CHAPTER – I

INTRODUCTION

1.1 Background

Micro-hydro has multidimensional Changes and events on social cultural as well economic dimension of society. It empowers various possibilities of different dimensional changes and enabled social cultural transformation. The enormous investments and widespread Changes of large dams have seen conflicts flare up over the siting and Changes of dams - both those in place and those on the drawing board, making large dams one of the most hotly contested issues in sustainable.

According James W. Vander Zander "Sociologist refers to the fundamental allegations that occur overtime a patterns of culture structure and social behaviour as social change." Available of electricity in the rural areas most of the people buy TV. as well as other electrical instruments which leads cultural changes in the society. Electronic media also increase due to micro hydro power which ultimately increases social awareness. Use of fire wood also decreases due to availability of electricity which helps to better impact in the environment. Students also benefited due to electric light. Use of computer also increases in the rural areas. Electric Rice mill also established in the village area (Tiwari, 1995).

Micro hydro takes Social change which can be taken as evolve from a number of different sources, including contact with other societies and help to settle unemployed population in the village areas. Social change is also spurred by ideological, economic, and political movements.

Nepal has sufficient hydroelectric potential but around 1% of the hydropower potential has currently been developed and micro-hydropower generation potential in half century is more than 27MW and more than 300,000 households are beneficiaries. Micro-hydropower includes more positive socio-economic Changess in Nepal. This paper aims to study the socio-economic Changess and Changess in MHP due to change in environment in Nepal through the case study of Athbiskot MHP of Rukum. Rukum is rich in hydropower resources, around 20 years ago three hydropower were constructed 250 kW in Syarpu Taal, 150 kW in Bijeshori and 11 kW in Athbiskot of Rukum district were constructed by Nepal Electricity Authority of Nepal.

Alternative Energy Promotion Centre(AEPC) is installing 87 MHPs in Rukum among them 11 micro-hydropower serving 3097 household generating 308 kW power, seven micro-hydropower are under construction having estimated power 239 kW and beneficiaries households 2518 and eleven number of Pico-hydropower are generating 53 kW and beneficiaries' households are 624 of Rukum district and remaining MHPs are in process. For sustainability technical, social and economic factors play vital role in community. The micro-hydropower sustainability with social, economic and environmental aspect is under a broad point of view it may be assumed that the advantages generally overcome over the limitations and a solid trend of further energy generation by the installation of hydropower plants can be identified in Nepal. (Dahal and Shrestha, 2014)

Nepalese people are using 300 kg to 900 kg fuel wood per head per year for cooling and heating. Fuel wood consumption that in mountain has been estimated 640 kg/person 1 year while for the Terai it is 479 kg/person per year (Lekhak, H.D., 2003: 205).

But the water resources is immensely available in Nepal and hydropower is clean renewable among this micro-hydropower is more than more renewable pollution free, relievable and easily available. So the region in mountain and hillside of Nepal. So micro-hydropower is the best alternative among all the available energy in the context of our country.

Nepal is the second richest country of the world and first richest country in Asia in the context of water resources. Nepal has about 6300 large and small river hurling from the Himalayas and high mountains towards the plain and Terai. The total length of those large and small rivers is about 45000 km. The perennial nature of Nepalese river and stepped grand of the country topography provided ideal condition for the development of some of the world's largest hydropower project in Nepal. The total hydropower potential of these rivers is estimated about 83,290 MW of and which 45,520 MW (54.69%) and 42,133 MWE 50.59 percent are technically and economically feasible from 93 and 66 sites respectively, the countries theoretical potentiality occupies 2.77 percent of words at potentity of hydropower. Nepal has generated 861.2 MW hydropower up to the end up to FY 2073/74 it is theoretical and economic potentialities respectively. Out of the total installed power 531.2 MW and 429.6 MW power have been installed from public and private sector respectively. And thormal plant 53.4 MW and solar energy 100 KW.

So, energy can be generated from falling water through the use of turbine, which can be used as mechanical power. This is known as hydropower. This power can be used directly to run various milling machines or can be converted into electricity by using generator. Electricity generated in this way can be used for lighting, heating and operating machines. Hydro-projects that generated that small amount of mechanical or electrical power up to 100 KW are called micro-hydro power. Generally, this projects are classified on the basis of amount of power produced into large, medium, small and micro-hydro. In Nepal, project up to 100 KW capacities are classified as micro-hydro project, (AEPC, Booklet, 2000).

Nepal is facing enormous challenges in the path of economic development. One of the major-infrastructures required for sustainable development of any nation is power sector, (SHD, 1997: IX). Due to the unique topography with scattered settlements the national grid electricity expansion has difficulties, so the electrification through micro-hydro is suitable. There are more than 6000 rivers and innumerable rivulets crisscrossing the country. So, micro-hydropower has a great potentiality for fulfilling the energy requirements of rural Nepal to a great extent (WECS, 1995: 7).

Different social institutions such as Alternative Energy Promotion Centre (AEPC), Energy Sector Assistance Programme (ESAP)/ Rural Energy Development Programme (REDP), Rural Renewable Energy Service Center (RRESC- known as area center) / District Energy & Environment Sector (DEES) are acting to get expected result from MHP. Each area center has mobilized its field coordinators (henceforth FC) for each district to identify need of MHPs. Field Coordinator (FC) explains about MHP and helps UC in preparing and submitting the required documents for getting subsidy from different agencies.

All policies and processes designed by (AEPC) have a certain criteria like as community participation in planning, implementing and monitoring. But existing practices do not match with theoretical criteria. Theoretically, the UC must be involved in decision making, by the MHP, but the reality reflect something else. Instead of taking ordinary people's consent, the AEPC is taking consent only from elite UC members; thus disempowering the ordinary people and empowering local elites involved in UC.

There are various agencies such as Alternative Energy Promotion Centre (AEPC), Rural Energy Fund (REF) Energy Sector Assistance Program (ESAP) and Renewable Energy for Rural Livelihood (RERL), Renewable Rural Energy Service Center (RRESC), and District Energy and Environment Sector (DEES), working under the MHP in Nepal. All of the MHPs have adopted user group approach while constructing the micro-hydro project in the villages. There is people's participation in all stages of MHP installation and benefit sharing. Beneficiaries' households have to contribute cash and kind (labor) for the construction of MHP in their community.

Basically participation is a collective strategy of process of making development more successive and sustainable through grass root peoples' involvement. It is believed that this strategy might ensure community ownership over local resources and way out in mobilizing resources in community benefit. It asks individual community member's direct involvement in decision making for resources mobilization and make possible development. In development sector, the concept of people's participation is considered as an imperative approach to fuse development with democratic values. It believes in promoting people's rights in decision making in the entire development issues related to that particular community. It is almost unimaginable of development in the absence of people's participation. So, it is a process of development which enables each user to expose specific idea on community development, express decision on it and be equal stakeholder in benefit sharing.

MHP is a community based development organization has exercised participatory approach. Different dimensions of MHP such as investment, planning, decision making, implementing, monitoring, benefit sharing etc has helped to prove the concept. Grant is not enough all for the formation and operation of MHP. It is compulsory condition to have contribution allocated to be beneficiary. It assures the equal benefit sharing and collective ownership of MHP. It is sum of cash contribution is measured by out accessed total cost of project and kind contribution is measured with total duration of project formation and operation. Participation in MHP appears in three different levels: i) UC, the executive committee of planning bring the agendas, however, users are primary level in bringing the agendas but UC is seemed playing dominant role in planning

1.2 Statement of the Problem

Micro Hydropower Project is social organization. It has certain social norms and values regarding to achieve organizational objectives. Different social institutions have being involved to yield organizational objectives. It creates the potentialities of improvement of social, cultural and economic institutions broaden the transformation of society.

MHP as social organization has involved different actors from different social institution. It supposed to have equal significant participation for achieving organizational goal through accomplishing its objectives. However being the social organization, Micro Hydropower Project is seemed unequal in terms of leadership process to hold the executive role inside the organization and using imbalance power of authority privileged by community development concept and participatory approach (Tiwari, 1995).

Almost studies on micro hydropower project seemed conducted beyond the sociological stream. It has focused mostly on technical and environmental aspects and its Changes on electricity users. It artificially fragmented the existing social reality into economic, technical or environmental aspects and ignored all other phenomenon not related to this field. The studies conducted on have treated MHP only as product which Changes to people not to society in long term. It could not have strengthened weak understanding on MHP that it is a social organization involves different social institutions which produce and reproduce different social cultural, political and economic relationship into society (AEPC, 2013).

MHP is a social phenomenon is an essence of cooperation, coordination of different social institutions inside the organizations. Large numbers of people get involve through different institutions in its formation, installation and operation. It seems that the institutional or individual involvement other ordinary people (users of MHP) is a general involvement does not hold specific meaning and they have got just role of implementing tools of decisions made by local elites. Existing practice of process, situation shows that dominance of local elites such as political leaders, local businessman and teachers. Such leadership in MHP basically hinders what the ordinary actors or users of society want, particularly other such as farmers, other professionals in issues of collective planning, decisions making, implementing planning and so on.

Nepal is a diverse feature country. Here are innumerable hills, peaks and mountains. Because of the diverse features of hilly and mountains regions, which are sloppy and many rivers and rivulets flow forcibly from mountains to Terai regions. The hydropower energy is most feasible and alternative energy sources. Nepal is developing country, where 82.92 percent (CBS, 2011) people live in rural area, so the national grids are not suitable due to its high cost and roughed topography. In the context of Nepal and other countries, it is impossible to make the bigger than bigger hydropower it is the most expensive for make large-scale hydropower.

So the micro-hydro is the most, which is cost effective and feasible in many areas in Nepal. Although it is feasible and the input cost is also not high the plant are not successding in satisfactory way. Some are running with low efficiency and some are completely failed during the recent random sample survey conducted on about 10 percent sample of the total plants installed in Nepal, it was learned that around 30 percent of the total MHP are completely failed (East Consult, 1997).

Nepalese economy is based on traditional agriculture system. In addition to agriculture other sectors of economy such as industry, trade and commerce transportation, communication and tourism are to developed yet due to their inadequate electric power and financial resources. On the other in the absences of infrastructures like road and transmission line. Hydropower development cannot be achieved more over infrastructures are required for proper exploitation of other available resources in the country. Economic development has not got proper acceleration due to insufficiency of electricity.

The pattern of energy consumption is based on tradition resources particularly fuel wood dung, etc. The over exploitation of forest creates sensitive environmental problems, petroleum product are utilized for transportation, operation of machines and so on. The use of petroleum products creates environmental problems and large amount of foreign currency is needed to import the petroleum products. Nepal has limited sources of foreign currency exchange. As a result Nepal has been facing the problem of debt trap deficit and unfavourable balance of payment. on the basis of the above statement of the problem, following research questions are posed:

- What are the socio-economic and environmental status of the about peoples expectation towards micro-hydro project?

- What is the sustainability of micro-hydro power project do implementation in rural area?
- What is the relationship specialize towards Micro-Hydro power project and local people in the study area?

1.3 Objectives of the Study

The general objective of the study is to evaluate the Changes of Jharbang Chankhari Khola Micro-Hydro Power Project (Western Rukum district) in rural development on social, economic and environmental aspects and specific objectives of the study are as follows:

1. To study socio-economic and environmental status of the about peoples expectation towards micro-hydro project.
2. To study the sustainability of micro-hydro power project do implementation in rural area.
3. To study about peoples relationships specialize towards Micro-Hydro power project.

1.4 Significance of the Study

MHP as social organization, it is has multidimensional Changes and events on social cultural as well economic dimension of society. There is involvement of different actor of different social and cultural institutions and it is an organization build through different relationship. It empowers various possibilities of different dimensional changes and enabled social cultural transformation.

However, having a social organization and its relation with social and other institution of society, no more studies are conducted for. In the context, sociological study is that which tie up the entire social aspects concern and related to such organization. Such organization produce social product which plays dynamic role into society for its change and development. It is necessary to understand such organization sociologically to deconstruct causal relationship among the different social organizations. It is surely a powerful factor of social transformation. Therefore, present effort of study is to understand sociological dynamics in MHPs.

It would be the encouraging sociological study in the field of hydro energy development and would help to explore the causes and effects of hydro energy development for overall

development sectors, because hydro energy development and its promotion is one of the major development infrastructures for Nepal.

In the view of growing scarcity of fuel wood the other non-renewable energy sources and huge investment of commercial 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 effect for the upliftment in the life of rural poor, how far the projects is successding in terms of overall socio-economic upliftment of the rural people in their perception are leading issues that have been tried to access by this study. Moreover there are many studies adopted in MHP sector there are still lack of proper information and show documentation, which has analyzed the ground reality of socio-economic, gender and environment aspect of Jharbang Chankhari Khola Micro-Hydro Power Project. Hence this Changes study has been rounded on the pivot of rural poor and gender in socio-economic aspect.

1.5 Limitation of the Study

This research was conducted for this study is focussed on socio-economic Changes of the micro-hydro power project in the rural development of Nepal.

This is a project work mainly for a academic purpose based on information from secondary data and field survey suffered from certain limitation. The budget, manpower, theoretical and methodological limitation during research has been prevailed for the thesis work carried out by student. This study has been limited only to micro hydropower, which cannot be generalized especially to other types of plant.

The research has been limited in ward No. 4 and 5 the Triveni Rural municipality Western of Rukum district. The Changes that occurs by contraction of a Jharbang Chankhari Khola Micro-Hydro Power Project is the derivation of numerous social, economical effects. Thus the study has been limited only social, economical perspective. Moreover, the social indicators are less factual which had made some difficulties to analyze social Changes and pre-electrification information has been depended on the user groups saying and other secondary information.

CHAPTER – II

LITERATURE REVIEW

2.1 Development

'The post-World War II (Post 1950s) molded the product of development. It was institutionalized as Jeffry (1990) said to legitimize the hegemony campaign initiated particularly by USA. Many technical and financial grant supports were provided for the provision and still in continuation. For example it could be still seen getting grant and technical support such as in community forest management programme, community health programme, and community based micro hydropower projects too.

Ferguson (1990) has characterized development project as contradictory endeavor because it is not a progressive force but the reactionary one for marginalized society. It is strategy of colonization that colonizes the different level of society into single petty state at local level (Cardoso, Falleto, and Theotonio, 1973). As Frank (1968) said, development is a discourse of categorizing society into different category (macro level) then it could also be the strategy to social categorization at local level (micro level) too. Almost community development project are focused into those community, which are introduced as undeveloped society and actors of this course are not other than the local elites of different institutions (Frank, 1968).

Political factors are that which plays decisive and dynamic role for change (growth). Political ideology helps to promote those factors to be dominant in development in different level of society (Rostow, 1953). Development defined and applied through different approaches aim ultimately to transform the different institution (economic. political and others) society from existing one to another level and forms as well (Zaqf, 2004).

Development is that tasks which enables to different elite as actors control the society and its different institutions in different level through its different development organizations (Portes, 1990). The whole course of development is to maintain hegemony in different level of society applying different forms, level through different strategies and approaches (Ouden, 1997). It has applied different approaches and strategies (participatory approach) to control the society but the

result has promoted challenges for real development society whether level of society is matter where it is (Ouden, 197).

Hydropower schemes must have significant role in poverty alleviation, and raise the economic standard of the society. Electricity approach, children and woman empowerment and the infrastructure development are the positively influencing factors for making the society beneficial such as fresh drinking water and irrigation water, flood control, fishing profession development has convinced the people on the positive side of hydropower development in Nepal and many places have seen the uplifting of the overall social status. These Changess were mitigated by offering the cash compensation for those who lost their land, house and property. Alternative indirect mitigation measures were also taken in the projects including the rehabilitation of the affected families, providing thereplacement land and house and providing the job in the project according to their skill and qualification. This is the trend in Nepal and till today almost all the displaced people are rehabilitated. (Dahal and Shrestha : 2014)

Mostly proactive during the planning phase, the element involves the following considerations to ensure the sustainability of the project:

- Improved life conditions
- Improved health conditions
- Direct or indirect project benefits distributions
- Information and economics transparency (Dahal and Shrestha : 2014)

2.2 Community Development

Community development is a road travelling by both governments and development agencies was introduced during post World War II. It is concentrated into macro level micro level of community has achieved it in support of macro social institution and initiation of micro community organization (CRWRC, 2004). It is community based development project is an umbrella term that actively include beneficiaries in their design and management (Mansuri & Rao, 2004).

Community development is a solution of social problem which interacts with institutions, communities, and society at-large (Tan, 2009). It based on mobilization of common property (local recourses) and synchronizes the cooperation, coordination through action and interaction held between different actors of society. It ties up different institutional and individual relation into the principle standard of equal benefit sharing (Chamber, 1993). After introducing of the decentralization Act 1987 the concept of "user groups" as well as user committee for local control of local resource management and development. So, MHP based on common property is started to form, operate and manage by local people themselves since 1996 (AEPC, 2000).

The approach was a strategy to strengthen the development discourse in specific form and pattern. It had adopted the strategy of both top to down and bottom up approach in development discourse; however, both strategies are reverse to each other. Concept of community development is nothing but creation of each citizen's responsibility and participation in development activities (Meisel, 2006).

The core strategy since introducing of decentralized development concept, most of the community development are conducted through foreign aid. According to Mishra (2007) most of the foreign aid is articulated in infrastructural expansion. As a result the sector has gained an increasingly centralization and dependency characters (Mishra, 2007:165). However, the level and layer of centralization and dependency characters do not limit on particular. It has affects on macro, mezzo and micro level. Whereas it's depth might different. There are some evidence that community development project creates some infrastructures but most such projects are dominated by local elites, and both targeting and project quality tend to be more markedly worse more in unequal community (Mansuri & Rao, 2004).

Dams have been built for thousands of years - dams to manage flood waters, to harness water as hydropower, to supply water to drink or for industry, or to irrigate fields. By 1950, governments, or in some countries the private sector, were building increasing numbers of dams as populations increased and national economies grew. At least 45 000 large dams have been built as a response to meet an energy or water need. Today nearly half of the world's rivers have at least one large dam. (Dams & Development: 2000)

As we start the new century, one-third of the countries in the world rely on hydropower for more than half their electricity supply, and large dams generate 19% of electricity overall. Half the world's large dams were built exclusively or primarily for irrigation, and some 30-40% of the 271 million hectares irrigated worldwide rely on dams. Dams have been promoted as an

Important means of meeting perceived needs for water and energy services and as long-term, strategic investments with the ability to deliver multiple benefits. Some of these additional benefits are typical of all large public infrastructure projects, while others are unique to dams and specific to particular projects. (Dams & Development: 2000)

Regional development, job creation, and fostering an industry base with export capability are most often cited as additional considerations for building large dams. Other goals include creating income from export earnings, either through direct sales of electricity or by selling cash crops or processed products from electricity-intensive industry such as aluminium refining. Clearly, dams can play an important role in meeting people's needs. But the last 50 years have also highlighted the performance and the social and environmental Changess of large dams. They have fragmented and transformed the world's rivers, while global estimates suggest that 40-80

Million people have been displaced by reservoirs. As the basis for decision-making has become more open, inclusive and ntransparent in many countries, the decision to build a large dam has been increasingly contested, to the point where the future of large dam-building in many countries is in question. The enormous investments and widespread Changess of large dams have seen conflicts flare up over the siting and Changess of large dams - both those in place and those on the drawing board, making large dams one of the most hotly contested issues in sustainable development today. (Dams & Development: 2000)

2.3 Micro Hydropower Project

History of hydropower development (mega hydropower project, small hydro power project, small hydropower project and micro hydropower project as well) has accomplished a century in Nepal. It is as old as with Japanese history of hydropower development. Particularly, Micro Hydropower project (MHP) has accomplished the hundred years of history in the sector (AEPC, 2000: 3-4). The history of MHP begins with using of waterwheels in nineteenth century and was

most common way of generating electricity in the early 20th century. In terminological understanding, hydropower projects that generate up to 100 kilowatt, small amount of electrical power is called micro hydropower project (MHP) (www.microhydropowser. net/basics/intro.php, 23 Sep 2011).

The first Nepal's hydro power project (HPP) was Chandra Jyoti power house of 500 kilowatt, Pharping, Kathmandu initiated by Rana regime. It was just made to electrify in royal Rana family in Kathmandu and after 1980s onward MHP were initiated targeting to ordinary rural community people too (AEPC, 2010). Alternative Energy Promotion Centre (AEPC) / Ministry of Environment, a Government institution was established in 1996 to promote micro hydropower project, one of the source renewable energy with support of government grant (AEPC, 2000).

The establishment of MHP is understood as means of social and other changes. In this context, it has played a determinant role in rural development process. It is possible only in participation of all the ordinary local users where the MHP is been formation and operation. Ordinary local users are those who participate in investing cash and contribution as well as local skill and knowledge for MHP (Shah, 2007). According to the criteria given by the concept of community development, in context of MHP, Local people means those users who owned the MHP, involve on formation and operation; be equal eligible to share the benefit of MHP.

Micro hydropower, in context of Nepal is constructed to maintain the social equality. It has been Facilitating to lightening the rural household. It has no more end use provision which could promote the life standard of people of MHP as users. There are major two stake holding social institutions, one is Alternative Energy Promotion Center (AEPC), a government institution functions as a unit of ministry of Environment of Government of Nepal (GoN); and other is user committee (UC) at rural local community represents the entire users of MHP users (community people of MHP benefited local area). AEPC invest grant technical support and user committee known as community investment invests finance and kind contribution in support of local users. Community investment is equal portion of both cash and kind contribution of each household (AEPC, 2000). User Committee is that community organization, which represent to each user of MHP and form by all the users of purposed MHP. Rural Energy Policy (2063) and Subsidy policy (2066) has made policy to have public consent for MHP.

It promotes better living of rural people Participatory concept is most important in MHP due to size of budget, limitation in its resources and criteria for receiving subsidy from the government of Nepal. users and its representative UC approach is applied to manage MHP like as community forest management system in all stages, from decision making to harvesting by keeping hope of positive social change through adapting political, economic, or physical environment in Nepal (USAID,2006). The MHP system is development project managed and operated by local people. They are provided training with support of AEPC / ESAP and REDP (RERL since 2012) for its operation and energy generated through lighting purposes (Dhungel, 2009:10). Rural electrification through micro hydro project have played significant role for sustainable rural development (ESAP II/AEPC, 2009/10).

Hydro projects that generate up to 100 kilowatt, small amount of electrical power is called micro hydro project (MHP) (AEPC, 2000: 3-4). The history of MHP begins with using of waterwheels in nineteenth century and was most common way of generating electricity in the early 20th century. So, numerical values of MHP show that 1920s was decade of MHP because more than 80,000 MHP plants were constructed in Asia and Europe (www.microhydropowser. net/basics/intro.php, 23 Sep 2011).

There are imbalances in power and access to assets to be present in micro hydropower project, as local elite often tends to control the decision-making of MHP user committee power of authority use unequally. This power imbalance relates to, and is typically reinforced by, socio-economic, cultural, and institutional factors. Equity, on the other hand, refers to social justice, and a political or social situation of process in which, people, particularly the poorest of the poor and the socially marginalized, have fair access to assets and decision-making (UNDP, 2004, Ojha, 2004, Wollenberg et al., 2005). According to Ojha (2005) in equitable society, "people can develop their full potential and lead productive and creative lives in accord with their needs and interests…. (and) participate in the life of the community".

2.4 Community Organization

Community development organization is such a social product produced through package of development was for reducing poverty and famine (Tan, 2004). It is the projected concept by outsider implemented in local level to maintain state ship is replication of state- and nation-

building of macro level such as western campaign Ferguson (1990). It is a mysterious structural processes comprehended and practiced in partial and discrete manners (Mishra, 2007).

Various scholars such as Ostrom (1992), Meisel (2006), Dhakal (2004), Pokharel (2009), Chhetri and Gautam (1996), etc, have highlighted the various aspects of community development and people's participation. Community development began as a social movement and has been a growing as a industry since the mid twentieth century. After realizing the ambiguous understanding of the concept of community development, it was seen as new discourse in development sector (Meisel, 2006). Community development was implemented through community organization or community development such as in community forest management, an irrigation projects was understood as synonymous concept in development (Ostrom, 1992:8).

Dhakal (2004), Pokharel (2009) in the past have done studies on community organizations and community development process in Nepal. Both of them have shown how development process open space for some people. According to Dhakal (2004), participation in community development is socially embedded at local level and sets the condition in public space. So it requires exploring and considering assessing level and reason of different realities that some people participate and not others or participating just to avoid fear of social exclusion. Community Organizations (CO) is a driving political bureaucratic concept based on political ideology such as User Committee over general users. About structure of CO, Pokharel (2009) writes, COs are sometimes crafted by a dynamic and outstanding individual who is already a well known politician or who has entered political life on the basis of being COs leader, keeping aims such as access on resource mobilization of population and increase influence over the people. It appears as law maker and acts as ruler to achieve the political goal through exercising executive power of authority.

2.4.1 Participatory Approach

It can be said that participatory concept refers to 'local' peoples' perspectives, knowledge, in sustainable, relevant development and empowerment by ensuring the central state's mainstream development process, which increases and encourages beneficiary involvement of socially and

economically marginalized peoples. It stands up on representation and consent on basis of local knowledge and village plans shaped by pre-existing relationships among community people (Cooke and Kothari, 2001). Development paradigm changed to "development from below" after its failure and criticism over it by 1960s (Stohr & Frasetylor, 1989). It avoids the gap of community development by people's direct and active involvement in decision making, planning and implementations. It was the outcome of a search for an alternative to the conservative mainstream development models that put economic growth without focusing on participation (Maharjan, 2008).

As a discourse, it has become a force so destructive to third world culture, ironically in the name of people's interests. Marxist social scientists, such as Freire (1993), Escobar (1995) and Scott (1998), supported the movement by arguing that the top-down perspectives adopted by conservative conventional developmental approaches so far were both disempowering, ineffective and counterproductive, influential effort to shift the focus of development from material well-being to a multidimensional capacity approach.

2.5 Manipulated Strategy in MHP

The establishment of MHP is understood as means of social and other changes. In this context, it has played a determinant role in rural development process. It is possible only in participation of all the general users and it promotes better living of rural people (Shah, 2007). Participatory concept is most important in MHP because it own by users, form and operate by users. Users invest time, money and skill and knowledge as well. They utilize the local resource i.e. small stream, jungles to harvest wooden poles for transmission and distribution work. They do manage and allocate fund themselves. User committee form to initiate the MHP. It holds the executive rights and duties regarding the MHP. So, users and its representative UC approach is applied to manage MHP like as community forest management system in all stages, from decision making to harvesting by keeping hope of positive social change through adapting political, economic, or physical environment in Nepal (USAID,2006). The MHP system is development project managed and operated by local people. They are provided training with support of AEPC / ESAP and REDP (RERL since 2012) for its operation and energy generated through lighting purposes

(Dhungel, 2009:10). Rural electrification through micro hydro project have played significant role for sustainable rural development (ESAP II/AEPC, 2009/10).

The experience have shown that there is no attempt from past on implementations done to improve opportunities and minimize constraints to people's effective participation in MHP like community forestry. Bureaucratic structures on the whole do not know how to get people's participation (Lohani, 1980). The theme of people's participation is to ensure individual involvement in decision making level as well as planning and operating the project. But all the ordinary users cannot participate equally because economic factors play decisive role in their participation. It is an outcome of ownership, control and access over resources within circumstances of resources mobilization (Gurung, 1986). Participation should be seen in decision making on relevant issue (Luitel, 1990). People's participation has relativity in practice due to its variety in understanding, implementing and taking benefit. Sometimes, the local elites capture the benefit more than general communities, because all general people are capable of active participation in decision making for benefit sharing (Chhetri and Gautam, 1996).

2.6 Conflict in Community Development

In general understanding, community development is an essence of participation based on available natural resources and its mobilization directly or indirectly. The concept of community development known as decentralized development approach has manipulated the strategy of participation. Participation does mean cooperation and coordination of users. So, Baker and Ostrom (1995) have concluded that ecological system and status of available resources inside it is responsible for shaping human behavior which determines both cooperation and contradiction. Processes and forms of development are dependent on resources. The size and number benefited household would determine by available degree of resources. How the size of local resources, it allow to form the related size of development project like MHP. MHP, its size is determined by the available quantity of water and geographical structure (land gradient) (AEPC, 2000). The size of MHP defines the number of Household beneficiaries. Participation does not mean compulsory investment in project. As Webler (2001) said, people could deserve the right to disagree about what is inappropriate in specific context which emerges conflict concerned with process (Webler, 2001).

If development is the motion, participation is energy for its motion. Participation and development are such two concepts which exist together in development projects (Warner, 2000). Mostly conflict appears in development project due to major two issues; first, relating with contribution for project and second, relating to issues of equal benefit sharing (Ruckstuhl, 2004). It is expected that development brings harmony, prosperity, cooperation and sustainability in community. The development agencies should aim at 'doing no harm'. But development or development project like MHP in Nepal may cause conflict, if development organizations or agencies ignore ethnic or local composition of project located area (UNDP, 2003). Development project itself is not source of conflict; it is more responsible for conflict as to how the project based on local resources mobilization is designed and such benefit sharing, decision making affected; Or how the collective interests of local elites make community development project to fulfill their personal interests (Mähler, Shabafrouz & Strüver, 2011).

This review section is focused on carrying out what is development and community development. It also reviewed the concept of community organization inside community development project and concept of participatory approach, concept of micro hydropower project and applied approach in micro hydro project as well. To know how the leadership and participation process goes on inside community organization of community development project. How the local resources are mobilized in community development and who are the major actors of community development and why?

But it was found that all the reviewed literatures were focused on analyzing the macro level development where micro level development processes are equally important in Nepal. All most all literatures have analyzed only good Changes rather than critical analysis such as community forest management. Community development projects are being the political arena to exercise the power of authority over the ordinary users. However, it was found that it is not critical about leaders and leadership characteristics related to community development projects and its effects on existing social cultural relationship.

Community based development activities are the cores of overall development agenda and intention of any kind and any level of development concept. It is similar to reviewed literatures because on the basis of these literature, this study is concerned on to explore, explain and

interpret the community based development activities on how it is being the scale to people in different level and preferential right to enjoy the power of authority in micro level. It is different in that sense that it has tried to explore how macro level development agenda are being the privileges for micro level local elites. This study has also given priority to community based development particularly to micro hydro energy (micro level), because almost study of MHP is focused macro level economic and technical aspects only.

It is also focused on to explore and explain sociologically how participatory community development project is practicing and how ordinary users are taking part in it; and why only the economically, academically well strong persons or local elites are being the leaders. The researcher found no more sociological literatures on community development particularly in micro hydro and its relation with society and its Changes on socio - cultural as well as economic and other aspects.

By the end of 1995 a highly committed project team had sensitively built relationships with people in a handful of the poorest adivasi villages in a remote corner of western India. Slowly over three years they earned a remarkable level of local trust and credibility, by helping farmers identify and test improved rice and maize varieties for poor upland soils with few inputs, providing them with credit, initiating low-cost soil and water conservation work, deepening wells, providing tree seedlings, vegetable seeds and improved breeds of goats and chickens, and mediating external connections. Through constantly meeting, sitting, discussing, explaining ideas, conducting PRAs and CPAs, taking men and women to distant research centres or

bringing government experts and administrators to their doorsteps, they exposed Bhil villagers to new technologies, ideas and ways of thinking. Daily they collided with the unfamiliar contours of Bhil society and understood them a little better, responding flexibly to a complex social and institutional environment, learning a lot as they groped for successful interventions, sometimes drawing on *ad hoc* interventions based on 'off the shelf' development ideas or government schemes. Villagers would themselves readily contrast IBRFP with earlier experiences of missionaries: here were outsiders who respected their worldview and lifestyle and with whom they gladly did business. (Davis: 1989).

Limited research has been conducted on energy, socio-economic and environmental Changes of micro-hydro power scheme projects. There are many studies in other sector of micro-hydro projects. Generally, the studies on medium and large, small and micro-scale hydropower projects have been conducted to identify various types of Changes created by the rural development of micro-hydropower projects.

HMG/N 2000 – Annual Report of Rural Energy (UNDP, Supported Rural Energy Development Program). This is the fairly informative report prepared by REDP, which has include the information of rural energy sectors. The principal aims of this report are to give the message to the people about rural energy related areas; to appraise the Changes of energy and its related components. It tries to demonstrate the development path of rural energy sector, to review on rural energy sector policy and to raise the issues and give the solution of the rural energy sector problems for the sustainable development.

The report mainly focuses on the information of execution of working to increase the level of energy services to poor citizens in the village of Nepal through technological development including micro-hydro, solar, biogas, improved cooking stove etc. This reports connotes that the increased population increase the demand of resources that puts further pressure on the forest which is already in determine processes in Nepal. Desertification, ecological instability, loss of biodiversity, drying up of water springs is some of the serious environmental consequences of massive deforestation. So most of the energy needed can be fulfilled by the big hydropower projects but which is focused only one urban areas. This efforts has largely ignored the rural population. This reports raises the majors' issues and focuses on the promotion of rural energy.

This study glimps, the present trend of micro-hydro power, illustrating that most of the MHP schemes have been installed for mechanically driving agro-processing unit like grinder, huller and oil expeller, whereas other end uses are few and far from the low cost application and the local resources utilization through micro-hydro plants. The report concludes that there are inconsistencies in policies support and implementation of micro-hydro, and other, rural energy technology. These inconsistencies are, lack of technical and managerial skills for operation and main finance among the rural population, weak co-operation among the delivery agencies and inadequate information about the technology in rural sector.

Shrestha (2015) "Role of Hydro-electricity in economic development" mentions that the development of hydro-electricity is possible due to the enormous water resources as well as favourable topographic and climate condition. Hydro-electricity has tremendous advantages for the people, and its helps to develop energy sector 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 experiences show 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.

My Life Has Changed: Has Yours? Mr. Ghanashyam Budhachhatri was born in Babiachaur VDC of Baglung District. He comes from an economically deprived and poor background. Although literate, he was not able to use his education in his village. Because he did not have enough land to cultivate in order to support his family, he was forced to go to India for several months at a time in search of seasonal employment. When the Khamari Khola micro hydro project was launched in his VDC, a skilful locally-based operator was needed to provide emergency services for the plant, if and when required. When he applied for the job, Mr. Budhachhatri did not think he would be selected because of his social background, and those of his competitors. He was proven wrong. An entrepreneur by nature, Mr. Budhachhatri is now also successful in the furniture business, which he runs using the electricity produced from the same hydro project. Between his business and his job, he now earns around NPR 18,000. Interestingly, with his new status as a technical operator, the attitude of the village residents towards him has also changed drastically. Earlier referred to by a shorter name, he is now politely addressed as Mr. Ghanashyam ji. (AEPC - 2013)

Actually micro-hydro plant is very necessary for Nepal as well as rural areas. Where the national projects cannot cover electrification, in such places the small project known as micro-hydropower plant may be very useful. The micro-hydro power project conducted in district head

quarter as well as another places cannot cover the whole district. So the Jharbang Chankhari Khola Micro-Hydro Power Project must be suitable and usable.

CHAPTER – III

METHODOLOGY

3.1 Introduction to Study Site

There are ten districts in Karnali Province, among them western Rukum is one district which is known as remote and backward. There are three Rural Municipality and three Municipalities in Western Rukum district. The study site is mainly located in Triveni Rural Municipality ward No. 4, and 5 in Western Rukum district. There is cast and ethnic diversity in the study areas. It is one of the interesting for the researcher of sociologist. Triveni Rural Municipality ward No. 4 is the birth place of the present researcher so it is very much easy for rapport building for research. Present researcher is familiar with the place and people of the study areas so it is easy to conduct the present research.

3.2 Research Design

The research design was adopted in this study is descriptive as well as analytical types. The fundamental objective of this study is to analyze micro hydro and social changes. In this study, the descriptive research design helps to know the socio- economic changes. On the other hand, the analytical research design helped to analyze the major effects of the society on the study area.

3.3 Nature and Source of Data

Nature of data were Quantitative and qualitative. This study was based on primary data. The primary information was collected from field survey. Additionally, secondary data was also included in this study from different sources such as survey reports, feasibility reports and journals etc.

3.4 Universe & sampling

There are 83 micro hydro power in Rukum district which is the universe of the study. In course of study, it is no possible to study all micro hydro in Rukum district. So, this study was done on Jhar Chankhari Khola Micro hydro project.

The respondents of this study are having using electricity by Jharbang Chankhari Khola Micro-Hydro Power Project. There are 312 household in the study area which is the universe of the present research. 20.83 percent of total household (i.e. 65) was selected by Simple Random Sampling Method.

3.5 Techniques of Data Collection

For this study data were collected through direct personal interview with help of structured questionnaire and observation method.

3.5.1 Questionnaire

For the collection of information about socio-economic Changes of Jharbang Chankhari Khola Micro-Hydro Power Project.The questionnaire is consisted open-ended as well as closed ended questions. The questionnaire is divided into three sections. First section of questionnaire covers socio-economic Changes, second section covers expectation relationship and third sustainability of Jharbang Chankhari Khola Micro-Hydro Power Project.

3.5.2 Interview

Interviewing is one of the major methods of data collection in qualitative research. It may be defined as a two-way systematic conversation between an interviewer and an Informant, initiated for obtaining information that is relevant to a specific study. Furthermore, it can be defined as a face to face verbal Interchange in which one person, the interviewer, attempts to elicit information or expression of opinion or belief from another person or persons. Face to face interview was held in the Tribani areas of West Rukum .

3.5.3 Observation

In order to assess required information researcher observation and experience was also considered as information source as where necessary. The inspection of the researcher at different level has helped to sketch out some information regarding micro hydro power. The researcher had observed the activities at HHs level and visited concerned personalities. Similarly

the level of awareness and utilization as well as social changes through micro hydro power in the study areas.

3.6 Data Processing andData Analysis

Field questionnaire was carefully checked for possible errors. The data was carefully edited and processed by traditional method i.e. Tally bar, then the required tables was generated by using computer software program. The data are collected through personal interview and presented in suitable tables. They was analysed and tabulated according to the objective of the study. The method of data analysis is descriptive.

CHAPTER – IV

MICRO-HYDRO POWER AND SOCIAL CHANGE

The chapter four includes the analysis and interpretation of data. For this purpose data are tabulated at first then analyzed. This chapter is divided in to three sub-chapters. The first part of the chapter covers the socio-economic Changes of Jharbang Chankhari Khola microhydro power. Second part covers the attitude expectation of community towards micro-hydro-power project, and third part of the chapter covers the relationship and sustainability of micro-hydro-power project in the rural area.

4.1 Socio-Economic Changes

There may be so many Changes of everything; the first part of the chapter covers the socio-economic Changes of the Jharbang Chankhari Khola Micro-Hydro Power Project. This study is focused specially what types of change occurred in social as well as economic sector. Then what kinds of effect have seen in environment after the plant implemented. For detail different related data are tabulated and interpreted as follow.

4.1.1 Caste/Ethnicity

Nepal is rich in caste/ethnic Nepal is also known as common garden of different caste/ethnicity and language. So there are different caste/ethnicity in the study area. It is attempted to present the caste/ethnicity group separately. Mainly there are so many Chhetri, Dalit and Janajati people. The table 4.1 shows the distribution of respondents by caste/ethnicity.

Table 4.1

Distribution of Respondents by Caste /Ethnicity

Caste	Number	Percent
Chhetri	43	66.15
Dalits	14	21.53
Janajati	8	12.30
Total	65	100.00

Source: Field Survey, 2017.

The table 4.1 shows the distribution of respondents by caste/ethnicity. Out of the total 65 respondents highest proportion is known Chhetri i.e. 43 (66.15%). Then lowest proportion is known Janajati i.e. 8 (12.30%) and out of the total 65 respondents i.e. 14(21.53%) are Dalit.

In addition, some of the Rural municipality of Western Rukum are dominated by indigenous people like, Chhetri, Dalit, So Janajati proportion is found highest. The interview is also focused on such types of respondents.

Nepal is a rich in caste/ethnic Nepal is also known as common garden of different caste/ethnicity and language.

4.1.2 Change in Living Standard

The modern facilities mostly affects in 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. The table 4.2 and 3 shows that aggregate status of living standard after electrical facility.

Table 4.2

Change in Living Standard After Electricity

Change	Number	Percent
Yes	65	100.00
No	0	0.00
Total	65	100.00

Source: Field Survey, 2017.

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. 65 (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.

4.1.3 Status of Family Income

Family income is crucial significant for the betterment and prosperity of the family members as well as whole society. Micro- hydro power project play significant role for the income generating activities.

Table 4.3

Status of Family Income After having Electricity

Status	Number	Percent
Increased	50	76.92
Decreased	8	12.30
No changed	7	10.76
Total	65	100.00

Source: Field Survey, 2017.

The table shows that the status of family income of respondents. Out of total 65 respondents highest proportion i.e. 50 (76.92%) reported that their family income has increased. Among 65 respondents only 8 (12.30%) reported their family income decreased after using electricity and remaining 7 (10.76%) respondents reported their family income is in neutral situation.

To sum up, those respondents 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. Those people who have credit of loan when interested in MHP. They reported that their family income decreased. Some of the respondent's income neither increased nor decreased. They are living in neutral position after electricity.

4.1.4 Food Supply

Nepal is known as agriculture based country. Most of the people i.e. 65.6 percent (CBS, 2011) are farmer in Nepal but they have not able to meet basic needs by crops and livestock. The Table 4 shows the status of crops and live stock i.e. either the crops and live stock are able to meet their annual food demand or not.

Table 4.4

Status of Crops and Livestock

Status	Number	Percent
Yes (Sufficient)	29	44.41
No (Not Sufficient)	36	55.38
Total	65	100.00

Source: Field Survey, 2017.

Nepal is known as agriculture based country. Most of the people i.e. 65.6 percent (CBS, 2011) are farmer in Nepal but they have not able to meet basic needs by crops an livestock. The table shows the status of crops and livestock i.e. either the crops and livestock are able to meet their annual food demand or not. Maximum proportion i.e. 36 (55.38%) out of 65 respondents reported that they are unable to meet their annual food demand by crops and livestock. Remaing 29 (44.61%) respondents reported they are able to meet their annual food demand by crops and livestock.

To sum up Dalit and Janajati are known as backward and indigenous. So they have not proper land for cropping and livestock and unable to meet their basic need as well as annual food demand. Those people who has medium level land and other grassy land they are able to meet annual food demand of by crops and livestock.

4.1.5 Situation of Irrigation

Irrigation is known as the important factor for farming. There is not chance of maximum production of crops in the absence of irrigation. The study area is located in hilly region. It is attempted to find out that either there is facility of irrigation or not.

Table 4.5

Situation of Irrigation in Farm

Irrigation	Number	Percent
Regularly	11	16.92
Irregularly	54	83.8
Sometimes	0	0

Total	65	100.00

Source: Field Survey, 2017.

The table shows that the availability or situation of irrigation in study area. Out of 65 respondents, maximum proportion i.e. 54 (83.8%) respondents reported that they have not irrigation facilities in their farm. Remaining only 11 (16.82%) respondents has irrigation facility in farm.

To sum up, irrigation is necessary to produce sufficient crops and other eating sources, but the absence there is not proper management of irrigation in rural and hilly regions. This may also affects negatively in socio-economic status.

4.1.6 Status of Forest

The infrastructural development may affects in natural resources like forest. It is attempted to find out the condition of forest in the study area. What kinds of effect has seen in the forest, shows the Table4. 6.

Table 4.6

Status of Forest After Project Launched

Status	Number	Percent
Destroyed	11	16.92
Reformed	49	75.38
No change	5	7.69
Total	65	100.00

Source: Field Survey, 2017.

The table and picture shows the status of forest after the project launched with reference to environmental Changes. Out of the total 65 respondents maximum proportion i.e. 49 (75.38%) reported the forest have been reforming or improving. The lowest proportion i.e. only 11 (16.12%) respondents reported the forest is destroyed. Remaining 5 (7.69%) respondents reported the status of forest is no change same as before.

To sum up, most of the people have been using the firewood as fuel and other lighting purpose in rural area. After launching the MHP all people have been using the electricity as main lighting source and some of the people started to use heater for cooking, Therefore, forest has not been destroying but improving. This is the positive symptoms of electricity in conservation of natural resources and environment.

4.1.7 Status of Sanitation

People most be care about indoor and out door sanitation. In the negligence of sanitation there may happen different kinds of problems. Human health have been riskly with out sanitation. It is hoped that people would be able to get awareness and sensitive about sanitation after using modern technology. Electricity is also known as modern technology therefore it is attempted to find out the status of sanitation after electricity in the study area (Table 4.7).

Table 4.7

Status of Sanitation after Electricity

Status	Number	Percent
Improved	39	60
Same as before	26	40
Total	65	100.00

Source: Field Survey, 2017.

The table shows the status of sanitation after electricity with reference to environmental Changes. Out of 65 respondents maximum proportion i.e. 39 (60%) reported the sanitation is improved. Remaining 26 (40%) reported there is not any change occurred in sanitation after electricity i.e. same as before.

To sum up, who have proper knowledge that what is the use of electricity those people changed their behavior and cared about indoor and outdoor sanitation. It is proved that most of the negligence about sanitation happened at the time of night. But after electricity people have been using the lighting time to remove the pollution.

4.1.8 Changes of Project

Changes of MHP project in human health may be positive and negative both. It is attempted to find out how many respondents positively and negatively affected by this after MHP with referenc to human health (Table 4.8).

Table 4.8

Changes of Project on Human Health

Changes	Number	Percent
Positive	51	78.46
Negative	0	0
No change	14	21.54
Total	65	100.00

Source: Field Survey, 2017.

The table presents the Changes of project on human health. Out of total 65 respondents maximum proportion i.e. 51(78.46%) reported that the electricity have occurred positive effect on human health. Minimum proportion i.e. 14 (21.54%) respondents reported that electricity may not affect on human health. Nobody respondents not found in the support of negative effect.

To, sum up, people of rural areas have been using the most firewood and kerosene for lighting or lamp. After the MHP people have drown up the use of kerosene and firewood as lamp then they are faraway from such types smoking and feeling easy and healthy.

4.1.9 Effect in Drinking Water

Some of the constructions may effects on different sectors. Electricity is nearest to water, therefore, it may affects on drinking water in some places but not everywhere. This table 4.9 presents the situation that what is the effect of projects in drinking water supply.

Table 4.9

Effect of Project in Drinking Water Supply

Effect	Number	Percent
Yes affect	-	-
No affect	55	84.61
Unknown	10	15.39
Total	65	100.00

Source: Field Survey, 2017.

Out of the total 65 respondents, maximum proportion i.e. 55 (84.61%) reported that the project has not affected on drinking water. Only 10 (15.39%) respondents reported that he is unknown about any kinds of effect. No body told whether the project affected on drinking water.

In addition, it can be proved that the main origin of MHP water and drinking water are in different places.

4.1.10 Establishment of Industries

Electricity is main foundation of any kinds of industries. Without electricity no one industries can be conducted. Although the MHP is known as small scale but it is attempted to find out that what types of industries are there established or not? (Table 4.10)

Table 4.10

Establishment of Industries After Electricity

Establishment	Number	Percent
Yes established	10	15.39
No established	55	84.61
Total	65	100.00

Source: Field Survey, 2017.

Among 65 total respondents maximum, proportion i.e. 55 (84.61%) people reported that the industries are not established after electricity in their village. But lowest proportion i.e. 10 (15.39%) reported that the industries are established in their village or ward.

To sum up the researcher asked the questions to respondents either industries are established or not in their village or especially in ward. The respondents who are from industries ward they told

yes and who are not from those ward where industries are not established they told no. Flour mill and oil mill is established there after electricity.

4.1.11 Status of Education

Nepal is stated is second position with reference to water resource in the world. Most of the rural areas of Nepal have been dark at the night. People have been using kerosene and burning firewood for light. By this situation schooling aged generation is mostly affected. It is attempted to find out that what is the status of student's education after electricity (Table 4.11).

Table No. 4.11

Status of Student's Education After Electricity

Status	Number	Percent
Improved	46	70.76
No improved	15	20.07
Unknown	4	6.16
Total	65	100.00

Source: Field Survey, 2017.

Among total 65 respondents most proportion i.e. 46 (70.76%) reported that the education status of their children is improved. Lowest proportion of respondents i.e. 4 (6.16%) respondents is unknown about their children's educational status and 15 (20.07%) respondents the education reported that status is not improved or same as before and after electricity.

In addition, most of the guardian of schooling children found that their children have been studying at the night time using electricity by this situation, it can be said that most of the student's educational status is improved after electricity.

4.1.12 Pollution by Project

There are different kinds of pollution. In this stud y 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? The table 4.12 and 4.13 shows about that.

Table No. 4.12

Status of Environmental Pollution After the Project

Pollution	Number	Percent
Yes	20	30.76
No	45	69.24
Total	65	100.00

Source: Field Survey, 2017.

Most of the infrastructure may occur the environmental degradation and pollution. In this situation a question was asked either there is environmental sound pollution or not in the study area. Out of the total 65 respondents. Most proportion i.e. 45 (69.24%) reported that there is not any kinds of environmental pollution and remaining 20 (30.76%) respondents reported there is environmental pollution after project.

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 study area.

Table No. 4.13

Type of Pollution Occurred After Project

Type of pollution	Number	Percent
Landslide	10	50.00
Rock fall	5	25.00
Soil erosion	5	25.00
Total	20	100.00

Source: Field Survey, 2017.

Out of 65 total respondents only 20 respondents reported that there is environmental pollution after the project. The researcher asked them what kinds of pollution occurred after the project. Out of 20 respondents maximum proportion i.e. 10 (50%) respondents reported landslide occurred in the place, 5 i.e. (25%) respondents reported rock fall and 5 (25%) respondents reported soil erosion occurred after the project.

To sum up, there is minor environmental pollution occurred after the MHP plant.

4.1.13 Trend of Migration

Naturally people want many more facilities and easy living. Where the availability of services people wants to move there from another places. There is two factors of migration, those are pull factors attracts the people and push factor push the people from origin. Electricity is one of the important pull factor in urban areas. To find out the such types of situation the table 4.15 presents the migration trend after the MHP implementation in the study area.

Table 4.14

Trend of Migration After Project

Trend	Number	Percent
Increased	0	0.00
Not Increased	65	100.00
Total	65	100.00

Source: Field Survey, 2017.

Out of 65 respondents i.e. 65 (100%) respondents reported that migration trend is not increased that means there is not entrance. There is not immigration and emigration of men.

In addition, the MHP is implemented in rural area; therefore there was not chance of immigration and emigration.

4.2 Attitude of Community Towards MHP

The chapter four is divided into three section according to objectives. In this sub-chapter or section it is attempted to find out the thinking, feeling and vision of the community towards MHP. What kinds of mind making with respondents for MHP related data are tabulated and analyzed.

4.2.1 Effects In Social and Culture

The invention of new technology can effect directly and indirectly in different sectors. The electricity is also knows as modern technology in rural areas of Nepal. The table 4.16 and 4.17 presents the effect of plant and factors affected by MHP in social and cultural properties.

Table No. 4.156

Effect of Plant in Social and Culture Properties

Effect	Number	Percent
Yes	48	73.84
No	17	26.15
Total	65	100.00

Source: Field Survey, 2017.

Among the total 65 respondents highest proportion i.e. 48 (73.84%) respondents reported that the plant affected in social and cultural properties. Likewise among 65 respondents lowest proportion i.e. 17 (26.15%) respondents reported the MHP has not affected on social and cultural properties.

In addition modern services directly and indirectly affects in traditional attitudes, eating, speaking, clothing and behavior. So MHP has also affected in social and cultural properties.

Table No. 4.16

Factor Affected by Project

Factors	Number	Percent
Change in behavior	25	38.46
Change in thinking	18	27.69
Change in fashion	12	18.46
Others	2	3.48
Total	65	100.00

Source: Field Survey, 2017.

The table represents the respondent's attitudes towards project, so it is attempted to find out the factors affected by the MHP. Of the total 65 respondents 65 reported the project can affects the social and cultural properties, therefore the question is asked for them what are the factors affected by the plant? In this question among the total 48 respondents, highest proportion i.e.25

(38.46%) reported change in behavior. Lowest proportion i.e. 2 (3.48%) reported in other factors. Likewise change in thinking constitutes 18 (27.69%) change in fashion, 12 (18.46%) respectively.

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

4.2.2 Feeling/Concept of People

Feeling or concept refers the any kinds of response towards and things. People have either satisfaction or dis-satisfaction toward electricity. What they have been feeling after MHP established. It is attempted to find out that what is the feeling of people towards electricity in the study area (Table 4.17).

Table No. 4.17

Feeling of People Towards Electricity

Feeling	Number	Percent
Satisfied	42	64.61
Unsatisfied	11	16.92
All right	12	18.46
Total	65	100.00

Source: Field Survey, 2017.

Among total 65 respondents highest proportion i.e. 42 (64.61%) reported that they are satisfied by electricity service. The lowest proportion i.e. only 11 (16.92%) respondents reported they are unsatisfied and remaining 12 (18.46%) respondents reported all right.

In addition electricity facility is closely related with human life. It is not only necessary in day time, but also in might 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 must of the respondents are satisfied by electricity.

4.3 Sustainability of MHP

Invention of anything is not only better itself, but also repairing and maintenance should be necessary. There is not worth of construction in the absence of sustainability. For this purpose this third part of chapter four includes the ways of sustainability of MHP in rural area. What kinds of methods and ways should be implemented for maintenance, which must be responsible for operation and maintenance? Here is attempted to explain the ways of sustainability. Related data are tabulated and analyzed respectively.

4.3.1 Operation Schedule

A clothes needs to be washed, houses needs to be colored and so many things needs repairing and maintenance. So that there is necessity of operation schedule in powerhouse. It is attempted to find out that either there is operation schedule or not, regular or irregular schedule have been practiced (Table 4.18).

Table No. 4.18

Status of Operation Schedule in Power House

Operation schedule	Number	Percent
Regular	50	76.92
Irregular	15	23.07
Total	65	100.00

Source: Field Survey, 2017.

The table shows that the statuses of operation schedule in powerhouse. Among the total 65 respondents highest proportion i.e. 50 (76.92%) respondents reported that there is regular operation schedule in powerhouse and remaining only 15 (23.07%) respondents reported there is not regular operation schedule in powerhouse.

To sum up it is known that repairing and maintenance is necessary every non-living things. So MHP must needs repair and maintenance. That makes things sustainable. Most of the people are known about operation schedule and least people unknown about that.

4.3.2 Peoples' Responsibility

Responsibility is also known as accountability. Everything needs maintenance. For this purpose some one must be responsible. In this study it is attempted to find out who is responsible for maintenance, what is the concept of people (Table 4.19).

Table No. 4.19

Concept of People Towards Maintenance Responsibility

Responsibility	Number	Percent
User	12	18.46
User committee	53	81.53
The plan owner	0	0.00
Total	65	100.00

Source: Field Survey, 2017.

The table presents the concept of people towards maintenance responsibility. Among 65 respondent highest proportion i.e. 53 (81.53%) respondent reported the maintenance responsibility goes to user committee and remaining 12 (18.46%) reported on the favor of users. Nobody reported on the plant owner.

To sum up it is known that "it take to makes a quarrel" therefore user community and a kind of committee organized by selected people must take such responsibility.

4.3.3 Women's Participation

Women are backward in our society with reference to every issue. They have not courage and proper knowledge about every subject matter. Men and women are known as two cards of a wheel but it is limited only in saying not in reality. It is attempted to find out the status of women's participation in maintenance and use of electricity by a question high, low or zero (Table 4.20).

Table No. 4.20

Status of Women's Participation in Maintenance and Use of Electricity

Status	Number	Percent
High	21	32.30

Low	25	38.46
No	19	29.23
Total	65	100.00

Source: Field Survey, 2017.

The table shows that status of women participation in maintenance and use of electricity. Out of the total 65 respondents highest proportion i.e. 25 (38.46%) reported that women's participation is low in maintenance and use of electricity. Likewise lowest proportion 21 (32.30%) reported high and remaining 19 (29.23%) reported there is not women's participation in maintenance and use of electricity.

To sum up it is known that "Men and women are two cards of wheel." So equal opportunity and participation is necessary in maintenance and use of electricity. Due to lack of awareness and traditional thinking women's participation is constituted low proportion.

CHAPTER – V

SUMMARY AND CONCLUSION

5.1 Summary

Nepal has occupied the second position in the field of the water resource in the world. The feasibility is shown there may be possibility of 83000 MW electricity but nowadays load shading is known as burning issue in Nepal. In this complex context lower power MHP may be note worthy in the rural areas of Nepal. The Jharbang Chankhari Khola Micro-Hydro Power Project is known as an innovative attempts by a courageous.

This has brought noteworthy modification on the rural society.

This is a descriptive study designed to find out the socio-economic Changes of micro-hydropower project of Jharbang Chankhari Khola Micro-Hydro Power Project, Western Rukum.

For this proposes different chapters are included in the study. First chapter includes background, statement of problem objective of the study significance of the study and limitation of the study. Chapter two includes the literature review. Chapter three includes introduction to study site, nature of data, sample selection questionnaire design, method of data collection, data processing and data analysis in methodology. Chapter four includes analysis and interpretation of data and at last chapter five includes summary, conclusion and recommendations.

This study conducted from the direct interview method among 65 respondents. Those respondents were selected by random selection. The major summary findings of the study area pointed as follows:

Proportion of Chhetri caste is found highest (i.e. 66.15%) in study area and lowest proportion of respondents found in Janajati i.e. (12.30%). The living standard of all respondents (i.e. 100%) has changed after electricity.

The highest proportion of respondent's (i.e. 76.92%) family income increased after having the electricity facility. The highest proportion of respondents (i.e. 55.38%) unable to meet their annual food demand by crops and livestock.

The maximum percentage of respondents (i.e. 73.38%) reported the condition of forest is reformed after MHP. The highest percentage of respondents (i.e. 60%) reported the sanitation situation is improved. 78.46 percent respondents reported that the MHP positively affected in human life. 83.8 percent respondents reported they have not irrigated land for farming.

Maximum percentage of respondents (i.e. 84.61%) reported the MHP has not affected the drinking water. 70.76 percent respondents reported that their children's education status is improved. Some percentage respondents reported that there is not environmental pollution.

The highest percentage of respondent (i.e. 83.80%) reported that the MHP affected the social and cultural properties. The highest percentage of respondents (i.e. 64.61%) is satisfied by electricity. Majority of the respondents (i.e. 76.92%) reported there is regular operation schedule in powerhouse. Most of the respondents (i.e. 38.46%) reported there is low participation of women in maintenance an use of electricity.

5.2 Conclusion

Lower scale MHP may be most useful in rural and remote areas. There is sufficient feasibility of such types of lower scale MHP, but neither governmental nor private sector's vision goes there. The conclusion of the study area as follows:

Western Rukum district is known as main place of Chhetru and Janajati. Therefore, most of the respondents found Chhetris, which are listed in others Electricity is the closely related with human life therefore all respondent's living standard have been changed after MHP. After electricity facility most of the respondent's family social status is increased. In rural areas, farming and keeping livestock is main occupation but the respondents have not able to meet their annual food needs by that occupation.

Before electricity people have been using maximum firewood as light or lamp and cooking but when MHP established the condition of forest is improved. The status of sanitation is improved after electricity facility. Before electrical facility people have been using he flaming firewood and Kerosene at the night, after electricity they are reduced such types of materials, so positive Changes is found in human health. Most of the respondents are satisfied by MHP.

There is not irrigation facility in study area. The origin of drinking water and MHP used water is in difference places. So the project has not affected in drinking water. After electrical facility students have been using evening time for study therefore it is found that educational status of student is improved. Major environmental pollution has not seen after MHP but minor pollution has found.

The MHP is known as lower scale plan and established in rural hilly area, therefore there is neither immigration nor emigration trend. Respondents has started to use audio and audio-visual materials, therefore plant has effected on social and cultural properties like change in behavior, changing in clothing and thinking. To build the MHP sustainable, repair, maintenance and operation schedule should be necessary therefore there is operation schedule in powerhouse. For these propose user committee is fully responsible.

Men and women are known as two cards of a wheel but in rural and remote area of Nepal the statement is limited in saying. In some places there is zero participation and some places lower participation of women found in maintenance and using electricity.

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ANNEX – 1

QUESTIONNAIRE

General Information

Household No.:

Interview Date:

1. Respondent's name:

   a) Age: b) Gender: c) Village:

Ward No.:

2. Number of family:

   a) Son ……. b) Daughter …….

   c) Other …….

3. Occupation:

Questionnaires:

1. Have your living-standard been changed after electricity?

   a) Yes b) No

2. What is the status of your family income after having electricity?

   a) Increase b) Decreased c) No change

3. Is the product of crops and livestock meet the annual food demand of your family?

   a) Yes b) No

4. How much time did you spend to collect the firewood before and after this project ?

   a) Before ……. b) After …….

5. What is the condition of forest after this project launched ?

   a) Destroyed b) Improved c) No change

6. What is he status of sanitation in the village after electricity ?

   a) Improved b) Same as before

7. What kind of change occurred on your health after the project being implemented ?

   a) positive b) Negative c) No change

8. Is there irrigation in your farm ?

   a) Yes b) No

9. If yes, what is the status of irrigation of facilities ?

   a) Regularly b) Irregularly c) Sometimes

10. Is the project affected to drinking water supplies ?

    a) Yes b) No c) Unknown

11. Are there established any kinds of industries ?

    a) Yes b) No

12. If yes what kinds of industries established ?

Name and types of industries	Function of industries

13. Are your family employed in the industries ?

    a) Yes b) No

14. What is the educational status of your children after electricity facilities ?

    a) Improved b) No improved c) Unknown

15. Is there environmental pollution after this project ?

    a) Yes b) No

16. If yes, what types of destroyed ?

    a) Landslide b) Rock fall c) Soil erosion

    d) Dust/Water/air pollution

17. Is there wild animal extricated after project ?

    a) Yes b) No

18. If yes, which animal is extincted

    ……..

19. Is there any increase in migrated people after this project ?

    a) Yes b) No

20. If yes how many people ?

    …….

21. Has the plant affected your social and cultural properties ?

    a) Yes b) No

22. If yes, in which factor is affected after project ?

    a) Change fashion b) Change behavior

    c) Change in thinking d) others ……..

23. Is there any change occurred in governmental and non-governmental sectors after established project ? Yes given name.

……..

24. What is the Changes of project in infrastructural development ?

a) Positive b) Negative

……. …….

……. …….

……. …….

……. …….

25. What was the installation cost of project ?

……..

26. How did your self-fund to install MHP ?

Rs. ……

27. How much subsidiary did you get about it ?

Rs. ……

28. Do you have the continuous operation schedule in powerhouse ?

a) Yes b) No

29. If no, have you done maintenance schedule?

a) Yes b) No

30. Who is responsible for maintenance?

a) User b) User committee c) The plant owner

31. What is the women's participation the use of the electricity?

a) High b) Low c) No change

32. What is the your feeling about the electricity facilities?

a) Satisfied b) Unsatisfied c) All right

33. What type of activities should be done for sustainability of the project in run term? Give option.

Opinion		Suggestion	
a)	…….	a)	…….
b)	…….	b)	…….
c)	…….	c)	…….

d) ……. d) …….

34. Have you taken subsidy?

a) Yes b) No

35. How do you feel about subsidy policy?

a) Good b) Unknown