

Socio-Economic Impacts of Hydropower Development: A case Study of Budhigandaki Hydropower Affected Darbungphaat and Majhitaar Villages of Gorkha and Dhading Districts

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Abstract

Nepal is a country which is gifted with abundant water resources, and the perennial rivers flowing through steep gradient really provides ideal conditions for the development of hydro power. However, Nepal being bestowed with tremendous power potential, it has only managed harnessing very less power. Nepal had faced serious power deficit (load shedding) for last many years. The scenario of the power deficit used to be so worse that at winter seasons it could go even 16-18 hrs. a day. Rainfall in Nepal is heavily monsoon centered i.e. nearly 80% of the total rainfall in Nepal occurs only within the four months (june-september). This fact indicates the need of storage based hydropower which could provide power even in the dry seasons. Storage based hydropower projects have their influence/inundation over a very large area, thereby resulting strong socio-economic complexities. So, in this scenario, this study aims to find out various socio-economic impacts related to hydropower development in Nepal. So, to meet the objective of the study, a case study has been conducted at Darbungphaat and Majhitaar Villages of Gorkha and Dhading District Respectively. The case study is mainly focused on impact evaluation of various parameters such as Land Acquisition and Compensation, Resettlement and Rehabilitation, Livelihood etc.

Keywords

Hydropower, Land acquisition, Resettlement, Livelihood, Earthquake

1. Introduction

Nepal is a country which is gifted with abundant water resources, and the perennial rivers flowing through steep gradient really provides ideal conditions for the development of hydro power. The estimated theoretical power potential is approximately 83000MW, of which 43000MW is estimated to be economically feasible (HIDCL, 2015). However, Nepal being bestowed with tremendous power potential, it has managed harnessing very less power. Nepal had faced serious power deficit (load shedding) for last many years. The scenario of the power deficit used to be so worse that at winter seasons it could go even 16-18 hrs. a day. However, recently, due to some management strategies, the power deficit seems lower. But this is the case of suppressed demand. So, only the management strategies couldn't be the permanent solution, rather there would be no other options than to optimize the water resources. Rainfall in Nepal is heavily monsoon centered i.e. nearly 80% of the total

rainfall in Nepal occurs only within the four months (june-september). So, this figure indicates that to empower the hydropower sector, it is necessary to capture the monsoon rainfall and utilize back in the dry seasons. So, there need large storage based hydropower projects. Storage based hydropower projects have their influence/inundation over a very large area, thereby resulting strong socio-economic complexities. Socio-economic issues are crucial and critical for a hydropower project to kick off. Generally, Communities are centered around rivers and other bodies of water because they rely on the water as a resource. A dam interrupting a river leads to unpredictable social impact. So, regarding the socio-economic and policy issues/challenges in the hydropower development, this project aims studying socio-economic factors in case of storage based Budigandaki hydropower project.

2. Rationale

Mostly, during the development of project, the initial phase (the preparatory/beginning phase) which has large influence/impacts over all the phases of the project, generally gets overlooked. Only the result part or the technical part gets highlighted, and in turn the project either gets terminated or gets delayed due to the lack of earlier prediction of potential risk measures. Similarly, in the case of hydropower projects, generally the technical part is only highlighted. The Socio-economic and cultural aspects which have large influence over the project i.e. from beginning of the project and continues together within the implementation phase too, often seems to get overlooked. Mostly, the trend is to take socio-economic impacts as a set of unavoidable effects, instead of risks which could be avoided/reduced. The trend to overlook the socio-economic impacts may be due to the tread off mentality, i.e. positive impacts would outsize the negative ones, but it is not always the scenario that the benefitted and adverse affected groups are same. The background above states the need of the research which will access the socio-economic impacts of the Budigandaki hydropower reservoir inundation.

3. Problem Statement

In order of moving towards the goal of Energy self-dependence and supply of surplus energy, Nepal Government has proposed a storage based mega hydro project i.e., Budi Gandaki Hydro project. While the storage based hydro projects have multipurpose benefits, alongside, it also triggers socio-economic issues/challenges with its large influence/inundation area. Hence to evaluate and offset/mitigate the socio-economic impacts of hydro development, the research is to be conducted.

4. Objectives

Objectives of the project are to study various socio-economic and policy issues/challenges that appears during the hydropower construction in Nepal. And in order to analyze over these issues, Darbungphant and Majhitaar villages of Gorkha and Dhading districts respectively, which are the Budigandaki reservoir affected villages, have been chosen.

4.1 Specific Objective

More specifically, the study focus on the issues of rehabilitation/ resettlement, land acquisition/ compensation and livelihood, in relation to the hydropower development.

5. Literature Review

There lie numerous socio-economic issues/challenges in hydropower development. Michael M. Cernea, through his paper, "Social Impacts and Social Risks in Hydropower Programs: Preemptive Planning and Counter-risk Measures", has classified the adverse social impacts of hydropower development in four categories as follows.

- i. Forced population displacement and impoverishment
- ii. Boomtown formation around major constructions
- iii. Downstream unanticipated changes in agro-production systems
- iv. Loss of cultural heritage assets

The writer has claimed that the single most complex and difficult among these four categories of impacts is clearly the first, the forced displacement and relocation of reservoir populations. The writer has further described each one of them as follow.

5.1 Boom Town Effect

The sudden inflow of large armies of construction workers and related groups within small, often traditional and remote local communities cause social/health/economic and cultural problems at the local community level. For instance, Syagga and Olima (1996) have described the following "boomtown" type of impacts caused by a dam construction in the Kenya Third Nairobi as "The sudden socio-economic changes in the environment caused an increase in marital problems, increased immorality, and teenage pregnancies. It was reported that the dam construction had a major effect on the school going pupils. During the peak construction period many girls were lured out of school, became pregnant, and dropped out of school." The writer, Michael M. Cernea, further claims that Local labor is substituted by over-importation of massive labor from Outside areas, causing unnecessary social and

financial complications and also surreptitiously reducing the long term social sustainability of dams.

5.2 Downstream Unanticipated Social Impacts of Dams

Downstream impacts have been under-studied and overlooked by dam planners, as well by the authors of many Environmental Assessments (EAs) and Social Assessments (SAs) for projects that finance dam construction (often because these assessments did not take a basin-wide approach). (Cernea, 2004). Downstream impacts can be serious in case of valleys in which agriculture has been historically based on recurrence of natural and limited annual floods. These annual floods not only provide essential water, but bring rich nutrients in the silt they carry and deposit. And the local cultivators have adapted their agricultural and settlement patterns to this recurrence: they learned to “absorb” the flood into their agricultural strategic, practicing what is often called recessional agriculture or wetlands agriculture. (Cernea, 2004)

5.3 Forced Population Displacement

Michael M. Cernea, claims the forced population displacement as being the most complicated impact of the dam construction. He further claims that the sharpest debate about the social liabilities of hydropower development revolves around population displacement and forced resettlement. Three elements, the writer explains, why the displacement processes have overtaken much of the public debate around dams, both in developing countries (e.g. India, Laos, Thailand, Brazil, Argentina, a. o.) and developed ones (in Europe and in the USA).

First, magnitude of human impacts: large groups of people are adversely affected, profoundly and enduringly, by imposed material losses and social disruptions.

Second, absent or weak regulation frameworks: policies and laws for socially responsible resettlement have still been missing.

Third, under-financing, underestimating the losses caused by displacement, compensates them in utterly insufficient proportion, and externalizes the difference as an unbearable burden on the displaced population.

The first social challenge in hydropower development is local opposition, which having many dimensions.

One is when “upstream and downstream villages cannot agree on how to share Water resources.” in other cases, “the social aspects of getting transmission lines going, which is very difficult (Benjamin K. Sovacool*, 2011). One of the respondents of Sovacool’s paper has claimed that “Here in Nepal people protest almost everything, it’s a very agitated social and political environment, and coupled with a strong sense of entitlement it creates conflicts.”. Sovacool further presents that the unfamiliarity and unrealistic expectations could impede projects. Another respondent in the same paper has shared a view that “there is a general attitude among people in Nepal that building a dam is easy, they get frustrated when dams are not built quickly enough and do not understand why it takes many years to design, approve, and build projects.”. Sovacool has spotted final social barrier in hydropower development in Nepal as the expectations from the international donors. Respondents in Sovacool paper has explained that the donor requirements often being contradicted and unexpectedly get changed. One final aspect of this challenge concerns “changing development priorities over time.” Organizations like GTZ and USAID, for example, “used to focus on infrastructure, involving engineers and building dams and roads,” but have shifted to focus on “post-conflict election monitoring and education.” (Benjamin K. Sovacool*, 2011).

6. Literature Review of Kaligandaki-A HEP, Based on Land Acquisition, Compensation, Resettlement and Rehabilitation

6.1 Background

The Project (KGA-HEP) lies about 180 km west of Kathmandu, the capital city of Nepal. The project is a daily poundage type scheme located on the Kali Gandaki River with an installed capacity of 144 MW. The project generates about 842 GWh of electric energy annually by utilizing a net head of 115 m. The dam and powerhouse is located at Shree Krishna Gandaki and Jagatra Devi Village Development Committee (VDC) of Syangja District respectively. Permanent camps are located at Beltari and Mirmi of Shree Krishna Gandaki VDC. The power generated from the project by 3 units of turbines of 48 MW each capacity is evacuated to the central grid via 132 kV single circuit 66 km long transmission line to Pokhara and 44 km double circuit transmission line to Butwal.

A sub-station is constructed in Lekhnath Municipality of Kaski district whereas existing Jogikuti substation of Butwal has been upgraded. (Rajendra p. Thanju,2007)

6.2 Impacts on Bote (Fisherman) Families and their Resettlement and Rehabilitation Plan

6.2.1 The Bote (Fisherman) Community

Bote are an indigenous, socially marginalized and vulnerable poor community of Nepal whose livelihood and culture are closely associated with the river. They are also called Majhi and Ghatwar, the first means fisherman and the later means man who ferry boat. They are found residing in small community along the bank of several rivers in Nepal, particularly in the tributaries of Sapta Gandaki. They are occupational group of fisherman and boat transportation. Bote depend heavily on the river for their livelihood. Fishing, boating and working as wage labor in the field of local's elite are their traditional occupation. A small community of Bote families is living near the headwork site of the Kali Gandaki "A" Hydroelectric Project along the bank of Andhi Khola river in Andhimuhan village of Shree Krishna Gandaki VDC of Syangja district of Nepal

6.2.2 Impact on Bote Families

A small group of Bote (fisherman) families residing along the bank of Andhikhola river near the confluence of Kali Gandaki and Andhikhola river of Syangja District were seriously affected by the acquisition of their houses, cowshed and land for the project access road, contractor camps, reservoir and suspension bridges resulting displacement and relocation during various stages of project construction. (Rajendra p. Thanju,2007)

6.2.3 Loss of Land/houses/cowshed

The Kali Gandaki "A" Hydroelectric Project acquired houses/cowshed and lands from the Bote families of Andhimuhan village of SKG and Nibuwakhark VDC for the implementation of the Project with specific purposes such as access road construction, reservoir area, central workshop construction by main civil contractor, suspension bridge construction etc.

6.3 Resettlement and Rehabilitation Plan for Affected Bote Families

The Project/NEA has acquired a plot of 4 ropani⁴ of land (1.5 ropanis for Primary School for the children of Bote community and 2.5 for housing scheme) nearby their village at the Andhimuhan village. Altogether 8 houses (including one house for community center) were constructed by the Project on this plot of land 7 Bote families who were residing in unsafe place in & around the inundation area of Project reservoir level were resettled in these houses. the programs implemented under this plan included; i.) Adult Literacy Program, ii.) Training program on poultry and pig farming, iii.) Construction of Sheds for Pig Farming, iv.) Cage and aqua culture training program, v.) An amount of NRs. 60,000 had been released as a micro credit to 20 members of Bote families in 4 groups for income generating activities, v.) Similarly, 8 Bote were employed in Project Fish Trapping and Hauling program and 5 in Project fish hatchery, vi.) A Primary School established for the children of Bote families. (Rajendra P. Thanju 2007)

7. Brief Overview of Budi Gandaki Hydropower Project

7.1 Background

Budi Gandaki HEP is a storage based project of 1200MW, situated in the Gorkha and Dhading district. The influence/inundation of this project is in 27 VDC's, 14 from the Gorkha district and 13 from Dhading. The reservoir being formed after construction of 263 m dam would be of 63Sq. Km. (Environment, 2017).The estimated cost of the project is 260 billion. Total households to be displaced physically i.e. (both land and houses) are 3560 and the households to be displaced economically are 4557, so in total, households to be affected are 8117. The population to be displaced physically would be 20260 and economically 25351, so in total, population affected would be 45611. (Environment, 2017). Similarly, total land to be acquired would be 2958.46ha. The project is likely to impact over 12115 built property of the households. Likewise, 23 educational institutions consisting of 119 built structures; 74 shrines comprising 80 built structures; 44 cremation sites with 22 structures; 4 industries with 10 built structures, 4 police post with 4 built structures, 7 health facilities with 14 built structures, and 30 community built property with 30 built

structures will be inundated by the BGHEP reservoir. (Resettlement Report- BGHEP)

7.2 Socio-Economic and cultural Aspects of Budi-Gandaki Reservoir Inundation

7.2.1 Land and Property Loss

Land is the key property affected substantially by BGHEP. Both government and private lands will be acquired for the construction of different structures and facilities of the project. A total of 6785.88 ha of land will be acquired permanently or temporarily by the BGHEP. Out of this land, about 3201.57ha land is classed as agricultural / settlement land, while 222.24 ha is grass land. This land totaling about 3423.81 ha is considered as potentially operated by the PFP (project Foot Print)/PVDCs (Project Village Development committee) communities for agriculture/settlement and other community purposes within BGHEP-PFP.

7.2.2 Loss of Agricultural Productivity

Agriculture is one of the main sources of a living for the people living in the project area. In the project area, three types of agricultural land were found; that is, khet (irrigable), pakhokhet (rainfed farmland) and pakhobari (non-irrigable land). The cropping pattern was found varied by types of land. In the pakhobari, the farmers of the project area grow crops three times in a year. In the spring season, they grow maize and ghaiya paddy (sowing paddy). After harvesting of maize and ghaiya paddy, they grow lentils, soybean and millet in the fall season, and winter maize and potato in the winter season. However, cultivation of winter maize and potato is very little due to lack of irrigation facility. Based on the estimated amount of land loss and current crop production practices, the project affected households will be deprived of crop cultivation in 2566 ha of land. This is estimated to cause annual loss of crop production amounting to 5,510 MT, valued at the annual loss of Rs 160.6 million at current prices. (EIA Report-BGHEP)

7.2.3 Loss of Community Assets and Properties

According to the EIA Report of Budhigandaki HEP, Within the PFP geographical limits a number of community assets and properties developed and managed either by the community organizations, or local governments or central governments are located. These assets and properties are providing services not only to the PFP communities but also to the PVDCs

communities of the PFP adjoining areas. The assets and properties located within the PFP are:

- Community Forests Managed by the CFUGs
- Built structures of the Community Organizations
- Community Educational Institutions
- Health Care Facilities and Health Posts Built Structures
- Police Posts, Post Office and VDC Office Built Structures
- Industries Built Structures
- Built Community Infrastructures

And towards the cultural aspects, Shrines or Locations of Religious, Cultural and Archaeological Values, total of 80 nos. and cremation Sites: 22nos. (EIA Report-BGHEP)

7.3 Downstream Hydrological Changes

Water impounded behind the dam wall of BGHEP is regulated for energy production. The operation regime of the BGHEP envisages use of the project for peak energy production only. Narrow sections are likely to produce higher waves, whereas wide sections are more likely to restrict the wave height by spreading the flow in the river width. In view of the estimated wave surge, wave height, and the velocities of wave surge, the riverine area downstream Budhi Gandaki and Trishuli are very vulnerable from the point of river bed erosion, and landslides.

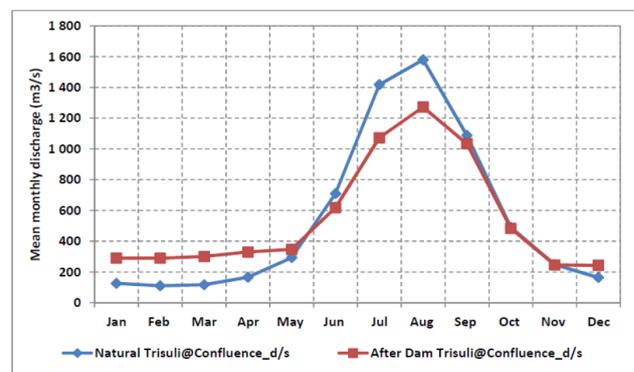


Figure 1: Hydrograph of Natural and Regulated flow at the confluence Budhi Gandaki / Trishuli (Source Feasibility and Design Report 2015)

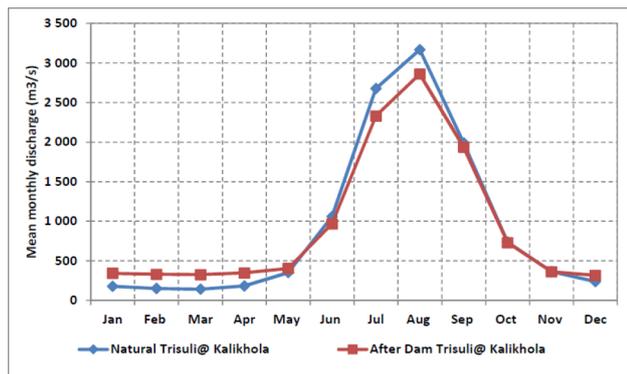


Figure 2: Hydrograph of Natural and Regulated Flow downstream Trishuli – Marsyangdi Confluence (Source Feasibility and Design Report 2015)

Apart from this, such surges will have undesired consequences to the irrigation infrastructures, communities using the river flood plain areas for economic activities such as river rafting, aggregate sourcing, fishing etc. Similarly, the recreational activities and cultural and religious activities along the river bed will be at risk.

The study Parameters Being Land Acquisition and Compensation, Resettlement/Rehabilitation and Relocation, Earthquake affected in the inundation area and Livelihood. Then the site identification has been set up, which is the Darbungphant and Majhitaar villages of Gorkha and Dhading District. Then the case study has been conducted in the particular sites, thereby collecting data through various data collection techniques such as FGD, Questionnaires, Key Informant Interviews, Direct Observations, Photographs and Audio/visual. Then the impact evaluation under various parameters performed, thereby concluding with the conclusions and recommendations.

9. Case study in Darbungphant and Majhitaar villages of Gorkha and Dhading District



Figure 4: Google earth view of Darbungphant and Majhitaar villages

8. Research Methodology

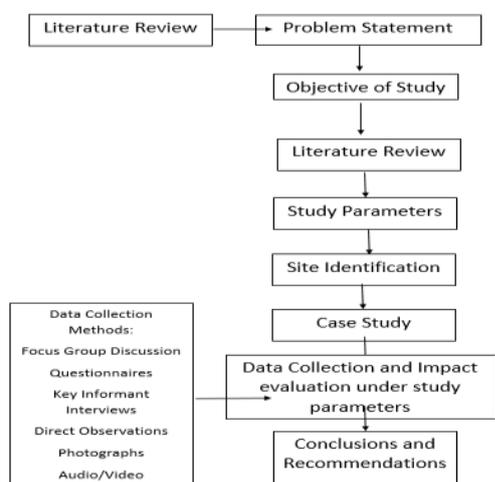


Figure 3: Research Framework

The study is based on the mixed paradigm of Constructivist and Transformative, which then follows the qualitative research methodology. After the problem statement has been derived from the initial literature review, then the study objective is targeted. The study objective here in in this research is to access various socio-economic impacts related to the hydropower development. Then through the extensive literature review, study parameters have been setup.

The site visit is conducted in the villages of two VDC's (Darbung and Maldi). Site visit conducted is mainly in Darbung phant ward no.6 of Darbung VDC and Majhitaar ward no 09 of Maldi VDC. The case study is focused on the socio-economic issues regarding the land acquisition and compensation, rehabilitation/relocation process in the development of storage based Budigandaki hydroelectric project. As the impact area of project being large, it is difficult to cover total affected area through site visit, so only the two villages have been selected.

The Case study is conducted for the study of impact evaluation under following different parameters.

1. Land Acquisition and Compensation
2. Resettlement, Rehabilitation and Relocation

3. Earthquake affected in Inundation area
4. Livelihood

9.1 Land Acquisition and Compensation

Land acquisition and compensation is the crucial part in project development. It is the beginning processes and challenging as well for the project development. Budigandaki HEP being the storage based project, has influence/inundation over large area, which requires large area of land to be compensated thereby resulting in more complication.

Impact Evaluation:



Figure 5: Discussions with Local Peoples

In the Case study site, the land acquisition and its compensation have almost been completed. However, compensation of Houses/animal sheds/plants/fruits have remained, but the survey of houses/animal sheds/plants/fruits have already completed. Land acquisition and compensation is found to be based on the old land survey of 2038 B.S. However, (according to the “Budigandaki Jalbidhyut Rastriya Sarokar Samiti”)

Table 1: showing different land categories with prices. Source (BGHDC)

सि.न.	किसिम	रकम रु. (प्रति रोपनी दर)
१	वाक्नोबन्ति र मूल मोटरबाटो सँग जोडिएका दायो बायोका जग्गाहरु	८,३५,०००/- (आठ लाख पैंतिस हजार मात्र)
२	मूल मोटरबाटोसँग जोडिएका दायो बायोका जग्गाहरु	८,०४,०००/- (आठ लाख चार हजार मात्र)
३	अन्य घरबन्ती क्षेत्र र सहायक मोटर बाटोमा पर्ने जग्गाहरु	७,७३,०००/- (सात लाख त्रिहत्तर हजार मात्र)
४	खेत अञ्चल	७,४२,०००/- (सात लाख ब्यालिस हजार मात्र)
५	खेत दोयम	७,११,०००/- (सात लाख एघार हजार मात्र)
६	खेत सिम	६,८०,०००/- (छ लाख असी हजार मात्र)
७	खेत चाहार	६,४९,०००/- (छ लाख उनान्वास हजार मात्र)
८	बारी अञ्चल	६,१८,०००/- (छ लाख अठार हजार मात्र)
९	बारी दोयम	५,८७,०००/- (पाँच लाख सतानी हजार मात्र)
१०	बारी सिम	५,५६,०००/- (पाँच लाख छपन्न हजार मात्र)
११	बारी चाहार	५,२५,०००/- (पाँच लाख पन्निस हजार मात्र)

During the field visit, it was reported that, the land in the actual field is “Aaham type” i.e. in category 4th

according to the above table, but in the land parcel document, found to be in the lower category. It may be due to the land use changes, but the compensation price got reduced than actual deserved, since the land survey not being updated. in some cases, locals got compensation only of area mentioned in land parcel document, regardless of actual field area which have been used as agricultural land for years. This decreased the compensation amount received.

Continuing on the implication of compensation based on the old land survey, during focus group discussion, locals reported a case that, slope land in actual field was registered as upper category land in land parcel document, and now in getting compensation, the price of sloppy non irrigable land is higher than the irrigable land (khet).

Regarding the compensation issue, locals in the discussions, reported that, previously it was told that the land owners having land less than ten and five ropanis would respectively receive 10% and 15% extra compensation. But in real, no extra compensation was received than the actual land area. In case of the guthi land, people who have bought the guthi land are facing problems in receiving the compensation. Similarly, during discussions with local peoples, it was found that the landless peoples have not got any compensation. people living in and doing agriculture from no. of years before, but not having valid document (lalpurja), are deprived of getting compensation.



Figure 6: Key Informant Interview with Teachers of Ratneshwor School, Darbung

During Discussions with School teachers of Ratneshwor School, Darbung, Gorkha, during the key informant survey, deputy head teacher of Ratneshwor Higher Secondary School, Mr. Sushil Kumar Shrestha raised an issue regarding compensation that, in the case of Ratneshwor school, initially, during buying

land for the school, local peoples and school teachers had raised a fund. But, now, during acquisition of school land, it didn't receive any compensation, as it is registered as government land. Similarly, Mr. Milan Gurung, in charge of Darbung health post reported the same case.

9.1.1 Misuse of Compensation Price: A social Threat

Compensation process (of land), except some cases, has almost been completed in the case study site. During discussions with locals, misuse of compensation price has been reported. Compensation price, which has been received in replace of agricultural land (i.e. from the productive sector), is now being started to invest in the unproductive sectors, such as buying Bullet bikes and other sophisticated items. Similarly, a local shopkeeper (called by name Nepal Dai) mentioned a case that, people of certain social group, who used to drink homemade alcohol before getting compensation price, now have started buying cartoons of branded beer and whiskeys. Also the increasing tendency of hiring bikes and van for commuting has been reported.

9.2 Resettlement, Rehabilitation and Relocation

Resettlement/Rehabilitation and relocation are the most challenging and crucial parts of the project development. There can be very long term socio-economic impacts on the resettled populations. In the site visit of Darbung and Majhitaar villages, locals have raised various issues regarding resettlement and rehabilitation. The resettlement location proposed by Government for Darbung VDC is Archale area, and for the majitaar village (of Maida VDC) is Ratmate area.



Figure 7: proposed Resettlement Site of Darbung

9.2.1 Impact Evaluation

During discussions with the local peoples, they mentioned that the resettlement site is proposed without proper coordination with them. Some of the locals interviewed were unaware of the resettlement site. It seems challenge to find out the exact data of household, which want to get resettled in the Government proposed location. It is because, after getting land compensation, household having medium to strong economic background are slowly shifting to nearby city areas like Chitwan, Kathmandu etc. There seems trend of buying land and even houses in the nearby city areas, with the money received from land compensation. According to the study, there lies a possibility that, only the household with low economic profile and who have no other options to go, would go for the resettlement in the government proposed location. However, it seems to take time to get exact figure.



Figure 8

Discussions with Local Peoples

In absence of exact figure of no. of household to be resettled, there obviously lies difficulties in planning for the development of infrastructures in the resettlement site, which will affect more in the resettlement process to complete in time. During the discussion with local peoples, they were sad to remember the fact that, they have to leave all the livelihood systems (House-shed, nearby irrigable land (khet), livestock, plants, fruit plants, and other infrastructure like nearby school, health post, water supply etc), and go in a new place and again to start from zero. Locals feared that they would go years backward in leaving the well settled area of native place and gong in the new place to start from the beginning.

After resettlement, there remains a chance of conflict

of the host community and the resettled community, while sharing the infrastructures and resources. Also, while a community being resettled, all the households in the community doesn't get resettled as some household has already bought land or house in the nearby city area. This fragmentation of society, which has been living for together for no. of years, obviously breaks the social bond which have been maintained during the time of ancestors.



Figure 9: Ratneshwor School, Darbung



Figure 10: Health Post, Darbung

It is not only the issue of resettlement of households, there also lies challenge in relocating the physical infrastructures, cultural aspects and many more.

9.3 Impacts due to Delayed Resettlement

9.3.1 Impact on Education

Mr. Sushil Kumar Shrestha, deputy head of Ratneshwor School reported that, in the school, no. of students has drastically reduced (before, no. of students used to be 500-600, now the number is reduced to 250- 300). It is so because, the middle-high class family started shifting to nearby cities, and there remained in school, only the students of family who are waiting for government resettlement. And as implication of this event, the no. of teachers has also been cut off and seat of vacant

teachers are not getting filled in time. So, there lies risk of quality of education being degraded.

9.3.2 Impact on Health Services

Similar is the case of health services and facilities. There are no signs of health services and facilities being upgraded, either the facilities get limited to the existing one or can be degraded slowly, until the resettlement program gets completed.

9.3.3 Impact on Road and Infrastructure



Figure 11: Bus on the Benighat-Arughat road

To reach the location of site visit, it is nearly 10-12 km from the prithvi highway, but it takes near about 1.5 hrs. on Bus. Here can we depict the condition of road to reach Budi Gandaki Reservoir affected village site. The condition of road is very bad with humps and bumps. However, the road is hilly, but, had it been graveled/paved, the time could be saved by 45 minutes to 1 hours i.e. it would take only 1/2 hrs. or 45 minutes to commute the distance. But the scenario is different, since the road is in reservoir inundation area, it doesn't get upgraded, and had remained the same for many years.

There had been a planning of re-routing the road as section of the Ring road, but it doesn't seem to get started. So, it is uncertain that, how long the peoples have to commute through the road by risking their life. And it is all because of lingering of the resettlement process. Had the resettlement process completed on time and people had started living in their permanent location, then the it would be automatic pressure to reach the good standard road up to the resettled location

9.4 3rd Case Study Parameter: Impacts on Livelihood

Physically and economically displaced peoples, who are completely in the inundation area are most affected victims of the project development. They have to leave the native place where they have been living for no. of years, also, agricultural fields, nearby community assets, fruits/plants etc. have to be left and get started from zero point in the newly resettled area.

Impact Evaluation:



Figure 12: Agricultural land in the case study site, Majhitaar



Figure 13: Farmers harvesting crops in case study site

Agriculture is one of the main sources of a living for the people living in the project area. So, Loss of agricultural land and agricultural productivity has great impact on the livelihood of peoples. Specially the case study site has very fertile and irrigable land, locally also called khet. The farmers of the area grow crops three times in a year in khet. The peoples of case study site have to resettle in the place called Archale, which is on high land nearly about 560 masl. Peoples who have been practicing agriculture in the low land, in the fertile land with irrigation facility from nearby river, after being resettled, will have to practice agriculture in the pakho khet (rain fed farm

land). This change in the agricultural land type will certainly reduce the agricultural productivity and hampers the livelihood.

Similarly, Krishna Jung shah, local resident of Majhitaar village raised livelihood issues they had a very good agricultural land. He also said that he had planted a plant called “chap”, which would produce very good logs that could be sold in good price. In this regard, local peoples have a fear that, would they be succeeding in regaining their livelihood there in the resettled area, after leaving well established status in the recent location.

9.4.1 Loss of Community Resources Impact Evaluation

The riverine, grassland and the forests area are the key community resources affected by the project, which were used invariably for various purposes by the community. The rivers are used for fishing and a number of recreational and spiritual purposes.



Figure 14: Budi-Gandaki River



Figure 15: A public Tap in Darbungphaat, also an example of livelihood asset

The forest of the area is used for sourcing various forest products apart from timber and fodder. Similarly, the grasslands are used for cattle grazing. These resources

are a part and parcel of the community livelihood and spiritual being and are considered to have significant impacts on the livelihood and spiritual being of the populations residing.



Figure 16: Banana Cultivation in site area

9.4.2 Loss from Business Impact Evaluation



Figure 17: Discussion with hotel owner Gita Didi

Gita Didi, having a small hotel nearby the school (also observed selling stationery items and lunch to the school students) reported that she had irrigable land (Khet) which gives 20 Muri of rice a year and other crops as well, also claimed that she had a good life with 4 nos. of family being sustained from the income of agriculture and small hotel. Now, as going to the new place as resettled, she fears that how could she sustain and regain the livelihood. Gita Didi is only a representative case, such cases can be more.

9.5 Earthquake Affected in the Inundation Are

The devastating earthquake which hit Nepal on 25th of April 2015, had epicenter on Barpak of Gorkha District. And eventually the case study site is also on the villages of Gorkha and Dhading District. So, there can be no any chance that the case study site remains unaffected of the earthquake.

9.5.1 Impact Evaluation

Since the majority of houses in the case study site being earthen house (With Stone- mud mortar), and epicenter also being nearby, the effect of earthquake is very large, that almost all the houses are badly affected. And since the area lies in Budigandaki Hydro Power reservoir inundation area, the post- earthquake effect has been much amplified, which means the affected houses couldn't be reconstructed as they lied in the inundation area.



Figure 18: Earthquake affected House



Figure 19: Temporary Shelter of Earthquake affected

The earthquake affected peoples in the case study site have been living miserable life for four years since 2015, but unfortunately, it is unknown that, how longer should they be in the temporary shelter. It is because, if made a permanent house in the existing location than the area lies in the reservoir inundation area, which will be worthless, and if not made a permanent house, then it is unknown that how long the resettlement process will take to complete, and until the resettlement process gets completed, the earthquake affected are compelled to be in the temporary shelter being deprived of basic facilities.

Now in the winter season, it will be more difficult to be under the CGI sheet roof, so, earthquake affected seems more vulnerable. The Earthquake affected in the inundation area have been provided with Nepalese Rupees Two Lakhs in order to construct the temporary shelters. During discussion with the local peoples, a case is reported and observed that, a house is severely damaged by the earthquake, but has not received compensation till the date, instead, the house owner had to re-register his house to get checked whether the house falls under the compensation category or not. In contrary to this, in other case reported, that the RCC house which got no damage by earthquake, has received the earthquake compensation money.

10. Conclusions and Recommendations

Physical and economic displacement of the households due to loss of land for reservoir creation is the most significant impact of the project. Associated with the displacement of households are the loss of agricultural land and productivity, and other community resources which also has significant implications on the livelihood and wellbeing of the people affected by the project. Impacts of significant nature are also experienced by the loss of the shrines and other cultural resources.

The Recommendations in pointwise:

- Remaining compensation of Households/sheds and Fruits/Plants should be made ASAP, and awareness/training program should be launched in guiding peoples to invest the compensation money in productive sectors, which would help in regaining the status.
- Since no any resettlement plan/policy can completely replace the native place of local peoples, hence with sufficient information

dissemination, locals should be convinced of the resettlement location (provided that the resettlement site is first fully inspected, with the stakeholder inclusion, by the professionals in every respect), and the resettlement process should be completed ASAP, thereby preventing the further negative implications due to delay of resettlement.

- More urgency is required in completing the land acquisition and compensation process in the proposed resettlement area, so, building of required infrastructures such as road network, schools, health posts, water supply etc. can be started, which is also a basic requirement before the resettlement of people.
- Beginning the construction of hydropower structures such as dam and others, doesn't start the inundation as the construction is done by diverting the river. So, the hydropower structures can be started to be made where the land acquisition and compensation process have completed.
- This ensures firstly, the timely completion of project, and secondly, start of construction works would provide employment opportunities and opportunities for opening the hotels (in temporary sheds) nearby the dam construction and other structures construction. This would help project affected peoples to regain their livelihood.
- In case of the earthquake affected, first of all, it is to be ensured that all the earthquake affected are provided with the compensation to build temporary shelter.
- Permanent resettlement is the sustainable solution to the impacts on earthquake affected. But to fight with immediate effects, temporary solution can be adapted such as distributing warm clothes/blankets to fight with cold, and since, EQ affected remaining in temporary shelter are more vulnerable to various health hazards, Free health checkup should be provided.
- Since the impacts on the livelihood assets of the people of inundation area is unavoidable, it is to be ensured with various livelihood restoration plans (such as employment opportunity in project, encouraging cooperative business,

encouraging tourism business etc.) after resettling to the new location.

- re-regulating the dam by help of structures can regulate the high surge of water during BGHEP peak power operation in the downstream section of the Dam, thereby limiting the potential damage due to high surge water waves and water volume fluctuations downstream. However, regulations can be done only to some extent to minimize the huge effects, so care is to be taken during the high discharges from the plant i.e. Siren warning system during the discharge, SMS information in cell phones regarding the flooding due to discharge from power plant etc. can be provided to minimize the effects to other extents.
- In connection to the literature review of Kaligandaki-A HEP, however, the scale of impacts will largely be amplified in the case of Budhigandaki HEP (as Kaligandaki is Peaking run off river project, which relatively have less inundation area in comparison to the Budhigandaki which is the storage based project having very large influence/inundation area), the lessons can be learnt from the land acquisition, compensation, and resettlement/rehabilitation of Bote (fisherman) community. With bearing all the burdens, people in the project area are supporting Government with full heart, the plan to build the mega scale storage based power plant.
- Accordingly, Government also should resettle the displaced populations in the safe area, thereby working in its full pace.

References

- [1] Benjamin K Sovacool, Saroj Dhakal, Olivia Gippner, and Malavika Jain Bambawale. Halting hydro: A review of the socio-technical barriers to hydroelectric power plants in nepal. *Energy*, 36(5):3468–3476, 2011.
- [2] Emily Bird. The socioeconomic impact of hydroelectric dams on developing communities: a case study of the chalillo dam and the communities of the macal river valley, cayo district, belize, central america. 2012.
- [3] Michael M Cernea et al. Social impacts and social risks in hydropower programs: Preemptive planning and counter-risk measures. In *Keynote Address: Session on Social Aspects of Hydropower Development. United Nations Symposium on Hydropower and Sustainable Development Beijing, China*, 2004.
- [4] Michael M Cernea. *Hydropower dams and social impacts: a sociological perspective*. The World Bank, 1997.
- [5] Kamal Raj Dhungel. Social issues in hydropower development. [Online] <https://www.newbusinessage.com/MagazineArticles/view/1278>, 2015-08-23. Accessed: 2017-03-10.
- [6] Subash Ghimire. Land tenure in hydropower development: A review. *Kathmandu University Journal of Science, Engineering and Technology*, 8(2):101–108, 2012.
- [7] Thomas Chandy, Rodney J Keenan, R John Petheram, and Peter Shepherd. Impacts of hydropower development on rural livelihood sustainability in sikkim, india: Community perceptions. *Mountain Research and Development*, 32(2):117–125, 2012.
- [8] N Hildyard. Dam on the rocks: The flawed economics of large hydroelectric dams the corner house briefing. *Dorset, United Kingdom: The Corner House*, 2008.
- [9] Rajendra P Thanju. Advantages of hydro generation: Resettlement of indigenous bote (fisherman) families: A case study of kali gandaki” a” hydroelectric project of nepal. In *International Conference on Small Hydropower-Hydro Sri Lanka*, volume 22, page 24. Citeseer, 2007.

