Key Issues:
7-Resettlement

Climate Zone:
Temperate to Sub-tropical

Subjects:
- Restoration of Livelihood and Rebuilding of Resettled Communities

Effect:
- Socio-economic improvement
- Improvement in general infrastructure
- Improvement in health facilities
- Improvement in education

Project Name: Uri Hydroelectric Project
Country: The State of Jammu & Kashmir, India

Implementing Party & Period
- Project: National Hydroelectric Power Corporation Ltd. (NHPC)
1989 (Commencement of Construction) -
- Good Practice: National Hydroelectric Power Corporation Ltd. (NHPC)
19?? (Rehabilitation Plan Prepared) - 19?? (Resettlement Completed)

Key Words:
Resettlement, Livelihood Improvement, Rehabilitation Plan, Public Participation

Abstract:
The Uri Project is the largest hydroelectric scheme in the state of Jammu & Kashmir, built to meet the power demands of the northern states, viz.: J&K, Punjab, Haryana, Delhi, Himachal Pradesh, Uttar Pradesh, Uttaranchal, Rajasthan and the Union Territory of Chandigarh. The construction of the project has lead to vast improvement in general livelihood of the displaced population, including new housing, schools, medical facilities, water supplies, etc.

1. Outline of the Project

Uri Hydroelectric Project is located in the State of Jammu & Kashmir, the northern-most state in India. The state is almost mountainous with a number of perennial streams and rivers like Chenab, Indus, Jhelum, Zanskar etc. forming the drainage system. Among all the rivers, Jhelum and Chenab have the maximum hydro potential. Jammu & Kashmir offers tremendous scope of generation of cheap & clean electricity with a power potential as 7,487 MW at 60 % load factor most of which is still to be tapped. Uri project has been executed by National Hydroelectric Power Corporation (NHPC) who are the owner of the project was in turn got constructed by a consortium comprisinig Sweco AB (Sweden), Uri Civil (Saeden), Kraverner Boving (U.K) & ABB (Sweden).

Uri HE project is a run-of-the-river scheme on river Jhelum located on the downstream of lower Jhelum Power Station. The project comprises a Barrage, Cut and Cover, Desilting basin, Open channel, 10.65 Km long Head Race Tunnel, 2 Nos Pressure Shafts, an underground power house and 2.06 Km long Tail Race Tunnel with outfall at the Bandi village, near Uri town. The plan and profile of the Project are shown in Fig.-1 below.

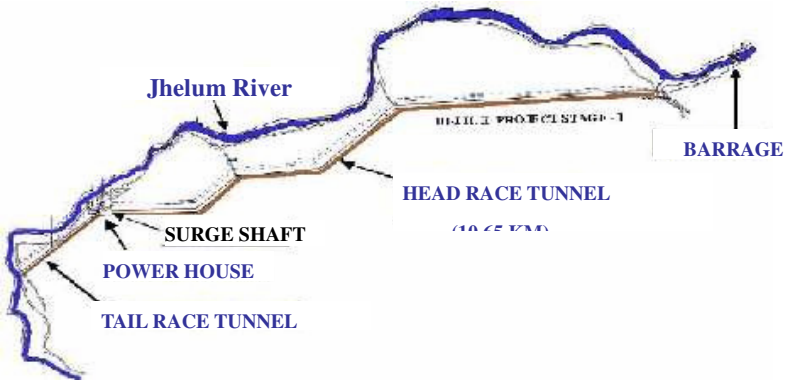

Fig.-1 Plan & Profile of Uri HE Project

The project has an installed capacity of 480 MW (4X120 MW) under Stage-I with a provision to install an identical capacity under Stage-II when the additional regulated water becomes available with the construction of Wular Barrage and Kishenganga HE Project. The project is designed for annual generation of 2663 Million Units in 90 % dependable year.

Table-1 Specifications of the Uri HP Project

SALIENT FEATURES	
Location	Dist. Baramulla, J&K.
Approach	Nearest Rail Head - Jammu.
Capacity	480 MW (4 x 120 MW)
Annual Generation	2663 million units
Project Cost	Rs. 33000 million ($ 720 million)
Beneficiary States	J&K, Punjab, U.P, Haryana, Delhi, H.P, Rajasthan & Chandigarh.
Tariff rate	250.95 Paise / Unit ($ 0.055 /Unit)
Year of Commissioning	1997
TECHNICAL FEATURES	
93.5 m long barrage.	
10.64 km long head race tunnel.	
2 km long tail race tunnel.	

2. Features of the Project Area

The project under study comes under the Kashmir valley in India. The Kashmir valley is world famous tourist spot of India and tourists from all over the world visit the valley every year. The valley is approximately 150 kms long and 50 kms wide with an average elevation of 1700 m above the mean sea level and surrounded by high hills like “Pirpanjal” on the southern side and “Hindu Kush” on the northern side. River Jhelum on which the project is located originates from “Chashma Verinag” spring near Banihal hills. It is joined by a number of tributaries originating from about 1000 m above the valley level. The river is a snow fed and perennial one.

Uri HE project is situated on river Jhelum, in the Uri tehsil of Baramulla district in J&K state. It is located along the Srinagar to Uri National Highway spread over a length of 20 Km. Jammu Tawi is the nearest broad guage rail head which is about 380 kms and Srinagar (capital of J&K state) is the nearest airport, which is about 90 Kms away.

Fig.-3

The project area is in the lower part of the 'Himalayan dry temperature forest' characterized in its natural state by trees such as Cedrus deodara (deodar), Pinus excelse (blue pine), populus ciliata (poplar), Fraxinus excelsior (ash) and Fexanthoxyloides, Quercus dilatata (Oak), juglans regia (walnut), Aesculus indica (horse chestnut) etc. Near Uri, the slightly warmer climate permits the chir (Pinus roxburghii) to dominate the vegetation. The deforested slopes are occupied by terrace cultivation.

The region is characterized by severe to moderate cold temperature in winters and moderate temperature in summer. The average annual rainfall is 31 inches per annum with comparatively lesser snowfall during winter as compared to other parts of Baramulla district. The maximum temperature in the region goes upto 38 ^{0}C during summers and the minimum temperature goes below freezing point upto –10 ^{0}C. The snowfall is almost universal starting from December and for two months upto middle of February, and the region remains under the grip of cold dampness with snow covering the ground completely and perennial fog hanging over it. On the basis of general characteristics of weather, the year can be divided into the following four seasons as per the table below:

Table-2 Weather Characteristics of Uri Region

S.No	Season	Duration	Daily max. Temp	Daily min. Temp.	Ave. Rain
1	Winter	Nov. to Feb.	5℃ to 10℃	3℃ to 10℃	55cm snow
2	Spring	March to mid. May	12℃ to 15℃	5℃ to 10℃	280 mm
3	Summer	mid. May to mid. Sep.	25℃ to 38℃	18℃ to 25℃	NA
4	Autumn	mid. Sep. to Oct	12℃ to 22℃	7℃ to 18℃	NA

Source : Distric meteorological records

The project area exposes Murree formation which is overlain by the unconsolidated to semi consolidated alluvium. Murrees accommodate the underground engineering structures while open channel, desilting-cum-balancing reservoir are located in the quaternary sediments.

3. Major Impacts

People living in and around the project area needed resettlement due to submergence of land & properties because of construction of project. The total number of families affected due to acquisition of land for project construction was 471 belonging to 19 villages out of which 121 families became houseless or landless and needed resettlement. Rest of the families having their houses and losing their land only did not require to be resettled but only compensated.

4. Mitigation Measures

4.1 Social Measures

A socio-economic survey of the affected families was conducted taking into consideration their sociological, cultural, economic, educational and occupational aspects. On the basis of this study a Rehabilitation Plan was prepared and implemented by NHPC. Various steps were taken by NHPC for

improving the general livelihood of the area to mitigate the affects of resettlement. Benefits extended to the project affected people (PAP's) besides compensation for their land, houses etc are as follows:

1) Housing at new places

Resettlement sites were selected in the proximity of the affected village so as to minimize the affect of displacement. Cash compensation was provided to over 470 families of PAP's (out of which 121 were totally affected people) for their houses, land, rice mill, shops etc. This compensation has been used by these project affected people for the construction of new houses. They were also provided logistic support for transportation of belongings and resettlement.

Fig.-4 Reconstructed Houses

2) Construction of primary school

A primary school was setup in the relocated area to cater to the needs of primary education of the children for PAP's. Higher schools and degree colleges were already existing at Baramulla to take care of the higher education.

3) Medical facilities

The medical facilities available at the project dispensaries at Gantamulla was extended to the PAP's as well as to the local people of the area.

4) Employment to oustees

All out efforts were made to employ maximum number of workmen for the construction of project from among the oustees, depending on their suitability and availability. Jobs were provided to 237 persons from NHPC and to 2778 persons by the Consortia executing the project directly or indirectly.

5) Reconstruction/Safeguard of Religious places

An Old Pandava Temple of archaeological importance was getting affected due to the project. However, after detailed deliberations, the Dam axis was shifted to save the temple. Further, utmost care was taken in reconstructing the places of religious importance which were coming in the submergence area. Two mosques were affected, and suitable compensation was made to the mosque committee who in turn renovated/constructed the mosques.

Fig.-5 Pandava Temple URI

6) Training/Self Employment

In order to generate self employment, training in the field of Backyard Poultry Farming was arranged by NHPC for the PAP's through Animal Husbandry Department of State Government of J&K. About 165 families were imparted training under this scheme.

7) Water Supply Plant

A drinking water supply scheme was got commissioned with NHPC funds through State Public Health Engineering Department at village Buniar to supply clean drinking water to the people in the area. Under this scheme a reservoir having 10,000 gallon capacity has been constructed which is supplying water to about 1000 persons in the village. Additional connections were provided to the mosques, primary school and higher secondary school besides providing connections to the people in village Kharpura.

Fig.-6 Water Supply Plant

8) Communication facility/maintenance of road

Baramulla to Uri was one lane National Highway before the construction of project. During construction, the stretch from Sheeri to Rajarwari (about 34 kms) including Bailey bridges were upgraded and widened by this project to make it two lane highway, resulting not only in faster movement of vehicles but also in reducing the wear and tear. In addition, National highway No 1 between Srinagar and Sheeri was upgraded to 70 tonnes capacity.

As a welfare measure to locals, a motorable RCC bridge was constructed across Mundri Nallah 3 km upstream of Sheeri village. The bridge has considerably improved the mobility of the surrounding villagers.

9) Pasture development

Majority of people in the project area belongs to the Gujjar tribe. Although once nomadic grazers, they are now settled for several decades. The Gujjars in the area move their cattle far less now than in the past. The cattle are stall-fed in the valley during winters but are grazed on the slopes during summer.

Keeping in view the fodder requirement of cattle and to avoid degradation of the vegetation, an area of 100 ha has been developed as pasture, as a part of Catchment Area Treatment (CAT) Plan. Besides this additional area of 150 ha is being developed as pasture as a part of Augmentation scheme of CAT so as to fulfill the requirements of Gujjars.

4.2 Environmental Measures

A comprehensive CAT plan envisaging the treatment of all nine micro watersheds in Uri catchment was prepared. The objective of CAT was achieved at an estimated cost of Rs 38.205 million ($ 0.83 million USD) through an integrated approach of massive afforestation programme and soil & water conservation works like contour bunding, bench terracing, gully control, landslide control, vegetation spur and pasture development etc. More than 7 lac plants have been planted. For raising the plants material, nurseries were created.

The project involved diversion of 54.6 ha of forest land for its construction activities and felling of 4000 trees. In lieu of this, compensatory afforesting scheme at a cost of Rs 1.255 million ($ 0.027 million USD) has been implemented which involved afforestation area of 62.7 ha of degraded forest land and plantation of 1,56,000 trees. Besides the above scheme, voluntary afforestation of 50,000

Fig.-7 Compensatory Forestations - Uri

shade-providing and fruit bearing species have also been planted in the project area colonies.
In order to facilitate upstream and downstream migration of fish, fish ladder has been constructed in the Uri barrage. To know the efficiency and efficacy of the fish ladder, a tagging experiment study was conducted. Under this study 1,300 Schizothorax species were tagged and dropped in the downstream/upstream of barrage in 1997, 1998 & 1999. The study indicated that fish ladder is facilitating the movement of fish.

5. Results of the Mitigation Measures

1) Resettlement of displaced people

The cash compensation provided by NHPC under the Rehabilitation plan enabled the Project Affected People to construct new houses at the relocated places. The relocated place was selected at proximity to the affected villages and all out efforts were made to provide similar environment at the new place. Due care was taken in reconstructing the places of religious importance. One mosque which was affected due to construction of project, was renovated by compensation provided by NHPC. Also one new mosque was constructed at the relocated place at Kanchan Village which is being used by locals.

2) Improvement in education and public health

The construction of project lead to improvement of basic education and general Public health in the area. The primary school constructed in the area by NHPC helped a lot in reducing the illiteracy in area. Drinking water plant in the area provided safe drinking water to number of families in the area.

3) Socio-economic development

Many development activities had taken place in the area due to construction of the project and there has been considerable upliftment in the socio-economic conditions of the local population. Lot of business avenues got opened up for locals due to overall development activities in the area. Employment generation took place in the area through NHPC as well as through its contractors directly or indirectly. Also the training imparted by NHPC to the PAP's in the field of poultry development helped them in getting self employment and earn money.

Fig.-8 Children Park

4) Better infrastructure and communication with other areas

Widening of stretches of National Highway from Baramulla to Uri and up gradation of other roads and bridges by NHPC helped in better connectivity of the local population with the surrounding areas. This lead to faster communication and lesser wear and tear for the vehicles. In addition to this various infrastructural development activities like construction of primary school, waters supply plant, Children parks etc. were taken up by NHPC in the area as a good will gesture to locals.

5) Summary

Various mitigation measures taken by NHPC to minimize the effect of displacement and improve the livelihood of the local population can be tabulated as below:

Table-3 Summary of the result of mitigation measures

S.No	Mitigation Measure	Result
1	Housing at new place	Minimized the affect of displacement and the displaced people did not feel like landless or houseless.
2	Construction of primary school	Helped in imparting basic education to the children and improving the literacy in the area
3	Medical facilities	Improved the general public health in the area.
4	Employment to oustees	Reduction of unemployment and economic development of people
5	Reconstruction of religious places	Took care of sentiments of local people
6	Training to local people	Training imparted to local people in the field of Backyard poultry farming helped in generating self employment
7	Construction of water supply Plant	Provided safe drinking water to a number of families in the area and thus helped in improving the public health in area.
8	Widening and up gradation of roads/bridges	Helped in better communication of local people with the surrounding areas besides reducing wear and tear to their vehicles and reducing the commuting time from one place to another.
9	Pasture development in the area	100 ha developed as pasture by NHPC as a part of Catchment Area Treatment Plan has helped the local population of the area in moving their cattles for feeding far less now than before.

In all, due to construction of Uri Project the displaced population was not only provided with housing at new place in the vicinity but the steps taken by NHPC in development of infrastructure and other facilities have lead to improvement in general livelihood of the local people.

6. Reasons for Success

In case of Uri HE Project the quantum of benefits provided to the displaced families in the form of houses, education and health facilities, employment opportunities and mitigation measures taken for conservation are physically much more than damage caused. The success of the effort is largely due to timely and adequate planning and implementation of various mitigation measures, supplemented by a very stringent monitoring mechanism which yielded desired results, in otherwise hostile socio-political scenario where militancy and other logistic constraints were many. The main reasons for the success can be taken as per below:

1) Comprehensive Rehabilitation Plan

A socio-economic survey of the affected families was conducted taking into consideration their sociological, cultural, economic, educational and occupational aspects. This helped in arriving at a rational plan and clear line of action to be taken.

2) Public participation in resettlement program

The local population/Project affected people were always encouraged to participate in the rehabilitation program and give their suggestions for the same. This had helped in long way in keeping away the feeling of alienation in the affected families which created the cordial atmosphere for taking

up the resettlement works.

3) Support of Local Administration and Government of J&K
The above programme would not have been successful without the valuable support of the local administration and Government of J&K where the project was being constructed. For example the Water supply plant was constructed by the local PWD department on behalf of NHPC. Also the Government of J&K helped in providing training to the PAP's in the field for poultry farming.

4) Sentiments of Local people
Due care was taken not to hurt the sentiments of the local people. Even the Dam axis of the propped Uri Dam was shifted from its original proposed location to save the old Pandava temple. Similarly funds were given for construction and repair of two mosques which were affected due to construction of project.

5) Implementation of R&R plan with true spirits
The most important reason for the success of this whole programme is the proper implementation of the Comprehensive Rehabilitation Plan in true spirits. All the facilities like housing, medical, educational, employment, water supply, communication etc. which were propped or planned in the R&R (Resettlement & Rehabilitation) plan were implemented in totality.

7. Outside Comments

1) Uri HE Project was awarded with " Indo-German GREENTECH Environment Excellence Award" in year 2001 by Green Tech Foundations, New Delhi. The award was given in the field of ' Management of Mitigation measures, Catchment Area Treatment, Afforestation, Conservation of fish and Water quality monitoring'.

2) In order to know the impact of project on fish and bottom fauna of river Jhelum, a study was conducted in association with the Institute of Fresh Water Research (FWRI), Sweden and Department of Zoology, University of Kashmir. On the basis of this study the design of fish ladder was finalized.

8. Further Information

8.1 References

1) Uri Booklet by NHPC Ltd
2) Detailed Project Report- Uri HE Project
3) Other literature compiled by NHPC on Uri HE Project.

8.2 Inquiries

National Hydroelectric Power Corporation Ltd.
Sector-33
Faridabad-121003 (Haryana)
INDIA.
E-mail : amitgupta@nhpc.nic.in