Aramill	1	1
			21.			1	House		
			22.			1	Toilet		
			23.		Atmaram S/o	1	House	1	0

District	Tehsil	Panchayat	S. no	Village	PAP Name	No. of structure	Description	PAFs getting Displaced	PAFs loosing Livelihood
			24.		Milkhiram	1	Kitchen		
			25.			1	Toilet		
			26.		Ranveer Singh S/o Patiram	1	house	1	0
			27.			1	store		
			28.		Ratoram S/o gulava ram	1	house and shop	1	1
			29.		Gopal S/o Suresh	1	house	1	0
					Total	**29**		**13**	**12**

**Source: Field Survey*

6.3.4 Impact on Biodiversity and Environment

Biological resources are among the most important resources impacted by such huge projects. A detailed baseline study of these resources is essential to estimate the magnitude of potential impacts and to avoid or mitigate any loss caused by the proposed project. An Environment Impact Assessment (EIA) study has already been conducted by WAPCOS Ltd. In 2011 for the project which in details assesses the Impact on Biodiversity and environment.

Further, the total forest land coming under the project is 57.74 Ha. During the study it was found that the villagers were dependent on the forests for collection of fodder and fire wood would now be lost and therefore equivalent alternatives need to be provided.

Impact of fog

Due tothe creation of reservoir the area would witness change in its microclimate which would include alteration in its peak temperatures (both max. and min.) both during summers and winters. There would also be considerable rise in humidity levels during summers and increased frequency and lasting hours of fog during winters. Consequently, this would alter the productivity of crops and fertility of soil in the area. This will have more severe effect in some villages like Bulli, Laungni, Balehu, Mathan, Dalli, Gaagla and Bhalunder.

According to an estimate by the Department of Agriculture Economics, CSK Krishi Vishvavidyalay Palampur in 2011 the productivity of crops (field) and fruits valued at Rs 1500/ha in case of field crops like wheat and Rs. 7500/ha in case of fruits may decline by 10% from this project.

The fog may also impact the health of the locals and consequently would increase expenditure on human and animal health on account of increased fog & infestation of diseases and pest is estimated to be Rs. 300/ to Rs. 200/head, respectively. People also have also apprehensions about the substantial increase in the population of snakes and other dangerous reptiles, the insect-pests; etc after the construction of dam and persistent fog. However, during summer people may get relief from heat due to cool climate.

Increased Incidences of water related diseases

The construction of a reservoir replaces the riverine ecosystem by a lacustrine ecosystem. The vector of various diseases breed in shallow water areas not very far from the reservoir margins. The magnitude of breeding sites for mosquitoes and other vectors in the impounded water is in direct proportion to the length of the shoreline. The construction of the reservoir would increase the shoreline by manytimes as compared to the pre project shoreline of river Beas under submergence. Thus, the construction of the proposed reservoir would enhance the potential breeding sites for various diseases vectors. There are chances that incidence of malaria may increase as a result of the construction and operation of the proposed project.

In addition to the construction of the reservoir, the following factors too may lead to the increased incidence of malaria in and around the project area if not properly mitigated:

- Aggregation of Labour
- Excavation
- Inadequate facilities in labour camp
- At muck disposal sites

Muck Disposal

As per the existing proposal for the construction of DSHEP about 0.882 Mm^3 of muck is to be generated including 40% swelling factor. Out of this 0.118 Mm^3 of muck is proposed to be utilized for various project works and the balance quantity of 0.764 Mm^3 would be needed to be disposed off. For disposal two muck disposal sites namely at village Jihan nearby road Sujanpur Nadaun via Jihan Bada and along Jihan to Nadaun Road at Mohal Busal, Mauza Choru, tehsil Nadaun, Hamirpur have been identified with a total area of about 4.3 Ha and a combined capacity of 0.801 Mm^3.

Normally muck disposal is done at low lying areas, which get filled up due to stacking of muck. This can sometimes affect the natural drainage pattern of the area leading to accumulation of water or partial flooding of some area which can provide ideal breeding habitat for mosquitoes. Moreover, muck disposal sites are vulnerable to dust/air pollution and also prone to unchecked open dumping of waste from the vicinity, thereby degrading the local environment.

Soil Erosion/increased Siltation

The run of river from the construction sites will have natural tendency to flow towards river Beas or its tributaries. For some distance downstream of major construction sites, such as dam, power house etc. there is a possibility of increased sediment levels in river water, which can lead to reduction in light penetration, which in turn could reduce the photosynthetic activity to some extent as it directly depends on sunlight. This is likely to have an adverse impact on the primary productivity of the affected stretch of river beas and its tributaries.

Since river Beas has sufficient flow the impact on this account are not expected to be significant. However, some adverse impacts are anticipated on the streams and nallahs which have flow during lean season.

6.3.5 Impacts on public services and utilities

Loss of access to commonly owned assets (forestlands, water bodies, grazing lands, gharats, cremation grounds, temples and schools) is often overlooked and uncompensated, particularly for the asset less as they are considered to be providing indirect benefits to the community which could not be quantified. But absence of the same do affect the quality of life of the community.

Since the acquisition of land is taking place linearly along the river therefore, apart from private land the adjoining forest area is also coming under the project on both banks. The study found that the villagers have dependency on forests for collection of cattle fodder and collection of firewood. Moreover, these areas are also used by villagers as grazing grounds.

Similarly, 80 public assets are also being lost under the proposed acquisition which include 1 govt. primary school in village Laungani of Hamirpur district, 1 anganwadi, 1 Mahilla Mandal, 2 temples, 1 sewerage system, 29 cremation grounds, 25 water supply infrastructure including IPH Schemes, pumphouses and tubewells, 1 Gharat, 15 electric poles, 2 bauris, 1 well and village footpath in Balunder village.

Since there would be loss of pumphouses and bauris in many of the villages, it would impact their existing irrigation and drinking water facilities. Similarly, due to loss of electric poles in Pargana village, the area would be vulnerable to electricity blackout unless proper alternate measures are taken beforehand to provide electricity to the villages before removing the existing poles.

In addition, 2 temples at Alampur and Laungani respectively and 29 cremation grounds would be submerged in most of the villages since they are located mostly on river banks. Loss of these utilities would bear a direct negative impact on the economic and socio-cultural lives of the affected population.

Impact on bridges, roads and culverts

As per the requiring body no bridges are going to be impacted from the proposed dam-reservoir as the water level in the reservoir is going to remain well below the safe limits. As per the study there are 6 bridges, 1 culvert and 1 road which fall in close vicinity of the reservoir area and are vulnerable to impact. These are :

1. Hamirpur-sujanpur bridge near sankat mochan temple
2. Bhaleth-Syor bridge
3. Main bridge connecting Sujanpur tirah with Alampur
4. Sandhol Sujanpur culvert at abour 1 km from Tirah bridge
5. Bridge on Sandhol sujanpur road abour 2 km from Tirah bridge
6. Bridge connecting Palahi with puar
7. Bridges connecting Puar with Jangal behri and Jangal Beri with Kheri
8. Buli Tipri Road

Since the water levels in Beas and its feeders are going to rise considerable after creation of reservoir, the soil on the banks will become moist and watery due to absorption and capillary action. It is suggested that the requiring body undertakes a proper structural stability study of each of the above-mentionedroads, culverts and bridges as whether they would be able to withstand the rise in water levels and consequently plan alternatives to restore the connectivity in the area if the need arises.

Besides this, there will be increased movement of people, material, equipment and in-migration during the construction phase which will create an extra load on the available infrastructure such as roads, existing health and educational facilities etc. which therefore need to be strengthened beforehand.

The table below gives the village wise details of the loss of public services and utilities due to the proposed acquisition.

Table 6-4: Loss of public services and utilities

District	Tehsil	Panchayat	S. No	Villages	Final Water Tank/IPH Scheme/pump -houses	cremation ground	other
Hamirpur	Sujanpur	Sujanpur	1	Sujanpur	2	2	Sewerage system
		Darla	2	Bhadaryana Bhaleth	2	1	
			3	Miyana	1	1	

District	Tehsil	Panchayat	S. No	Villages	Final Water Tank/IPH Scheme/pump -houses	cremation ground	other
			4	Mihadpura	1		
			5	Darla	1		
		Karot	6	Balehu		1	
			7	Loungani	2		1 mahila Mandal, 1 govt primary school, 1 anganwadi and 1 temple
		Chamiyana	8	Bharmad		7	
			9	Graudhu Buhla		3	
		Jol	10	Pargana	2	1	15 electric poles
			11	Palahi	2	1	
		Dhabriana	12	Riah	2	1	
		Bhageda	13	Baghera Buhla	1		
Kangra	Khundian	Tipri	14	Bulli		1	1 Baudi, 1 well, 1 gharat
			15	Kiyod			1 Baudi
			16	Chowki	1	1	
	Alampur	Kuhan	17	Dalli	1		
		Lahru	18	Balunder		1	Village Footpath
		Balakroopi	19	Daddu	1	1	
			20	Nichli bheri		1	
			21	Paprola	1	1	
		Jangal	22	Bir	2	2	
			23	Sai	1	1	
		Alampur	24	Alampur		1	1 sidhi vinayak temple
			25	Baag	1	1	
		Sakoh	26	Lyunda	1		
TOTAL					**25**	**29**	

**Source: Field Survey*

6.3.6 Impacts on health, culture and social cohesion

The study found that there may occur impact on health of villagers in the project area due to increased humidity, increased frequency and lasting hours of fog, vulnerability to water borne diseases, increased air and noise pollution, increased stress on existing health facilities.

The respondents were also apprehensive about chances of rise in conflicts among the locals and the in-migrants. They opined that there are chances in rise in crime rates and anti-social activities in the area because of migration. The area may also witness cultural mixing. However, due to in migration the area would also witness increased consumption of goods which would benefit the local economy

6.3.7 Gender based impacts

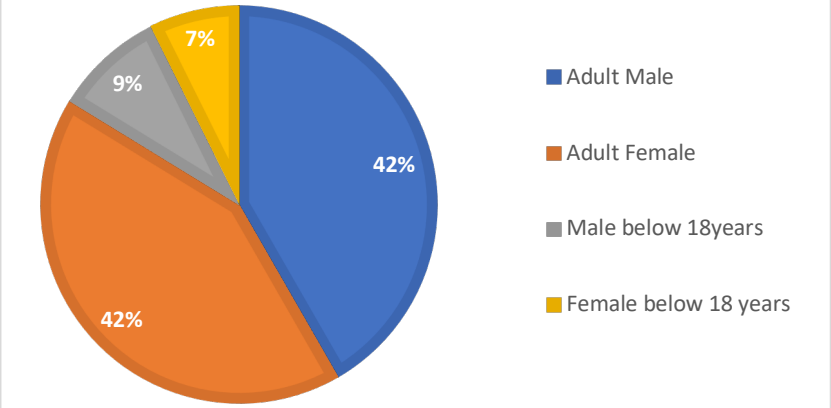
Gender Equality: One of the possible impacts of proposed acquisition of land can be unavailability of work opportunities to the females in project area due to the loss of land. Even if the females are educated, they do not prefer to go out of the village to earn livelihood. Another impact possible is degradation of economic status of females since many of them don't have any legal claim on papers over the land hence they might will not qualify for compensation of land-loss and they fall in the category of indirectly affected PAPs. Table given below gives a gender wise distribution of PAPs in the project area:

Table 6-5: Gender wise distribution of PAPs in the project area

Adult Male	Adult Female	Male below 18years	Female below 18 years	Total Male	Total Female	Total
4564	4602	981	799	5545	5401	10946

**Source: Field Survey*

Figure 9: Gender wise distribution of PAPs in the project area



**Source: Field Survey*

During the study it was observed that women of the household too participate in carrying out the agricultural activities in the area along with men. Apart from agriculture, during the day women were found to be more involved in carrying out other activities such as managing the shops, maintenance of cattle and poultry, collection of cattle fodder and firewood for the household etc. Although these activities play a crucial role towards the economic wellbeing of any household, however to quantify the same becomes difficult. Out of the total 10946 PAPs, 5401 are women. There are 763 widows among the PAPs out of which 74 are titleholders. Women especially widows are highly vulnerable and require particular attention during award of compensation.

6.4 Impacts as Perceived by the PAPs

Consultation with the affected landowners was the starting point to address involuntary issues, concerning resettlement. People affected by this project have apprehensions regarding their loss due to land acquisition.

During the Primary Survey, the respondents shared that there would be some positive impacts due to the DSHEP activities. These includes an increase in the employment and income opportunities- within the project and in the ambit of the forward and backward linkages. The increase in the value of land is another positive impact according to the respondents. Majority of them also believed that it will create scope for increase in business opportunities. Also, some of them are hopeful that due to a better road network there would be an increase in the average vehicular speed and increased frequency of transportation services. Most of the PAPs were also positive about the overall development especially infrastructural development (social and physical) that would occur in the project villages due to the upcoming HEP.
The respondents also seemed to be worried about some of the negative impacts. The main among these was the loss of land. This in itself carries a huge impact on their livelihoods, way of life and social relationships. Next impacts are related to the influx of in-migrants from different parts of the state or from different states- that may instigate conflict between the locals and the outsiders, an intrusion to their culture and social life, more pressure on the existing natural resources and on the infrastructure.

Further, due to the acquisition of forest land on which the villagers were dependent for collection of fodder and fire wood would now be lost and therefore equivalent alternatives need to be provided.

There would also be increased humidity due to creation reservoir and rise in water levels, risk of water borne diseases, Impact of fog on productivity of crops, fertility of land and health of humans and animals, rise in air and noise pollution, possible rise in water pollution due to

construction, rise in traffic esp. heavy vehicular traffic etc. The increase in the vehicle speed and more cars on the roads would lead to more road accidents.

The villagers were also concerned about the impacts which would be created due to loss of cremation grounds. Another concern was the impact on the villages due to loss of their water resources such as IPH infrastructure, streams, wells and bavdis and also loss of Gharats. Few of the respondents also opined that the chances of HIV/AIDS and risks of trafficking could increase.

The table below captures the responses received during the household survey:

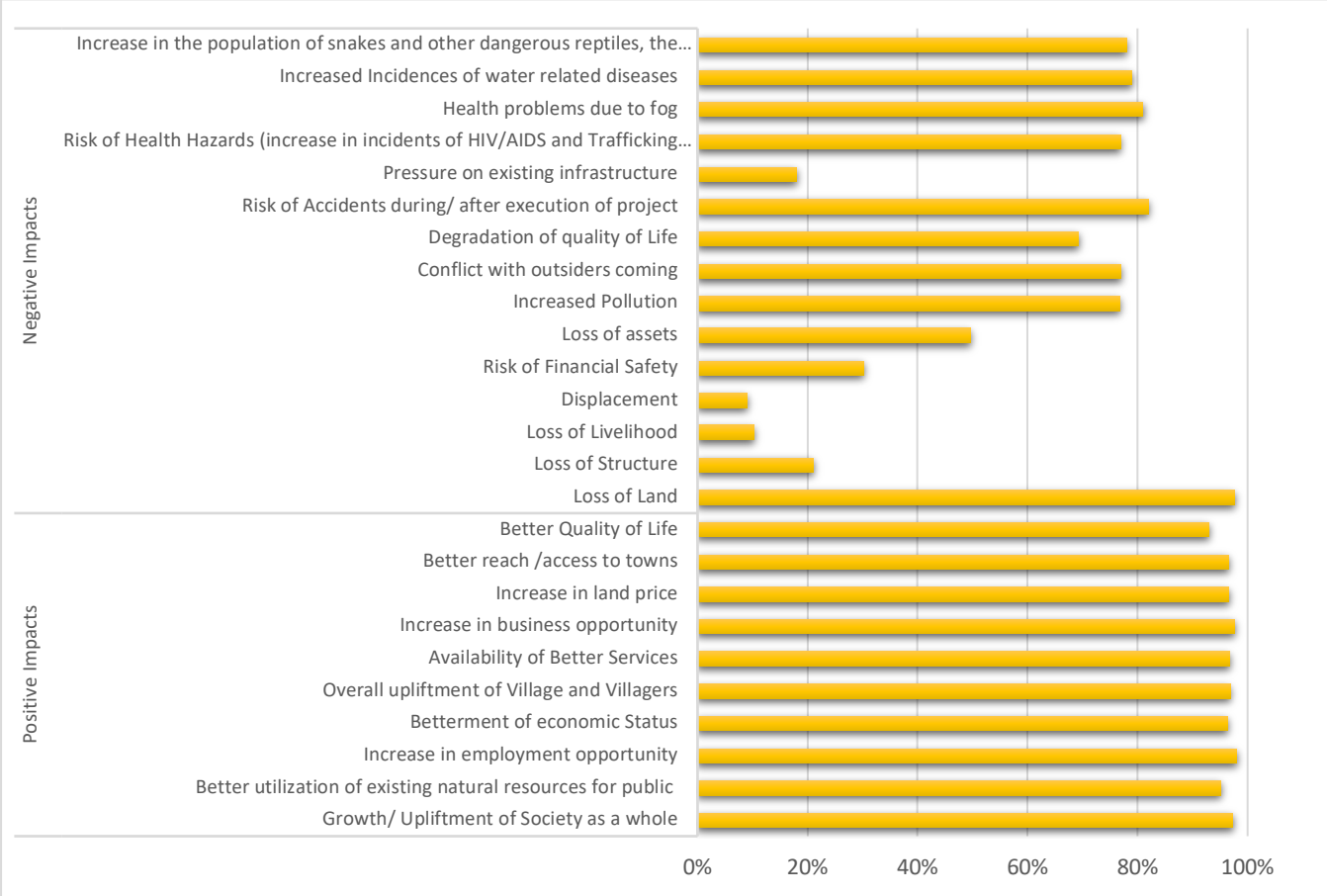
Table 6-6: Impacts Perceived by the PAPs

S. No	Type of Impact	Description	% of Responses
1	Positive Impacts	Growth/ Upliftment of Society as a whole	97%
2		Better utilization of existing natural resources for public	95%
3		Increase in employment opportunity	98%
4		Betterment of economic Status	96%
5		Overall upliftment of Village and Villagers	97%
6		Availability of Better Services	97%
7		Increase in business opportunity	98%
8		Increase in land price	97%
9		Better reach /access to towns	97%
10		Better Quality of Life	93%
12	Negative Impacts	Loss of Land	98%
13		Loss of Structure	21%
14		Loss of Livelihood	10%
15		Displacement	9%
16		Risk of Financial Safety	30%
17		Loss of assets (both private and public)	50%
18		Increased Pollution	77%
19		Conflict with outsiders coming	77%
20		Degradation of quality of Life	69%
21		Risk of Accidents during/ after execution of project	82%
22		Pressure on existing infrastructure	18%
23		Risk of Health Hazards (increase in incidents of HIV/AIDS and Trafficking	77%

S. No	Type of Impact	Description	% of Responses
		etc.)	
24		Health problems due to fog	81%
25		Increased Incidences of water related diseases	79%
26		Increase in the population of snakes and other dangerous reptiles, the insect-pests	78%

**Source: Field Survey*

Figure 10: Impacts Perceived by the PAPs



**Source: Field Survey*

Apart from the negative impacts, people are also optimistic about the positive impacts that the project will bring along with. They are hopeful to get better job opportunities because of the upcoming project, growth/ upliftment of society as a whole, better utilization of existing natural

resources for public, betterment of economic status, increase in business opportunity and land prices, better connectivity with neighboring towns and better quality of life overall.

Apart from loss of land, structure and assets, people showed their concern for increased level of pollution due to construction activities, loss of livelihood, risk on financial safety, conflicts with outsiders coming to their villages for construction work, risk of health hazards, pressure on existing infrastructure and risk of accidents during construction period.

Apart from the above, people believe that biggest challenge they will face because of the proposed acquisition will be:

1. Less land available for agriculture in village.
2. Selection and preparation of new land for agricultural activity.
3. Getting cultivable land in compensation with good fertility
4. Loss of fruit bearing trees.

To cope up with the possible challenges and difficulties, the following mitigation measures were proposed by the PAPs and during FGDs held with panchayats:

1. Better connectivity in terms of roads, bridges and digital network including upgradation of village and link roads to all weather metalled roads
2. Proper drainage facilities in all panchayats of the project area
3. Job opportunities in upcoming HEP project for PAPs.
4. Development of village in terms of infrastructure, services and facilities.
5. Better school and higher education facility within village.
6. Technical education institutions for the project area and surroundings
7. Compensation against acquired land with increased circle rates.
8. Better health care including ambulance services, ambulance roads, better infrastructure of PHCs, clinics and hospitals facilities with in village.
9. Vocational training centres for income restoration.
10. Provide Skill upgradation trainings to the working-class population under various government schemes
11. Continuous check on pollution level caused by proposed project.
12. Business opportunities for local villagers in upcoming project and otherwise such as contracts for construction, supply and transportation.
13. Street lighting in all panchayats of the project area

14. Electricity at special subsidized rates to PAPs and panchayats being affected by the project.
15. Proper Irrigation facility in all project affected Panchayats.
16. Assistance/ Loan from other ongoing development scheme

6.5 Awareness about the Dhaulasidh Hydro Electric Project

During the primary survey, on an average, 65% of the respondents responded that they were completely aware about the upcoming Hydro Electric Project and its purpose while 32% responded that they were partially aware. However only 3.26% responded that they were completely aware regarding eligible compensation and about 93% respondents were partially aware.

Table 6-7: Awareness about the Dhaulasidh Hydro Electric Project

Awareness	About the Hydro Electric Power Project	About project purpose	Regarding eligible compensation
Completely	64.75%	65.03%	3.26%
Partially	31.42%	32.61%	92.81%
Not at All Aware	0.13%	0.13%	0.44%
Can't Say	3.70%	2.23%	3.48%
Total	**100%**	**100%**	**100%**
**Source: Field Survey*			

During the survey 96% of respondents expressed their interest in getting to know more about the project, its purpose, benefits to individuals/ families/village on whole, compensation they are eligible for and possible positive/ negative impacts on the individuals/ families/village.

Table 6-8: Major Source of Information About the Project for PAPs

Source of Information	
Radio	0.53%
Newspaper	0.28%
Govt Officials	69.30%
Other Villagers	16.07%
Other	0.53%
Can't Say	13.28%
Total	100%
**Source: Field Survey*	

It was also found during the primary survey that 69% of PAPs got to know about the project through Govt. Officials, 16% got to know about it through other villagers, less than 1% got the information about the project and proposed acquisition through radio, newspaper and other sources each.

6.6 Consent for the Project

During the survey, 94% people said that they have no objection over the upcoming DSHEP project or proposed acquisition while 6% expressed their objection over the proposed acquisition of the land.

Table 6-9: Any objection regarding acquisition By PAPs

Yes	6%
No	94%
Total	**100%**
**Source: Field Survey*	

6.7 Compensation Preferences

During the survey, 98% of land losers responded that they want cash as compensation against the land they are losing and remaining 2% demanded for land against land as compensation.

44% of the structure losers demanded for cash and 56% demanded structure against structure as compensation.

100% of the asset losers demanded for cash compensation against their loss.

Table 6-10: Compensation Preferences By PAPs

Compensation Preferences	Opted by Land loser	Opted by Structure loser	Opted by Assets loser
Cash	98%	44%	100%
Land for land	2%	0	0
Structure	0	56%	0
Total	100%	100%	100%
**Source: Field Survey*			

Almost all PAPs preferred to receive cash compensation in a single payment. Only 17 PAPs were interested in receiving compensation in monthly/quarterly phasing.

6.8 Use of Cash Compensation Received

During the primary survey, almost 63% PAPs said that they will use the cash compensation received to buy a land for agriculture or new house, almost 26% said that they will save it in bank for future use, only 0.25% responded that they would like to invest it in some other business. Almost 9.66% people said that they are not yet sure how they will use the compensation received and 0.47% expressed their interest in buying a new house with compensation amount received. 2 persons responded thet they would use the compensation amount for the family wedding.

Table 6-11: Use of Compensation Received

Use of Compensation Received	% of Responses
1. By buying a land for agriculture/ shelter	63.18%
2.By buying a house	0.47%
3.By saving it for future in bank	26.39%
4.By investing it in some other business	0.25%
5. Not decided	9.66%
6. Family wedding	0.06%
**Source: Field Survey*	

7 Analysis of costs and benefits and recommendations on acquisition

In this chapter final conclusions regarding assessment of public purpose, less displacing alternatives, minimum land requirements, viability and extent of mitigation measures are discussed along with nature and intensity of social impacts. Finally, the chapter aims to capture the tentative overall benefits of the proposed project and the proposed acquisition and compared with the impacts being inflicted on the direct stakeholders of the project area like PAPs, project affected panchayats and adjoining area, thereby giving a final recommendation of whether the acquisition should go through or not.

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7.1 Assessment of Public Purpose

The strategy followed in Himachal Pradesh for exploitation of hydroelectric power is to produce as much energy as possible with minimum cost and with minimum environment negative impacts. The speedy exploitation of hydroelectric power potential will definitely improve the economic health of the State because 12 percent free power plus 1.5% LADF (Local Area Development Fund) of the project cost, on all new installations will increase the resources of the state to a significant extent. The need for hydroelectric projects also arises from the need, to fulfill a steady increase in peak electricity demand and the growing energy deficit in the Northern Region.[23]

Hydropower has certain advantages, principle among them being the ability to start and stop quickly and instantaneous load acceptance/rejection. This makes it particularly suitable to meet peak demand and for enhancing system reliability and stability. The long life of the hydro power plants, the renewable nature of the energy source, very low operating and maintenance costs, absence of inflationary pressures experienced by the fossil fuels are some of the other advantage

Demand Projection

The National Electricity Policy aims at achieving "Power for all by 2012" and per capita consumption of electricity energy is required to be increased from 704.2kWh in 2007-08 to over 1000 kWh by 2011-12. According to the 17th EPS, the latest in the series of Electric Power Survey of India, conducted by the Central Electricity Authority, the total energy requirement on all India basis at the end of 11th and 12th Plan would be 9,68,658 MU and 13,92,066 MU respectively. Actual energy available at the end of 10th Plan was 6,90,587 MU. The peak load requirement on all India basis at the end of 11th and 12th Plan would be 1,52,746 MW and 2,18,209 MW respectively. Actual peak demand met at the end of 10th Plan is 1,00,715 MW.

[23] (Department of MPP and Power, 2019)

Accordingly, it has been proposed to add a generation capacity of about 78,500 MW, 82,000 MW in the11th and 12th Plan respectively. Over the period, change in life style and economic growth would result in increase of annual per capita power consumption. The projected per capita energy consumption by 2011-12 is over 1000 kWh. The per capita power consumption of Himachal Pradesh is around 765 kWh/year as compared to the national average of 704 kWh/year.

Power Supply Position

In the recent years, the Govt. of India has made a quantum jump in the financial allocation and also by way of other supports so that hydroelectric projects not only get right priorities but also contribute in an increased way to the future capacity addition programmes of the country. Accordingly, in the 11th Five Year Plan (year 2007-2012), the target for hydroelectric capacity has been placed at 14,393 MW, which is more than the total installed capacity (13,666 MW) created in the last 20 years. The thrust is on hydroelectric development. About 14,000 MW of additional capacity in the period 2002-2007 and 50,000 MW of additional capacity planned during the period 2002-2017. Not only has the capacity to be added but also the present hydro-thermal imbalance of 25:75 has to be corrected and brought to 40:60 to meet the peak load requirements and achieve frequency and voltage stability and provide system operating flexibility under changing seasonal and diurnal load patterns.

In India, though over 1,44,000 MW of capacity has been added in the last over 60 years, there is a huge gap between the demand and supply of power. While in the last few years it has marginally reduced, the peaking shortage continues to be over 14% to 15% and the average energy shortage is about 10.1%.

The Northern region has an energy deficit of around 24.3 BU and a peak deficit of around 3.5 GW. The situation varies throughout the year and the worst situation is seen in the summer. Uttar Pradesh is the largest deficit state in the Northern region followed by Jammu & Kashmir, Punjab, , Haryana, Rajasthan and Delhi. The region has states like Himachal Pradesh and Uttarakhand, which have enormous hydro potential, and can be tapped to meet the region's demand for power.

Hydro Power Potential in Himachal Pradesh

The total potential in Himachal Pradesh is 12235.24 MW at 60% load factor, with an installed capacity of 20392.07 MW. The great Indus Basin in Himachal Pradesh has a huge hydro power potential with its tributaries/river in the basin. Among these are Beas River: 4597MW, Ravi River: 2294MW, Chenab River: 2748MW, Yamuna: 591.52MW which are part of the same basin and pass through Himachal Pradesh, Satluj basin has a hydropower potential of 9443.75 MW, which represents approximately 50% of its likely installed capacity. In addition to the Satluj, other rivers also contribute to the power potential of the state. The huge hydro potential of the

State can play a major role in power development programmes in the northern region which will provide an economic base for the overall development of Himachal Pradesh. At present, out of the total available hydropower potential of 20392 MW, only 6060 MW has been exploited by various State and Central Sector agencies.

The Dhaulasidh Hydro Electric Project (66 MW) is a run of river type development proposed scheme in order to harness optimal hydel potential river of Beas. SJVN Limited is the implementing agency for the same. The project is aimed at bridging the gap in power supply in the Northern Region and increasing the State's revenue by exploiting maximum energy resources with minimum hazardous and minimum social-environmental impacts on the local habitants.

The project has been planned to be operated as a Peak Power Station. Incoming water will be stored in the reservoir during lean period flows and released at full load when the reservoir is filled up. It generates high energies while operated as a peaking plant as compared to the Run-of-the River scheme. Further, this will also help in catering to the high peak power demand in Himachal Pradesh.

Expected power generation of Dhaulasidh HEP would be 258.31 GWH per year. The total project cost is estimated to be 789.64 crores. The expected revenue from the project would be approximately 108 crores annually in a 90% dependable year. The project is estimated to generate a total of employment of 600 persons during its peak construction phase which would include 500 workers and about a 100 technical staff. This employment would be generated for skilled, semi-skilled and unskilled labourers. As per the HP govt. rules, 70% of the employment should be reserved for the residents of Himachal Pradesh. In this case, PAFs would be given priorities for the employment generated at the project level.

As per Section 2 sub-section 1(b) of the RTFCTLARR Act, 2013 the Dhaulasidh Hydro-Electrical Project (66 MW) is well justified under the definition of infrastructure projects (energy generation) for public purpose.

7.2 Less Displacing Alternatives & Minimum Land Requirement

The Alternates for various components of the project have been discussed in detail in chapter 1 under examination of Alternatives. The location of the dam and power house and its basic design features have been finalized considering optimum power generation, topographical and geotechnical features, existing projects on the upstream, economy, submergence and other relevant factors such as displacement and land acquisition.

Out of the total land requirement 332.87 Ha for the project 246.8062 Ha (74%) is private land which is to be acquired while the remaining 86.06 Ha (26%) is Government and Forest Land. Although the share of private land seems to form the majority of the total land requirement it is

mainly because the PAFs are having ownership of land right on the river banks and in many areas on the river bed itself. Most of the private land being acquired is coming under submergence of the proposed reservoir. Moreover only 13 PAFs are getting displaced from the proposed acquisition which comparatively a very low figure considering the scale and magnitude of the project and acquisition. On further Analysis out of the total private land of 246.8062 Ha being acquired only 9% land is cultivable and the remaining 91% land is uncultivable.

Conclusively, the proposed acquisition is the least displacing alternative for the project. Furthermore, only 1% (approx.) of the total land required for the project would be used to construct all ancillary facilities for the project during its construction and post construction phases. The remaining 99% of the land would be coming under submergence. Hence all the efforts have been made to minimize acquisition of private land as well as minimal displacement due to the project activities.

7.3 Nature and Intensity of Social Impacts

An impact, if permanent in nature, will have same intensity during post construction phase as during pre-construction/ construction stage on the other hand temporary impacts will show a continuous decrease in intensity during following stages of project cycle. Any impact lasting even after the construction phase is considered as long-term impact and if it lasts only till the construction phase is going on, it is considered as short-term impact.

The table given below shows the nature and intensity of various identified impacts during different stages of project cycle:

Table 7-1: Nature and Intensity of Impacts

Impact Area	S. No.	Impact Identified	Stage of Project cycle	Nature of Impact	Intensity of Impact
Social	1.	Disputes among stakeholders for receiving compensation	Pre-Construction	Temporary	Short term
	2.	Social divide created between people who are getting benefitted from the project and people who remain unaffected.		Temporary	Short term
	3.	Impact on existing cultural practices and traditions of the local habitants due the in-migration.	Construction Phase	Temporary	Long term
Land/	4.	Loss of agricultural land	Construc	Permanent	Long term

Structure	5.	Landlessness among PAPs	tion phase	Permanent	Short term
	6.	Loss of shelter for PAPs		Permanent	Short term
	7.	Loss of public infrastructure like gharats, footpath, IPH/pumphouses/water tanks, schools, aanganwadi, temples, baudis, sewerage system, cremation ground and electric poles.		Temporary	Short term
	8.	Loss of common property		Temporary	Short term
Livelihood/ Income	9.	Loss of agricultural income	Pre-Construction Phase	Permanent	Long term
	10.	Loss of livelihood option for people indirectly dependent on land being acquired. For eg: agricultural labourers, vendors, shopkeepers, etc.		Temporary	Short term
	11.	Increased consumption of goods due to in migration benefitting the local economy.	Construction Phase	Temporary	Short term
	12.	Job opportunity for local villagers and PAPs in construction work.	Construction Phase	Temporary	Short term
	13.	Increase in land prices	Construction and Post Construction Phase	Permanent	Long term
	14.	Sudden change in financial condition of the PAFs due to the compensation awarded, their purchasing capacity will change and would also increase the risk of fund miss-management.	Pre construction	Temporary	Short term
Physical Resources	15.	Loss of private assets like trees, cowsheds, shops, toilets, kitchens, stores, etc.	Construction Phase	Temporary	Short term
	16.	Increased pressure on existing infrastructure such as PHC, educational institutes, roads, etc.	Construction Phase	Temporary	Short term
Biodiv	17.	Loss of forest land serving as primary	Construc	Permanent	Long term

ersity/ enviorn ment		source for fodder and firewood collection for people living in affected villages and neighboring areas.	tion Phase and Post Construc tion		
	18.	Increased humidity and fog due to construction of reservoir.	Construc tion Phase and Post Construc tion	Permanent	Long term
	19.	Increased level of air, water and noise pollution due to construction activity and quarrying.	Construc tion Phase	Temporary	Short term
Health	20.	Risk of water borne diseases due to increased pollution level.	Construc tion Phase	Temporary	Short term
	21.	Risk of Accidents during/ after execution of project	Construc tion Phase	Temporary	Short term
	22.	Risk of Health Hazards (increase in incidents of HIV/AIDS and Trafficking etc.)	Construc tion Phase	Temporary	Short term
Quality of life	23.	Rise in traffic esp. heavy vehicular traffic	Construc tion Phase	Temporary	Short term
	24.	Possible disputes among local villagers and migrants.	Construc tion Phase	Temporary	Short term
	25.	Compromised connectivity among various villages.	Construc tion Phase	Temporary	Short term
	26.	Degradation of irrigation facility.	Construc tion Phase	Temporary	Short term
	27.	Degradation in availability of drinking water due to loss of natural spring and	Construc tion	Temporary	Short term

		pumphouses.	Phase		
	28.	Loss in sense of social security due to in-migration.	Construction Phase	Temporary	Short term
	29.	Overall development of village.	Post construction	Permanent	Long term
*Source: Team SIA					

As shown in the table above, most of the impacts are temporary and short term which if properly mitigated can be minimized.

7.4 Viability of the Suggested Mitigation Measures

The Mitigation measures suggested by the study have been discussed in details under the Social Impact Management Plan (SIMP). Based on the opinions and demands of the affected families, Panchayats and community as a whole and considering different aspects of the project and the involvement of the State Government, there are both positive as well as negative impacts of the project. While there is hope of development of the area due to the upcoming HEP, there are also visible fears and apprehensions in the community regarding the project.

The expected negative impacts by the Landowners include loss of land, increase in pollution levels, sudden drop in activities dependent on the private and forest land, influx of outside population resulting in rise of safety-security concerns, social conflicts etc. Due to project activities and loss of public utilities, the residents of project affected villages and nearby area would face a difficulty in access to road communication, which will in turn affect the social relations between people of different Panchayats/villages and the families which will be displaced due to submergence. However, the suggested infrastructural mitigation measures if followed in a planned manner would almost negate these impacts to a bare minimum.

There is a general optimism about the positive impacts that would come through the implementation of this project such as increase in employment opportunities, land price, and increased scope for small and medium business ventures. better road network including better connectivity across both banks of the river, higher frequency and better-quality transportation services. The infrastructural facilities especially irrigation, drinking water, health, education, electricity and drainage will also be improved and the area will become a landmark in the HEP Map of Himachal Pradesh.

In addition, the expected revenue to the State from implementation of this project is about 108 crores per year thereby increasing the overall economic health of the State. Furthermore, due to the availability of funds like LADA and CSR, the project area would witness accelerated development during construction and post construction phases of the project.

Land acquisition and involuntary resettlement has been minimized due to the selection of best available alternative site and project design among the possible alternatives. The current proposed acquisition will have the least adverse impact on the PAFs and communities in the project area.

Where the households (including communities) are losing assets, livelihoods or resources will be fully compensated and assisted so that they can improve, or at least restore to their former economic and social conditions.

Compensation, rehabilitation and resettlement support will be provided to the PAFs, that is, any person or household or business which on account of proposed project implementation would have theirs:

(a) Standard of living badly affected;
(b) Right, title or interest in any house, interest in, or right to use, any land including premises, agricultural and grazing land, commercial properties, tenancy, or right in annual or perennial crops and trees or any other fixed or moveable assets, acquired or possessed, temporarily or permanently;
(c) Income earning opportunities, business, occupation, work or place of residence or habitat adversely affected temporarily or permanently; or,
(d) Social and cultural activities and relationships affected or any other losses that may be identified during the process of resettlement planning.

All PAFs residing, working, doing business and / or cultivating land within the proposed project impacted areas including inventory of lost assets, are entitled to compensation proportionately for their lost assets (both land and non-land assets) and restoration of income and businesses; and will be provided with rehabilitation measures sufficient to assist them to improve or at least maintain their pre-project living standards, income-earning capacity and production levels.

According to the present R&R plan proposed by the requiring body land for resettlement has already been identified for the 4 PAFs being displaced within the same Gram Panchayat. Further, 25 amenities are proposed to be developed in the resettlement colony. In this line, some basic amenities are proposed to be developed on the resettlement area for the 4 displaced PAFs which may include roads, drainage facility, drinking water, electricity facility, playground community center etc. and provision of Rs. 28,57,000 is proposed for these works. Additionally, 13 IPH Schemes are also proposed to be developed in the project area with a total budget provision of Rs

65 Lacs. The total budget for carrying out R&R activities excluding land compensation has been proposed at Rs 3.12 crore including Rs 1 crore miscellaneous expenditure for implementation under the proposed R&R plan by the requiring body.

However, the study found that there are 13 PAFs being displaced including the 4 PAFs already identified by the requiring body.

The final R&R plans will be designed in accordance with the RTFCTLARR Act, 2013 and the HP RTFCTLARR Rules 2015 and the latest R&R policy.

Adequate budgetary support will be fully committed and made available by the project authorities to cover the costs of land acquisition (including compensation and income restoration measures) within the agreed implementation period.

Displacement would not occur before making provisions of compensation and of other admissible assistance required for relocation. Acquisition of assets, payment of compensation, and the resettlement and start of the livelihood rehabilitation activities of PAFs, will be completed prior to project construction activities. Livelihood and income restoration measures must also be in place but as these may take time, not necessarily completed prior to construction activities.

Having said that if requiring body and state government take appropriate measures to mitigate the various losses of the PAPs and the community at large and, considering the positive development and interests of the State, the project benefits will largely overshadow the adverse social cost of the project.

7.4.1 Final Recommendation

From the above analysis it is clear that the project benefits will be extended not only to the people of the affected area but also to the entire district and State. Infact the entire northern region stands to be benefited from this upcoming project. Implementation of the Dhaulasidh HEP project will bear both positive and negative impact on the project. However, if the proposed Mitigation Plan is followed, it will help mitigate the social impacts by minimizing the negative impacts and amplify the positive impacts, thereby overshadowing the adverse social costs.

Also, it is recommended that the project authorities relook into the case of village Jol of Jangal Panchayat District Kangra as whether that village will be impacted by the reservoir or not.

Therefore keeping in mind the macro picture of this project which will benefit and contribute towards the development of the State and consequently the country as a whole, the study recommends that the proposed land acquisition for the Dhaulasidh hydro-electrical project (66 MW) should be carried out, provided that all measures suggested mitigate the various identified impacts are followed judicially.

8 Social Impact Management Plan

8.1 Approach to mitigation

This Social Impact Management Plan (SIMP) has been prepared in accordance to the RFCTLARR Act, 2013 and the HP RTFCTLARR Rules, 2015 with the aim to mitigate negative social impacts and enhance the positive impacts of Dhaulasidh Dam HEP (66 MW). It consists of a set of mitigation, monitoring and institutional measures that needs to be taken during the design, construction and operational phases of the project to eliminate adverse social impacts or to reduce them to acceptable levels. The SIMP may be implemented during the various stages of the project viz. pre-construction stage, construction stage and operational stage. A description of the various management measures suggested during different stages of the project is provided in following section.

8.2 Measures to Avoid, Mitigate and Compensate Impacts

8.2.1 Social measures

1. If there is any dispute between the stakeholders, then this dispute should be resolved first and made sure that the compensation is given to the legal owner.
2. Provide funds for Construction of the 2 temples being lost under acquisition at Alampur and Laungani
3. Construction of Community halls in all villages and Panchayats of the project area
4. Construction, repair and up gradation of building/structures used as Mahila Mandal, Yuvak Mandal and Gram Panchayat Offices.
5. Efforts should be made for the upliftment of women and marginal sections by enhancing their traditional skills and developing new skills.
6. Project affected persons and families have requested for Updation and increase of circle rates before calculation of compensation from the market value and job for their family members.
7. After commissioning of the project PAFs may be provided with Special Subsidised Tariff rates or provide few free units per month or both.
8. **Street lighting-** Almost all panchayats and villages have requested to be provided with streetlights.
9. **Promotion of sports –** In order to promote physical fitness and sports, youths engaged in sports should be encouraged. The requiring body can organize Sports Competition in the affected panchayats and provide sports kits to the local Sports/Youth Clubs. Promising athletes can further be endorsed and provided employment opportunity in the project.

10. Sports complex can also be developed by converging with the district administration and concern departments, which may promote bright athletes and create employment for the locals.

8.2.2 Infrastructure measures

2. **All weather Roads** – As per the SIA team's observation and demand of the villagers, all village roads and link roads may be upgraded to all weather pucca roads throughout the gram Panchayats of the project area to ensure better connectivity that has a direct impact on the development of this region.

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3. **Bridge along the river** It is suggested that the requiring body undertakes a proper structural stability study of the following mentioned roads, culverts and bridges as whether they would be able to withstand the rise in water levels and consequently plan alternatives to restore the connectivity in the area if the need arises:
    - Hamirpur-sujanpur bridge near sankat mochan temple
    - Bhaleth-Syor bridge
    - Main bridge connecting Sujanpur tirah with Alampur
    - Sandhol Sujanpur culvert at abour 1 km from Tirah bridge
    - Bridge on Sandhol sujanpur road abour 2 km from Tirah bridge
    - Bridge connecting Palahi with puar
    - Bridges connecting Puar with Jangal behri and Jangal Beri with Kheri
    - Buli Tipri Road

    Hence, all alternative and suitable arrangements may be made for the affected panchayats/ villages to restore the social connection and accessibility.
4. Construct proper drainage facilities to all Panchayats of the project area
5. Provide Irrigation facilities such as lift irrigation in all villages and Panchayats of the project area
6. **Drainage System-** There is a need for developing proper drainage systems in the affected villages. The feasibility of the drainage pipes along the roads should be explored in the given terrain conditions.

7. **Drinking Water Supply** – From the discussion with the villagers and observation during FGDs, it was found that the villagers are using Bavdis and natural spring/aquifer water as drinking water or have made some arrangements to pump water from the river or nearby rivulet.

Many of these natural water resources would be submerged/finished as per the proposed project Hence, before commencing the project activities, the villagers must be provided with alternate source/system for drinking water supply.

Similarly, there are about 25 government water pumping station/IPH water Schemes close to the river bank in which will also be submerged. It therefore becomes imperative that all necessary arrangements are made prior to the construction phase of the project to ensure regular supply of safe drinking water in all the affected villages.

All Panchayats of the project area have unanimously demanded to provide clean Drinking water Facility in all villages of the project area.

8. **Health Facilities** - As per the discussion with the villagers of the affected area, there are few government health facilities/centres established of different levels but the services offered are inadequate and the distances are huge.

   Hence, the existing government facilities may be upgraded in order to provide adequate medical and health facility. The requiring body may open a Level 3 health facility at a convenient location which is well connected to the affected villages and is equipped to cater the needs of the affected area. A Mobile Medical Van can also be started in the area scheduled to visit on fixed days with essential test equipment and referral system. Apart from that, an ambulance service with toll free number (like 108 service of NHM) can be started.

9. **School and Scholarships** – To impart quality education for the children in the affected area, schools can also be started where the children of affected families may get the first priority during admission. These Children may also be considered for fee concession. The requiring body may also provide scholarships to bright and meritorious students.

   Requiring body may also help these students in opting for higher education/ professional trades such as Engineering, Medical, Law and CA/CS etc. for which they can share a percentage of fees/accommodation cost of the student and later may absorb them in the organization as per their skill sets. This could prove to be a long-term investment for the requiring body as well as a great help to the affected families who are making efforts for their children's higher education.

   Also, Since the Requiring body is PSU, it may officially have an MOU with the education department of the State to adopt/partly sponsor/upgrade the existing infrastructure of government schools and may even consider to operate these schools in the project affected villages.

10. **Technical Institution** - Technical institutions can be established in the area or collaborated with existing technical institution, to offer courses like Food Preservation and Processing, Civil Construction, Vehicle Repair and related to Electrical fields. An independent survey can be conducted to understand the future needs of the area, available resources and interest of the project affected families before finalizing the trades offered by the technical institution.

11. **Cremation grounds** - Cremation grounds are mostly located on river banks in the project area. Even in the project affected area most of the Panchayats are losing their cremation grounds due to the project. Hence, electronic/alternative crematories may be built in consultation with the residents of affected Panchayats.

8.2.3 Rehabilitation and Resettlement Measures

12. For PAFs getting displaced and also for land looser who opt for land as compensation for acquired land, the requiring body should provide land preferably in the same Gram Panchayat or in neighbouring Gram Panchayat.
13. Appropriate compensation to be provided to PAFs whose houses are being acquired and additional compensation in form of subsistence and transportation allowance for the inconvenience caused due to relocation under relevant sections of the act.
14. For PAFs loosing structures other than residential houses should be paid appropriate compensation
15. For the 12 PAFs whose livelihoods are getting affected, measures to restore their livelihood to the existing level or better should be taken.

16. **Promotion of Horticulture and Herbal Plants:** The agro-climatic conditions of Project area are quite suitable for tropical and sub-tropical fruits. Mango (Indigenous and improved varieties) was more common followed by citrus, guava, papaya, indigenous banana and amla were other fruits found to grown in the area. Herbal Plants may also be promoted in the area with support from the concern department.

17. **Promotion of Tourism:** If adequate attention is paid by the administration, this area can be a developed as a tourist destination as well as hub for water related activities /sports. River side camps and rafting can be promoted in the PPP mode which might generate regular income for the affected families.

18. **Promotion of Fisheries:** The project will provide congenial conditions for development of fisheries. Training can be imparted in Pisciculture to the interested persons in the

affected area. Interested people and fishermen (from the affected families) can be supported by granting fishing license from the concerned department.

19. **Animal Husbandry:** Livestock is also owned by the population in the affected areas. Animal husbandry, which is helpful to small and marginal farmers for increasing their income, can be commercialized. A milk cooperative can be promoted in the area which will benefit not only the project affected families but also the entire area.

20. **Forming and Strengthening Self-Help Groups (SHGs):** The requiring body may provide opportunities for women to come together and form SHGs and strengthen the existing ones with proper training and to earn their livelihoods through credit offered under various schemes. Handicraft, diary, shawl making, stitching and embroidery etc. can also be introduced.

21. **Institutional linkages and skill upgradation for income restoration:** Requiring body can play a proactive role to mobilize affected family members to get some vocational/ skills training opportunities and also support in establishing forward and backward linkages for raw materials, inputs, besides marketing and credit facilities. District administration and other stakeholders in institutional financing and marketing may prepare micro-plans for undertaking such activities. In case of creation of alternative livelihoods schemes, needs of the target population will be studied and prioritized in a participatory manner. Various poverty alleviation and income generation schemes sponsored by the state govt. and GOI shall be converged for offering income restoration options to the affected population.

22. **Project-based Employment:** Preference toProject-related employment opportunities such as work under the project construction, maintenance, supply and transportation contracts can be given to the affected families.
23. The compensation for the damage of the crops and horticulture activities including fruit bearing and non-fruit bearing trees during the project should be appropriately compensated.
24. The requiring body may also run skill development programs for upgradation of skills of individuals for them to be able to receive better employment opportunity in the project.
25. During the operational and other stages of this project the preference should be given to award petty contracts in construction, supply and transportation to PAPs and PAFs and also to Locals of the Affected Gram Panchayats.

8.2.4 Environmental Measures

I) Aforestation – Due to the proposed project forest cover will be adversely affected. To restore the ecosystem and mitigate the ecological losses, aforestation can be undertaken in the government land. The process should involve the forest department, requiring body and the community. These efforts will not only help in restoring the losses but also provide employment opportunity to local people.

Apart from that, plantation may be done in the susceptible area for check on soil erosion in the private land. It will check the loss of fertility of the soil and minimize associated risks. Furthermore, Plantations along the river banks would effectively reduce the risk of landslides due to rise in water levels and during monsoons.

II) Noise pollution and vehicular traffic

Noise pollution and traffic may be minimized by:

g) Defining specific hours of the day for entry of heavy transport vehicles.
h) Regulating the number of heavy vehicles that can enter/leave the project site in one day.
i) Strict instructions to the drivers to minimize the use of horns.
j) Complete ban on pressure horns on transport vehicles.
k) staggering the timings of transport vehicles evenly throughout the day in order to avoid unnecessary overload on the roads and traffic situations.
l) strict instructions to drivers of heavy vehicles to give regular overtake passes on priority to small vehicles and adhering to speed limits.

III) AIR Pollution

Air pollution arising due to dust during transportation, construction, excavation, mining and dumping may be mitigated by affectively covering the construction site, transport vehicles such as trucks, tippers etc. mining & dumping sites. Also, regular water spray throughout the day in the project area will also helps in reducing air pollution.

IV) Water Pollution, Water borne Diseases and increased humidity.

1. water pollution may be minimized by strictly assuring that during excavation and mining minimalistic dumping occurs in the river.
2. the dumping site should be created away from the river banks in order to avoid the dump entering the river especially during rains and monsoons.
3. the storage units of construction material especially sand and aggregate should also be place away from the river banks.

4. standing water especially after creation of reservoir should be sprayed regularly to avoid water borne diseases.
5. increased humidity due to the reservoir may be minimized by Afforestation. However special care should be taken to plant Local trees instead of alien decorative trees. Also, only those varieties of trees should be planted that reduce humidity and help keep surroundings comparatively cooler

V) Risk of Land Slides Due to increase in Water Levels

The competent authorities may make sure to build embankment walls/retaining walls etc. at vulnerable locations in order to check the river course and minimize risk to landslides due to increased water levels in the river.

8.2.5 Other measures:

1. Compensation should be given in fixed time frame to Project Affected People.
2. Project Affected People should be given technical and financial counselling for the productive usage and safe investment of compensation money.
3. To device proper phasing plan for distribution of compensation for PAPs and PAFs who want to opt for compensation in phasing.

4. **Local Area Development Committee** LADF Contribution is 1.5% of the project cost during construction period of the project. Thereafter 1% shall be earmarked for the LADF to provide a regular stream of income generation and welfare schemes on a sustained and continued basis over the life of the project. The Govt. of HP may also provide matching 1% from its share of 12% free through plan/budgetary provisions to the LADF. These provisions need to be widely discussed with project affected families and for that, a Local Area Development committee (LADC) can be formed comprising various stakeholders such as government departments, members from project affected families and requiring body officials.

5. **Revision of Circle rates** Many of the PAPs and PAFs feel that the existing circle rates of their land is very low. They have therefore requested to revise and increase the circle rates. The concerned authorities may look into this issue and revise the circle rates of the Panchayats appropriately in accordance to the relevant laws.

6. **Awareness & Financial Literacy Camps**–Various awareness programs related to health, hygiene, nutrition, social rights etc. may be organized frequently in the area. This will help

the affected villagers to cope with the social changes brought in by the huge influx of population and anticipated changes in the pattern of health issues.

Also, Special financial Literacy camps may be organized to educate villagers about safe investments, investment plans, money management etc since many would be receiving heavy compensations.

It has been observed in many land acquisition projects that whenever bulk money has been disbursed to families, that money is not utilized judicially by the family members and is generally spent on luxuries and unnecessary items and also changes the spending pattern and lifestyle of the individual/families. Sometimes, this also causes loss of traditional and cultural practices prevalent in the society. Many families are not aware of the financial management as a whole, hence concern here is compensation money will not last for long and ultimately adversely affect the families as well as society in the long run.

Moreover, there are many cases of frauds and cheats with the uneducated villagers and vulnerable groups once they have received the compensation.

Therefore, the requiring body may organize Financial Literacy Camps in Affected Project area with the help of specialized external agency.

8.3 Measures included in R&R and compensation as per Act 2013

This SIA report will be beneficial for the requiring body to undertake land acquisition process and also to prepare a Plan of Action according to the aspiration conveyed by the project affected families and other stakeholders during public consultations and surveys. In the light of the findings of the study, the following steps may be taken for mitigation of expected social impacts.

Table 8-1: Impacts identified and corresponding mitigation measures

S. No	Assessed Impacts	Suggested mitigation Measures
1	Loss of Private Land (246.8062 Ha)	Appropriate Compensation to title holders and stakeholders as per the provisions of RTFCTLARR Act, 2013
2	Loss of Private Assets due to Acquisition such as Residential and commercial Structures, boundary walls, Crops, Fruit Bearing and non-fruit bearing trees. List of private assets being acquired is mentioned in Table 4.2 and 4.3	Appropriate Compensation to Owners and stakeholders as per the provisions of RTFCTLARR Act, 2013

	Revision of Circle Rates	As per the decision of District Collector and requiring body
3	Inconvenience caused due to acquisition for displaced Families and individuals	Appropriate Compensation to Owners and stakeholders as per the provisions of RTFCTLARR Act, 2013 for relocating to new location and construction of new houses
4	Loss of employment/income/livelihood dependent on land.	Appropriate Compensation to Individuals as per the provisions of RTFCTLARR Act, 2013. 2) the Requiring body may ensure employment of these individuals in the project during its construction and post construction phase depending on their skill set, qualification, age and existing income. 3) the requiring body may also run skill development programs for upgradation of skills of these individuals for them to be able to receive better employment opportunity in the project. 4) During the operational and other stages of this project the preference should be given to award petty contracts in construction, supply and transportation to PAPs and PAFs and also to Locals of the Affected Gram Panchayats.
5	Loss of Community Assets such as Gharats, Cremation grounds, bavdis, grazing land, temples etc.	All cultural and community Assets being impacted should either be relocated or provided with an equivalent/upgraded alternate with prior consent of the concerned community before starting of construction.
6	Loss of Common properties such as Water Resources including Drinking water resources such as springs/& bavdis. Loss of pastures/grazing lands, forests for collection of firewood.	All common properties being impacted should be provided with an equivalent/upgraded alternate with prior consent of the concerned community before starting of construction.

7	Impacts on vulnerable groups: the survey reveals there are 857 Women headed HH, 8 divorcees, 763 widows, 82 physically/mentally challenged PAPs.	1) Provide Appropriate Compensation to Individuals as per the provisions of RTFCTLARR Act, 2013. 2) In addition, they may be provided with special assistance like providing additional support in terms of skill development and income restoration to at least one member from each vulnerable family. 3) the authorities may make sure that the relevant share of compensation is transferred directly to the vulnerable individuals in order avoid chances of frauds and cheat.
8	Impact on Food Security and animal husbandry: Loss of Cultivable land and grazing grounds will lead to negative impact on agriculture and animal husbandry.	Agriculture Department is advised to assist the affected families to undertake intensive cultivation in the remaining land or alternate land provided. Similarly, they should be assisted and promoted to carry on animal husbandry practices
9	Noise pollution and vehicular traffic	1) Development and implementation of a management plan to mitigate the increased levels of noise, traffic, dust within the permissible limit may be taken up in consultation with local people, 3) noise pollution and traffic may be minimized by: a) defining specific hours of the day for entry of heavy transport vehicles. b) regulating the number of heavy vehicles that can enter/leave the project site in one day. c) Strict instructions to the drivers to minimize the use of horns. d) complete ban on pressure horns on transport vehicles. e) staggering the timings of transport

		vehicles evenly throughout the day in order to avoid unnecessary overload on the roads and traffic situations. f) strict instructions to drivers of heavy vehicles to give regular overtake passes on priority to small vehicles and adhering to speed limits.
10	Air pollution	Air pollution arising due to dust during transportation, construction, excavation, mining and dumping may be mitigated by affectively covering the construction site, transport vehicles such as trucks, tippers etc. mining & dumping sites. Also, regular water spray throughout the day in the project area will also help in reducing air pollution.
11	Water Pollution, Water borne Diseases and increased humidity.	1) water pollution may be minimized by strictly assuring that during excavation and mining minimalistic dumping occurs in the river. 2) the dumping site should be created away from the river banks in order to avoid the dump entering the river especially during rains and monsoons. 3) the storage units of construction material especially sand and aggregate should also be place away from the river banks. 4) standing water especially after creation of reservoir should be sprayed regularly to avoid water borne diseases. 5) increased humidity due to the reservoir may be minimized by Afforestation.
12	Risk of Land Slides Due to increase in Water Levels	1) The competent authorities may make sure to build embankment walls/retaining walls etc. at vulnerable locations in order to check the river course and minimize risk to landslides due to increased water levels in the river.

		2) Afforestation and plantations along the river banks, especially on vulnerable and susceptible sites would also affectively reduce the risk of landslides.

**Source: Team SIA*

8.4 Outlay for SIMP Implementation

The entitlement framework and the process of rehabilitation and resettlement have been furnished below in the backdrops of the legal provisions applicable for the project affected families.

An Entitlement Matrix has been developed in compliance with Laws, Rules and Policies framed by the Government of India and Government of Himachal Pradesh. The entitlement matrix summarizes the types of losses and corresponding nature and scope of entitlements.

Table 8-2: Entitlement Matrix

S. No	Impact Category	Unit of entitlement	Details of entitlement	Remarks
Loss of Assets- titleholders				
1	Private Land	Land Owner(s)/titleholders	(a) Cash compensation for the land at market value, which will be determined as per provisions of RFCTLARR Act, 2013 b) Amount equivalent to current stamp duty on compensation amount for replacement of lost assets. Training Assistance c) Loss of perennial and non-perennial crops and trees will be compensated in accordance with the provisions of Horticulture and Agriculture Department as applicable. (d) A Grant of Rs 25,000 for replacement of cattle shed or petty shops.	Compensation for land includes compensation for all assets attached to the land
2	Loss of structure	Land	a) Cash compensation determined	

	(Residential or Commercial or Res-cum-Commercial)	Owner/Titleholder	on the basis of current rates as per admissible norms (b) Shifting allowance of Rs 50,000 as per provisions of RFCTLARR Act, 2013 for the displaced families (c) Provision of free house as per RFCTLARR Act 2013, for completely displaced residential/commercial Or Equivalent cost of the house may be offered in lieu of the constructed house (d) Subsistence allowance of Rs 36,000 for the displaced families (RFCTLARR Act 2013) (e) Resettlement allowance of Rs 50,000 for the displaced families (RFCTLARR Act 2013)	
3	Tenants and Leaseholders	Tenants and lease holders	Registered lessees will be entitled to an apportionment of the compensation payable to structure owner as per applicable local laws.	
Loss of Residential and Commercial Structures - Non-Titleholders				
4	Encroachers	Affected Person (Individual/ Family)	(a) Encroachers shall be given advance notice of 2 months in which to remove assets/crops. (b) Right to salvage materials from affected structure	
Loss of livelihood – Title and Non-Titleholders				

5	Loss of livelihood – Title holders, Agriculture labour and commercial squatters	(Individual/ Family)	One-time grant of Rs 25,000 (value prescribed under RFCTLARR Act 2013)	For commercial squatters, the eligibility will become from the date of Census Survey
6	Foreseeable and unforeseen impacts likely during the construction stage	Owner, affected person	Payment of damages if any to Structures Temporary access would be provided, wherever necessary	Such as temporary impacts on structures, temporary disruption to access or passage
7	Temporary loss of income of mobile kiosks, if any	Kiosk owner	Two months advance notice to vacate the area	
8	SC, ST		Assistance to include in government welfare schemes if not included, if eligible as per Government criteria; and Additional benefits to SC and ST as per the provisions of RFCTLARR Act 2013 Second Schedule	
9	Unforeseen impacts		Any unforeseen impacts shall be documented and mitigated in accordance with the principles and objectives of the Act.	

Details of Cost of Resettlement and Rehabilitation has been worked out and given in tables in following section.

The entitlement framework and the process of rehabilitation and resettlement have been furnished earlier in the backdrops of the legal provisions applicable for the project affected families. Details of Cost of Resettlement and Rehabilitation has been worked out and given in tables below:

Table 8-3: Details of Estimated Compensation on land

District	Tehsil	Panchayat	S. No	Villages	Total Area in Sq. m	Area of land acquisition under each category (in sq. m)										Total Land Value (INR in Crores)	Total Land Compensation Including 100% Solatium (INR in Crores)
						Category I 0 to 25 Mtr		Category II 25 to 50 Mtr		Category III 50 to 100 Mtr		Category IV 100 to 1000 Mtr		Category V >1000 Mtr			
						Cultivated	Uncultivated	Cultivated	Uncultivated	Cultivated	Uncultivated	Cultivated	Uncultivated	Cultivated	Uncultivated		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	19
Hamirpur	Sujanpur	Sujanpur	1	Sujanpur	53,087	-	-	-	-	30,777	22,310	-	-	-	-	25.24	50.47
			2	Balla Ghirthan	33,328	-	-	-	-	768	32,560	-	-	-	-	12.25	24.51
		Darla	3	Bhadaryana Bhaleth	27,952	-	-	-	-	-	-	7,870	20,082	-	-	0.89	1.77
			4	Gahlian	17,470	1,475	2,053	-	2,304	-	3,551	-	8,087	-	-	0.95	1.89
			5	Ropa	3,954	-	-	-	-	-	-	57	3,897	-	-	0.12	0.24
			6	Miyana	16,702	-	-	-	-	-	-	-	16,702	-	-	0.38	0.75
			7	Mihadpura	3,475	-	-	-	3,475	-	-	-	-	-	-	0.31	0.61
			8	Chowki	10,923	-	-	-	6,815		4,108			-	-	0.36	0.71
			9	Darla	41,202	-	-	-	-	-	-	479	40,723	-	-	2.73	5.45

District	Tehsil	Panchayat	S. No	Villages	Total Area in Sq. m	Area of land acquisition under each category (in sq. m)										Total Land Value (INR in Crores)	Total Land Compensation Including 100% Solatium (INR in Crores)
						Category I 0 to 25 Mtr		Category II 25 to 50 Mtr		Category III 50 to 100 Mtr		Category IV 100 to 1000 Mtr		Category V >1000 Mtr			
						Cultivated	Uncultivated	Cultivated	Uncultivated	Cultivated	Uncultivated	Cultivated	Uncultivated	Cultivated	Uncultivated		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	19
			10	Haar	1,053	-	-	-	-	-	-	593	460	-	-	0.03	0.05
			11	Gagla	25,321	-	-	-	-	-	-	-	25,321	-	-	0.57	1.14
		Karot	12	Balehu	41,643	-	-	-	-	-	-		41,643	-	-	1.04	2.08
			13	Mathaan	24,017	-	-	-	-	-	-	4,319	19,698	-	-	0.62	1.24
			14	Loungani	71,576	-	-	-	-	-	-	22,080	49,496	-	-	1.90	3.80
		Chamiyana	15	Bharmad	40,320	-	-	-	-	-	-	38	40,282	-	-	1.01	2.02
			16	Graudhu Buhla	228	-	-	-	-	-	-	-	228	-	-	0.00	0.01
		Jol	17	Kaach	228	-	-	-	228	-	-	-	-	-	-	0.01	0.02
			18	Pargana	33,636	-	901	-	2,380	21,443	8,912	-	-	-	-	1.18	2.36

District	Tehsil	Panchayat	S. No	Villages	Total Area in Sq. m	Area of land acquisition under each category (in sq. m)										Total Land Value (INR in Crores)	Total Land Compensation Including 100% Solatium (INR in Crores)
						Category I 0 to 25 Mtr		Category II 25 to 50 Mtr		Category III 50 to 100 Mtr		Category IV 100 to 1000 Mtr		Category V >1000 Mtr			
						Cultivated	Uncultivated	Cultivated	Uncultivated	Cultivated	Uncultivated	Cultivated	Uncultivated	Cultivated	Uncultivated		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	19
			19	Palahi	381,791	-	-	-	-	-	-	8,985	372,806	-	-	10.55	21.10
			20	Birh Khas	12,497	-	-	-	-	-	-	8,254	4,243	-	-	0.39	0.78
			21	Samouna	53,737	-	-	-	-	-	-	13,208	40,529	-	-	1.13	2.26
		Dhabriana	22	Riah	152,311	7,296	21,789	7,524	80,854	-	34,848	-	-	-	-	6.17	12.34
		Banal	23	Sarohal	19,428	-	-	-	-	-	-	190	19,238	-	-	0.78	1.56
		Tihra	24	Tihra	6,737	-	-	-	-	-	6,737	-	-	-	-	0.29	0.58
		Bhageda	25	Baghera Buhla	302,322	-	-	-	-	-	-	-	302,322	-	-	11.34	22.67

District	Tehsil	Panchayat	S. No	Villages	Total Area in Sq. m	Area of land acquisition under each category (in sq. m)										Total Land Value (INR in Crores)	Total Land Compensation Including 100% Solatium (INR in Crores)
						Category I 0 to 25 Mtr		Category II 25 to 50 Mtr		Category III 50 to 100 Mtr		Category IV 100 to 1000 Mtr		Category V >1000 Mtr			
						Cultivated	Uncultivated	Cultivated	Uncultivated	Cultivated	Uncultivated	Cultivated	Uncultivated	Cultivated	Uncultivated		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	19
	Nadaun	Choru	26	Jangal Mehfuja Mahduda Jeehan	122,798	-	-	-	-	-	-	-	-	2,590	120,208	6.78	13.56
Kangra	Khundian	Tipri	27	Bulli	108,540	-	-	-	-	-	-	28,573	79,967	-	-	7.14	14.28
			28	Tippri	17,401	-	-	-	-	-	-	-	17,401	-	-	1.09	2.18
			29	Kiyod	1,995	-	-	-	-	-	-	-	1,995	-	-	0.12	0.25
			30	Chowki	179,666	-	-	-	-	11,149	168,517			-	-	13.64	27.28
	Alampur	Kuhan	31	Dalli	21,304	-	-	-	-	-	-	364	20,940	-	-	0.27	0.54
		Lahru	32	Balunder	31,286	-	-	-	-	-	-	8,227	23,059	-	-	0.25	0.51
		Balakroopi	33	Daddu	23,022	-	-	-	-	-	-	361	22,661	-	-	0.18	0.36
			34	Nichli bheri	104,486	-	-	-	-	-	-	19,148	85,338	-	-	0.83	1.67
			35	Paprola	2,507	-	-	-	-	-	-	-	2,507	-	-	0.11	0.21

District	Tehsil	Panchayat	S. No	Villages	Total Area in Sq. m	Area of land acquisition under each category (in sq. m)										Total Land Value (INR in Crores)	Total Land Compensation Including 100% Solatium (INR in Crores)
						Category I 0 to 25 Mtr		Category II 25 to 50 Mtr		Category III 50 to 100 Mtr		Category IV 100 to 1000 Mtr		Category V >1000 Mtr			
						Cultivated	Uncultivated	Cultivated	Uncultivated	Cultivated	Uncultivated	Cultivated	Uncultivated	Cultivated	Uncultivated		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	19
		Jangal	36	Bir	1,471	-	-	-	-	-	-	-	1,471	-	-	0.07	0.14
			37	Sai	825	-	-	-	-	-	-	-	825	-	-	0.04	0.08
		Alampur	38	Alampur	2,958	-	-	-	-	2,768	190	-	-	-	-	0.17	0.34
			39	Baag	467,488	-	-	-	-	20,612	446,876	-	-	-	-	23.11	46.22
		Sakoh	40	Lyunda	1,169	-	-	-	-			300	869	-	-	0.04	0.09
TOTAL					**2,461,854**	**8,771**	**24,743**	**7,524**	**96,056**	**87,517**	**728,609**	**123,046**	**1,262,790**	**2,590**	**120,208**	**134.06**	**268.12**

**Source: Team SIA*

The above-mentioned cost of land is a projected compensation that the requiring body may have to make provisions of. This is subject to change as per the competent authority of the State Government.

Table 8-4: Details of compensation on trees

	Fruit Bearing trees	Non fruit bearing trees	Total Trees
Trees under acquisition	77,724	17,280	95,004
Rate	Rs. 5000/tree	Rs. 3000/tree	-
Amount (Rs.)	**38,86,20,000**	**5,18,40,000**	**44,04,60,000**

**Source: Team SIA*

The above estimate and the rate of the trees (fruit-bearing and non-fruit trees) are subject to change as per the enumeration, verification and valuation of the trees by the competent authority. Further, under sub-section 2 of section 26 of the Act, the market value calculated shall be multiplied by a factor Mentioned in the First Schedule. Since this factor has not yet been notified by the GoHP, the same has been taken as 1 in calculation of compensation.

Table 8-5: Compensation for Rehabilitation and Resettlement

S. NO	Families displaced due to loss of housing unit	Details of Cost	Amount
1	A house will be provided under Pradhan Mantri Awas Yojana (PMAY). Each family will only get one house. If not opted for house, equivalent cost of the house would be offered.	Under PMAY 2016 notification of HP government, the allowance for each house would be 1.30 lakhs in hilly states 13 families x 1,30,000	1,690,000
2	One-time payment of 5 lakhs per PAF or, under annuity policy, 2000/- per month per family for 20 years	13 families x 5,00,000	6,500,000
3	Subsistent grant of 3000/- for each family for one year**	13 families x 36,000	468,000
4	One-time shifting cost of 50000/- per family	13 families x 50,000	650,000
5	One-time "Resettlement Allowance" of 50000/- per family	13 families x 50,000	650,000
6	One-time grant financial assistance of minimum 25000/- to construct cattle-sheds or petty shops	13 families x 25,000	325,000
7	**Total Estimation**		**10,283,000**
8	**In case of SC/ST, additional one-time grant of 50000/- should be given to each family for resettlement.		

**Source: Team SIA*

The above estimation cost is calculated under provisions made under Act 2013.

Table 8-6: Estimated cost for R&R

S. No.	Activities	Amount in crores (Rs.)
1	Cost of R&R activities	0.47
2A	Provision of infrastructural amenities as per the schedule III of RTFCTLARR Act, 2013	1.00
2B	IPH Schemes	0.65
3	Additional compensation for loss of existing private structures like shops, toilets, kitches, aramill etc. and livelihood restoration for the 13 PAFs identified (approx.)	1.00
4	Miscellaneous	1.00
5	**Total**	**4.12**

Table 8-7: Details of Total Costs for Land Acquisition, Rehabilitation and Resettlement

S. No	Details of Cost	Amount in Crores (Rs.)
1	Compensation for land*	268.12
2	12% interest on the compensation (land)	32.17
3	Compensation for trees	44.05
4	Rehabilitation and Resettlement costs**	4.12
5	Total Cost	348.46
6	Miscellaneous (10% of the total cost)	34.85
7	Grand Total (5+6)	383.31

**The compensation for land acquisition doesn't include compensation for standing crops, which will be calculated by the competent authority*
***The compensation costs includes those measures as suggested by the R&R Plan of requiring body*
**Source: Team SIA*

Information collected during the survey is based on the interviews of the respondents and the information provided by them is considered true but it is not the authentic version of ownership entitlement. The total land area belonging to the private estimates to 246.8062 Ha for which, on the basis of the computation of compensation formula, the tentative land compensation (excluding compensation for standing crops) works out to Rs. 300.3 croresincluding 12% interest has been estimated for payment as per Section 30 (3) of Act 2013.

The compensation for trees is estimated as Rs. 44.05 crores. However, the number of the trees will be enumerated and the actual value will be assessed by the competent authorities.

This estimation of compensation for land acquisition doesn't include compensation for standing crops. The cash compensation against crops will be provided at market cost of mature crops based on the average production.

The entitlements for R&R expenses are totaling to Rs. 4.12 Crores. The total cost for land acquisition including R&R is estimated as Rs. 383.31 Crores. However, the final compensation amount for the land acquisition and structures will be determined by the Competent Authority as per the Act 2013. Further, the cost of the Mitigation Plan has not been included in the said computation.

8.5 R&R Measures stated Requiring Body

The requiring Body has also identified 4 PAFs that are being displaced due to the acquisition. 3 of the PAFs are located in Pargana while 1 PAF is located at Sujanpur.

Table 8-8: Proposed Resettlement Plan by the Requiring Body for the

Sr. no.	Details of PAFs				Proposed Resettlement Plan		
	Name of the affected person	Revenue village	Kh.No.	Area (K-M)	Name of revenue Village where Land is Identified for Resettlement	Kh. No of Identified Land	Area of Identified Land (K-M)
A) House Less							
1	Karam Chand S/o Harbhajan	Sujanpur	791	0-15	Sujanpur	791/3	1-0
2	Baba Singh S/o Sambhu	Kaach	162	0-2	Pargana	76/2	2-0
	-do-	Pargana	59	0-16			
			60	0-11			
			Total	**1-9**			
3	Kahnu Ram alias Om Parkash S/o Tokha	Pargana	76	0-6	Pargana	76/3	1-0
4	Manoj Kumar S/o Jagat Ram	Pargana	76	0-6	Pargana	76/4	1-0
B) Land Less							

1	Prabhdayal S/o Shankar	Pargana	13	1-15	Pargana	57/2	1-7
						38/2	0-12
						Total	**1-19**

Infrastructural Entitlements to Displaced Families in The Resettlement Colony:
As per R&R plan proposed by the requiring body, 25 amenities are to be developed in the resettlement colony. In this line, some basic amenities are proposed to be developed on the resettlement area for the 4 displaced PAFs which may include roads, drainage facility, drinking water, electricity facility, playground community center etc. provision of Rs. 28,57,000 is proposed for these works.

8.6 Additional Measures Stated by the Requiring Body

The Requiring Body has stated to develop the following IPH Schemes that will be affected due to submergence along with the budget provisions for each scheme.

Table 8-9: Budget for Additional Measures Stated by the Requiring Body

S. No	Tehsil	Village	Details of IPH Scheme (No.)	Whether scheme will implemented on Govt./Pvt. Land	Budget Allocation @ Rs 5,00,000 per Scheme
District Hamirpur					
1.	Sujanpur	Badriyana	2	Pvt.	10,00,000
2.		Riya	2	Pvt.	10,00,000
3.		Palahi	2	Pvt.	10,00,000
4.		Bagehda Bulla	1 well	Pvt.	5,00,000
5.		Loungani	1	Govt.	5,00,000
6.		Miyana	1	Govt.	5,00,000
7.		Sujanpur	1	Govt.	5,00,000
District Kangra					
8.	Khundian	Chowki	1	Pvt.	5,00,000
9.	Jasinghpur	Dadu	1	Pvt.	5,00,000
10.		Dali	1	Govt.	5,00,000
11.	**Total**		**13**		**65,00,000**

The following Budget has been earmarked by the Requiring body for Implementation of the its R&R plan which includes R&R benefits, infrastructural facilities and miscellaneous expenditure

Table 8-10: Total Budget for R&R Stated by Requiring Body

S. No.	Activities	Cost in (INR)
1	Cost of R&R activities	47,00,000
2A	Provision of infrastructural amenities as per the schedule III of RTFCTLARR Act, 2013	1,00,00,000
2B	IPH Schemes	65,00,000
3	Miscellaneous	1,00,00,000
4	**Total**	**3,12,00,000**

8.7 Institutional Arrangement for implementation of Rehabilitation and Resettlement Plan

As per the act 2013, where land proposed to be acquired is equal to or more than 100 acres, the government shall constitute a "Rehabilitation and Resettlement Committee'' under the chairmanship of the Collector. This committee would aim to review the progress of implementation of Rehabilitation and Resettlement Schemes or plan and to carry out the post-implementation Social Audit in consultation with the Gram Sabha.

The members to be involved in the process of implementation and social audit thereafter, may be as follows:

1. A representative of women residing in the affected area.
2. A Representative of SC population residing in the affected area.
3. A Representative of a voluntary organization (NGO) working in the area.
4. The Land Acquisition Officer of the Project.
5. The Chairperson of the Panchayat/s of the affected area or their nominee/s.
6. Member of Parliament and Member of Legislative assembly of the concerned area or their nominee. (GP Pradhan)
7. A Representative of Requiring Body.
8. Administrator for R&R as the Convener.

8.8 Grievance Redressal Committee (GRC)

Efficient grievance redressal mechanism shall be developed to assist the PAFs to resolve their queries and complaints. Grievances of PAFs shall be first brought into the attention of field level functionaries of the project. Grievances not redressed by then will be brought to the Grievance Redressal Committee (GRC). The composition of the proposed GRC may be the same as R&R Committee. This Committee may meet on the monthly basis or the case may be defined by the state Government.

The main responsibilities of the GRC may be:

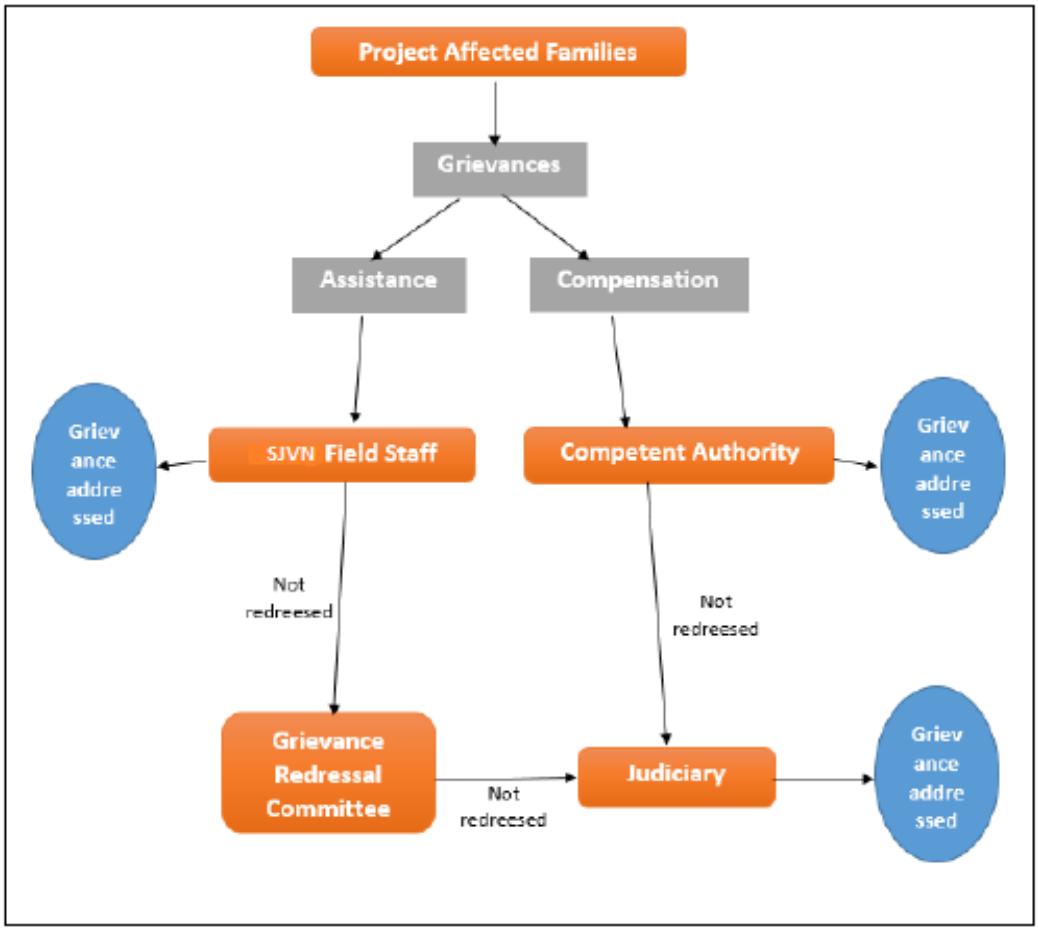
i. Provide support to PAFs on problems arising from land / property acquisition;

ii. Record PAFs grievances, categorize and prioritize grievances and resolve them; and

iii. Report to PAFs on developments regarding their grievances and decisions of the GRC.

Other than disputes relating to ownership rights under the court of law, GRC will review grievances involving all resettlement benefits, compensation, relocation, replacement cost and other assistance. When any grievance is brought to the field level functionaries, it should be resolved within 15 days from the date of complaint. The GRC will meet every month (if grievances are brought to the Committee), determine the merit of each grievance, and resolve grievances within a month of receiving the complaint — failing which, the grievance will be referred to appropriate Court of Law for redress. Records will be kept of all grievances received including: contact details of complaint, date of the complaint, nature of grievance, corrective actions taken and the date these were affected, and final outcome. A flow chart of grievance redressed mechanism is indicated in Figure 11 below:

Figure 11: Grievance redressal mechanism



**Source: Team SIA*

8.8.1 Stages of Grievance Redressal

8.8.1.1 Monitoring and Evaluation

Monitoring and Evaluation of the SIMP implementation is necessary as activities are to be executed by many agencies in a time bound manner. Monitoring involves periodic checking to ascertain whether activities are progressing as per the schedule whereas Evaluation is to assess the performance of the SIMP. For this purpose, a Monitoring and Evaluation plan needs to be developed to provide feedback to the project authorities. Monitoring and Evaluation of R&R gives an opportunity to reflect on the success of the R&R objectives, strategies and approaches and to assess the efficiency and efficacy in implementation of R&R activities, their impact and sustainability. Monitoring will give particular attention to the project affected vulnerable families and groups such as Scheduled Castes, Scheduled Tribes, BPL families, women headed households, widows, old aged and the physically or mentally challenged persons. An independent evaluation through third party is also necessary for mid and end term evaluation of SIMP implementation.

8.8.1.1.1 Internal monitoring

The internal monitoring for SIMP implementation will be carried out by the project authorities where main objectives will be to report progress against the SIMP schedule; check that agreed entitlements are delivered in full to affected families and people; identify any problems, issues or hardship resulting from the SIMP implementation and to take corrective actions; monitor the effectiveness of the grievance system and measure the satisfaction of PAFs. Internal monitoring will focus on measuring progress against the schedule of actions defined in the SIMP. Activities to be undertaken by the project authorities will include liaison with the Land Acquisition team, construction agencies and project affected communities to review and report progress; verification of land acquisition compensation delivery against entitlements in accordance with the SIMP; verification of implementation of agreed measures to restore income and living standards of PAFs; identification of any problems, issues, or hardship resulting from resettlement process; assess project affected families and peoples' satisfaction with resettlement outcomes; and redress grievances of PAFs to follow up that appropriate corrective actions. Field level officers of SJVN, in charge of SIMP implementation will track the R&R progress. For this purpose, the indicators suggested are as given in table 8.12.

Table 8-11: Indicators for monitoring of SIMP progress

Physical	Extent of land acquired, number of structures dismantled, number of families affected, number of families purchasing land and extent of land purchased, number of PAFs receiving assistance/compensation, number of PAFs provided transport facilities/ shifting allowance, extent of government land identified for house sites, number of land users and private structure owners paid compensation
Financial	Amount of compensation paid for land/structure, cash grant for shifting, amount paid for training and capacity building of PAFs.
Social	PAFs knowledge about their entitlements, communal harmony, morbidity and mortality rate, taking care of vulnerable population etc.
Economic	Number of Jobs provided to the entitled families, number of business reestablished, utilization of compensation, house sites/business sites purchased successful implementation of Income Restoration Schemes implemented
Grievance	Number of community level meeting, number of grievance redressal meetings held, number of cases disposed by Project authorities to the satisfaction of PAFs, number of grievances referred and addressed by the concerned Authorities

**Source: Team SIA*

8.8.1.1.2 Independent Evaluation

An Independent Evaluation Agency may be hired by the Project for mid and end term evaluation to achieve the following: (a) verify results of internal monitoring; (b) assess whether resettlement objectives have been met, specifically, whether livelihoods and living standards have been restored; (c) assess resettlement efficiency, effectiveness, impact and sustainability; (d) ascertain whether the resettlement entitlements were appropriate to meeting the objectives and (e) this comparison of living standards will be in relation to the baseline information available. The following table 8.13 should be considered as the basis for indicators in external evaluation of the SIMP.

Table 8-12: Indicators for Project Outcome Evaluation

S.No.	Objectives	Risks	Outcomes
1	The negative impact on the persons affected by the project will be minimized	Resettlement Plan Implementation may take longer time than anticipated	Satisfaction of the landowners with the compensation and assistance paid. Type of use of compensation and assistance by the land owners Satisfaction of structure owners with compensation and assistance Type of use of compensation and assistance by the structure owners
2	Persons and families losing assets to the	Institutional arrangement may	Percentage of PAFs adopted the skills acquired through training as only economic activity

S.No.	Objectives	Risks	Outcomes
	project shall be compensated as per the Act and Rules	not function as efficiently as expected	Percentage of PAFs adopted the skills acquired through training as secondary economic activity
3	Affected persons and families will be assisted in improving or regaining their standard of living	Authorities implementing SIMP may not perform the task as efficiently as expected	Percentage of PAFs reported increase in income due to training Percentage of PAFs got trained in the skill of their choice Role of project authorities in helping PAFs in selecting trade for skill improvement Use of productive assets provided to PAFs under one-time economic rehabilitation grant
4	Vulnerable groups will be identified and assisted in improving their standard of living	Unexpected number of grievances may arise PAFs falling below their existing standard of living	Type of use of additional assistance money by vulnerable group Types of grievances received Number of grievances forwarded to Grievance Redressal Committee (GRC) and the time taken to solve them Percentage of PAFs aware about the GRC mechanism Percentage of PAFs aware about the entitlement framework Opinions of PAFs about the approach and accessibility of the project authorities

**Source: Team SIA*

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10 Annexures