

CHAPTER-I

INTRODUCTION

1.1 Background of Study

Nepal has a huge hydropower potential. In fact, the perennial nature of Nepali rivers and the steep gradient of the country's topography provide ideal conditions for the development of some of the world's largest hydroelectric projects in Nepal. There is the potentiality of 40,000MW electricity as anticipated by experts. However, the present situation is that Nepal has developed only approximately 763 MW of hydropower. Therefore, bulk of the economically feasible generation has not been realized yet. Besides, the multipurpose, secondary and tertiary benefits have not been realized from the development of its rivers. Although bestowed with tremendous hydropower resources, only about 44 percent of Nepal's population have access to electricity. Most of the power plants in Nepal are run-of-river type with energy available in excess of the in-country demand during the monsoon season and deficit during the dry season.

Nepal's electricity generation is dominated by hydropower, though in the entire scenario of energy use of the country, the electricity is a tiny fraction, only few percent of energy need is fulfilled by electricity. The bulk of the energy need is dominated by fire wood (68%), agricultural waste (15%), animal dung (8%) and imported fossil fuel (8%). The other fact is that only about 44 percent of Nepal's population have access to electricity. With this scenario and having immense potential of hydropower development, it is important for Nepal to increase its energy dependency on electricity with hydropower development. This contributes to deforestation, soil erosion and depletion, and increased flooding downstream in the Ganges plain. Shortage of wood also pushes farmers to burn animal dung, which is needed for agriculture. Not only this, the development of hydropower will help to achieve the millennium development goals along with the protection of environment, increase of literacy rate and improvement of health of children and women with better energy. Growing environmental degradation adds a sense of urgency.

The electricity demand in Nepal is increasing by about 10-12 percent per year. About 44 percent of population in Nepal has access to electricity through the grid and off grid system. Nepal's Tenth Five Year Plan (2002– 2007) aims to extend the electrification within country and export to India for mutual benefit. The Hydropower Policy 2001 seeks to promote private sector investment in the sector of hydropower development and aims to expand the electrification within the country and export.

The hydropower system in Nepal is dominated by run-of-river projects. There is only one seasonal storage project in the system. There is shortage of power during winter and spill during wet season. The load factor is quite low as the majority of the consumption is dominated by household use. This imbalance has clearly shown the need for storage projects, and hence, cooperation between the two neighbouring countries is essential for the best use of the hydro resource for mutual benefit.

Hydropower is an indigenous and source of energy for which the potential exists in the almost the whole Hindu-Kush Himalayan Region, which includes Afghanistan, Bhutan, China, India, Myanmar, Nepal and Pakistan. Micro hydro is generally defined as decentralized small-scale water power plant less than 100KW. For the power generation up to 100KW, micro hydro projects have gained enormous popularity in developing countries during the last four decade. Micro hydro can provide electricity services. Micro-hydro generation is a cost-effective and low-impact technique for power generation that offers a potential solution for rural electrification in Nepal. According to a 2005 report by the Alternative Energy Promotion Centre (AEPCC), 1,956 micro-hydro schemes with an overall capacity of 13,064 KW have been installed in Nepal since 1962.

The basic idea with micro hydropower is to convert the energy of falling water from some height to electricity. The micro hydropower plant visited in Modhikhola was of the run of the river type. The flow of the river is blocked and the water is led through an intake to the canal. The canal brings the water to the fore bay from where the penstock starts, which the water falls through to the Powerhouse. A turbine in the powerhouse converts the potential energy of the water to mechanical energy that drives the generator, which in turn produces electricity. Afterwards the water is returned to the river. Since water flows continuously in rivers the energy from a micro hydropower plant that can be used whenever there is a demand. The amount of energy

can be predicted if the water flow and head are known. Another advantage with micro hydropower is that with a sufficient head the hydro scheme can be quite compact and a small amount of water is enough to produce the electricity needed for light and other equipment. Once the plant is installed the costs for running the plant are very low and if the plant is well maintained it can work for many decades.

Of the world's total energy supply 80 percent is constituted by fossil fuel. Burning of fossil fuel will not last forever and it is damaging the environment and affecting the climate through the emission of greenhouse-gases. Economic growth and population growth increase the demand for energy in developing countries. Hence it is necessary to look for renewable energy alternatives. Hydropower is a good alternative and since dam building is not needed, as for larger plants; their impact on the environment is very small. Water is the only force running the plant and no fuel like diesel is needed as input. There are some negative effects worth considering. Some fish species is moving far along the rivers, both upstream and downstream. The hydropower plant must have a passage through wire network so network path is no hindering once for the fish migration.

In many rivers water is used for irrigation of the fields nearby the plant. Before building a plant it is therefore important to make sure that there is enough water available for irrigation also when part of the river is diverted to the plant. Another effect of building the plant can be that the soil gets more sensitive for erosion. There are many working hydropower plants in different countries in Southeast Asia. Especially in China there are thousands of operating plants. Many plants are financially profitable, and others are invaluable for the positive effect they have on the living standard for poor people in rural areas. One of the problems with hydropower is that there are no clear rules on how to make the plants profitable in a financial way. In very poor and remote areas it is not even possible to get some money in return for the hydropower plants.

An investigation of generation of hydropower shows that men and women have a different view of the benefits from the plant. For men, the biggest advantages are leisure, quality of life and a better education for the children whereas the women see the advantages in reduced workload, expenditures and an improved health care. Women in developing countries spend much time on domestic duties that are

necessary for the family to survive. Often they have to walk long distances to collect fire wood and water. Indoor cooking is done over open fire in bad light, both of which are tiring for their eyes, time-consuming and unhealthy due to all the smoke. The more time women spend cooking and collecting fire wood and water, the less time they have for children care, education, and income generating activities. The household tasks could be more easily done if they had access to electricity. An electrical water pump could reduce the time and ache of walking far with heavy buckets. Electricity used for light in the household makes cooking and other indoor activities proceed much faster and the light would also give women a chance to study or carry out income generating activities. After sunset outdoors streetlights are a base for a more secure environment. Information and contacts are gained very quickly through information technologies. If children in developing countries should have a chance to find information and get themselves heard it is very important that they can have access to modern technologies in school. Electricity from a hydro plant makes it possible to use overhead Projectors, Computers, TV, Video and Radio. Mega hydropower plants are less cost effective than large plants since they do not give any direct income from power export. The government is nevertheless positive towards the use of hydropower since it gains many advantages for the community, like education, health and security. This is good in theory but since money is needed in many sectors, such as road building, agriculture and forestry, the budget for rural electrification is limited.

1.2 Statement of the Problem

The non-availability of commercial source of energy is one of the major obstacles in the development of rural areas in Nepal. This has not only slowed down the rate of development of new technologies for increasing agricultural productivity but also created excessive dependency on traditional sources of energy including fire wood, agricultural residuals and animal dung. Owing the lack of commercial energy sources, the productivity of rural population remains modest. The excessive and unsuitable use of traditional resources has resulted in low agricultural productivity, deforestation and soil-erosion, which creates imbalance in eco-system. The use of the fire wood, agriculture residue and animal dung in cooking causes respiratory diseases. With the use of traditional sources of energy, considerable labour hours of human resources are

spent in production activities, which could have been done with much less manpower if modern technologies were used. People especially women; have to spend much of their working hours in collecting fire wood. Students study hours is affected by the lack of lighting in the houses. They may suffer from the eye infection, ENT irritation, etc. due to the smoke of fire wood. All these problems arise due to the lack of commercial sources of energy, which has negatively impact the human capital formation in the rural area. There is a high potential of hydro power in Nepal and considering that rural communities are isolated and scattered, Micro-hydro systems is positive impact on social welfare through improvement in education, health, and communication.

Some research questions are:

- What is the impact of Hydro Electrification (HE) on Education in the study area?
- What are the impact of MHE on information technology and entrepreneurships in study area?
- What is the impact of MHE on Health and sanitation in study area?
- What is the impacts of MHE on income and employment generation in Khagankot, VDC of Jajarkot District?

1.3 Objectives of the Study

The main objective of the study is to evaluate the impact of the hydropower projects (HPs) in rural development on socio-economic aspects through income, saving and employment generation and specific objectives of the study are as follows:

- To describe the impact of Nalsing Gad hydropower project on the education, health, education, infrastructure, compensation and women's participation in Khagenkot VDC of Jajarkot district.
- To analysis the changes and development in income, employment, infrastructure and local empowerment of the women in the adjoining area by the project development.

1.4 Significance of the Study

In the view of growing of fire wood the others non-renewable energy sources the search for alternative energy sources is prominent. In this context, many projects have been operated but how far the projects are succeeding in terms of end-use-efficiency, how far it effects for the up liftmen in the livelihood of rural people, how far the projects is succeeding in terms of overall socio-economic enlistment of the rural people in their perception are leading issues. Moreover, there are many studies adopted in HP sectors but there is still lack of proper information and show documentation, which has analyzed the ground reality of socio-economic aspects of HP. Hence this study has been rounded on the pivot of impact of hydro project on socio-economic aspect of the rural people. Outcomes of this study will help to assess the impact of the HP on education, health, information, and technology of the people two wards of Jajarkot district.

1.5 Limitation of the Study

This research was conducted to analyse the impact of hydro power project on socio-economic, education, health information technology and entrepreneurship of the people live in remote area of Nepal. This research was done by random sampling method. But, the site is selected purposively. These two wards of the khagankot VDC are very near to the project, so the changes caused by the project can be seen clearly. However, this outcome may not be applicable to the whole generalization and for other scenario too.

Some limitations are:

- It is the case study of Nalsing gad hydropower project on khagenkot VDC which may not be applicable on the other VDC of the country.
- The data would be depending on social survey which may not provide the exact picture of society.
- The study narrowed only some limited variables and ignores many variables which may affect on study area.
- The study focused only limited area so the generalization of the study may not reliable to other area.

1.6 Organization of the Study

This section deals with how the chapters are organized hereby. Altogether this study is divided into five chapters. The first chapter deals with general background, statement of the problem, objectives, significance, limitation and organization of the study. The second chapter is about literature review. The third chapter is about Introduction to study site, nature of data, sample selection, questionnaire design, method of data collection and data processing. Fourth chapter deals with the analysis and interpretation of data and fifth chapter includes summary, conclusion.

CHAPTER-II

LITERATURE REVIEW

Limited research has been conducted on socio-economic impacts of hydropower projects. However there are many studies in other sector of hydropower project. Generally, the studies on medium and large scale hydropower project have been conducted to identify various types of impacts created by the development of hydropower project. Many publications, reports, theses, dissertations, articles in journals and newspapers which are related to the hydropower are reviewed. Those pieces of literature which are closely related to this research have been reviewed:

2.1 Reviews of Studies at International Level

Brodman (1981) has depicted the socio-economic impact of Klaten Rural Hydropower project in Indonesia. This study is mainly based on primary data. This study has found 88 percent of the business in the study area had installed electricity of project, 77% of the electricity adopters with school children reported that electricity had caused an increase in their study time, more than 80 percent of respondents said that electricity had made the village safer due to lightening of the village paths, more than 70 percent of electricity adopters and non adopters opined that electricity had benefited them by stimulating night time activity. Business work hours had increased 11 percent of the interviewed household increases their income by using electricity in their home industries, 33 percent of the business respondent reported that electricity use had developed their business, 50 percent of the business respondents and 43 percent of household respondents said that employment opportunities had increased due to electrification.

Therefore, his study has thus concluded that rural electrification is the most viable and most benefited source of energy in the rural area. Thus he concluded that Klaten rural hydropower has contributed to enhance the living conditions and expand the capabilities of the people in Java in a clean and sustainable way.

Nattakul, Boonrod and Roongrojana (2010) assesses social impacts of Pico-Hydropower applications in the Northern region of Thailand. Six existing Pico hydropower projects were selected based on different characteristics including system

capacity, size of user. Normally, Pico-hydro power systems are found in rural or hilly areas. Based on the guidebook, most projects should utilize hilly and mountainous locations to site suitable projects. From a report on electrification technologies by the World Bank Energy Unit, of the options currently available for off-grid generation, Pico-hydro is likely to have the lowest cost. For mini-grid power, it is likely that only biogas plants provide more cost-effective electricity than micro hydro. Northern Thailand is filled with mountains and high level. In areas with high rainfall, there is plenty of water. In terms of economic the results is clear because most the people have the tea gardens and coffee gardens, so they can use electricity at night time to boil tea leaves and pack it for sale. The production cost for each village in the system In addition, they have home stay service to tourists, which increase incomes. Socially, second range is high percentage of users have satisfaction in the hydropower. According to the light at night time the villager can take time for exchanging ideas with each other, the children read books for longer time and old people understood more Thai language as they can remain watching TV in the night.

2.2 Reviews of Studies at National Level

Bhattarai (2012) analyzed that establishment of hydro power project opens up immense opportunities for social and economic upliftment of the rural communities, if, other crucial aspects like - basic road infrastructure for transportation, promotion of income generation, tourism development rural electrification and small industrial activities based on local resource available in the local area etc. develop the rural and remote area of Nepal. This helps to reduce the migration of skilled and non-skilled manpower. Therefore there is no doubt that the hydro electricity is the key of economic development. If there is the sufficient development of hydro electricity it brings the positive change in all sector of the economy. He concluded that hydro electricity contributes to sustainable development, rural electrification, industrialization tourism development etc.

Tiwari (1995) has analyzed the role of MHP in rural electrification and also examined the impact of MHP after construction within the influenced area. He has compared the benefits and cost of Bhorletar MHP. Field survey has been used to collect the primary information and the secondary data sources are ICIMOD, East Consult, Ministry of

Finance and NEA. This study has concluded that micro hydropower is the most feasible and most efficient alternative source of energy in rural areas.

Awasthi (2010) has examined the socio-economic impacts of Chameliya Hydropower Plant in the adjoining area. This study has concluded that the socio-economic impacts of the project are moderate in absolute term and satisfactory in relative term. The project has provided sufficient drinking water and employment opportunities to the local people and electricity supply has extend the social and recreational activities like increasing educational standard, purchase of radio, television, tape recorders etc.

Dhungel (2002) has mentioned that main sources of energies are biomass (traditional), which constitutes fire wood, agriculture waste, animal dung etc. and commercial sources which constitute coal, petroleum products, hydro-electricity etc. Energy consumption in Nepal is dominated by biomass, which accounted for 95 %, 94.9 %, 91.7 %, 86.4 % and remained shares of commercial energy in total energy consumption in FY 1984/85, FY 1989/90, FY 1995/96, and FY 2000/01 respectively. Average growth of biomass and commercial energy consumption during the FY 1984/85 and FY 2000/01 were 2.4 % and 10 % respectively. Combining both an average growth rate was more than 3 % per annum during this period. The trend of energy consumption in Nepal during the FY 1984/85 – FY 1995/96 also shows that biomass was growing by 2.2 % per annum. Similarly, commercial energy consumption was growing by more than 5% per annum. Annual growth rate of fuel wood, coal, petroleum products and electricity during the FY 1984/85 to FY 2000/01 were 2.7 %, 27.2%, 12.7% and 10 % respectively. Income elasticity of electro-products consumption and electricity were 1.75 % and 1.14 % respectively. He found that elasticity coefficients are greater than one, which reveals that an increase in per capita real GDP will increase to the amount of per capita energy consumption. By assuming 2.24 % population growth rate and 4 % economic growth annually, he predicts that energy consumption increase by 4.2 % per annum during the FY 1994/95 – FY 2004/05.

Jha (1990) says that one of the major reasons for poverty and backwardness of the Nepalese economy is power deficit. Shortage of power creates a problem in the development of agricultural industrial, trade and other sectors of the economy. With a view of meet the power shortage, there is need to generate power from not only the

medium or mega projects but also small scale hydropower projects. The small hydropower projects might contribute significantly by providing electricity in isolated pocket area as well as to the grid since the electrification is related to productivity. Small hydropower might help to increasing working efficiency of the rural families. For the sustainable development of small hydropower, he has emphasized the implementation of small and micro hydro projects by adopting is required it provide supporting services such as agriculture extension input supply. Marketing services credit facility etc and development of capability of the farmers.

Paudyal (1999) has analyzed the energy scenario of 1990s. in average shares of traditional and commercial energy consumption seem more than 90 percent and less than 10 percent respectively.

The share of fuel wood, in traditional or in total energy consumption is very high and adverse effect on the consumption of electricity. Use of electricity is high in domestic sector, although its use is increasing rapidly in industrial as well as commercial sector. High GDP cannot be accomplished without technological progress, which requires increasing use of commercial energy. Use of energy is essential for industrialization and transformation of agriculture to the other sector, more time and labour are required to collect fuel wood as a result there remains very little time for productive works. The use of hydropower helps to reduce deforestation that will grow agricultural production through conserving the soil pumping, irrigation water. Dryings crops grinding gravis using factor, threshing machine this demand of commercial energy is positively linked with increased income of household. He emphasized that micro and small hydropower should be developed to meet rural demand for energy but medium and large scale projects are essential to meet the demand for industrial and commercial sector.

Upadhyaya (2051) has mentioned that Koshi, Gandaki and Karnali rivers are international level rivers. Total 244MW capacity had been installed till to that date. Nepalese people have been getting neither irrigation facility nor electricity facility adequately. India is taking more advantages than Nepal from large barrage, near to the border, of Nepal's large rivers. Out of the total land irrigated by Koshi and Gandaki irrigation projects, only 2.4 percent lies in Nepal and the remaining 97.6 percent in India. In other words, he suggests that we should reserve large water resources as

USA did. It would be better to install small-scale hydropower projects from small rivers in the present context of Nepal. After becoming capable to invest on our own, we can install large-scale projects at low cost by utilizing our large rivers. Alternative measure to develop hydroelectricity in Nepal at present context is to develop suitable small and middle scale projects, which fulfil annual demand of electricity, by utilizing available local resources. He suggests that people's participation is required to make policy for utilizing water resources as national resources.

Acharya (1983) has mentioned the contribution of hydroelectricity to Nepalese economy. It plays significant role by developing various fields such as agriculture, industries, transportation, social services etc. Water resource is the Nepal's greatest asset but unfortunately very insignificant portion has been harnessed to this date. She says that there is unequal distribution of electricity in different development regions. Nepal is facing many problems with respect to hydropower development. These are: lack of capital, skilled manpower, technical Know-how, sufficient market and economic status of people as well as country.

Shrestha (2000) has mentioned that the development of the hydroelectricity is possible due to the enormous water resources as well as favourable topographic and climatic condition. Hydroelectricity has tremendous advantages for the people, and it helps to develop energy sector of economy. Electricity is one of the infrastructures of upgrading the socio-economic condition of nation. The proper utilization of electric power accelerates the motion of national development. Our experience shows that the developed countries like Japan, UK, USA, China, France etc. achieved advancement in time through electric power. At present, the stock of non-renewable resources like petroleum products, coal, natural gas, fuel wood etc. is decreasing. The hydroelectricity has become economically attractive because it is renewable and environment friendly. He has discussed the role of hydroelectricity in various economic as well as non-economic sectors. Industries, agriculture, transportation, social services and other sectors can be promoted by the utilization of electricity. He has also discussed but the development during the plan periods.

"Final Evaluation of Private Rural Electrification Project (367-0162)" (1994, is a report prepared by a research team of Ranjitkar, under the USAID of Nepal. This report is based on the study of evaluation of three private plants as the private Rural

Electrification Projects which are: (1) Purang-25 KW (Muktinath VDC of Mustang), (2) Silkes-100KW (Parche VDC of Kaski) and (3) Seem - 16 KW (Morabang VDC of Rukum). The study shows that the installation of micro-hydropower plants has brought technical revolution in the rural areas where people had not been exposed to modern technology. Micro-hydropower plants give them opportunities to utilize modern technology to improve their living standard. These plants also help them to link their subsistence village life to the modern market through value-added goods produced by micro enterprises e.g. milling cottage industries and so on developed in the course of time. After the establishment of pored plants in villages, there are good changes that micro enterprises will flourish. The study has found that the expected benefits from the projects are firewood and kerosene savings; improvement in education, agricultural productivity, health, and women's working time etc. right sized micro-hydropower plants are economically replicable and sustainable because such plants are within the managerial capacity of the rural people. The team recommends that the micro-hydropower projects should not only be financially and economically viable but should be also on appropriate scale depending upon the needs of villagers' transparency and participation in the decision making, managerial as well as technical back-up support.

Shrestha (2011) has studied on Socioeconomic Impact of Tarakhola Micro Hydro Project which has positive impact on education, health, and awareness of people live in Tara VDC. Tarakhola MHP has been playing crucial role in rural electrification in Tara VDC. That MHP provide opportunities to study more in night time and people are less infected from eye problem. The acquisition and use of physical assets such as electric appliances has increased access to information.

Joshi (2011), has mentioned that energy is important for economic development. The pace of economic development cannot be accelerated without hydropower development. The development of productive sector of an economy depends on development of the energy sector. In the hilly and mountainous area, almost all the households are found to have consumed traditional sources of energy for cooking, heating, lighting and other necessary activities. Traditional energy sources cannot be sustainable to fulfil energy requirement. From the present analysis it has been observed that most of the people depend on forest for energy sources and livestock.

As a result, the deforestation has brought about ecological and environmental hazards along with shortage of fuel wood, soil erosion, deterioration of the fertility of soil etc. Deforestation leads to the deterioration of water sources and hampers both electricity generation and drinking water. Hydropower occupies a very eminent place in the energy sector of Nepal. The utilization of energy is concentrated on urban areas and most of the rural areas have been by-passed-by this power development. The hydropower project has brought about changes in socio-economic, cultural and other aspects of the people living in the project located area and its surroundings .To find socio-economic impact and to introduce the total effect of the project at the study area is main objective as well as quantitative method is used the study find the every kinds of socio-economic and environmental effect in the study area as well as surrounding area.

Regmi (2012) has analyzed the present condition of Nepalese energy system. The summary conclusions of her finding are: There should be need of proper utilization of Natural Resources like water to achieve the goal of development. By proper harvesting of rest water resources, by generating aptly trained manpower and investment on water resources dependency on foreign country could be vanished. One of the alternative way to increase the energy power not only by the formation of new hydro projects but also the maintaining and optimizing the existing hydropower plants which may become panacea to control the web of problem and has been grossly overlooked for these reasons. The development of hydropower in Nepal has always been dictated by many constraints and conditions. Projects are selected by planning procedure which is deliberately designed to produce a 'no option' situation in decision making. It is too late to understand the government that private sector is not capable to develop sufficient hydropower projects to satisfy the demand so the public sector must play a sustainable and major role for implementation of hydropower project.

Poudel (2011), states that during the price like of petroleum, the debate of new hydropower projects become hot. If there is no much news, the issue falls on shadow, highlighting the present condition of demand and supply of hydropower in Nepal, he states that demand increases when supply decreases. During dry season the power becomes excess. so the overcome such imbalances on demand and supply, run off

river projects are to be slotted to address base load where as peak load is to be met by storage projects like Kulekhani.

According to him, after the liberalization of the economy, private sector is still lower than the expectation due to government procedural complication, political instability and insufficient infrastructure.

Though hydropower projects are capital intensive and the government is unable to arrange adequate financial resources to finance such projects, investment of private sector is essential Indian interest for power trade between Nepal and India is very crucial for Nepal to be able to capture the benefit from the Indian power crisis. He comes to the conclusion that procedural communication should be simplified by the government. Government has to pay role to create favourable environment for investment by the private sector rather than regulatory and investing role.

Pandey (2008) has tried to find out the sustainable rural electrification with the co-operation of local people. The study emphasized the dissatisfaction of consumer due to unable of meeting community-growing demand, so demand driven rural electrification with new technology envisages for reduction of operational cost of NEA through managing people with development of entrepreneurship in rural area to build up better product and quality of electricity services offered in win-win situation to the public and utility both.

The program has enriched the adaptive capacity of local communities in rural areas to cope with the Negative impact of environment change and helps communities meet their basic need for energy services and preparing the ground for the achievement of millennium development goal. This program is not limited up to wheat and paddy irrigation but also people have their kitchen garden. Half or one horse power single phase motors and their hand pumps are taped and using ground water commonly in kitchen garden. Thus, this program has also generated local employment in the villages.

Local pastures and farm lands have been reforested with native spices and fruit trees. Farmers are selling green vegetable to urban areas rather then bring in their own home town etc. The study found the most positive thing was that forest user groups which are regarded as most successful modality in Nepal have now joining this program

expending their income in rural electrification which has helped not only in curbing the illegal export of forest product but has also encouraged conserving local forest. Thus there are reduced firewood users and increased tree planting that reduces CO₂ emissions and carbon sinks in environments. Many schemes in developing countries fail due to lack of entrepreneurship and opportunity for creation of down/up streams integration and market, so this scheme has created entrepreneurship, marketing innovation and social responsibility with equality to develop other products based on electricity. The main gist of scheme is when communities and consumers become stakeholders of the electricity which they use then those distribution and supply systems provide better services and deliver better return on investment to the institutions and nation.

Kandel (2006), has examined the importance of electricity it is known as white gold of country, renewable, multi purposeful, no raw materials cost and from environmental prospective too. Hydropower development in Nepal has been facing different problems such as procedural complications, political instability, insufficient infrastructure etc. Most of the rivers are run off type, unnecessary condition imposed by multilateral and bilateral countries while providing financial assistance too.

The hydropower potential of Nepal is huge and the sustainable hydropower development becomes the key to make Nepal's economic growth scenario brighter, gaining deep inroads into the national goal and priority of poverty reduction. Water resource is the Nepal's greatest asset but unfortunately very insignificant portion has been harnessed to this data. He says that there is unequal distribution of electricity in different development regions.

Thapa and Pradhan (1995) say that hydropower is Nepal's major resources endowment. Numerous attractive run-off river and multipurpose hydro schemes have been identified but remain underdeveloped. They explain the strategy of water resource development that saving in transportation cost environmental benefits, foreign exchange earnings from large power project, agricultural, industrial products and other modern manufacturing output to be stimulated by power supply. Small and micro hydro potential remain virtually used in the hilly and mountain area, despite. Nepal's small size only about 10.5 percent of the total population has had the access of

electricity (whereas about 40 percent of domestic connection is concentrated in the Kathmandu valley).

The installed capacity of hydropower station developed until now worked out less than one percent of potential identified up to that date. Nepal's energy scenario reflects an imbalance between energy constipation that energy resources endowment development of water resources is essential in order to meet human needs like increasing agricultural and industrial production, meeting energy needs and earning foreign exchange from power export. They have pointed out that high investment requirement for the development of hydropower and lack of financial resources to the major constraints at present.

Sharma (2003), "Economics of Nepal" is another important publication. This publication includes overall macroeconomic aspects and their scenes of Nepalese economy he explains about utilization of water sources and its role in economic development. He mention about hydropower potentiality. He explains the development of hydropower project in Nepal. Pharping (500 KW) be the first installed hydropower project in 1911 in the history of hydropower development of Nepal. Total generated capacity was 2077 MW before the initiation of economic plan (1956). Sixth plan brought out new vision in the development of small hydropower project. He mentions the installed of all scale projects up to that date. Similarly is brought out new policy to develop water resources and hydropower as well. Consequently, private sector has been encouragingly investing in the development of hydropower, it has mentioned region wise distribute, sector wise consumption of electric power within the Nepal. These was 62.6 percent (which is in top position) of total generated capacity in CDR installed until the date of 2001. Similarly WDR, MWDR, EDR and FWDR occupied 30.3 percent, 3.0 percent and 0.5 percent of the total generated capacity development respectively up to the same time.

It seems that most of the total capacity is used by household sector than commercial sector, which are 95.6 percent and 2.3 percent respectively. He points out some problems related to the hydropower for sustainable development Hydropower he suggested to solve the debate between Nepal and India to make and implement appropriate policies about water resources to reduce cost, leakages, integrated approaches national commitment. In short it requires suitable policy and programs to

develop small and middle scale project to meet national demand for electric power and it can equitable alternative measure to reduce power imported from India.

2.3 Research Gap

The literatures above shows hydro energy and hydropower project able to uplift the economic condition of a country and able to change the social welfare condition of a society aptly. The review to available literatures at the Nepalese context as well as the international context shows that studies about the socio-economic impact of hydropower project in the mountainous and backward rural regions is still facing problems. Therefore, the present study aims to examine the socio-economic impact of Nalsing Gad hydropower project in Khagankot VDC of Jajarkot District as well as measures to economic potentialities in the project area.

CHAPTER-III

RESEARCH METHODOLOGY

3.1 Rational and Site Selection

Nalsing Gad Hydropower Project is one of the development project settled in the western part of Nepal and this study focused on the Socio-Economic impact of the project affected areas of the Jajarkot district. Where the construction site is mainly in Khagenkot, VDC. The Dalli and Kada Dalli, are the areas from where people are displaced from.

Disputes between locals and authority of hydropower are seen every day and written in news paper Kantipur, Nagarik and Annapurna published from Kathmandu. Most of the dispute/conflict are located to hydro power project like. Khimti, Marsyangdi, Kulekhani,3, Seti, Arun, 3, upper Karnali, Buddigandaki, etc. like other hydropower, Nalsing Gad hydropower projects have had a history of socio-economic impact of local people.

3.2 Research Design

This study has adopted exploratory research design which explores the nature, exploratory research design describes socio-economic impact of people it is useful for this study get the data like qualitative data. Other method of methodology techniques used for research data collection, key information interview, household survey, focus group discussion field visit maps and observation.

3.3 Nature and Sources of Data

Data collection is important part of research work. Qualitative and quantitative data used to analyze the related subject that is success to achieve the objectives of this study from both of this data we can get social and economic variable.

In this research both primary and secondary nature of data are used. The sources of primary data were interview, key informant interview and observation. The sources of secondary data were different publication of Districts Development committee (DDC)

national survey(census) and national as well as international journal related to social science.

3.4 Universe and Sampling

Research site was selected purposively. The sampling within site was done by random sampling for the present data were collected from Nalsing Gad hydropower project areas of Jajarkot district. There are total of six VDCS, which are affected by the project. It was not possible to take the data of all the VDCS. So only Khagankot VDC was selected for the site, which is also a large area. So it is taken only two of the wards for the data collection. The ward no 1 Dalli and ward no. 2 Kada Dalli are the sites of my research. These sites are selected purposively because, these are the most affected wards, are joined with the project Powerhouse and people are affected by the project. The data are collected from some of the 183 household and where the population is 1022 selected randomly. Therefore, sampling method is applied for collections of the require data in this study.

3.5 Tools and Techniques of Data Collection

The study is based on primary as well as secondary data. Both quantitative and qualitative data were used in this study. Information were collected through interview, observation of household survey, at the time of field work more emphasis was given to collect accurate data based on the ground reality of respondent as far as possible.

3.5.1 Interviews

Interviews were conducted with the knowledgeable person of the communities and the officials of the line agencies, representative s of CBOs/NGOs, former VDCs chairman, ward members, local leaders VDC secretary, social workers, teachers, women, students etc. PRA and RRA techniques in general include participatory methods to obtain information from the beneficiaries of proposed project area. PRA/RRA was conducted in each cluster of the affected area after researcher with Nalsing Gad sarokar samiti. Household interviews / Census Surveys was carried out for collecting the quantitative as well as qualitative household level information relating to demography and socio-economic status such as occupation, land holding pattern , income source , and average monthly income etc.

3.5.2 Observation

This method was used to verify the collected information and to identify the exact situation of the project area during household area level interview and through walk – on-survey method.

3.5.3 Field Observation

I met household owner and representative physically in their premises and face to face the information on houses sanitation condition, drinking water, latrine, food hygiene and personal hygiene, cleanliness of each household. I observed the affected area of the project like Khagenkot, VDC village which are located at the bank of Nalsing Gad River. I met local people in tea shops and Dalli Bazar . I got some general information from them about social network of this area. I met peoples who were directly involved in socio-economic impact and land, poverty. Some of them are the party representative at the local level and Ex-VDC chairman too.

3.5.4 Key Informant Interview

The interviews were conducted with the knowledgeable person of the communities and the officials of line agencies, representative CBOs, NGOs, former VDCs chairman, ward member local leaders VDCs secretary. Social workers teachers, woman, student etc. key informant interviews were conducted at homes and also where they was appropriate to talk. Interviews with the key informants were based on checklist; which was focused on research objectives and also asked some relevant issues that occurred in the interviews. It is one of the most appropriate techniques because the project area is wide and geographically large and having huge demographic picture.

I took interviews with 38 persons. They were 18 beneficiaries from different villages which I have selected as my study area, 5 political leader and local politician, 5 official personnel, 4 NGOs leader and stakeholder, 6 Ex-VDC chairmans from the project affected area. I had taken the interview some of them, were one times and some of them were taken double. Each of them, I have taken interviews few hours in one time. Through interviews I got the information about the project, impacts of the project, why people's property and land is replaced and how the socio-economic condition is. Their individual experiences and practices help to understand the interrelationship between project and the people.

CHAPTER-IV

THE SOCIO - ECONOMIC IMPACT ON KHAGENKOT VDC

4.1 Socio-Economic Status of the Study Area

This chapter provides general information of Jajarkot district and khagenkot VDC. This includes socio-economic condition, livelihood pattern and change adjoining area after NHP and available facilities.

4.2 Jajarkot District

Jajarkot district is the most remote and least developed upper hill district of the Bheri Zone. Its elevation ranges from 1,524 to 7,337 meters above sea level. The total area of the district is 2,230km², of which 290k m² is arable land. Jajarkot borders Rukum and Dolpa on the east, Surkhet and Dailekh on the west, Jumla and Kalikot on the north and Salyan and Surkhet on the south. Administratively, the district is divided into 30 Village Development Committees (VDCs), 11 Ilakas and two electoral constituencies.

According to 2011 census, the population of this district is 171,304(including male 85,537 and female 85,767). The average household size is 5.62 and average population density is 290 km² within the total 30,468 households. Khalanga is the District Headquarters (DHQ), located at elevation 2,945m. Accessibility to the DHQ and the VDCs of Jajarkot district is heavily dependent on road conditions, monsoon and landslides. Khalanga is connected to Surkhet district by the Chhinchhu-Jajarkot road, a 63km section of which (Sallibazaar to Jajarkot) is regular moterable bridges. A section of the Chhinchhu-Jajarkot-Dolpa road (107km including three motorable bridges) is under construction. None of the VDCs have roads; instead, 37km of mule tracks and trails connect the VDCs to DHQ. People in remote VDCs need to walk for three to four days to reach DHQ. Mules and sheep are used to transport goods. The district has 59 wooden bridges, many in poor condition, 41 suspension bridges and four truss bridges.³ Jajarkot district does not have an airport. The nearest air transport

options (four hours' walk from Kalanga) are irregular weekly flights from Chaurjahari airport in Rukum district, but these are often cancelled due to weather conditions.

According to the Nepal human development report 2014, Jajarkot is ranked at 71 in term of overall composite development index and world Human development index of Jajarkot 0.342 and of Nepal 0.478. It shows that this district is backward than the other minority district of Nepal. Some human development index indicators are presented as follow. Nalsing Gad Hydropower project is one of the national level and attractive project as well as top one Dam development of the symbol of development infrastructure.

Table 1: Human Development Index

Indicators	Jajarkot	Nepal
Life expectancy at birth	62.36	60.98
Adult literacy	34.6	48.6
Mean year of schooling	1.89	2.75
GDP per capita	543	1310
Life expectancy	0.532	0.600
Educational attainment index	0.234	0.385
Income index	0.278	0.385
Human development index (HDI)	0.393	0.471
Ratio of national HDI		100

Source: Nepal human development (UNDP) Report 2015

4.3 Nalsing Gad Hydropower Project and Socio Economic Impact

Nalsing Gad is a tributary of the Bheri River in the Karnali Basin. The project site is located between longitude 82 1400E -82-19 12 E and latitude 28 47 28 N"-28 58 "N. the dam, waterway and upstream and downstream stresses upon 6 VDCs are including as project area. The power-houses is located at just downstream of the confluence of the Udheri khola which is the approximately 9.25km upstream from the confluence of the Nalsing Gad and Bheri-River and powerhouse was identified at the right bank Bheri-River at Dalli gau. Due to the adverse geological condition, the located is shifted to that left bank of Nalsing Gad River. Altitude ranges 625 at the confluence

of the Nalsing Gad and Bheri-River confluence of the Udheri khola and Nalsing Gad and 3420m at the hill top north of dalli.

4.4. General Background of the Project Area

Nalsing Gad Hydropower Developing Committee is one of the established by Government of Nepal on (1st October,2012) for development of Nalsing Gad Hydropower project of 410 MW Capacity in Jajarkot district in

Nalsing Gad (River) a tributary of the Bheri River of Karnali Basin.

Nalsing Gad storage project was identified as one of the potential storage hydropower projects in 1999-2001 during study of "Identification and Feasibility Study Storage Project" (IFSSP). Among 93 potential storage projects, Nalsing Gad storage project was one of the attractive projects and ranked in first priority. The implementation of this project in Nepal is expected to fulfill the increasing demand of peak power in the Integrate National Power System (INPS). The Nalsing Gad storage project is also called as Nalsing Gad storage project in some of the reports. The feasibility study of the project was completed in July, 2012 by Project Development Department, Engineering service of Nepal Electricity Authority. NHPDC is in process to develop Nalsing Gad Hydropower project. At present, the NHPDC has initiated the process to Update of Feasibility study and conduct Detail Engineering Survey and Design and Environmental Impact Assessment study of the NHP.

The hydropower development in any country involves acquisition of large quantity of land and displacement of many affected families. As NHPDC is storage project, large quantities of lands are to be acquired for the project development. In this context, the NHPDC intends conduct survey to identify land area required for project development and make inventory of land and property that are to be acquired for development of project. In addition, the NHPDC also intends to conduct socio- economic baseline survey of the families whose land will be acquired by the project and that will be directly affected by the project. It is expected that this survey will provide a basic data for acquisition of land and baseline socio- economic condition of the direct project affected families.

Project Location

The project is located in Jajarkot District in the mid western development region of Nepal. The dam site of the project is located just downstream of the confluence of the Udheri Khola which is approximately 9.25km upstream from the confluence of the Narsing Gad and Bheri-River and powerhouse was identified at the right



bank Bheri-River at Dalli gau. Due to the adverse geological condition, the location is shifted to that left bank of Narsing Gad River upstream of confluence of Bheri River and Narsing Gad.

Altitude ranges 625m at the confluence of the Narsing Gad and Bheri-River, 1415 at the confluence of the Udheri Khola and Narsing Gad and 3420m at the hill top north of Kadadali.



Fig; above one, map of Nepal showing Jajarkot district and the lower one showing site of the project area.

Table 2 : Population Distributions of the Total People and Affected Areas/VDCs

S.N.	Name of affected Area/VDCs	Households no.	Total Population
1	Khagenkot	183	1022
2	Laha	5	39
3	Navakawada	234	1604
4	Ramidada	159	913
5	Rokayagau	109	734
6	Sakala	798	4754
Total		1488	9066

Source: Socio-Economic Baseline survey 2011

This table explains the distribution of the whole figure of the project area. But, my research is limited in the Khagankot VDC and specially ward no. 1 and 2. which are explained as the following topics.

Table 3 : Sex Composition of the Respondents by wards.

Ward No.	Total Respondents	Male	Male %	Female	Female %	Total %
1.Dalli	27	17	32%	10	20%	52%
2. Kada Dalli	25	15	29%	10	19%	48%
Total	52	32	61%	20	39%	100%

Source: Field Survey, 2016

According to the above table the total numbers of respondents are divided into two parts of male and female. Male population is nearly 60% and female respondents are nearly 40%. In the ward number one the female respondents are 19.2% and male respondents are nearly 32%. In ward number two the male respondents are 29% and female respondents are 19.2%. The samples are taken randomly by the random sampling method. These respondents are chosen according to the availability of the people in the sampling time. In the Dalli the total of 52% respondents are taken and in the Kada Dalli the 48% of the respondents are taken. These two wards are selected the site that are very near and adjoining to the project area.

4.5 Caste, Ethnicity Based Respondent in Project Area

The different numbers of respondents are classified according to the caste and ethnicity. They are classified as their division in the normal familiar casts. Different people like as Magar and Gurung are included in the janajati. Specially Gharti Magars are dominant in this area. Dalits are specially of the Kami, Damai, Sarki, Nepali are the main dalits of the area.

Table 4 : Caste and Ethnicity of the Respondents

Caste, Ethnicity	No. of Respondents	Total Percentage
Bharaman	10	19%
Chhetri	23	45%
Janajati(Magar)	7	13%
Dalit	12	23%
Total	52	100%

Source: Field Survey, 2016

The table explains the caste and ethnicity of the respondents. The Brahmans population is nearly 19.2%. The respondents of the chhetri is 45% and janajati (indigenous people) are nearly 13.6%, the dalit respondents are 23%. These respondents are selected according to the respondents in the available area as well as the population size in that area respectively. The affected area is highly dominated by the Bharamans and Chhetries. The population of the janajati and the dalits is in large fraction as the higher caste. While taking the samples their proper population is nearly balanced with respect to the total population size.

4.6 Population Distribution of the Study Area by Religion

Nepalese people are categorized into different caste and ethnic groups. The Census of 2011 identified 125 different castes and ethnic groups in Nepal. Caste system is fundamentally based on Hindu religion where as a vertical relationship among the caste exists. Bramhan and Chhhetri are in the apex, whereas *Janajati* and *Dalit* groups are at the bottom of the social class.

Table 5 : Religion-wise Distribution

Religion	No of Respondents	Percentage
Hindus	44	84%
Buddhist	5	10%
Christians	3	6%
Total	52	100%

Source: Field Survey, 2016

84% of the population are Hindus, nearly 10% are Buddhist and the remaining 6% are Christians. The fraction of the Hindus is large in comparison of the other groups. Other religious groups are in minority.

4.7 Occupation of Households

Agriculture is predominant occupation in project area followed by livestock farming, poultry, alcohol fermentation weaving clothes and sacks from the wild nettle plant, and weaving various bamboo products, such as wooden threshers.

Non-agricultural economic activity in affected VDC that 31% of households are not engaged in such activities and distribution of households engaged in various types of activities. According to available data, out of the economically active population 48.08% are involved in agricultural sector, 30.77% are in service, 9.62% are in self owned business, 7.69% are in foreign employment and 3.84% other occupation (Table 4.3)

Table 6: Occupational Distribution of Respondents

Occupation	No. of Respondents	Percentage
Agriculture	25	48.08%
Service	16	30.77%
Self owned business	5	9.62%
Foreign employment	4	7.69%
Others	2	3.84%
Total	52	100%

Source: Field Survey, 2016

Basically who have the farm land in low land are mostly affected by de watering after the diversion of water for power generation from Nalsing Gad to Sepukhola. People are aware on land acquisition, those HH who lost their residence and land were worried for further resettlement and compensation of lost properties. The farmers were mostly affected and they lost agriculture production as well as those who mostly dependent on the farm wage labor, they have been lost their wage and have migrated as wage labor for their livelihood on seasonal basis. The means of transportation is Khachda for material and Horse for human Hence. Dalits also lost their traditional occupation, because they were dependent with other caste. When the occupation the people changed and they searched for new opportunity and after rural electrification expended they started using electronic machine so these transplanted materials that were made through traditional occupation as such they left their old occupation and migrated for search of new opportunities. All caste and ethnic groups were affected by this project. This areas local people started that “after this hydro project and electricity access, pottery industries and markets were opened, people were used these pottery market then the Taule (coppersmith) were lost skill and occupation. Traditional pottery was displaced by factory”. The traditional elite powerbase also shifted, before the project most of the people depended on agriculture production and domestic wage labor, and they also depended the land lord. After this project agriculture production decreased due to dewatering and land acquisition. Those domestic labors want out of village for new opportunity and some of them got good jobs and their living standards also became high. Their sons and daughters got higher education, and then they were free from the local elite and were able to raise their status in the society. So this affects the caste, ethnics and class groups positively and negatively.

4.8 Public Service and Main Facilities

According to the respondent and my field observation some of the public and the main facility of the project area have been taught as follows. A blacktopped chhinchu-jajarkot highway (was the access road now it is the main high way of the two district of jajarkot and Dolpa) connects the project main facilities (near power house site). The jajarkot-khagenkot rural road 35km, connected the downstream area of the khagenkot Dalli was recently built but it is not wide and good condition and sharp turning make danger the travel of villagers. This rural road connects the Chhinchu-

Jajarkot-Dolpa highway and through this highway connects with the district headquarter. In the downstream area, there is no good facility of hospital expected health post and small private clinics. There are some government schools, boarding schools and also public higher secondary school. One of the locals state “after the project jajarkot got the opportunity to development and it is the main force of development still today. The project has developed the following facilities in the adjoining area.

Table 7 : Infrastructure Developed in the Research Site by the Project to the Local People

Gravel road	10 km
Funds to primary schools	15 lakha
Infrastructure for prevention of soil erosion	19 lakha
Funds for higher sec. School [Nalsingh Gad H.S.]	30 lakha
Health and sanitation	35 toilets[24 lakha]
Drinking water	35 tapes
Irrigation	17 lakha

Source: Field Survey, 2016

Project development has constructed so many sites of road as well as other structures that has direct impact on the daily lively wood of the people. People are getting the chance of road as well as the education aid and health's and sanitation programme. There was no sufficient drinking water in the previous time but now they have been able to get the pure drinking water. This area has been suffered by the seasonal disease many times as well as the communicable disease. The sanitation programme has established the toilets for the locals in both of the wards. Those respondents who has not planned to go out of the village are getting the sanitation as well as drinking water facilities.

Project has helped the people to empower their knowledge as well as the health and education level. People are getting the habbit of discussing in the groups and make theis own decisions. The project has supported the primary as well as secondary school for the construction of the building as well as the surrounding wall of the

school. So social organization are getting the aids from the projects. 10 km of the road has been graveled by the project. So , people are getting the chance to travel as well as the exchange local goods to the nearest market and to by the goods in easy and accessibly.

Table 8 : Respondents and Getting Compensation Amount

No. of Respondent	Evaluated Compensation	Compensation received
12	Less than 2	Nearly 50%
24	{2-5}lakh	50%
16	More than 5 lakh	50%

Source: Field Survey, 2016

This table explains the compensation of the land that has paid by project to the affected site. The project paid the compensation of the locals according to the evaluation of their lands. Project is built in the land of both public as well as the private land. The value of the private land is bought by the project from the local residents. All the respondents have got nearly 50% of the compensation. So we can conclude that most of the people in the project area have got the 50% of the compensation and that is provided in the different instalments. The remaining instalment is remained to pay.

The project has established its power generation in the land owned by the people of the ward number 1 and 2. The project power house is situated in the area where my sample site is located. In this area people are getting the compensation according their wish so there is no any objection with the project.

Table 9 : Use of the Compensation Money by the Respondents.

Title of expenditure	No. of Respondents	% of Respondents
Land bought [especially in Kathmandu, Surkhet and Nepalgunj Khalanga ,Churjari]	22	42%
House construction	18	34%
Daily commodities	4	8%
Education	5	10% %
Business	3	6%
Total	52	100%

Source: Field Survey, 2016

The table above explains the money got by the people is used in the different titles. People who got the money, most of them utilized it for buying and house construction. 42% of the respondents has spent the money in the land buying. Because, their previous land is used in the project construction. And, rest of the respondents have used money for the construction of the new house.

34% of the people has used it for the construction purpose. Those whose house has lost in the project construction should be made in the new place, so people has spent their money for this purpose. 7% of the people have used money for the higher education to their children to Surkhet, Nepalgunj and Kathmandu Khalanga Churajari. Rest of the people have spent in the new business. But, some of the people has wasted their money for buying the daily commodities.

So the project has changed the social as well as the economic life of the people. They have got the chance to resettle in the new area those whose house is totally destroyed. And others, whose house is in the next villages, land is in the project area, they used money for buying the new land in the city areas as well as the facilities like education of the children and health services.

Table 10 : Monthly Income Generation of the Respondents Before the Project Development

Income Group	No. of Respondents	Percentage
Less than 3000	28	54%
3000-6000	12	23%
6000-10000	8	15%
More than 10000	4	8%
Total	52	100%

Source: Field Survey, 2016

The table above explains the different group of people having the income sources that they ear per month. Most of the people were involving in the agriculture before the project development. 54% of the people had the income that is less than 3000. And, 23% of the people are generating income that is 3000-6000. Remaining 8% are generating more than 6000 but less than 10000. Only small fraction of the respondents are generating more thab 10,000 of the money. This group is only 8%. The government job holder and the loal business owner could generate the money more than 10,000 monthly.

Table 11 : Monthly Income Generation of the Respondents After the Project Development

Income Group	No. of Respondents	Percentage
Less than 3000	10	19%
3000-6000	8	15%
6000-10000	18	35%
More than 10000	16	30%
Total	52	100%

Source: Field Survey, 2016

After the project development, the income generation of the respondents has increased. Before the project development most of the people used to depend on the agriculture and other households activities. But, after the project development people got the chance to work in the local project. Some of the local business owner got the

local business much more beneficial and got profit. Farmers were able to sell the goods to the project staffs and got the total revenue to increase. According the above table the minimum getting money drastically reduced. The percentage of people getting only 3000 was 50% but now it reduced to 19%. The medium income holder are increased. 15% got the income 3000-6000. And, 35% are getting nearly 10,000. This is possible due to the job by sages created by the project for the people of the adjoining area. The number of people getting more than 10,000 had also increased. That was possible due to the governmental job as well as jobs created by the project and local business owners. As a whole project establishment has created the positive economical environment to the local people.

Table 12 : Changes in the House structure of the Respondents after the Project Development

House structure of the respondents	Before the project	After the project	Percentage change
Kachhi	22	16	38% decrease
Ardha Pakki	26	20	34% decrease
Pakki	4	16	300% increase
Total	52	52	

Source: Field Survey, 2016

The table above shows that how the house structure change after the project development. After the project development the respondents has got the money for the compensation and were able to build the new house. The percentages of the kachhi ghar had been drastically reduced and the number of the pakki house were increased. The change in percentage of the pakki house were 38% reducing but pakki house were increased by 300%.

4.9 Women's Participation and Gender Balance

The society is primarily patriarchal. All household level decisions and property right goes to the male line. Decision making process has been rooted to the property rights. Property (land, valuables and cash) is controlled by males, because the daughter may go away marrying with somebody else.

One of the major focus areas of the field survey was to explore the extent of women participation / gender roles in different activities and also to understand their status in the community from different perspectives. Apart from household level interviews and informal meetings, a number of formal focus group discussions (FGDs) were organized at cluster levels with exclusive women groups as well as with mixed groups to explore and understand the status of women's participation / gender's role in the community in different activities.

At least one focus group meeting was organized in each major cluster. However, considering the number of households and cluster coverage, more than one meeting was also organized as necessary. On average, 10 women participated in each focus group discussion sessions.

The following are the major areas explored for the analysis of women's status in the community.

4.10 Women's Physical Presence in Project Activities

Regarding the level of awareness and physical presence of women in the proposed project, it was observed that very few women had heard about the project and involved during the preliminary meetings held to discuss on project activities (project identification / feasibility). However, no specific efforts or focus was given by any authorities or organizations towards increasing the women's participation during such meetings. Moreover, no separate meeting of women was organized for this purpose.

Reportedly, majorities of the women had heard about the project only after the mobilization of the staffs (Motivators / Enumerators) by resecher for the execution of census household survey However, majorities of them were also not aware regarding any such meetings organized in the community to discuss on the project issues related to the affected people.

4.11 Women's Participation in Decision Making

As obvious to other districts of Nepal, women have very subordinate position the society of present project area. Decision making process in the community plays an important role in family economy. The major decisions like economic control,

allocation of family property, selection of school for children, purchase and sale of property, marriage settlement of the children, visiting relatives etc are usually made by male and some of them may take wife's consent also, but if the wife has opposite decision, it may or may not be entertained. Other activities like farm decisions such as, manuring land, collecting fodder/grass, firewood, drinking water, weeding and harvesting crops are the tasks of female but majorly, the date and schedule are fixed by male. Therefore, economic headman ship dominates every aspect of farm- family decisions. Activities are given to the female but males make decisions. But in present days female participation in decision-making is accepted to some extent due to direct impact of change in the national scenario and modernization. Similarly, the involvements of women in decision-making roles at their homes have been found very much correlated with the ethnic/caste groups and education level. Overwhelmingly, majority of women reported their involvement in the household decision-making. However, their decision-making role was mostly confined to day-to-day household activities and limited in areas of economic decisions. Table shows the major involvement of women in the community.

4.12 Gender Division of Labour

As per the traditional roles, majorities of the women during household survey 76 % reported to be involved in household chores. Similarly, by occupation the involvement of women in agricultural work is found significant 92.7%. Obviously, as in other parts of the country, women are found performing the key role in fetching water. However, gender division of labor differs from one family to another family. Hence, socio-cultural and economic factor determines the gender discrimination. The women of the studied area are also mainly responsible in maintaining household / domestic sanitation.

4.13 Existing Status of Women in the Community

As reported by the women and also observed/cross-verified from other indicator (e.g. education level, proximity to market, in terms of ethnicity and caste etc) the existing status of women in the community is gradually changing with the pace of urbanization and proportion of educational attainment in the project area.

The opportunity/access of women for education is found encouraging. The involvement of women in operating trade / business activities in local market centers is also found significant. Moreover, the number of women reported in service is also remarkable in comparison to before.

During FGD and household survey, majority of the women participants expressed the status of self – respect. They also expressed their confidence in holding responsible positions to carry out the community development projects and in performing any challenging assignments compared to their male counterpart.

In general, findings of household survey represent that role of women in different activities is changing, women has not full authority to decide below activities however, women are informed and respect their views in all these variables. Which justify the comparatively satisfactory status of women in the project area.

Table 13 : Changes in the Educational status by the Development of Project

Respondents whose childrens studying in different educational fields	No. of Respondents	percentage
Technical education	12	23%
Management	8	15%
Education and arts	20	38%
Not involving in education	12	23%
Total	52	100%

Source: Field Survey, 2016

According to the above table the respondents are asked that how their children are involving in the different educational fields. After the project establishment most of the people are affording the education to their children in the cities like Kathmandu and Surkhet. The number of respondents they are getting the awareness to educate their child has sent to study in the sophisticated area has increased. In the technical field most of the students are sent to Kathmandu for the courses like as Health Assistant, Overseer, and Nursing. So, 23% of the respondents have sent their children towards technical field. And, remaining 15% of the respondents had sent their children in the management field. Most of the highest numbers of respondents were

involving in education and arts. 38% of the respondents are in this field. But, remaining of the of the respondents are not involving in any of the fields.

Table 14 : Changes Caused by the Project in the Field of Information and Technology

Types of communication means	Number of respondents	Percentage
Dish home TV	18	34%
Internet excess	11	21%
Not access any means	23	45%
Total	52	100%

Source: Field Survey, 2016

According to the table above, by the development of the project, the project area has changed so many infrastructures in the area of the communication and the technology. People had hired the dish home, a type of wireless television channel, to entertain the basic information channel. By the project the number of people getting dish home is increasing. So the respondents having dish home is 34% and having internet excess 21%, and not having the any access is 45%. Before the development of the project the number of people having such access was very less.

4.14 Health and Sanitation

The respondent households from the project area seem well aware of the causes of water borne and communicable diseases. Community member expressed their views that the main cause of water borne disease is unsafe and contaminated water and unsafe use of contaminated food. Also they feel due to poor sanitary conditions of the houses and public places communicable infection spreads. As per discussion Diarrhea, Typhoid, TB, High fever, Skin disease, Water born disease etc are the main disease seems in their community frequently.

Regarding the disease treatment when they fill ill, first they treat self at home. Secondly people go to priest or traditional healer thirdly goes to medical store and health post or hospitals.

Table 15 : Respondents Getting the Health and Sanitation

Types of facilities for sanitation	No of Respondents	Percentage
Tape build up	32	61%
Pipe distribution for water tape	16	30%
Health access to disable person	4	9%
Total	52	100%

Source: Field Survey, 2016

The table above shows that by the development of project paid the compensation to the local people and they got the different accommodations facilities. Project had also built the tapes and sanitation facilities. 61% of the households had got the tapes for the private uses. 16% of the respondents had got the pipe tape build up materials. And some of the respondents had got the wheel chair and other facilities for the daily uses. So, the disabled person are also getting benefits from the project. 9% of the such respondents are such disable person.

Table 16 : Income Generation and the Employment Created by the Project

Types of Jobs	No of Respondents	Percentage
Forman	3	6%
Office assistant	2	4%
Driver	4	9%
Own business in project site	2	4%
In the precious profession	37	77%
Total	52	100%

Source: Field Survey, 2016

Project development has created so many opportunities to the local people. Among them the some of the people are getting the jobs like as office assistant. 4% of the respondents are getting the jobs of this types. Drivers are 9% and some of the other people are getting their own business in the project site as the small restaurant and tea shop. Such population is nearly 4%. But, most of the remaining respondents are involving in their previous jobs.77% of the people are in the field their same previous profession.

CHAPTER-V

SUMMARY AND CONCLUSIONS

5.1 Summary

From the above facts, the results in the above tables and chapter 4 shows.

Socio-economic changes are occurred as the establishment of the Nalsing Gad hydropower in the Jajarkot district. Mainly the people of this region are getting the opportunity to be involved in the local business as well as the jobs of hard labor of lower class. But the most of the jobs in the project are hired from out of the district due to lack of qualities in the local people as the area of engineering as well as project management. All the human indexes are very lower in the comparison of the national human development indexes so this area is lacking so many basic quality of human life. Non-agricultural economic activity in affected VDC that 31% of households are not engaged in such activities and distribution of households engaged in various types of activities. According to available data, out of the economically active population 48.08% are involved in agricultural sector, 30.77% are in service, 9.62% are in self owned business, 7.69% are in foreign employment and 3.84% other occupation

The respondents are taken most of the youth. This study shows that the exposure in the youth is increased by the project. Women are participating in the project jobs as well. So the project has created the opportunity to people as well. The local population is mostly Hinduism. Other religious groups are in the ratio of negligible to the comparison of the Hindu. 84% of the population are Hindus, nearly 10% are Buddhist and the remaining 6% are Cristians. The faction of the Hindus is large in comparision of the other gropus. Other religious groups are in miniroty.

Male population is nearly 60% and female respondents are nearly 40%. In the ward number one the female respondents are 19.2% and male respondents are nearly 32%. In ward number two the male respondents are 29% and female respondents are 19.2%

Before the project establishment, the occupation of the most people was agriculture but, now it is believed that the load on the agriculture is reduced by the local jobs in the project as well as the self owned jobs business in the local level. It is seen that

nearly 90% of the jobs is created by agriculture. However, it is not the ever got job, it is quite seasonal so people are getting free all the time.

It is found by the drastically change in the income generation of the people. 54% of the people had the income that is less than 3000. And, 23% of the people are generating income that is 3000-6000. Remaining 8% are generating more than 6000 but less than 10000. Only small fraction of the respondents are generating more than 10,000 of the money. This group is only 8%. The government job holder and the local business owner could generate the money more than 10,000 monthly.

The percentages of the kachhi ghar had been drastically reduced and the number of the pakki house were increased. The change in percentage of the pakki house were 38% reducing but pakki house were increased by 300%.

Most of the people are replaced in the area of urban places as Surkhet, Nepaljung, Kathmandu and Khalanga Churjari. They got the money who gave the land to the project placement. Some of them has settled in the local level in the district headquarter and other VDCs. 42% of the respondents had spent the money in the land buying. Because, their previous land is used in the project construction. And, rest of the respondents have used money for the construction of the new house. 34% of the people has used it for the construction purpose.. 7% of the people have used money for the higher education to their children to Surkhet, Nepalgunj and Kathmandu.

The project has increased the participation if the women in the decision making level. That is seen as the public participation of the projects work as well as in the household activities. Many people in the households are in the foreign country for the employment so the woman has the key role for the household activities.

Reportedly, majorities of the women had heard about the project only after the mobilization of the staffs (Motivators / Enumerators) by researcher for the execution of census household survey

By the project the number of people getting dish home is increasing. So the respondents having dish home is 34% and having internet excess 21%, and not having the any access is 45%. Before the development of the project the number of people having such access was very less.

Health Assistant, Overseer, and Nursing. So, 23% of the respondents have sent their children towards technical field. And, remaining 15% of the respondents had sent their children in the management field. Most of the highest numbers of respondents were involving in education and arts. 38% of the respondents are in this field. But, remaining of the of the respondents are not involving in any of the fields.

Project development has created so many opportunities to the local people. Among them the some of the people are getting the jobs like as office assistant. 4% of the respondents are getting the jobs of this types. Drivers are 9% and some of the other people are getting their own business in the project site as the small restaurant and tea shop. Such population is nearly 4%. But, most of the remaining respondents are involving in their previous jobs.77% of the people are in the field their same previous profession.

5.2 Conclusions

This study covers the impact of Nalsing Gad Hydroelectric project on educational and access on information technology of the people in Jajarkot district. As per objective, this study tries to access impact of hydro project on education and information as well as the income increment and the generation of the new jobs as well as the changes occurred in the adjoining area by the project development.

The respondent from the study area some sample has been selected. The questionnaire has designed to evaluate the impact of hydro project and hydroelectricity on covered the impact of the socio economic conditions, changes that can be seen by the use of project related opportunity, and benefits by the project to the life of people as health and education.

Similarly, the results also shown on improvement of employment status by the help of hydro power project. The project had developed so many infrastructure to the local people. The construction of the 10 km long road has changed the lifestyle of the people as a whole. As well, they are getting the chance to transport in daily as well as special occasional activities. The soil erosion programme is running to the local people's field. Equipments and special medicine as well as awareness to the local

people are provided by the projects. All the respondents had got the 50% amount of the compensation. Remaining 50% have to be provided.

The people whose house had been destroyed and they had no other land in the adjoining places had moved to the urban areas. 42% of the people had sifted to the urban areas. And, remaining 38% had spent their money as building the new house. Recently, people had got the new jobs opportunity, road and infrastructure facilities, facilities to the health and sanitation. As well they got the compensation amount that enabled them to afford in the new houses and bying land in urban area and affording the fees to children education and health facilities.

Project had created the jobs like as assistant for the office and drivers. The self owned business as the tea shop and the restaurants are opening in the project site. They are getting the chance to make the economic status viable and vibrant. Such of the self business are growing in the project area.

The project has changed the communication and technological advancement in the local areas. Peoples are getting the facilities of the wireless television and internet facilities. Such facilities are the main causes of the changes of the society as a whole.

Nalsing Gad hydroelectric project has an upbeat impact on enhancement of economic status and awareness on information technology of people live in jajarkot district of affected area. People will gain lighting facilities which helps to increase study more and which helps to decrease diseases by reduce indoor pollution. The acquirement and utilize of physical assets such as electric appliances will be increased access to information. The verdict of impact hydroelectric project has been accomplished in the following days. These will be listed in the long term impact of the project.

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QUESTIONNAIRE

1. Study of the Nalsing Gad Hydro-project of affected area.

1.1. Area

1.2. Name of the Locality

1.3. VDC/municipality

1.4. Ward no.....

2. Name of the householder.....

2.1. widow /Dependent

1) Yes 2) No

2.2. Householder Disable or able

1) Yes 2) No

2.3 Family detail

Serial no.	Name of respondents	Relationship with Household	Age	Gender	Occupation	Education
1.						
2.						
3.						

2.4. Type of family

1) Joint 2) Nuclear

2.5. Ethnicity

1) Brahaman 2) Chhetri
3) Janajati 4) Dalit

3. What are the main economic activities of affected area?

Serial no.	Economics Activities	1) yes	2)no
1.	Agriculture		
2.	Agriculture wages		
3.	Small business		
4.	Gov. Job		
5.	Business		
6.	Fishing		
7.	Daily Wages		

3.1. Land of the (Ropani)

Agriculture land	Non –Agriculture land	Total land

3.2. Monthly income

Serial no.	Source of income	Amount Rs.
1.	Agriculture	
2.	Govt. Services	
3.	Business	
4.	Daily wages	
5.	Professional jobs	
6.	Forigen Empolyment	
7.	Pension	
	Total	

4. Income sources of Affected area people

- 4.1. Have you even gone to outside for job?
 1. Yes
 2. No
- 4.2. If yes , How many time do you remain ?
- 4.3. Generally , Where do you go?
 1. Without district
 2. Within district
- 4.4. What type of job do you do ?
 1. Agriculture
 2. Professional
 3. Business
- 4.5. How much do you earn in a Month
- 4.6. In which season , do you go outside?
 1. Winter
 2. Summer
5. Detail's of compensation .
 - 5.1. Ownership of land .
 1. land owner
 2. Guthi
 3. Public
 - 5.2. Amount of land per Ropani.....
 1. market price
 2. Government price
 - 5.3. Have you been replaced by project?
 1. Yes
 2. No

- 5.4. If yes, where have you been moved?
- 1. Inside district
 - 2. Outside district
- 5.5 Has project paid the compensation ?
- 1. Yes
 - 2. No