

CHAPTER-I

INTRODUCTION

1.1 Background of Study

Nepal is a landlocked mountainous country, which is sandwiched between India and China; it is 1,127 km far from the nearest point of the sea. It occupies 0.3 percent and 0.03 percent area of Asia and the world respectively. Nepal is located in between the latitude of 26°22' N to 30°27' N and the longitude of 80° 4' E to 88°12' E. The country is approximately rectangular in shape and its average length from east to west is 885 km and the breath from north to South is 193 km.

Nepal is divided on the various bases such as ecologically (Mountain, Hill and Terai) river's basis (Kosi, Gandaki, and Karnali) administratively 5 development regions, 14 zones and seventy five districts, 3915 VDCs and 58 municipalities. Out of the total population 86.06 percent people live in rural areas, and 80.77 percent depend upon agriculture.

The landlocked position, rugged topography with limited arable land (17 percent of total land). Poor resource base and high extent of poverty are major economic vulnerabilities Nepali are facing economic problems these days. This makes it susceptible to increasing imports and foreign dependents, Nepal has immense stoke of endowed natural resources, unfortunately we are still poor and the least developed nations because of underutilization of the available resources. On one hand, Nepal's economic growth rate is low. On the other hand, Nepal's economic development is its initial stage. However, more or less, all sectors such as agriculture, industry, trade, and commerce and commutation are in their growing stage along with social services and tourism.

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.

Micro 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. Micro 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 micro hydropower plant must have a passage through wire network so network path is no hindering once for the fish migration.

In many rivers the 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 micro 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 micro 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 micro hydropower plants.

An investigation of gender and micro 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 micro hydro plant makes it possible to use overhead Projectors, Computers, TV, Video and Radio. Small 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 micro 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 problems are:

-) What is the impact of Micro- Hydro Electrification (MHE) on Education in the study area?
-) What are the impact of MHE on information technology and entrepreneurships in study area?
-) What are the impact of MHE on Health and sanitation in study area?

-) What are the impacts of MHE on income and employment generation in Deupur VDC of Prabat District?

1.3 Objectives of the Study

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

-) To examine the impact of Modikhola hydropower project on income and employment generation in Deupur VDC of Parbat district.
-) To examine the socio-economic impacts of hydropower projects in rural areas.
-) To explore the problems associated with the MHP and suggest solutions for the sustainable 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 MHP sectors but there is still lack of proper information and show documentation, which has analyzed the ground reality of socio-economic aspects of MHP. Hence this study has been rounded on the pivot of impact of micro hydro project on socio-economic aspect of the rural people. Outcomes of this study will help to access the impact of the MHP on education, health, information, and technology of the people Deupur VDC of Parbat district.

1.5 Limitation of the Study

This research was conducted to analysis the impact of micro hydro power project on education, health information technology and entrepreneurship of the people live in remote area of Nepal. This study is mainly for an academic purpose.

Some limitations are:

-) It is the case study of Modhikhola hydropower project on Deupur 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 about the analysis and interpretation of data and fifth chapter includes summary, conclusion and suggestion.

CHAPTER-II

LITERATURE REVIEW

Limited research has been conducted on socio-economic impacts of small 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), in his study “socio-economic impact of rural electrification: Lessons from central java” 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, 77percent of the electricity adopters with school children reported that electricity had caused in 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), have made a study on “Socio Economic Assessment of Pico Hydropower Installations in the Northern Region of Thailand.” This work 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), the article entitled “Jalavidyut: Aarthik Vikash ko Mul Aadhar” has published in Vidyut (2012). He has 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), in his study “Micro hydropower in Nepal: A case study of Bhorletar Micro Hydropower Plant” 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), in his study “Socio-Economic Impact of Chameliya Hydropower Project in the Adjoining Areas” 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), in his article ”Trends and Patterns of Energy Consumption in Nepal”, 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 (1995), "Sustainable Development of Small Hydropower in Nepal" 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), "Pattern of energy consumption and its impact on economic development of Nepal", 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. Drying crops grinding grains 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), "Jalsrotko Barema Sunnu-bujnu parne Kuraharu" is an important article, about water resources of Nepal. He 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), in her thesis "Hydroelectricity Development in Nepal and its contribution to Nepalese Economy," 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), in his thesis "Role of Hydro-electricity in Economic development" 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), in his thesis “Socio-economic Impact of Surma Devi Small Hydropower Project: A Case Study of Bajhang district” 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) has published his article "Hydropower Opportunities and Challenges" in Kathmandu Post, which 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 than 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 of 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 be 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 mentions 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 of hydropower he suggests 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.

2.1 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 Modhikhola hydropower project in Deupur VDC of Prapat District as well as measures to economic potentialities in the project area.

CHAPTER-III

METHODOLOGY

3.1 Introduction to Study Site

Modi Khola Hydroelectric project lies in the Modi Khola, a tributary of river Kaligandaki in the Gandaki basin. The site is located in the Pokhara-Baglung highway at Deupur Village Development Committee in Parbat District about 42 km. west of Pokhara.

In 1990, a group of engineers from Nepal Electricity authority observed the possibility of hydro power generation from the river. The matter was widely discussed in Nepal Electricity Authority and initiated for further investigations and study.

In 1992, Nepal Electricity Authority conducted the feasibility study of the project involving its own engineers and technicians. Then the project was promoted by the private sector for its development under the privatization policy of His Majesty's Government of Nepal. But it was returned to NEA for implementation in order to cope with the increasing electricity demand of the country.

The detailed engineering design of the project was completed in the year 1995 by M/S Hyundai Engineering Company of Republic of Korea, under the technical assistance from the Government of Republic of Korea through KOICA.

The construction of project was started from the year 1996 with the eco-financing of His Majesty's Government of Nepal Electricity Authority. The Government of Republic of Korea has provided a loan assistance to cover part of the technical support, electromechanical works and 132 kV transmission line constructions.

Modi Khola hydroelectric project is designed as a runoff river type power plant with an installed capacity of 14.8 MW. The project utilizes the potential of Modi Khola on a river section of 3 km, where the head of 69 m is available.

The electricity is generated from two generating machines consisting of vertical Francis type turbine and vertical shaft synchronous type generator. The power generated is partially distributed in the local vicinity and remaining is evacuated to the national electricity transmission grid through a 37 km long 132 kV transmission line connecting Modi power house to existing substation at Pokhara.

During the construction, the quality control materials and works were carried out in the field laboratory, laboratory at Pokhara and laboratory at factories itself well as by continuous field inspection by the consultants in association with Nepalese Engineers and Technicians.

3.2 Research Design

Research design is a plan of the study regarding how to find answers to the research questions. It serves as a framework for the study, guiding the collection and analysis of the data, the research instruments to be utilized, and the sampling plan to be followed. This study is mainly based upon qualitative data because it is a fact finding investigation with adequate interpretation in the context of social research. It is more specific than exploratory study as it aims to identify the various socio-economic characteristics of the community.

3.3 Nature of Data

This study is mostly based on primary data. The primary information has been collected from field survey. However, some secondary data have been used in this study from different sources such as survey reports, feasibility reports and journals etc.

3.4 Method of Data Collection

For this study data were collected through direct personal interview with help of structured questionnaire. For the collection of information about socio-economic impact of Modi Khola Hydropower project. The questionnaire was designed to assess the impact of micro hydro power project on education and information technology and health of rural people of Deupur VDC of Prabat district. The questionnaire consisted open-ended as well as closed ended questions.

3.5 Data Processing

Field questionnaire is carefully checked for possible errors. The data are carefully edited and processed by traditional method i.e. Tally bars, then the required tables are generated by using computer software program.

3.6 Data Analysis

Primary as well as secondary data has been used in this study. Since this study is a case study and data analysis has been focused particularly on the primary data, which were collected by using various methods of primary data collection, secondary as well as primary data have been presented in the table, pie chart, simple bar diagram, sub-divided or component bar diagram and multiple bar diagram have been used to analyze the primary as well as secondary data. Sub divided or component bar diagram and multiple bar diagram have been also used to analyze primary as well as secondary data in this study.

CHAPTER-IV

PRESENTATION AND ANALYSIS OF DATA

4.1 Socio-Economic Status of the Study Area

This chapter attempts to analyze the collected data and information for pursuing the objectives of the study and deriving the major finding of the study. It presents the brief introduction of Deupur VDC with demographic features. This chapter deals with the analysis of impact of the Modhikhola hydropower on health, education, income and information technology of this VDC. The impact of Modhikhola hydropower on education and information technology would be analyzed by comparing gradual changes on socio-economic condition of the Deupur by the access of electricity (Case) by comparing with before and after. The questionnaire and observation was analyzed in the descriptive form.

Socio-economic features of the study area depicts the development status of the village. The sociological and economic characteristics such as religion, education, employment, health and environmental situation have a significant influence in the economy of the village and living standard of the people. In the survey area, project affected household are 474, where only 52 sample household are taken to find the socioeconomic impact of MHP on household, role of MHP for sustainable changes in project affected area.

4.1 Household Information of the Project Affected Area

4.1.1 The Household's Participation by Affected Area

Small hydropower played the vital role for the electrification of the rural areas of Nepal. This Modhikhola MHP project-electrify covers total

wards of Deupur VDC area. The ward-wise distribution of respondents of this research has been shown in table 4.1. out of the total 52 respondents higher number of respondents (20) were taken from ward no. 8 where large number of Brahmin people are live there where least no. of respondents (10) were from ward no. 6 likewise, (11) respondents were taken from ward no. 7 and 9. Due to large number of consumer in ward no. 8 respondents were more than from another wards(Table 4.1).

4.1: Ward-wise Household Participation

Ward No.	Number of Households	Households Members
6	10	39
7	11	40
8	20	104
9	11	45
Total	52	228

Source: Field Survey, 2014.

4.1.2 Age Group of Respondents

The respondents are divided into four groups. The questionnaires were asked to the respondents aging above 15 years. Then it divided into four groups as 15-25, 26-40, 41-60 and 60 above. The figure 4.2 explains that the high portion 46.15% respondents are from 26-40 age group and 23.09 are from 41-60. Similarly from age group 15-25 and above 60 are 19.23%, 11.54 respectively (Table 4.2).

Table 4.2: Age Group of Respondents

Age Class	Respondents	Percentage
15-25	10	19.23
26-40	24	46.15
41-60	12	23.09
Above 60	6	11.53
Total	52	100

Source: Field Survey, 2014.

4.1.3 Gender of Respondents

Regarding gender there was a significance imbalance in the participation of respondents. The ratio of male and female is got nearly 50-50%. But participation respondents were fewer numbers for this research in the study area. There was only 40.38% were female and 59.62 % were male respondents. The gender wise participation percentage of respondents of study area is presented in pie chart below. The study area is still male oriented are female is follower of male. In the social work male have played vital role. Due to the less activeness of female and shaming to speak female respondents were less in numbers than male respondents.

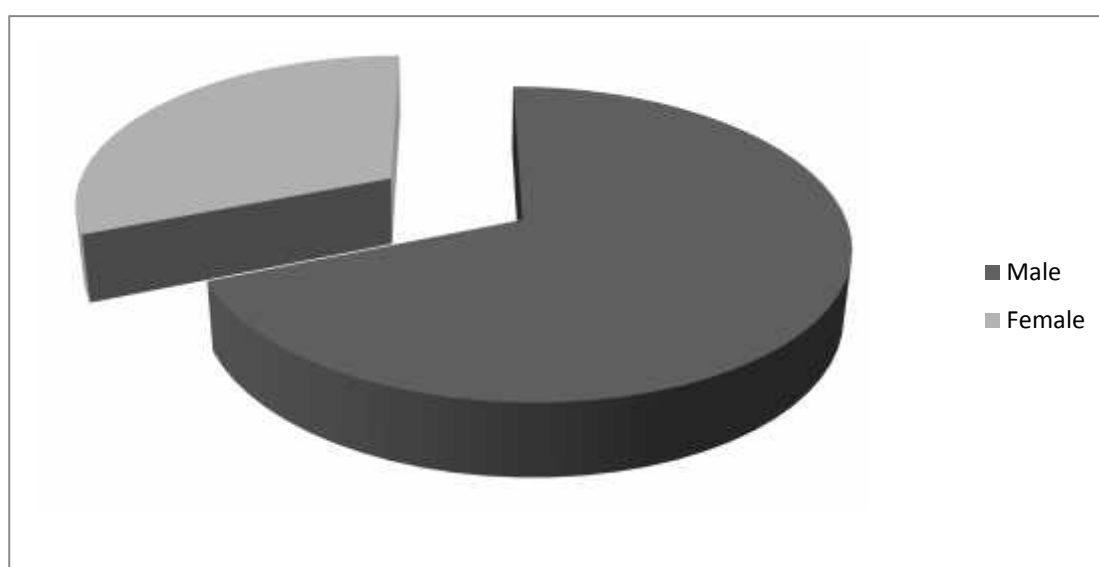


Figure 4.1: Participation Percentage of Respondents by Gender

4.1.4 Population Distribution of the Study Area by Caste Group and Religion

Nepalese people are categorized into different caste and ethnic groups. The Census of 2011 identified 126 different casts and ethnic groups in Nepal. Caste system is fundamentally based on Hindu religion where as a vertical relationship among the caste exists. Bramhin and Chouseholdsetri are in the apex, whereas *Janajati* and *Dalit* groups are at the bottom of the social class.

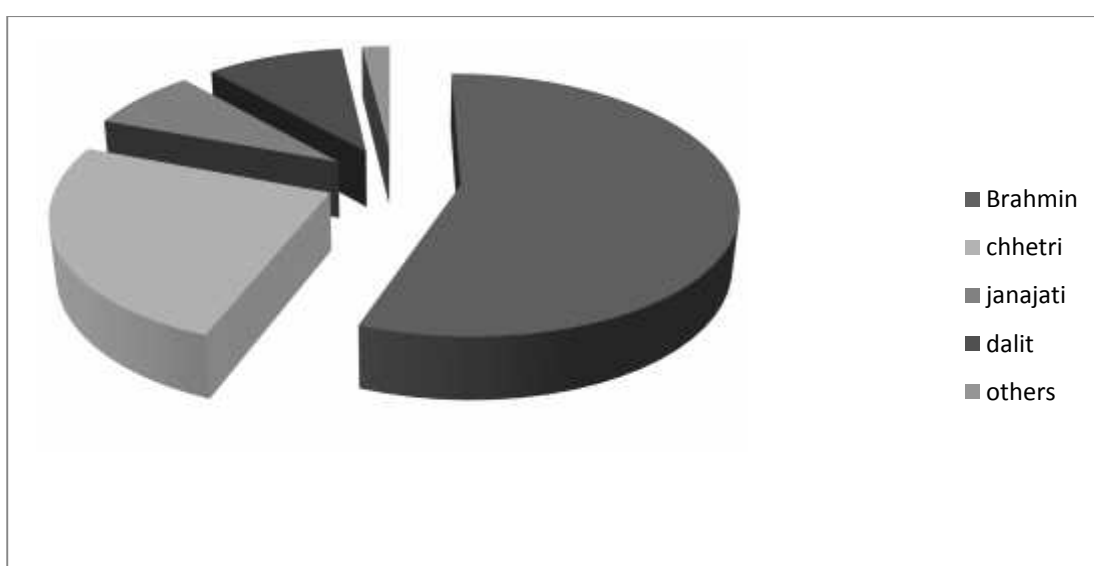


Figure 4.2: Ethnic Groups of Project Area

According to the census 2011 of Nepal, there are 81.3 percent of people follow Hinduism, while 9 %, 4.4%, 3.1%, 1.4% are Buddhist, Islam, Kirat and Christian respectively. Respondent religion practice has been found only Hinduism, Buddhism, Christians.

Figure 4.3 depicts that most of the demographic distribution of study area. Bramhin and Chouseholdsetri are in excess percentage where as majority of *Janajati* and *Dalit* are also remarkable.

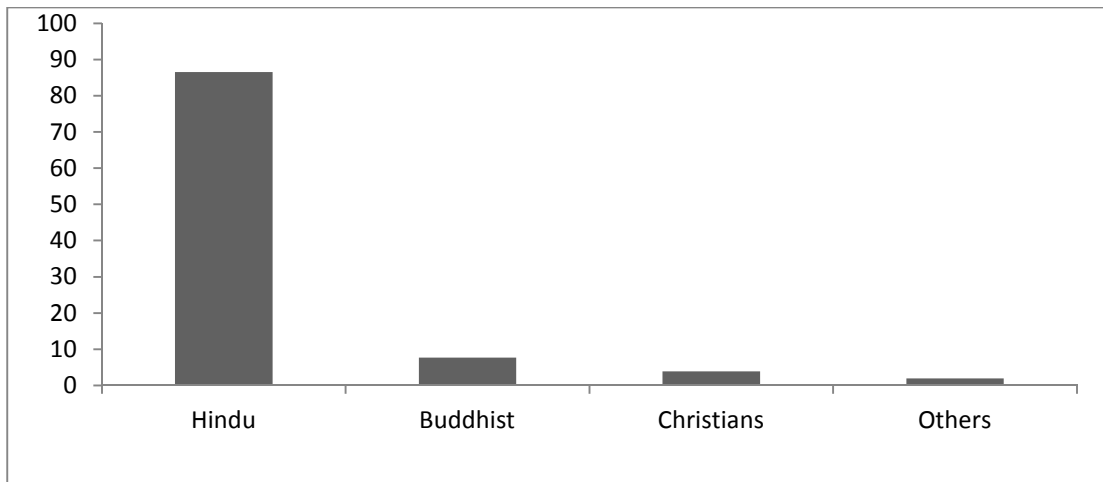


Figure 4.3: Religion-wise Distribution

4.1.5 Occupation of Household

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. Pastoralism is another important source of income for households in the village.

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 4.3: 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, 2014.

4.2 Electricity

4.2.1 Role of Electricity in the Study Area

The facility of electricity was not available in the study area before initiation of the project. Out of total households of the study area not any one households were electrified at the beginning of the project construction. Up to the study period total households are benefited from electricity. And also all project affected area is benefited from electricity now.

Almost all the household pay the bill of electricity i.e. rate of government. Mostly people use electricity for lighting and playing radio, T.V. etc. In Conclusion the consumption of electricity of the local area and whole study area is low. There is a need to increase the consumption of electricity that helps to uplift the living standard of the people of the study area.

At the completion of the project, it helped to electrify the project area and its surrounding areas. However, there is still increasing the demand of electricity.

4.2.2 Use of Electricity for Various Purposes

The lack of sufficient power Modhikhola Hydropower is unable to supply the power according to public demand. Therefore people are unable to lunch varies types of cottage industries as well as electronic equipment, as they want to use.

Due to insufficient of power, they are compelled to run the installed form in the alternative time. Mainly, Hous holds used MHP for lighting purpose minimum 3 to maximum 10 hours from 52 samples, 35 households used for cooking purpose minimum 2 hours to maximum 5 hours,21 households run business where they used electricity 5 to 17 hours per day. For TV/Radio purpose they used 2 to 17 hours and 2 to 6 hours for personal used where as in average 3.6 hours. For others (refrigerator, iron, grander, etc.) purpose used 1 to 12 hours (Table 4.4).

Table 4.4: Use of Electricity for Various Purposes

Use of MHP	Observations	Minimum hours	Maximum hours
Lighting	52	3	10
Cooking	35	2	5
Business	21	5	17
TV/Radio	49	2	20
Personal use	52	2	6
Others	52	1	12
Total Average		2.5	10

Source: Field Survey, 2014

4.2.3 Electricity Consumption Units by Household

According to the purpose electricity consumption by units are seems different. The consumption pattern of household is only for lightening purposes, they consumed very low units then business purpose. The minimum and maximum used units of electricity by respondents are presented in table no. 4.5 below. It is observed that 21households consume 0-20 units, 17 households consume 20-30 units, 9 households consume 30-50 units, 5 households consume 50-250 units per month. The household who are only used electricity for lightening purpose consumed monthly 0-20 units only (Table 4.5).

Table 4.5: Electricity Consumption by Household

Units consumption per month	Households
0-20	21
20-30	17
30-50	9
50-250	5
Total	52

Sources: Field Survey, 2014

4.2.4 Change in Consumption of Energy

Poor rural communities heavily rely on firewood, which is a free resource, as the only cost of firewood collection is physical effort and time. Over exploitation of firewood for household purposes (cooking, heating, and lighting) leads to the degradation of natural forests that ultimately results in scarcity of local resources. Before electrification, kerosene lamps were widely used for lighting purpose during night which is known as “tuki” and firewood was used in every household to cook the food. Biogas and solar were in very limited houses. The energy sources of households presented as below.

It is found 100% of households used firewood and kerosene for cooking and lighting purpose before MHP but after the installation of MHP it decline at 73.07% and 36.54% respectively. Only 15.38% people used solar plant and 21.15% households had biogas before the project but after the MHP solar plant decreases at 3.85% and biogas increases at 32.69%. 30.77% used other sources (Candel, *Diyo* etc.) but after it decreases at 11.38% (Table 4.6).

Table 4.6: Change in Consumption of Energy

Sources of energy	No of households	Before (%)	No of households	After (%)
Firewood	52	100	38	73.07
Bio-gas	11	21.15	17	32.69
Solar	8	15.38	2	3.85
Kerosene	52	100	19	36.54
Others	16	30.77	6	11.38

Sources: Field Survey 2014

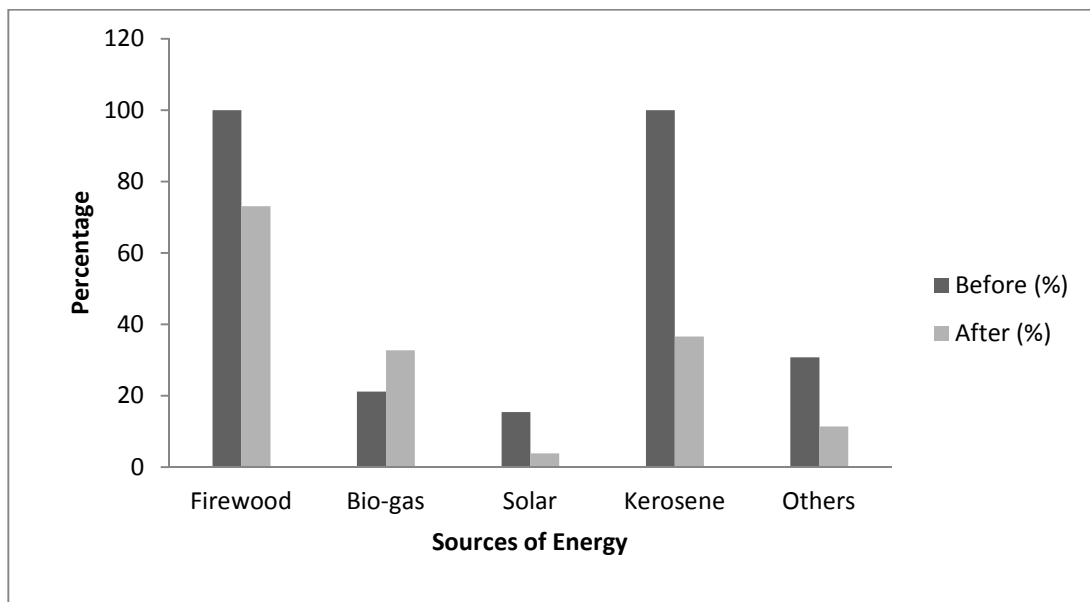


Figure 4.4: Change in Consumption of Energy

4.2.5 Access to Modern Technology

Almost every household visited in the study area have owned at least one television, and nearly every adult member of the family owned a cell phone. According to them, this was unimaginable before the availability of electricity because even charging a cell phone would have required expensive solar panels that only a few could afford. So, if there was need to make a phone call, residents often had to walk half an hour's way.

It is obvious that 82.69 percent of households possessed radio/tape recorder before MHP but now 100 percent households have. Here is a little bit change in radio use because radio can be run by using battery without electricity. Only 3.84 percent households had TV who had solar panel, now percentage of TV users increases and became 90.38 percent and computer is now possessed by 48.07 percent households. Number of cell phone user changed drastically from 9.61percent to 100 percent after MHP. It is because there was no well communication facility in the village before MHP. Now, 11.54 percent and 3.84 percent uses respectively Refrigerator and washing machine. Before, the MHP 100 percent possesses battery but after the installation of hydropower it declines at 46.15 percent (Table 4.7).

Table 4.7 Access to Modern Technology

S.N.	Instruments	Households	Before Possession %	Households	After Possession %
1	Radio	43	82.69	52	100
2	TV	2	3.84	47	90.38
3	Refrigerator		0	6	11.54
4	Washing machine		0	2	3.84
5	Computer/laptop		0	25	48.07
6	Battery	52	100	24	46.15
7	Mobile	5	9.61	52	100

Source; Field survey, 2014

4.2.6 Sources of Income

Agriculture, livestock husbandry, wage earner, business, services and foreign employment were major sources of income of study area before as well as after the completion of the project. Agriculture, Livestock and Husbandry were the key sources of income in the study area before the project started. Agriculture and livestock husbandry, service foreign employment, business and also main sources of income are successively in descending order now. It seems that order of income sources are changing.

4.2.7 Impact on Education

Owing to the access to electricity, the academic performance of children is greatly influenced in Deupur VDC. Electric lights in households extend the day providing additional hours for evening reading and also, reduced drudgery for children. The level of lighting provided by the modern electric lights in the households is more efficient and brighter than that provided by *Tuki* and *Panas*. The micro-hydro based electricity has indirect impact on the school student. Generally, children used to go with their mother while grinding or collecting firewood.

Out of total 52 sampled households, 7 (13.46%) Household's children raised their study less than one hour, 11(21.15%) Households children raised one to two hour, 19 (36.54%) raised two to three hour and 15 (28.85%) Household's children rise more than three hour (Table 4.8).

It can be said that, most of student's education status is improved after MHP installation because most of the Guardian of schooling children found that their children have been studying at the night time using electricity. There is the positive affect by MHP in the study area their adult also involved in informal education at night such as adult literacy class, women literacy class and pre-primary classes are held in project affected area.

Table 4.8 Impact of Electricity on Children Study Habits after MHP

Increased hours	Sample households	Percentage
Less than one hour	7	13.46
One to two hour	11	21.15
Two to three hour	19	36.54
More than three hour	15	28.85
Total	52	100.00

Source: Field Survey, 2014

The hydro project may have vital on the education of children as well as adult. With the availability of light, children can study additional time hours, which may improve their performance in school. Similarly, parents are more aware to their children’s education which also helps to uplift the academic performance of the children. By asking the improvement of their performance at school, participation on any type of literacy class and the dropout of children from the secondary level are taken as the measuring rod of impact of hydro project on the education sector.

There is too little difference between the improvements of children at school, which might be cause of different factors like: children spent their more time on watching TV, playing Videogames which might be lost their time on unproductive sector like chatting, internet site etc. There is slightly improvement on the performance of student at school (Table 4.9).

This is an also positive improvement of children at school due to the facility of electricity.

Table 4.9: Improvements of Children Performance at School

Performance at School improved		
	Frequency	Percentage
Yes	40	76.92
No	12	23.08
Total	52	100

Source: Field Survey, 2014.

4.2.8 Impact on Access to Information

Hydro electricity is boon to people because it provides electricity to run electrical and electronic equipments such as TVs, Radios, Mobile phones, Refrigerators, Washing machines, Computers/Laptops, Batteries, etc.

Impact of hydroelectricity on access to information has been assessed through the ownership of a number of communication devices, radio listening and TV watching habits. General awareness of various aspects of life is sky up, even in rural lives by information technology. Information technology jumps large steps in the present decade. Rural people updated them by the revolution of information technology.

4.2.9 Advantages of Project in Study Area

In addition modern services directly and indirectly affects in traditional attitudes, eating, speaking, clothing and behaviour. So MHP has also affected in social and cultural properties. The table represents the respondent's attraction towards project, so it is attempted to find out the factors affected by the MHP. Therefore, the question is asked for them what are the factors attracted by the plant? In this question among the total 52 respondents, highest proportion i.e. 47(90.38%) reported time saving and the lowest proportion i.e. 3 (5.77%) reported in other factors. Likewise, easy work at night 44 (84.61%), time saving 33 (63.46%) improvement in health 30 (57.69%) respectively (Table 4.10).

To sum up, when electricity facility is available there increases the use of audio, video visual media and internet. By those types of media new generation can imitate or copy of every things that they have heard or saw. So it is proved that projects has attracted in social.

Table 4.10: Advantages of Project

Factors	Number	Percentage
Improvement in health	30	57.69
Time saving	33	63.46
Easy to work at night	44	84.61
Increase in reading habit	47	90.38
Others	3	5.77

Source: Field Survey, 2014.

4.2.10 Status of Sanitation after Electricity

Sanitation is one of the indicators of living standard of the people. The table shows the status of sanitation after electricity with reference to environmental impact. Out of 52 respondents, the maximum proportion 47 (90.38%) reported the sanitation is improved. 3 (5.77%) reported there is not any change occurred and 2 (3.85%) reported there is adverse condition in sanitation after electricity (Table 4.11).

Table 4.11: Status of Sanitation after Electricity

Status	Number	Percentage
Improved	47	90.38
Worse	2	3.85
Same as before	3	5.77
Total	52	100.00

Source: Field Survey, 2014.

4.2.11 Impact on Health

Indoor air pollution is due to smoke from firewood and smoke of kerosene for the lighting purpose which leads to the serious problems on the people's health. People are suffering from asthma and eye infection due to indoor air pollution. Hydroelectricity has a prominent role in reducing indoor air pollution by decreasing the use of firewood and kerosene. Ultimately it is the environment friendly which helps conserve the jungle and helps keep fresh environment. To see the impact on health, this study compares the number of such cases reported among the sampled communities with and without Micro Hydro.

Micro hydro may also have indirect benefits on health though increase in access to information. Households with micro hydro may listen to radios, watch television, and watch educational videos more often than households without

micro hydro which may bring about positive changes in their health choices and health seeking behaviour in general.

Out of total 52 respondents, the maximum proportion i.e. 50(96.15%) reported that the electricity has positive effect on Eye infection. out 2(3.85%) respondents reported that electricity may not affect on Eye infection .Out of 52 respondents reported that the electricity has decreased respiratory, asthma, bronchitis, heart disease and others 41(78.85%), 49(94.23%), 43(82.60%), 30 (57.69%) and 3 (5.77%) respectively. But the respondents who reported that the electricity has no change in decreasing respiratory, asthma, bronchitis, heart disease and others are in number 11 (21.15%), 3 (5.77%), 9 (17.30%), 22 (42.31%) and 5 (9.61%) respectively (Table 4.12).

Table 4.12: Minimize/Improve the Diseases after Establishment of MHP

Kind of diseases	Number of respondents	Yes	Percentage	No	Percentage
Asthma	52	49	94.23	3	5.77
Bronchitis	52	43	82.60	9	17.3
Respiratory	52	41	78.85	11	21.15
Eye infection	52	50	96.15	2	3.85
Heart diseases	52	30	57.69	22	42.31
Others	52	3	3.77	5	9.61

Source: Field survey, 2014

4.2.12 Pollution by Project

There are different kinds of pollution. In this study it is attempted to find out the status of environmental pollution. Is there seen any kinds of pollution after MHP plant? If so what kinds of pollution have occurred? (Table 4.13 and Table 4.14).

Most of the infrastructure may be the cause of the environmental degradation and pollution. In this situation a question was asked whether there was

environmental pollution or not in the study area. Out of the 52 respondents 40 (76.92%) reported that there is no any kind of environmental pollution and remaining 12 (23.08%) respondents reported there is environmental pollution even after project.

Table 4.13: Status of Environmental Pollution after the Project

Pollution	Number of households	Percentage
Yes	12	23.08
No	40	76.92
Total	52	100

Source: Field Survey, 2014.

In addition, positive and negative result occurs after every changes but disadvantages must be dominated by advantages. So after the project there is not bad environmental pollution in the study area.

Out of 52 total respondents only 12 respondents reported that there is environmental pollution after the project. Out of 12 respondents maximum proportion i.e. 5 (9.62%) respondents reported air pollution occurred in the place, 3 (5.77%) respondents reported water pollution, 2 (3.85%) respondents reported dust and both landslide and rock occurred 1 (1.92%) (Table 4.14).

Table 4.14: Type of Pollution Occurred after the Project

Type of pollution	Number	Percentage
Landslide	1	1.92
Water pollution	3	5.77
Air pollution	5	9.62
Rock fall	1	1.92
Dust	2	3.85
Total	12	23.08

Source: Field Survey, 2014.

4.2.13 People Perception about Improvement of the Village after MHP

Life was hard for the women and men in rural Deupur VDC and the need of access to modern “clean energy” was acute, 90 percent of Deupur’s people lived many years without access to grid electricity. Earlier, in most of households, families would spend huge amount of their income in purchasing kerosene for lighting and diesel for milling of grain. And the very strange news is that, in village price of kerosene is more than diesel price at present time it was Rs. 120 per month. Therefore, average expenditure on purchase of kerosene oil for lighting was Rs. 360/households as normally each family consumes 3 liter/month. A rough calculation shows that monthly saving of money, only by replacement of kerosene in each family is Rs 280.

Living standard and the social status in the society; in fact it had also increased economic condition, as they provided enormous service to the village level. Now, it can easily be seen when they settling down to evening news on their colour, few have been connected to world by internet facility on computer via mobile phone. There are numbers of application come to energy committee for establishment of small enterprises like grinding mill, food processing unit, huller machine and saw mill etc.

People are engaged in different work for promoting their source of income such as agriculture produce and other locally available natural resources etc. The lighting facilities have helped them to increase their working hours to combat health hazards else would have faced from kerosene wick lamp to assist their children in study affairs to improve. However with access of power villagers are now able to save money and time both also given opportunity to local service provider in the villages with more employment with their increased and efficient service delivery capabilities. Students have good opportunity to read at night; with these direct benefits of the micro hydro power has resulted into a better socio-economic condition.

4.2.14 Establishment of Industries and Direct Job Creation

Micro hydropower plants have to some degree been successful in creating some jobs, like those who manage the pumps, and engineers and mechanists who manufacture and maintain the plants. Since management committee members of the plants work on a voluntary basis, they receive no compensation. Therefore, it is necessary to study to what degree micro hydropower stations have in increasing or creating jobs. It is also necessary to study enterprises that have come up after electricity was introduced.

Electricity is the foundation of any socio-economic activities. The life is very difficult as well as being backward due to in ability to use to modern technology in the absence of power. After MHP, people lunched varies industries in the study area, which help to raise the income level of the people as well as make the villagers way of living much easier. The firms that lunched after MHP in village is presented as below:

It is observed that villagers installed 27 small industries where around 55 villagers have partially/fully involved in job. The villagers life become easier after installation of Rice mill, Saw mill, Oil expeller and Spice mill and able to generate income from these firms. People generate income after installation of Bakery, Furniture and Poultry. The other business such as: Hotel, Stationary, Photo Studio and Medical have been run which generate the income as well as make the social life easier too.

Table 4.15: Establishment of Industries after MHP

Firms	Observations	Number of industries
Saw mill	52	2 (3.84%)
Rice mill	52	5 (9.61%)
Poultry firm	52	9 (17.31%)
Spice mill	52	2 (3.84%)
Oil expeller	52	1 (1.92%)
Bakery	52	1 (1.92%)
Furniture	52	7 (13.46%)

Source: Field Survey, 2014.

4.2.15 Change in Living Standard

The modern facilities mostly affect the lifestyle human being. After using such facilities it is expected that there must change in living standard of human. Actually living standard refers to the higher living.

It is expected that modern facility like electricity may effect in human life style. So, this table shows the status of living standard of respondents. The question was asked to respondents that have their living standard been changed or not. After the MHP plant, all respondents i.e. 52 (100%) reported that living standard has been changed after the MHP. In addition, it is proved that electricity is one of the most affecting factors of living standard. (Table 4.16)

Table 4.16: Change in Living Standard after Electricity

Change	Number	Percentage
Yes	52	100.00
No	0	0.00
Total	52	100.00

Source: Field Survey, 2014.

4.2.16 People's Perception about Increase the Income after MHP

People are engaged in different work for promoting their source of income such as agriculture product and other locally available natural resources etc. The lighting facilities have helped them to increase their working hours. People who have able to use the electricity properly, who have sufficient knowledge and ways about electricity facilities; they have been able to increase family income.

It is observed that 11.54% of respondent's income neither increased nor decreased. They are living in neutral position even after electricity. Out of total 67.3% respondents reported that their family income has partially increased. Out of total 17.31% respondents reported that difficult to say. Out of total 3.85% respondents reported that it is same as before (Table 4.17).

Table 4.17 People Perception about Increase the Income after MHP

Income level	No of respondents	Respondent in percentage
Increase	35	67.3
Decrease	6	11.54
Difficult to say	9	17.31
Same as before	2	3.85
Total	52	100

Source: Field Survey, 2014.

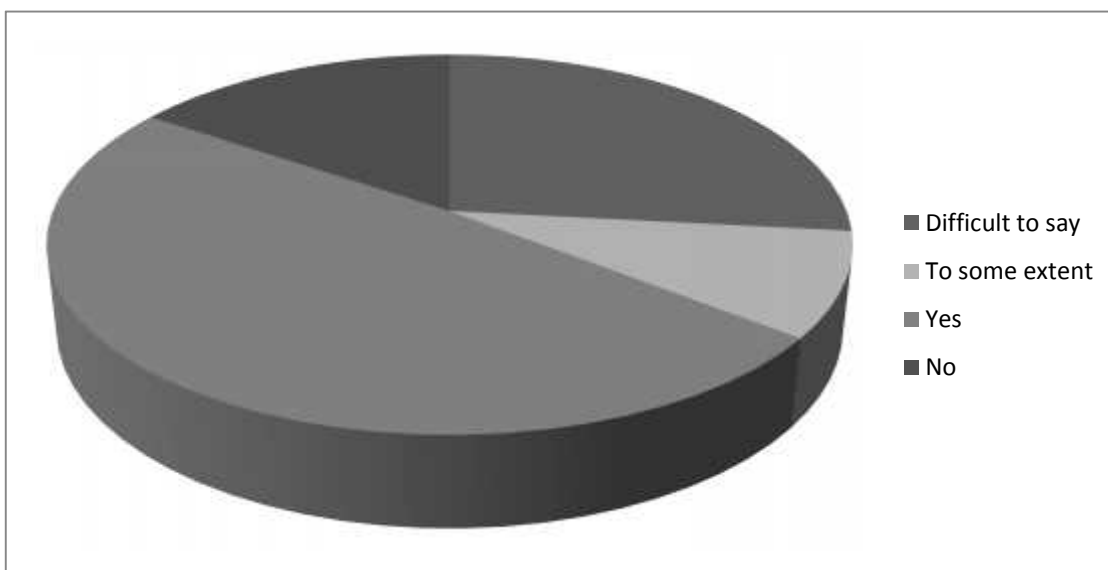


Figure 4.5: People's Perception about Increase the Income after MHP

4.2.17 Agriculture Product Promotion Due to MHP

The energy needed for the agriculture sector in the hilly and mountainous areas is for Agro processing and irrigation. For the processing, i.e. mainly grinding, husking and expelling of the local products, energy from MHP could be sufficient. In our country more than 80 percent of people involved in agriculture. The production of crops will not be increased drastically because the present crop-producing practice is already an intensive one. Therefore, from these perspectives, energy from MHP would be sufficient for the selected villagers in the vicinity of MHP areas if they use for off-season irrigation for cash crops only but not for regular crops irrigation like paddy. However, to estimate such a scenario, an in-depth study has to be done. The people perception about agriculture product is presented in figure 4.6

Among 52 respondents 9 percent cannot take any facility to raise their agricultural products. Among 91 percent, 43 percent household respondents fully used the facilities where as 43 percent use it partially. Thus, MHP help to raise the agriculture products of many households.

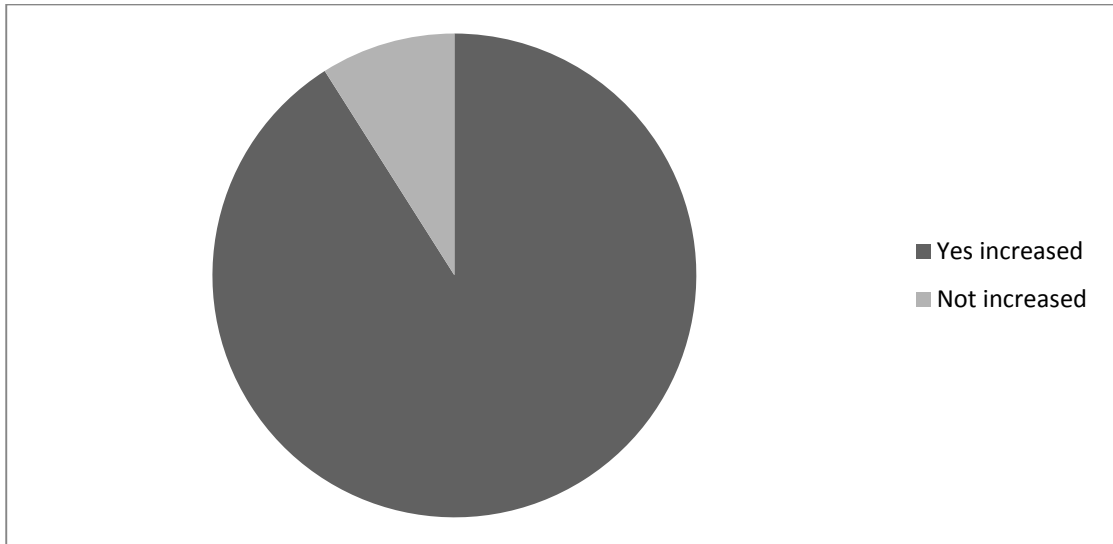


Figure 4.6: Agriculture Product Promotion due to MHP

4.2.18 Time Spending on Fuel Collection and Agriculture

Most of the females collect fuel wood instead of male in the study area. Before the project started, they used to spend around 40 day on fuel wood collection for a year. Around 7 hours on agriculture daily. Modhikhola hydropower helped to increase a number of consumers to enjoy more facilities now, women spend nearly 30 days to collect fuel wood for a year. The save an hour daily on household activities and utilize it in agriculture activities.

4.2.19 Feeling/Concept of People

Feeling or concept refers the any kinds of response towards and things. People had either satisfaction or dissatisfaction toward electricity. What they had been feeling after MHP established. It was also attempted to find out that what was the feeling of people towards electricity in the study area (Table 4.18).

Among total 52 respondents highest proportion i.e. 37 (71.16%) reported that they were satisfied by electricity service. The lowest proportion i.e. only 8 (15.38%) respondents reported they were neutral and remaining 7 (13.46%) respondent reported were very satisfied. There were no non-satisfied respondents in study area of MHP.

In addition electricity facility is closely related with human life. It is not only necessary in day time, but also in night time. Electricity made the human life easier and comfortable. It is also able, to make the whole world as a one state. In rural area electricity is a strange thing. So 71.16% respondents are satisfied the way of MHP.

Table 4.18: Feeling of People towards MHP

Feeling	Number	Percentage
Very Satisfied	7	13.46
Satisfied	37	71.16
Neutral	8	15.38
Non-satisfied	0	0.00
Total	52	100

Source: Field Survey, 2014.

4.2.20: Related Factor Responsibility about Sustainability of the Project

Repairing and maintenance is necessary for every non-living thing. There is necessity of operation and maintenance/repairing schedule in powerhouse to make it sustain. However, the development of hydroelectricity has been extremely challenging in Nepal. Hydropower sector is confronted with number of issues and constraints such as high costs and inadequate funding, low power utilization and incomes, inconsistency in subsidy policy, unhealthy competition and weak marketing strategies, inappropriate feasibility studies, lack of technical back-stopping and monitoring, poor installation and faulty equipments, natural disasters, trade off between the quality of the civil works, etc. Thus, the successful management of MHP projects requires a corporate structure that minimizes political interference and efficient access to credit by providing clearly stated objectives of strengthening the rural economic system related to affordability, profitability, sustainability, coverage, and the quality of the service to be provided in rural Nepal households. During the research time, all the respondents become ready to do anything for the betterment of project.

4.3 Major Findings

-) Out of total 52 respondents 20 were taken from ward no 8, 11 respondents from ward no 7 and 9, 10 respondents were taken from ward no 6 and 7 respectively.
-) The number of people involved with respect to their age group is tabled below:
 - a. 15-25 -10, b.26-40 -24, c.41-60 -12 d. above 60-12. In short the number of the people of the age 26-40 years is high.
-) In total the respondents have participated 43.38% female and 59.62% male.
-) Brahmin and Chouseholdsetri are in the apex whereas Janajati and Dalit is low level of the social class.
-) Out of economically active population 98.08% are involved in agriculture, 30.77% are involved in service similarly 9.62% , 7.693.84% are involved in self owned business, foreign employment and others respectively.
-) Almost all the households pay the bill of electricity regularly.
-) People use electricity for lighting, cooking, playing radio T.V and battery charge.
-) Households use MHP for lighting purpose minimum 3 to maximum 10 hours.
-) Out of 35 households used for cooking purpose minimum 2 hours to maximum 5 hours.
-) Out of 21 households run business where they use electricity 5 to 17 hours per day.
-) For TV and radio playing purpose they used 2 hours to 17 hours and 2 to 6 hours for personal used.
-) Use of electricity for lighting 20 households consume per month 0-20 units.

-) Out of 17 households consume per month 20-30 units, 9 households consume 30-50 units, and 5 households consume 50-250 units per month.
-) Before installation of MHP firewood and kerosene are the main source of energy for lighting and cooking purpose after MHP it declines at 73% and 36% respectively.
-) Only 15.5% people used solar plant and 20.45 households had biogas before the project but after the project solar plant decrease at 4% and biogas increase at 33.33%.
-) Before MHP 82% households possessed radio/tape recorder but now 100% households have.
-) Only 3% households had TV who had solar panel now percent of TV users increase and became 91% and computer is now possessed by 48% Households.
-) Number of cell phone user's change drastically from 9% to 100% after MHP.
-) After MHP 7(13.46%) households children raised their study time less than one hour.11 (21.15%) households children raised one to two hours. 19(36.54%) raised two to three hours and 15 (28.85%) households children raised more than three hours.
-) In total 40 households (76.92%) says improvement their children performance at school and 12 Households (25.08%) says no change in performance at school.
-) Out of 47 (90.38%) Households the sanitation is improved 3 (5.77%) reported there no any change occurred and 2 (3.85%) reported there is worse in sanitation after electricity.
-) In local area 27 small industries where around 55 villagers have partially/fully involved in job.
-) After MHP there are 2 saw mill, 5 rice mill,9 poultry form, 2 spice mill, 1 oil expeller, 1 bakery and 7 furniture established.

-) After MHP plant all respondents i.e. 52(100%) reported that living standard has been changed.
-) Out of 11.54% of respondent's income neither increase nor decreased.
-) Out of total 67.3% respondents reported that their family income has partially increased.
-) Out of 17.3% respondents reported that difficult to say and 3.85% respondents reported that it is to same extant.
-) Among 52 respondents 9 % cannot take any facility to rise agriculture products.
-) Among 91% households respondents fully used the agriculture facilities where as 43% use it partially. Thus MHP help to raise the agriculture product of many households.
-) Electricity is closely related with human life therefore all respondents living standard have been changed after MHP.
-) Major environmental pollution has not seen after MHP but minor pollution has found.
-) Respondents has started to use audio and audio-visual materials, therefore plant has effected on social and cultural properties like changing behavior, changing clothing and thinking.
-) To build the MHP sustainable, repair, maintenance and operation schedule be necessary therefore there is operation schedule in powerhouse for these proper user committee is fully responsible.
-) Before electrical facility people have been using the flaming, fire hood and Kerosene at the night after electricity they are reduced such types of materials, so positive impact is found in human health. Most of the respondents are satisfied by MHP.

CHAPTER-V

SUMMARY, CONCLUSION AND SUGGESTIONS

5.1 Summary

This study covers the impact of Modi khola hydroelectric project on educational and access on information technology of the people in Deupur VDC of Prabat district. As per objective, this study tries to access impact of Modi khola hydro project on education and information. The respondent from the study area 52 sample has been selected. The questionnaire has designed to evaluate the impact of hydro project and hydroelectricity on education and information technology of the local people. The questionnaire has divided on five sections. First section covers household's information, second section covers MHP and rural electrification, third fourth and fifth section cover respectively socio-economic impact, health and environment impact and question about the project.

The result shows that there is positive impact on the education. 76.92 percentages of people were agreed with the increased on the performance of their children at school. Similarly most of the people were benefited from woman literacy class and adult literacy class. Most of the student compared to left school due to poor economic condition and unwillingness to study.

Similar, improvements has also shown on the access on the equipment of information technology and modern electrical and electronic devices. There has also shown improvements on modern form of equipments compare with before and after the hydro energy. Almost people have Radio, TV, battery and many household have computer/laptop, mobile phone due to the awareness on information technology.

Similarly, the result also shown on improvement of health status by the help of hydro power project. Almost 50 percent of household is not suffering from any respiratory diseases and eye related infection during one year period.

Hydroelectric project significantly affect on the entrepreneur behaviour of the people. Approximately 52 percent of people engage with their own business.

5.2 Conclusion

The whole conclusion of research works has been given in this paragraph.

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 the study site, nature of data, sample selection, questionnaire design, method of data collection and data processing. Fourth chapter deals about the analysis and interpretation of data and the last chapter includes summary, conclusion and suggestion.

The main conclusion of the study is given below:

Modi Khola hydroelectric project has an upbeat impact on enhancement of education status and awareness on information technology of people live in Deupur VDC partially. People 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 has increased access to information. The verdict of impact Modi khola hydroelectric project has been accomplished below.

5.2.1 Impact on education

On the basis of improvement on the performance at school increased or not as well as the participation on Women literacy class as well as adult literacy class similarly rate of dropout student from school were the measuring rod to evaluate the impact on education. Significant percentage of children's

improvement on education performance at school similarly large percentage of people participation on women and adult literacy class compare to before installation project and lower number of dropout student from school comparatively to before installation project shows positive impact of Modi Khola micro hydroelectric project at the Deupur VDC.

5.2.2 Impact to access information

The hydropower brings revolution on the information technology of Case group; almost all of house hold has Radio and TV. Number of users of refrigerator and having computer/ laptop is significantly high by comparing with before and after the access on hydro energy. All people listen radio and watch TV every day and almost household has access on mobile and land phone.

About half of household's family member has access on internet and chat. On the basis of these we can conclude that the hydropower brings revolution on the information technology on the study area

5.2.3 Impact on health

Modi khola Micro hydro has a positive impact on health of the people live in Deupur VDC as well. Number of ill's households member from respiratory diseases and eye related infections such as asthma, bronchitis, eye infection, heart diseases etc. in the past one year period are found to be less in households that are connected with MHP than to the households does not connected with Micro Hydro.

5.2.4 Impact on entrepreneurship

Large number of people engages with some kind of business. The number of people engaged on their own business like Hardware, Computer maintenance and shell, mobile, TV, Music system is relatively high. The attraction of people on mill and shop like tea, retailer, shoe, bangle, fancy etc. is similar. Engagement of people on poultry firm, hotel and travel also high.

5.3 Suggestions

Nepal is second rich country in the world with respect to water resources, but people of rural areas have been living in dark not only at night time but also in day. People are far away from modern technology. At present, most of the urban areas which are known as facilitated also compel to remain on dark due to compulsion of load shedding. The condition becomes worse on day by day. The demand of electricity growing up and production is almost stopped. The gap between demand and supply is increasing adversely day to day.

The government should play to solve this complex problem. Many strategy and schemes can adopt by the policy maker to improve the life status of rural people. If we can emphasize on rural electrification, that uplift education as well as life standard of rural people.

-) If we give the ownership of electricity to the community rural people are very much conscious about any type of damage or loss towards the community assets. Thus this schemes not only creating real sense of ownership but it also leads to safety and security of national assets. This stops the leakage and theft of electricity which helps to reduce the problem of load shedding.
-) Plane area is very fertile for paddy and wheat but unfortunately there is no irrigation facility. People use motor to drain ground water from swallow tube well but if we can form water storage tank in community, lift the river water to fill up the reservoir and use it widely for irrigation purposes. Similar scheme can apply on kitchen garden, local pastures and farmlands have been reforested with native spices and fruit trees, therefore rural farmers are selling green vegetables to urban areas.
-) The rural electric communities are mobilizing electric contractors who are responsible for construction of new rural electrification system and joining together to develop foot trails into motorable roads using the local resource only. Thus electric material has becomes cheaper.

-) If we can join the people of VDC, INGO and local NGO as a partner and helping by providing staff development training and necessary tool and equipments for operation and maintenance then Increased rural electrification coverage, increased consumer connection rate, increased per consumer consumption, improved load factor, reduced operation and maintenance cost and improve Socio economic condition.
-) Communities are motivating their members for 100 percent consumer connection by introducing new domestic electrical appliances on installment basis, community shops, deploying local youth unemployed people as a working group. It increases the annual income of households, it reduces average annual health care expenditure for housewives, adult literacy rate, quality of education, women socio-economic status etc.

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An introduction of Prapat district retrieved from www.prapat.com

Questionnaire: 1. Household information

Q.N	Questions	Code/answer
1.1	Name of the village	
1.2	Ward no.	1 2 3 4 5 6 7 8 9
1.3	Name of household head	
1.4	Gender	1. Male 2. Female
1.5	Age of the respondent	
1.6	Education level	
1.7	Number of household members	male female -----
1.8	Caste	1. Brahmin 2. Chhetri 3. Janjati 4. Dalit 5. Others
1.9	Religion practiced	1. Hindu 2. Buddhist 3. Christian 4. Others
1.0	Main occupation of household members	1. Agriculture 2. Services 4. Daily wage basis 5. Self owned business 6. Unemployed 7. Foreign employment 8. Other specify

2. MHP and rural electrification

Q.N	Question	Code/answer	Skip
2.1	Do you agree MHP system has played vital role in rural electrification?	1. Yes 2. No	If 1, go QN 2.2
2.2	How MHP helped in rural electrification?	----- -----	
2.3	How much units of electricity do you consume per month?	maximum minimum -----	

2.4	How many hours per day you do access to electricity for the following purpose? (write in complete hours) 1) Lightening 2) Cooking 3) TV/ Radio 4) For business purpose 5) For agriculture purpose 6) Personal use 7) Other specify	----- ----- ----- ----- ----- ----- -----	
2.5	How much money do you pay for electricity per month? Write in total Rs.	maximum -----	minimum -----

3. Socio-economic impact

Q.N	Question	Code/answer	
3.1	Do you think participation in the project has improved the status of the village?	1. Yes	2. No
3.2	How it helped to improve the socio-economic condition of the people?	----- -----	
3.3	Have you done the productive work by using MHP system? 1. Poultry farming 2. Knitting 3. Furniture 4. Milling 5. Saw-mill 6. Dairy 7. Computer-institute 8. Other Specify	1. Yes 1. Yes 1. Yes 1. Yes 1. Yes 1. Yes 1. Yes 1. Yes	2. No 2. No 2. No 2. No 2. No 2. No 2. No 2. No
3.4	Dou you find that after involving on productive work it helped to increase your income level?	1. Yes 3. To some extent	2. No 4. Difficult to say
3.5	Number of employed persons at the project affected area:	Before -----	After -----

3.6	Does the project help to promote the agricultural product?	1. Yes	2. No
3.7	In your opinion, how it helped?	1. Regularly 2. Sometimes 3. Irregularly	
3.8	What type of industry is installed in your village?	1. Milling 2. Furniture 3. Irrigation 4. Drinking water 5. Knitting 6. Other specify	
3.9	How many electrical instruments does your household posses before and after electrification? Write in number.	instruments	before after
		1. Radio	----- ----
		2. TV	----- ----
		3. Refrigerator	----- ----
		4. Computer	----- ----
		5. Cell Phone	----- ----
		6. Chargeable battery	----- ----
		7. Others specify	----- ----
3.10	Specify the annual income of the family. Total in Rs.	Before	After
		-----	-----
3.11	What is the status of your family income after having electrified?	1. Increased 2. Decreased 3. No change	
3.12	How much money do you spend on these energy sources? Specify total in Rs. 1. Kerosene 2. Battery 3. Candle 4. Firewood	Before	After
		-----	-----
		-----	-----
		-----	-----
		-----	-----
3.13	What was the main source of energy in your family before installation of MHP?	1. Firewood 2. Bio-gas 3. Solar 4. Kerosene 5. Others	
3.14	After electrification, is your children's study hours increased?	1. Yes	2. No
3.15	How much time has been increased?	1. Up to 1 hour 2. 1 to 2 hours 3. 2 to 3 hours 4. More than 3 hours	
3.16	Has their performance at school increased?	1. Yes	2. No
3.17	Have you seen the following changes in the		

	activities of your children due to watching TV/ using computer? 1. Talking style 2. Dress up 3. Sport 4. Reading habit 5. Dance 6. Others	1. Yes 1. Yes 1. Yes 1. Yes 1. Yes 1. Yes	2. No 2. No 2. No 2. No 2. No 2. No
3.18	Has the project affected to drinking water supplies?	1. Yes 3. Unknown	2. No
3.19	Is there any increase in migrated people after the project implementation?	1. Yes	2. No
3.20	How many households are migrated in the village? Write in household number.		
3.21	Has electrification improved the communication in efficient way?	1. Yes	2. No
3.22	Have you seen any changes in following activities to household members after electrification? 1. In fashion 2. In behavior 3. In thinking 4. Others	1. Yes 1. Yes 1. Yes 1. Yes	2. No 2. No 2. No 2. No
3.23	What is the impact of project in infrastructure development?	Positive ----- ----- -----	Negative ----- ----- -----

4. Health and Environmental impact

Q.N	Question	Code/answer	Skip
4.1	How many hours per week did you spend to collect the firewood before and after this project?	Before After ----- -----	---
4.2	What is the condition of forest after this project launched?	1. Destroyed 2. Improved 3. No change	
4.3	Did you feel environmental pollution after the project?	1. Yes 2. No	If 1, go Q.N. 4.4
4.4	What type of pollution is increased?	1. landslide 2. Rock fall 3. Deforestation 4. Dust	

		5. Water pollution 6. Air pollution 7. Others	
4.5	How often do you use the following sources for lightening. Write in hours per day. 1. Bio-gas 2. Solar 3. Kerosene 4. Micro hydro 5. Others	----- ----- ----- ----- -----	
4.6	What is the status of sanitation in the village after electricity?	1. Improved 2. Worse 3. Same as before	
4.7	What kind of effects are seen in health conditions of family members after implementation of this project?	1. Improved 2. Worse 3. Same as before	
4.8	Does the establishment of MHP help to improve/minimize the following diseases? 1. Asthma 2. Bronchitis 3. Respiratory diseases 4. Eye infection 5. Heart diseases 6. Others	1. Yes 2. No 1. Yes 2. No 1. Yes 2. No 1. Yes 2. No 1. Yes 2. No	
4.9	Is there wild animal extricated after project implementation ?	1. Yes 2. No	If 1, go Q N 4.10
4.10	Which animal is extricated? Write name.		

5. Questions about the Project

Q. N	Question	Code/answer	Ski p
---------	----------	-------------	----------

5.1	Is there regularity in the electricity distribution?	1. Yes 2. No	
5.2	What advantage of MHP attracted you must?	1. Improvement in health 2. Time saving 3. Easy to work at night 4. Increased in reading habits 5. Effective in agricultural production 6. Others	
5.3	Is there any change occurred in governmental and non-governmental services in the VDC after establishment of the project?	1. Yes 2. No	
5.4	What type of change has been observed?	----- -----	
5.5	Are you satisfied with the way MHP working?	1. Very Satisfied 2. Satisfied 3. Neutral 4. Non-satisfied	
5.6	What should be done for the sustainability of the project?	From government side ----- ----- From users side ----- ----- From Management side----- -----	

Thank You !