CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Natural resources are the boon to a country's development. Without utilizing natural resources no country can be developed. Resources and development are inseparable to each other. Mere natural resources can't do anything without manpower. People's participation provides required manpower for the mobilization of natural resources. Not only this, but also it brings harmony and prosperity in the society with the development of infrastructure. Among the types of renewable natural resources, water is the most important one, which is abundantly found in Nepal.

Energy, a key ingredient for improving living conditions and fuelling the development process, is generally in short supply, and the inhabitants have to rely on local natural resources of fuel wood and other biomass to meet their daily needs. In many mountain areas, there are few areas in which trees can grow, or the existing forest has been depleted to an unsustainable level, resulting in soil erosion and other severe environmental problems.

More recently, especially for lighting, has come to be regarded as a necessity rather than a luxury, and people living in remote areas are demanding access to electric power. Similarly, mechanical power is needed for normal tasks such as milling and oil expelling, to reduce the drudgery of daily chores, and to improve productivity. Consequently, more appropriate and modern energy generation systems are needed to meet the increasing demand in remote and underdeveloped mountain areas.

Mini and micro –hydropower (MMHP) appears to be an appropriate resource for meeting the energy needs of people in the Hindu Kush Himalayan (HKH) region. Potential energy resources from hydropower are far greater than present or projected demand. By using small power plants established to fulfill the demands of individual communities, it is possible to avoid the problems and costs associated with transmission and transport of energy to remote, inaccessible areas with small populations. Private installation set up on the initiatives of beneficiary communities or local entrepreneurs in a decentralized manner are particularly effective, and the equipment is also indigenous and low-cost. Experience in Nepal and elsewhere has clearly demonstrated that such plants, especially in the micro range (up to 100kw), can be economically viable if certain support is provided and the entrepreneur(s)/ owner(s) are able to manage, operate, and maintain the plants properly (ICIMOD, 1997).

Himalayan country Nepal has more than 6000 fast following rivers. As a world's second richest country in water, Nepal accounts for nearly 2.27 percent of the total world water resources (Shrestha and Kojima; 1997, cited from Karky, 2004) with theoretical hydropower potential of the country estimates at around 83000MW (Amatya and Shrestha; 1998, cited from Karky,2004). Currently, around 800MW electricity is generated from various ways.

Looking at the nation's electricity demand, which is steadily growing at a rate of 15-20 percent, the power deficit is a glaring reality evidenced by load-shedding even among the minority consumers who are favoured with supply (WECS, 1995). This deficit will continue to increase for at least another five to seven years until additional supply from proposed projects come to line.

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Given, Nepal's mountainous topography micro-hydro electricity is a crucial source of energy in the resource scarce mountain environment (Karky, 2004). The promotion of micro-hydro energy service as experienced over three decades has witnessed a shift in paradigm. This new paradigm also empowers local communities for ownership, control and management of their renewable energy sources, such as by incorporating participatory processes in the designing and installation of community owned and operated. MHPs are simultaneously generating awareness and building capacity of the local people.

There are many areas in the mountainous region that are inaccessible and underdeveloped, and where the population is scattered, poor, and mostly unaware of technological progress/ benefits. Isolated micro-hydropower (MHP) plants are usually the least-cost option for providing energy in such areas. This is mainly because other options for the supply of energy, such as grid extension and diesel power, are more expensive and difficult to install or operate. Since small water streams are usually available in most of the mountainous region, it is quite easy of constructing MHP plants to meet the energy needs of a small village or cluster of settlements. These needs may be for electricity, mainly for lighting during the evening, or for motive power to be used for agro-processing, wood working, and / or other small scale industries.

Development is not a natural phenomenon. It needs external efforts to carry out. In the modern time development is not accepted only the responsibility of government. People's participation has been developed as one of the effective dimension of development in current days. Over the past few years' development history has been witnessing people's involvement as a basic requirement to conduct an effective program. It has been accepted as an ethical tool of development

Nepal's topography is quite unique with high hills, scattered settlements and more than 6,000 rivers and innumerable rivulets crass-crossing the country. In view of this, micro-hydro has a great potential for fulfilling the energy requirements of rural Nepal to a great extent. In fact, its importance has long been realized and reflected in the large number of traditional water wheels (ghattas) found throughout the country. In an attempt to tap this resource more effectively, various kinds of micro-hydropower devices, e.g., propeller turbines, cross-flow turbines, pelton wheels, multipurpose power units, being successfully operated in the country. In the scattered and isolated communities of the middle hills, micro-hydro installations have become a viable option for the production of electrical and mechanical power to replace traditional way of using hydro-energy.

Since, micro-hydro program is people oriented program and its success depends on the active participation, of the people so more researches both on technical and social aspects are needed. The technical aspects include the management operation, protection rules, conservation strategies whereas social aspects include energy user group and their culture, social norms, interest, religion, need etc. Both aspects should be considered equally because they influence each other and consequently reflect the success of micro-hydro programme. In this regard, study of people participation in micro-hydro project is very important, which allows to evaluate the success rate of the program. In this respect, people participation in MHP, which considers the institutional and decision making processes, affecting factors of participation and changed knowledge of people (users) has been studied in Chisapani VDC of Syangja District.

1.2 Statement of the Problem

Energy plays a key role in sustainable development of socio-economic growth in the country. The role of energy in our socio-economiy is important both from the stand point of domestic use and export. The pace of industrialization was sluggish in the past due to the shortage of energy and it couldn't accelerate until the obstacle of the availability of energy is removed. The case is same in agricultural sector for food processing, cottage industries, water mill, lift irrigation for drinking water, and so on. The demand of energy is increasing even though per capita consumption is very low in the country. Many developing countries are facing energy problem due to raising price of fossil fuels, high rate of depletions of the forest resources, where Nepal is not an exception.

Obviously, the sustainable management of natural resources requires the strong cooperation and participation of people. Only in the Ninth Five Year Plan for the first time in the development history of Nepal, analyzes the concept of long term development of electricity and its strategy (Uprety, 1999). It also raised 'policy participation' and efforts to be made for increase the involvement of private sector for the generation, distribution and management of electricity. So far as the policy is concerned, government of Nepal and other concerned parties have not yet made any clear cut vision about people's participation in MHPs. Voices in favor of people's participation and participatory development have been provoking, but in practical life, in the real sense people's organized development efforts are being ignored.

In spite of having many advantages of micro-hydropower technology, we may question, why has it not been widely accepted within the country? Some previous case studies proved the reality that local people are able to make direct participation, consist of mobilization of community resources such as

manpower, money and materials to carry out development program. It is now widely believed that people's participation is to be regarded as both means and an end in which people should learn to take responsibilities for their own development (Uphoff; 1992, cited from Devkota, 1999). It is also argued that to be any participation authentic, people must deserve capacity for enhancing a self sustained development at the local level (Oakley, 1984, cited from Devkota, 1999).

Problems arise when the composition of the ethnic group, political ideology and culture of one group of community differ from another community. But this beauty of our society may create complexity for social mobilization. Similarly people living near to the forest are not ready to involve outsiders in forest management activities. If the water is in different VDCs, or on the border of two VDCs the problem is more severe (Baral, 1993) Chhetry (1992) argues that in practice. People's participation has been given a variety of meanings and perceptions. The problems prevail because of inadequate understanding on how the idea of people's participation and empowering the people could be effectively put into practice. This could be because of the lack of knowledge about the social, cultural and economic context of the communities or localities when the ideas have to be transferred into practice. He also argues that there is gap between realities and rhetoric in people's participation in resource management.

Villagers are simply not aware of management responsibilities and use rights due to insufficient extension of work. The long time gap between investment and return in forestry enterprises and identification of real users has been inappropriately accomplished is also reasons for the less participation of people in such programs (Shrestha, 1999).

Based on the above discussion, it can be seen that there are still many problems, which exist in MHPs. Most of the researcher pointed out that the ignorance of local factor, the presence of different ethnic composition with different interest, lack of their role in decision-making and lack of awareness of the interest groups of micro-hydro project development are main reasons for the less participation of users in MHPs. Based on the above-identified problems, the researcher has set following research questions.

i. How are people participating in implementation process of MHP?
ii. How are all interest groups taking part in the process of decision-making and benefit sharing?
iii. Are there any changes in attitude, knowledge and skill of users after MHP?
iv. What are the contributions and impacts of MHP on people's livelihood in the village area?
v. How are people sharing their benefits and make equitable distribution?

1.3 Objectives of the Study

The general objective of this study was to uncover the reality of people's participation in infrastructure of development through natural resource management especially, water resources. Apart from that its specific objectives were:

i) To examine the effectiveness of people's participation in Putputte micro-hydro project.
ii) To explore the factors affecting in participation.
iii) To assess the changes brought by this project on people's daily life.

1.4 Rationale of the study

People's participation is only the means of development to generate feeling of ownership, transparency in budgeting, and sustainability by using locally

available resources. This study proves the answer of relevant questions raised in the context of people's participation in development. This study was aimed to encourage local people to take part in such program by reflecting their values and role regarding development. People's participation is the heart of development in anthropology. Anthropology of natural resource management always raises its voice in favor of this.

In the context of country like Nepal, only government's development effort for meeting fundamental needs of people is not sufficient. Since many years, as an alternative paradigm of development people's participation has been practised. Even in the name of people participation, rhetoric word of participation is being practised. So this study intends to re-spread the value and importance of people's participation, which can give good message in developing the MHPs throughout the country. Somehow, study also expected to support academic field too. This study is further hoped to be useful for development workers, policy makers and any other interested parties as well.
Micro-hydro technology occupies a very eminent place in the energy sector of Nepal. A technology, which helps to lessen the alarming deforestation, import of petroleum and many other bad consequences, plays vital role on improving socio-economic condition of Nepal. Rural economic activities and living standard can be raised through supply of electricity generation from MHP with local people's effort. This study was also carried out to find the problems and prospects of people's participation in infrastructure of development.

1.5 Limitation of the Study

This study is carried out for the partial fulfillment of the requirement for the Master of Art in Sociology/Anthropology. This study was confined to only one micro-hydro project of Chisapani VDC, Syangja. Due to limited resources like time, money and manpower, the detail study of MHP User Group could not be made, being a student. Except sampled households, some key informants were considered to gather necessary data and information.

Therefore, the responses of partial users are not adequate to explain the exact situation and the findings of the study. The generalization made in the study may not represent in other MHP User Group unless same socio-economic and socio-biological contexts are existing.

1.6 Conceptual Framework of the Study

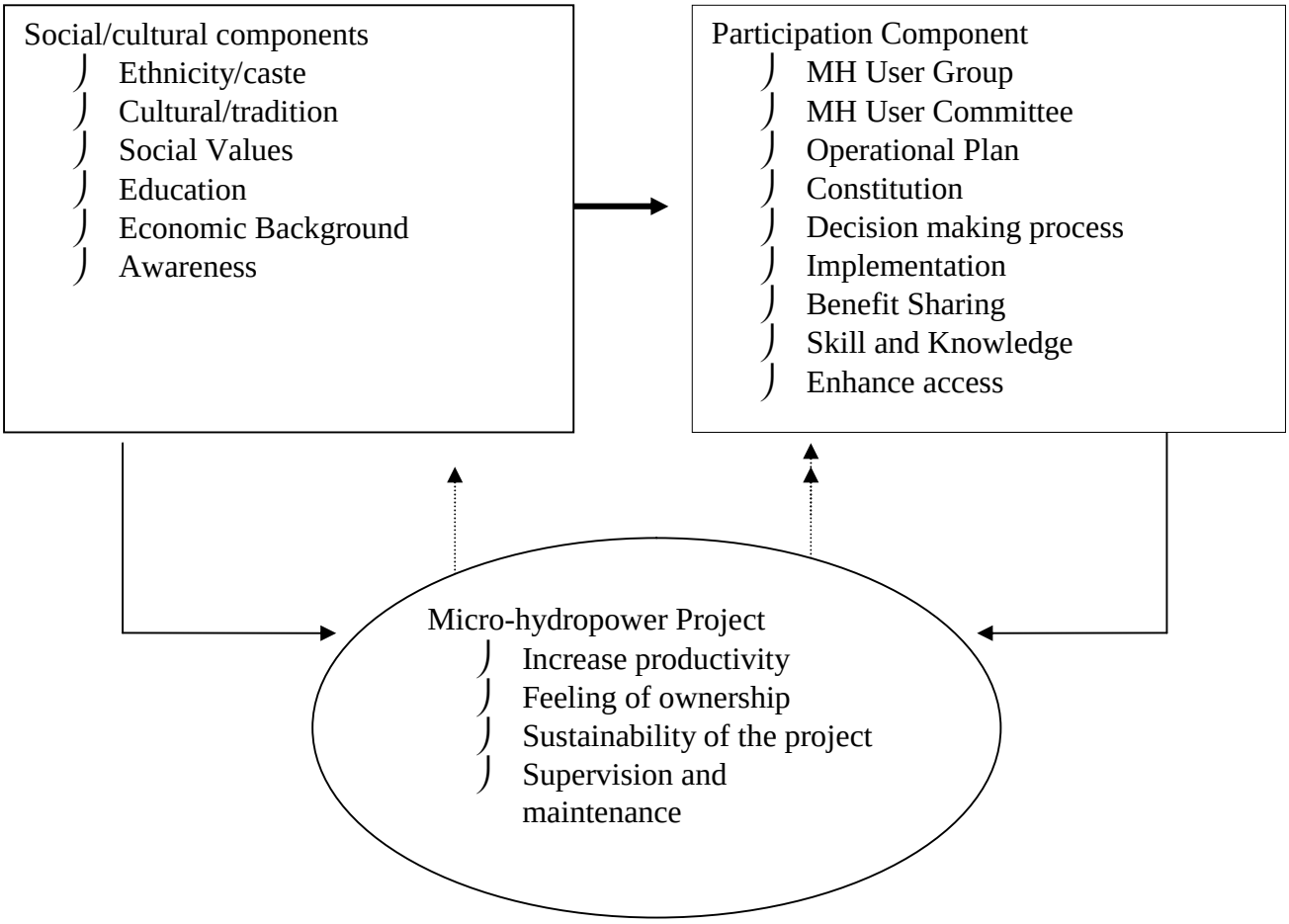

Fig. 1.1 : Conceptual Framework of the Study

Micro-hydro program is a "bottom to up" participatory program. Participation in decision making, implementation and benefit sharing are main components of participation. Socio-cultural components like caste/ethnicity, tradition / culture, norms / values, education, economic conditions may influence in active people's participation.

Belief on caste /ethnicity is found in every society of Nepal. Higher caste feel superiority in society and this superiority and inferiority feeling may influence from decision making process to benefit sharing.

Every ethnic group has peculiar tradition and cultural practice. Some practice, have good relation to natural resources management like water. This factor either encourages or discourages to participate in water management activities.

Social norms and values may play important role in people's participation. In some society in Nepal, women are not allowed to talk with unknown male from outside, to involve in outside activities than the household. This values affect on approaching to women by field level staff. Our male dominated society is not willing to share their authority and power to women. Where should women go what should they do are determined by male in male dominated society (Joshi, 1997).

Education is the next viable factor, which affects on participation of people. Education creates confidence in administrative function, decision making. Illiterate user, who were in working committee require help from literate people to perform written activities (Baskota'1997). Economy is another important contributing factor in the participation of any development activities. Poor and landless people can not give full participation because they have to involve in daily wages labor for fulfillment of their need and even they can't raise the money under their responsibility. Nature of occupation also affect in participation. Farmer can not participate in labour donation activities during the period of farming.

Knowledge and skill encourage people to participate in MHP. The aware user manages his time in the best suitable way to contribute MHP activities than lack in knowledge users as the aware users know the importance of water resource.

CHAPTER TWO
REVIEW OF THE LITERATURE

2.1 Theoretical Overview

2.1.1 People's participation and Participatory Development:-

Since 1960s, participation has become more popular term in the development. United Nations Development Program-UNDP, Human Development Report (1993) defines participation as a process not an event. It will proceed at different speed for different countries and regions and its form and extent will vary from one stage development to another.

In Anthropological terms, participation is an implicit aspects of wholeness-one of the important aspects of wholeness is that it requires participation (Reason; 1988, cited from Devkota; 1999) it is argued that one can't truly participate in the whole unless he takes responsibility for it. Taking responsibilities are again shaped by the collective value concerns of the community in question. It is now widely believed that participation is to be regarded as both means and end in which people should learn to take responsibilities for their own development (Uphoff; 1992, cited from Devkota, 1999).

In the context of participatory development, Devkota (1999) argues that 'participatory development has been regarded as an important social technology of knowledge creation process that starts right from the grass root up level of the societies. It begins with people's world of par axis resulting in to their critical awareness of the problems as achieve through their own action and reflections'.

This approach leads to types of development which is more respectful to poor people's culture values, self insight, position, priorities and interests (Oakley; 1991, cited from Devkota, 1999). Nowadays, participatory development has been respect as a key value for the development of infrastructure in the local level.

The concept, People's participation has been used since ancient time of Plato and Greek philosopher in public affairs especially in political science. Participation on those days was merely a matter of voting, holding office, attending public meeting, paying taxes and defending the state (Cohen and Uphoff, 1980 cited in Joshi, 1995). The meaning of participation however has changed with the passage of time. Participation of people in the affairs of the state is necessary for modern welfare state. The participation ideology "bottom-up" approach is originated in reaction to colonial Bureaucratic failure in 1950s (Moris 1981 cited in Rahnema, 2000). Social activist and field worker advocated on the side of participatory development against the "top down" approach (Rahnema , 2000). During the later half of the 1970, the concept of people's participation in development become more popular and fashionable as oppose to the "top-down" approach (Lisk 1981, cited in Joshi 1995). World Bank also realized the participatory development approach due to far less achievement on expected output from billions spent on development project through "top to bottom" approach of development. The concept of people's participation has become a politically attractive slogan; it is perceived as instrument for greater effectiveness as well as new source of investment. Participation is becoming good fund raising device and it could help the private sectors to be directly involved in the development business (Rahnema, 2000). Community participation is now generally taken as a necessary precondition to the successful implementation of any renewable or rehabilitation project. Community participation is generally agreed to be

important for the long term success of local resource management system (Joshi, 1995).

People's participation has been used in a variety of context such as community development, social mobilization, community participation, public participation etc. Various authors define people's participation in divergent way. Soen (1981) regards community participation as the means of involving people out side of the government in the planning process. While Fagence (1977) sees it is a means of reducing power differences and is therefore, contributory to equalization and social justice. White (1981) calls it an involvement of the people actively in the decision making concerning development project or in the implementation (Quoted in Joshi, 1995). World Bank defines "participation means their active not passive involvement and it should be transformative" (1995; 6). According to Cohen and Norman people's participation is often narrowly defined as the voluntary contribution of labor and / or cash by the local people. However, conceptually people's participation includes their participation in identifying needs, decision making, implied benefit sharing and evaluation (Cited in Bhandari, 1997). People's participation has been taken as means by the Government agencies and the projects for achieving their goals. "A problem free situation of people's participation is not easy". There is no common understanding regarding what people's participation. Different level of people has different conception about it. Participation in the sense of only physically involvement is passive participation. Such participation does not seem to last long (Baral, 1999).

Community Forestry of Nepal is one of the popular programs in the context of people's participation situation which closely involves local people in forestry or tree growing activities for which people assume responsibilities and from which they derive direct benefit through their own efforts". Along with the

development of MHPs rate of public involvement has been increasing. Various institutions are involved to mobilize local people for rural electrification campaign.

Participation of women is crucial for the success of micro-hydropower generation. Women are the major user and even decision makers due to the migration of male youth to foreign employment.

The users' participation is limited to the development of micro hydropower only. The users have to take the full responsibility for the operation and maintenance in case of community owned micro-hydro after commissioning. However, they receive technical support from the government in case of major maintenance (Magar: 2005)

2.1.2 Different stages of peoples' participation in MHP

People's participation in natural resource management can be observed in different stages or phases. Participation does not merely involve in contributing voluntary labour. In the words of Lohani (1980) participation process can be divided in six stages- participation in conceptualization and identification, decision making, mass participation in resources management, participation in implementation, sharing of benefits, and evaluation and control.

Here some levels of people's participation in different stages are mentioned as follows:

a. Investigation phase

This is the first phase of micro-hydropower generating process. This phase includes gathering of socio-technical information about the use of the water and the identification of the real MH users and coverage of electricity areas.

Careful attention should be given in identifying the users to ensure no one is let out.

b. Negotiation Phase

This phase includes formation of MH User Group, discussion on water management issues within the MH User Group and other stakeholders. Preparation of Operational Plan of water and constitution of user group come here. Existing management knowledge is acknowledged. The needs, problems, concerns and issues of different interest group as well as the solution of the needs and problems are identified during the preparation of Operational Plan. Finally, Operational Plan is prepared with the help of electricity technician; District office approves this Operational Plan and constitution.

The MH User Group could be newly organized specially to manage and mobilize people. After approval of constitution, MH User Group is formalized operational plan of forest is prepared with the objectives of developing and conserving the forests. The use and distribution of forest products is made by maintaining the environmental balance.

c. Budgeting and Fund Collecting Phase

During this process of participation, with the help of technician MH user group calculate the total expenditure of the project. Even user group determines the economic contribution from different user household. Days to contribute voluntary labour donation from each household and needy works are also fixed here. Fund could be generated from various sources but main source is user household. Each and every house should contribute fix monetary value determined by the MH User Group. MH User Group could be prepared such condition on the basis of people's economic condition and social status proportionately.

d. Implementation Phase

After the approval of constitution and operational plan, the right and responsibilities of management and utilization of water as mentioned in the Operational Plan are legally transferred to the MH User Group. The implementation phase includes fulfilling approved water management plan with the help of District Water Resources Committee. Any mistakes made during investigation of water and its real users and during negotiation among the users may create problems during the implementation of Operational Plan. Here, people contribute the project with both the means-by cash and providing voluntary labour donation. How actively people participate in this phase? Greatly influence the success of the project.

e. Benefit sharing phase:

Sharing benefit is an important component for enhancing user's participation in natural resources management. Without any incentives no one can be participated actively for using public resources. In the process of managing such projects, contributions and benefit sharing should be equal or in satisfactory manner.

f. Review Phase

This phase includes appraisal, revision and re-negotiation of the Operational Plan either at the request of MH User Group or upon the expiry of operational plan, which is prepared generally in every five years. Whether, MH User Group is working properly or not is evaluated and a new Operational plan is approved after the expiry of the old one.

2.1.3 People- Centered Development

People Centered Development is an approach to international development that focuses on improving local communities' self reliance, social justice, and participatory decision making. It recognizes that economic growth does not

inherently contribute to human development and calls for changes in social, political, and environmental values and practices.

David Korten (1984) a former regional advisor to the U.S Agency for International Development (USAID), proposed a People-Centered Development strategy that incorporated the values of justice, sustainability, and inclusiveness. According to Korten, the prevailing growth focused development strategy is unsustainable and inequitable. He calls for transformations of our institutions, technology, values, and behaviors, consistent with our ecological and social realities.

The Manila Declaration (1989) on People's Participation and Sustainable Development sets forth Principles and Guidelines for enacting these transformations. The concept of People-Centered Development, gained recognition at several international development Conferences in the 1990s. This approach stresses the importance of local ownership, participation, and capacity building while attaining economic growth.

2.1.3.1 Central Themes of People-Centered Development

Sustainability:

Sustainability is an inherent component and explicit goal of people-centered development. People-Centered Development calls for the establishment of self-supporting social and economic systems are key elements of a sustainable society. The Manila Declaration (1989) stated that people-centered development is the only way to achieve sustainable communities. Expanding beyond the environmental scope of sustainability it advocates small-scale community actions in order to enhance economic self-reliance and create reliable sources of income.

Korten claims that people-centered development is the only way to develop sustainable communities. He criticized the common development practice of increased economic out put through natural resource depletion.

Participation:

In the context of People-Centered Development, central elements of participation include:

- Democratic processes
- Government accountability
- Access to relevant information
- Gender equality

Here, democratic processes are essential to people-centered development because they allow communities to create that determine their quality of life. Community participation and true democratic process demand that people have means to hold government officials and public institutions accountable. It requires that government act as enablers for the people's agenda, creating policies that enhance citizen action.

Communities must have access to relevant, reliable information in order to make the best decisions for themselves and their communities. The democratic processes can only be achieved when men and women are represented equally.

Justice:

In people-centered development justice mainly includes local ownership, sovereignty of the people and government enablement and employment and income generation

This strategy emphasizes the need for local ownership so that, community have responsibility and control over their resources in order to benefit

themselves and also stresses the role of government as an enabler for the people's agenda. According to David Kotler, individuals have a greater incentive to pursue sustainable environmental practices when resources are locally owned. In addition, he says that people-centered development "rejects the right of one person to self enrichment based on the appropriation of the resources on which another person's survival depends".

2.1.4 Political ecology:

Political ecology studies the complex interaction between economics, politics, technology, social tradition and the biological environment. The academic discipline offers wide ranging studies integrating ecological, social sciences with political economy (Peet and Watts: 1996) in topic such as degradation and marginalization, environmental conflicts, conservation and control, and environmental identities and social movements (Robbins,2004)

The broad scope and interdisciplinary nature of political ecology lend itself to multiple definitions and understandings. However, common assumptions across the field give it relevance. Bryant and Bailey (1997) have developed three fundamental assumptions in practicing political ecology.

1. First, costs and benefits associated with environmental change are distributed unequally. Changes in the environment do not affect society in a homogenous way: political, social, and economic differences account for uneven distribution of costs and benefits.
2. Second, this unequal distribution inevitably reinforces of reduces existing social and economic inequalities. In this assumption political ecology runs into inherent political economics as "any change in environmental conditions must have affect the political and economic status quo" (Bryant and Bailey;1997)
3. Third the unequal distribution of costs and benefits and the reinforcing or reducing of pre-existing inequalities holds political implications in terms of the altered power relationship that now result

In addition, political ecology attempts to provide critiques as well as alternatives in the interplay of the environment and political, economic and social factors.

From these assumptions, political ecology can be used to:

- Inform policymakers and organizations of the complexities surrounding environment and development thereby contributing to better environmental governance.
- Understand the decisions that communities make about the natural environment in the context of their political environment, economic pressure and societal regulations
- Look at how unequal relations in and among societies affect the natural environment, especially in context of government policy.

Political ecology assumes that there is indispensable relationship between ecological conditions, problems and socio-political and economic structure. Development of political economy paradigm accompanied by ecological debates and movements in 1960s and 1970s gave rise to various debates generally, subsumes under the term political ecology. The field political ecology is very broad and rather sprawling, the central concern of which is to understand the relationship between social and environmental change (Adams, 2001, cited from Sharma; 2003). Political ecology in the context of Third World Countries help to explain the politicized environment and the role of diverse actors fighting for social justice and conservation of environment (Bryant and Bailey; 1997)

Within anthropology, Eric wolf (1997) pushed political economy towards a neo-Marxist framework which began addressing the role of local cultures as a part of the world Capitalist System as opposed to earlier political economists

and anthropologist who viewed those cultures a “Primitive Isolates”(Wolf; 1997)

This approach focuses on issues of power, recognizing the importance of explaining environmental impact on cultural processes without separating out political and economic contexts. These approaches tended to emphasize local, minority, and indigenous knowledge while moving a way from privileging a Western nature-culture dichotomy (Ervin; 2005)

2.1.5 Participatory Rural Appraisal (PRA)

“Participatory rural appraisal (PRA) and its variants aim to enable rural people to plan and enact solutions to problems by analyzing their own knowledge of local conditions, facilitated by outsiders (Gardner & Lewis 1996).

PRA has some characteristics according to Chambers (1992), (as cited by Gosselink, Paul & Strosser, Pierre, 1997), these features are:

1) a reversal of learning, to learn from rural people;
2) learning rapidly and progressively with flexible use of methods, improvisation, and cross-checking;
3) offsetting biases, especially those of rural development tourism (spatial, project, person, dry season, diplomatic, and professional);
4) optimizing trade-offs between quantity, relevance, accuracy, and timeliness;
5) triangulation, using a range of methods, types of information, investigators and disciplines to cross-check information, and
6) Seeking diversity.

2.1.6 Water Resource as a common Property

Water is a common-property resource. All common-property resources share two important characteristics. First, exclusion (or control of access) of users to these resources is problematic. Secondly, each user is capable of subtracting from the welfare of other users. Hence, a common property resource for which exclusion is difficult and joint use involves subtractability. According to this G. Hardin's definition, Common property is not owned by anyone. It is a free good owned by no one and belonging to everyone. Common property resources are basically open-access and freely available to any user. According to a second view, common property should be restricted to community owned resources-that is, those resources for which there exist communal arrangements for the exclusion of non-owners and for allocation among co-owners. To avoid some of the anthropological complications, 'community' is defined as 'resource community'-the group of people that uses a certain resource. Resources involved in common-property systems may be communal property or those which, although not legally owned by the community, are managed in accordance with community-based norms and rules. (Berkes, 1989).

2.1.7 Micro-hydropower

Micro-hydro is a term used for hydroelectric power installations that typically produce up to 100 KW of power. Micro-hydro is an isolated hydropower system that generates electrical power and serves nearby households through a local grid. This includes Pico-hydropower schemes of up to 3 KW capacity size as well. It provides electricity services comprising diverse type of end-uses including lighting, entertainment in households and institutions, as well as electricity or directly driven tools and machinery.

2.1.8 History of micro-hydropower in Nepal

The micro-hydropower sector in Nepal has a long history. Since the time immemorial, people in the rural areas used to build water mills (locally called Ghatta) for harnessing water –power for the purpose processing of agricultural products. Nepal being endowed with huge hydropower potential and favorable geographical set-ups, numbers of such Ghattas even exists today. The water mills were used extensively for processing or grinding of agricultural products utilizing direct mechanical power. In addition, generators became popular at the later stage for the electrification of the area in the vicinity. According to AEPC report, the institutional development of MHP started date back to 1962 when Swiss assisted to the establishment of a manufacturing company named Balaju Yantra Shala(BYS) at Lalitpur. But, first hydropower project of Nepal was already in operation since 1967BS. The MHP has been operating in Nepal since the construction of Godawari Fish Farm plant with 6 KW in 1962 at Godawari VDC in Lalitpur district of the country. The establishment of private manufacturing companies further spread in eighties and subsequent decades. The development of MHP has been continuous since 1975. But development of MHP has increased drastically since 1995. During 51 years, total of 797 micro-hydro plants (until July 2009) have been installed in the country generating around 15 MW power. Moreover, 315 projects are under construction of total estimated installed capacity 0f 10Mw electricity (AEPC; 2009). Table given below shows the historical growth trend of micro-hydropower in Nepal.

Table 2.1

Growth Trend of Pico/Micro and Mini –Micro hydro Electrification Scheme

Year of Installation	Pico hydro (upto 5 kW)		Micro-hydro (5 to 100 kW)		Mini-hydro (100 to 1000 kW)		Total	
	No.	kW	No.	kW	No.	kW	No	kW
2009*	50	153.5	103	2388.57	NA	NA	153	2542.07
2008	42	125.6	134	2893.2	NA	NA	176	3018.8
2007	70	202.24	98	1879.05	NA	NA	168	2081.29
2006	46	100.5	42	893.4	NA	NA	88	993.9
2005	48	100.7	38	661.6	NA	NA	86	762.3
2004	66	140.85	35	420.75	NA	NA	101	561.6
2003	80	184.32	53	749.5	NA	NA	133	933.82
2002	61	140.5	34	364.5	NA	NA	95	505
2001	36	81.2	50	891	NA	NA	86	972.2
2000	112	213.45	40	719.5	NA	NA	152	932.95
1999	123	226.4	25	386.5	NA	NA	148	612.9
1998	97	185	28	430.5	NA	NA	125	615.5
1997	84	143.4	16	262.7	NA	NA	100	406.1
1996	130	203.3	14	174.2	NA	NA	144	377.5
1995	115	170.9	13	145.3	NA	NA	128	316.2
1994	79	100.3	5	125.7	NA	NA	84	226
1993	0	0	3	26.5	NA	NA	3	26.5
1992	13	12	6	106.5	NA	NA	19	118.5
1991	46	43	7	125.1	NA	NA	53	168.1
1990	0	0	11	97.8	NA	NA	11	97.8
1989	0	0	17	183	NA	NA	17	183
1988	0	0	11	109.8	NA	NA	11	109.8
1987	0	0	17	190.5	NA	NA	17	190.5
1986	0	0	20	203.8	NA	NA	20	203.8
1962-1985	0	0	68	593.45	NA	NA	68	593.45
Year not Known	0	0	7	92.3	40	14948	47	15040.3

* First half of 2009 only (Source: AEPC, 2009)

2.1.9 Distribution of Micro-hydro Programme

According to the report of AEPC (2007), Micro-hydro plants are spread across the country from accessible areas to remote rural hills. At present, private utility micro-hydropower units are operating in 54 districts. The important markets for these units are the hills and mountains of Nepal, where they are generally used for agro- processing. In the western hills and mountains of the country, turbines for milling seem to be used already saturated and not many other are coming from these areas. The Western Development Region has the largest number as well as the highest installed capacity of private utility micro-hydropower, and the Far Western Development Region has the lowest. According to the Renewable Energy Data Book (2009) published by Alternative Energy Promotion Centre (AEPC) 305 micro-hydro projects are operating in Western Development Region having capacity up to 5674 Kw electricity. Whereas, Eastern Development Region has 140 projects of 2350 Kw, Centre Development Region has 162 projects of 2277 Kw, Mid-Western Development Region has 98 projects of 1222 Kw, and Far-Western Development has 89 projects of generating capacity up to 1530 Kw electricity so far. Among the districts of Nepal Baglung district has more number of micro-hydro plants.

So far, Syangja district has 8 micro-hydro plants and they are generating up to 100 Kw electricity. Still many projects are found under construction.

At present micro-hydropower is getting more popular in Nepal. Nowadays, news of launching MHP in hilly and various remote nook and corners of country are found to large number. MHPs are found constructed in numerous places even in the single stream. Some of such streams' names are change into *lagu urja khola* (micro-energy stream).

Our government aimed to provide electricity through this programme to nine lakhs households up to 2015.

2.2 Review of Government policy for micro-hydropower

The importance of developing water turbines was felt during both the Sixth and Seventh five year plans. The Fifth Five Year Plan (1975/76-1979/80), for the first time, considered the role of micro-hydro plants in rural electrification. The goal of rural electrification according to the plan was to promote expansion of agriculture, commerce and small-scale industries. Under the guidance of the plan, the Small Hydropower Development Board was established in 1975, which played a crucial role in the electrification of rural hill areas. The sixth plan (1980/81-1984/85) added the following goals for rural electrification:

1) Promotion of tourism.
2) Conservation of fuel wood and fossil fuel by substituting them with electricity.
3) Promotion of social services in rural areas by setting-up social amenities as hospital x-ray and surgical operation theatres, night schools for adults, libraries and reading room pumped drinking water supply, etc.

Under the Sixth Plan Period ADB/N, instituted in 1981, the Rural Electrification Project provided financial as well as technical assistance to promote rural electrification through micro-hydropower plants.

In 1984, government delicensed plants up to 100 KW to encourage private participation in rural electrification through micro-hydropower. The provision of subsidies for micro-hydropower in 1985 provided further encouragement. Under this provision, 75 percent of the cost of electric components of micro-

hydropower was subsidized for remote districts and 50 percent for the remaining districts. Since then, government has been actively pursuing rural electrification through micro-hydropower.

Through the government strategy for carrying out implementation works was not clear and specific enough, the existing infrastructure alone, starting from the availability of facilities for conducting surveys to fabrication, installation, etc., was enough to promote the water turbine activities to a certain extent, particularly in the relatively accessible areas around the fabrication sites. It was; however, felt that a modified policy was needed to encourage such activities in more remote areas, including those in the mountains.

Accordingly, the Eighth Five Year Plan is more specific. It gives more stress to private sector involvement for developing and promoting improved water mills and water turbines and generating both mechanical and electrical power to establish various rural industries.

The development of the energy sector has been given priority in the Eighth Five Year Plan. The basic objectives of the energy plan concerning micro-hydropower development are to maintain regional balance in the energy sector with hydropower by maximum utilization of indigenous energy resources, and to develop alternative and decentralized energy resources available in the country.

The following policy guidelines are established for the development of micro-hydropower sector:

1) Adequate arrangements will be made for the participation of both the public and private sectors.
2) External, internal and joint collaboration with the private sector will be promoted in development and financing.

3) Necessary steps will be taken for the development of improved water mills and turbines to set up micro-hydro electricity plants in rural streams and rivulets.
4) Various energy- related programmes will be implemented and coordinated through the establishment of an alternative energy organization.

Likewise, the government in the Ninth Five Year Plan (1998h) emphasizes on the development of overall water resources policy and puts forth the necessity of discouraging earlier sectoral or sub-sectoral policies to move towards managing the growing inter-sectoral water using competition.

Tenth Five Year Plan and Interim Plans also accepted the role of micro hydropower development as a key tool for rural electrification.

The Water Resource Act 2024 was the first significant action for the implementation on the enactment of the Canal and Electricity. The policy on irrigation was first adopted in 2045 focusing on people's participatory management from the then HMG level. In 2049, then HMG came up with overall management of water resources with umbrella coverage in the form of the Water Resources Act, 2049 in more elaboration from on irrigation as well as on hydropower with Irrigation Policy 2049 and Hydropower Development Policy 2049. Electricity Act 2049 and the Water Resource Regulations Acts 2050 were enacted thereafter. The Industrial enterprise Act 2049 was also amended 2049 to supplement other policy such as Hydropower Development.

The existing policies are that no licenses are required to operate a hydroelectric projects having up to 1000 KW capacity. Private investment may be made for projects relating to generation, transmission and distribution of electricity for projects below 1000 KW capacity, and the government does

have to be informed projects of capacity above 100 KW. Such projects are also exempted from income taxes and there are provisions for subsidies (for only electrical components) ranging from 50-75 percent. The owners are given the liberty to fix the selling price of electrical energy generated from their projects.

The government formulated a Hydropower Development Policy in 1992. The policy has clearly stated the necessity of small hydro electricity projects to meet the demand from the hill and remote Himalayan regions where grid connection is not a viable option. This policy envisages on the opening up to the private sector while retaining the government's role in its development. The policy exempts licensing from small projects up to the capacity of 1000Kw. There is reference to the cooperation and coordination between the private and government sectors along with the benefit sharing with the local people. Social and environmental effects have to be studied before the project implementation in order to avoid the social and environmental deterioration. The major emphasis has been given on the maximization of using water resources, private sector involvement, expansion of rural electrification with people's participation and development of fund, priorities on domestic needs, minimization of adverse effects with project affected area and protection of environment (Magar; 2005).

The Hydropower Development Policy (1992) has the following objectives:

- To supply electricity as per demand of the people in rural and urban areas.
- To enhance the development of hydropower to meet the energy needs required for industrial development.
- To motivate national and foreign private sector investment.
- To converse the environment through the development of hydropower.

In order to meet these objectives the policy provides guidance to:

- Carry out hydropower projects of various standards and capabilities to meet the interim and long-term electricity requirements;
- Give emphasis to the rural electrification programme in order to render assistance in the development of agricultural production and cottage and small-scale industries in the hill and terai regions; and
- Utilize indigenous labour, skills and resources as well as foreign investment and technology for the development of hydropower, and so on.

The overall national level objectives of Water Resources Act, 1992 focused on management and utilization of the available water resources for safe drinking water available for required quantity, increasing agricultural production and generate hydroelectricity for substituting the imports of the petroleum materials in the friendly way to environmental conservation and protection as well as to encourage consumers and private sector's participation in development, management and utilization of water resources in achieving multipurpose objectives in a complimentary way as far as possible.

The recent policy of the government is to promote public/private sector participation in the development of the hydropower. The individuals or a group can obtain government license for the development of hydropower. A number of micro-hydropower projects are currently being developed privately and by groups promoted by the government in some areas where services from the grid lines are not provided. The users receive technical and financial support from the government and also mobilize their resources for development (Magar: 2005).

National Water Plan-2062 has formulated the long term concept of hydropower development up to 2027 BS. The main objectives adopted by this plan are:

- To generate 4000 MW electricity for fulfilling internal demand of the country.
- To provide 75 percent electricity from national grid, 20 percent from micro-hydropower and 5 percent from alternative sources.
- Per person electricity consumption up to 400 KW
- Export electricity as a major source of national revenue.

2.3 Review of Previous studies

H.J. Bodenmann (1971) has reported *"Khumbu Hydro-electric Micro Plant"* that MHP plants specially planned for the electrification of remote (mainly northern parts of Nepal) areas in Nepal. The purpose of this report was to assess the possibilities of electrification of villages for lighting, heating, cooking i.e. to replace wood, kerosene etc. and to average prospect of the development of small scale industries e.g. wood, textiles, mills etc. facilities tourism by the development of MHP. The study unfolds that the development possibilities are very poor (all villages above 10,000 ft. high) agriculture at Khumbu and their main resources income is tourism.

Ray Holland (1983) in his book, "*micro- hydro Electric Power"* has emphasized that due to high and steep topography creates favorable condition for the development of MHP through small steams and rivulets to fulfill the rural areas demand in affordable price in the accessible and different mountain terrain where the settlement are scattered and limited few favorable sites. The important of MHP is in alleviation and rural poverty. In general, to solve the electricity problem of Nepal to great extent MHP occupies huge potentiality.

United Nations Development Programme (UNDP) conducted the study to assess the situation of "*New and Renewable Energy Sources* (NRES, 1993) in Nepal. Which was covered some districts of Central and Western Development Region particularly in hill and mountain areas. This study concluded that most of MHP plants installations are either operating in low water capacity or generating inadequate electricity during the dry season. In the colder regions MHP plants run effectively only for nine months due to the formation if ice in the intake and frequent break down of the canal. The absence of autonomous body to established effective linkage and co-ordination between affiliated organization and monitor and to evaluate program performance has been a serious setback in the development and promotion of MHP in Nepal.

Prabina Hora (1974) in her study, "*Role of micro-hydropower in Rural Electrification in Nepal"* has focused; tapping of small rivers for MHP would help to exploit the available resources of the hills and mountains in the country. If there is the facility of electricity in the villages, the replacement of traditional sources of energy by electricity will be possible. In order to meet rural energy demand, government has given more priority on MHP in Eight plans (1992-97) and with the supply of electricity Kerosene can be easily substituted. She further added that mills is another major end-use integrated in some of the MHP plants for processing grains and expelling oil seeds with promotion of MHPs. Other end-uses are saw-mill, battery charging, fruits and vegetable dying etc. can be promoted in rural areas.

S.B. Ranjitkar and et. al. (1994) carried out a study "*final Evaluation of Private Rural Electrification Project"*. Her study evaluated that the projects which were launched by ADB/N and Annapurna Conservation Area Project (ACAP) to develop a model of financing and management of MHP projects in the private sector. The MHP plants have provided various opportunities to the people to improve their life style. They found negative impact from pilot project that while all house holds contributed equal amounts of labour for the

construction of micro-hydro plants, the distribution of the electricity was unequal depending on demand (lower income families used less because to their inability to pay).

The study done by WECS, *"Alternative Energy Technology: An Overview and Assessment"* has emphasized about MHP and its development, contribution, economic and financial analysis and constrains. The total number turbines manufactured and installed in Nepal are use for agro processing. At present, private utility MHP units are operating in 54 districts. Out of 54 districts in Nepal, the Western Development Region (WDR) has a largest number as well as the highest installed capacity of private utility MHP and the Far Western Development Region has the lowest.

Suraj Neupane and et al (2002) have studied on *"An Opportunity of Carbon Trading through the Promotion of Micro-hydro in Nepal"*. They emphasized that due to the voice raised against global warming and deteriorating ozone layer, the big polluting countries yet to ratify the "Kyoto Protocol" on reducing the carbon emission to the 1990 level by 2008 to 2012. Renewable energy (MHP) has established itself as the best choice for pollution prevention and climate change.

The study describes that the carbon saving, which would otherwise be releashed into the atmosphere due to the burning of fossil fuels (e.g. kerosene and diesel etc) and the saving of forest resources, due to the use of more efficient heater, lighting for cooking, reading and other domestic activities, certainly contribute to maintain the local environment. In this way, local sources of energy such as micro-hydro remain very promising to act positively for the environment and play vital role in the global arena. The electrical lighting from MHPs generating and solar plant has been replacing 116 tons of carbon annually in Tanahun district. One hector of mature forest is assumed to absorb 3.21 tons of carbon. Considering this, the total carbon absorbed or replaced comes to be around 222 tons annually.

In this chapter various relevant published and unpublished books, reports, journals, articles, internet web sites etc. were reviewed to support the strength of study. Basically this study is based on people's participation and participatory development theory. In addition to this theory other theoretical insights were also cited. People Centered Development, Political Ecology, Participatory Rural Appraisal (PRA), policies of the government for MHP development, practices used in this sector etc were also consulted for this chapter.

This literature review provided theoretical guidelines as well as conceptual framework of the study. From the studied literature, both strength and weakness of the participatory development approach were uncovered. People are the main stakeholder of the infrastructure of development but so far they have not been regarded as the decisive power of such project. Government role of mobilizing people for their development activities is not proved clear and effective.

As per the review of previous reports published in this sector, micro hydro projects are proved as the best means of fulfilling electricity needs of the remote rural people where electricity supply from the main grid line is not easy and remain expensive. People's participation required awareness and encouragement from government and other institutions for its wide spread coverage.

MHP projects in many areas are found unsustainable and costly for installation. Local people couldn't afford its high cost of repairing and maintenance. Government only support for installation but turn deaf ear for long term services. From the previous literature, it is studied that many of such MHPs are now closed.

Moreover, literature review provided clear cut way of study and importance of people's participation. It also save researcher from the repetitions

CHAPTER THREE
RESEARCH METHODS

3.1 Study Area

This study was carried out to cover the importance of people's participation in development projects. This study was also aimed to investigate the reality of people's participation in natural resources management and infrastructural development. This field study was carried out In Chisapani VDC of Syangja district. Study area is located about 25 KM southeast from headquarter of the district. Almost 400 households of Chisapani VDC of the people of ward no. 5, 6, 8, and 9 have the electrification from Putputte Micro-hydro project. Among the electrified wards, ward no. 9 was taken as a study site for this study.

3.2 Research Design

This study was mainly based on descriptive and exploratory research design. Exploratory research design was followed to become familiar with phenomena and to gain real insight about the facts while the descriptive research design was applied to describe the importance and effectiveness of people's participation in infrastructural development and management of natural resources. Descriptive researcher design was further concerned with the describing characteristics of a particular individual or of a group. Micro-hydro User Group's character and their rules and process in electrification activities are descriptively discussed.

3.3 Universe and sample

The universe of this study included all the electrified households of Chisapani VDC, Syangja, from Putputte Micro-hydropower Project. Only five wards of that VDC were electrified from this hydropower project-5, 6, 7, 8, and 9.

Categorizing each ward as a cluster, ward no. 9 was selected as a sample cluster by simple random sampling. Thereafter, sample households were selected from the one hundred and fifty households of that ward using systematic random sampling. Altogether 90 households were selected as a sample unit of the study.

3.4 Nature and Source of Data

This research is field-based study. The primary data like socio-economic information, people's participation, factors affecting in participation and changed knowledge and skill of people were collected through fieldwork. The available relevant written documents e.g. village profile, user group constitution and operational plan of water, micro-hydro User Group and working Committee meeting minutes and documents, publication and reports of concerned offices and agencies were the sources of secondary data.

3.5 Data Collection Procedures

a. Interview- Schedule

An interview schedule was made according to the information required. Researcher involved himself in door to door visit for collecting data with questionnaire schedule. The model of interview schedule has been given in the Appendix. Mainly quantitative data were collected using this method.

b. Key Informants Interview

MH User Committee members, Village Development Committee members and other educated users were the key informants for the study. Formal and informal discussions were performed with them. The discussion was held on their contribution, history of micro-hydro project and status of participation of women, lower caste and other general users. Checklists were prepared to discuss with them. Based on the discussion, the relevant information was recorded in plain sheet. Besides that, two initiator users were also taken as

special key informants. They are the devoted initiator of that project. In depth informal discussion was carried out with their experiences, feelings and contribution. Maximum focus was given to collect qualitative rather than quantitative data from the key informants.

c. Observation

Direct observation was applied to get relevant information for the study. In the course of fieldwork, present condition of micro-hydro project, applied water management operation, changes experienced in the community after electrification was observed. The researcher attended one of the user committee meetings as an observer. Participation of women and their activeness in the meeting was also observed. Observation was made during rapport building and informal discussion with users. The observation helped very much in understanding the field reality, which was fruitful for the study that could not be captured through verbal discussions.

d. Formal and Informal Group Discussions

During field stay, the researcher met local users, women users and lower caster users. Formal and informal discussions were done with them. Discussion with women users and lower caste users were taken separately. Quantitative data were collected through discussions. The discussion focused on the matter of the user's participation in different electrification activities. Their view about the micro-hydro was also discussed. Checklists were prepared for gathering data and on other basis of checklists, researcher discussed to them carefully. Information was noted down in plain sheet later after discussion was held. Information was also collected from the discussions in meeting places of user e.g. in the field, tea shops and other places.

3.6 Methods of Data Analysis

Data collected were analyzed both qualitatively and quantitatively. The quantifiable raw data from the field survey was processed and analyzed by using Computer Software SPSS for Windows. Few simple statistical tools

such as frequency and percentage were used. Likewise, tabulations and graphic presentation were also made to present data. Much more qualitative data, which was not quantifiable manually managed and descriptively analyzed. Moreover, figures and diagrams were used to present some qualitative data. An attempt was made to interpret the qualitative data with anthropological approach. Also an effort was made to maintain the objectivity and avoid data error by comparing them with different data collected from various sources.

3.7 Ethical Consideration

In this study, some ethical norms and values were used, which guided for less biasness during study period. Such as:

- Respondent's personal/private relation and confidential matters which affects in his/her life were not mentioned in this study.
- Respondents or key informants were explained the purpose and objectives of the study clearly and in understandable way. This study did not consider adding any of researcher's own expectations and false information.
- No unnecessary pressure was made to the user refusing to involve in the discussion but more efforts were made to motivate such user to involve in the discussion.
- Data/information were not exploited or manipulated during study period. Data and information were interpreted on the basis of gathered information and findings.
- The due respect was given to the respondent's culture, social values and their ideology.

CHAPTER FOUR
STUDY AREA AND THE POPULATION

4.1 General Introduction of the Study Area

Syangja district is situated in the western development region of Nepal. The district is in mid-hill belt of the country and its relative location is in between Kaski in the North and East, and Tanahun in the East and South Gulmi and Palpa in the West. The district is divided politically and administratively into 3 electoral constituencies, 2 municipalities and 60 VDCs. It lies between 27^0 50' to 28^0 15' North latitude and 83^0 27' to 84^0 02' East longitudes. The total area of the district is 1,164 square kilometer. Its elevation ranges between 366m in Keladi to 2512m in Panchase hill from the sea level. According to the census of 2001, the total population of this district is 3, 17,320 out of which 173791 are females and 143619 are males, and population density is 272.6/km2. The literacy rate of Syangja district is 66.7 percent, where the population under poverty line is 35.1 percent. Average life expectancy rate of people in this district is 67.71 years.

Different ethnicities of people live in this district. The main inhabitants are Brahmin, Chhettri, Magars, Gurung, and others. The people are famous for their unique identities. Brahmin and Chhetris are renowned by their representation in the government jobs and Indian Army respectively. Gurungs and Magars are famous because of their involvements in British Gorkha Army and Indian military service.

The main occupation of the people of this district is agriculture, animal husbandry and poultry. People are also engaged in service, trades. The main agro-products are paddy, maize, wheat, barley, potato, soybean, etc. The main

markets centers of the district are Syangja headquarter, Walling and Galyang. Darau Sirubari, Alamdevi, KrishnaGandaki, Ramdi, Kolma Barahachour and Chitre Bhanjyan are the famous village for tourist destination. (Map of Syangja district and Chisapani VDC are presented in Appendices 2)

4.2. Introduction of Chisapani VDC:

Chisapani VDC is the study area selected for this study. It is about 25Km. far from its district headquarter Syangjabazar. Its altitude ranges from 600m to 1421m from the sea level. The total area of this VDC is 26.81sq.km and it is surrounded by Bhanumati and Raipur VDCs of Tanahun district in the east, Chitrebhanjyang in the south, Kichanas in the North and west and Raipur in the north. The main stream of this VDC is Chisapani Khola (which is also known as putputte khola in the some area).

4.3 Climate

The climate of Chisapani VDC is moderate. The climate prevailed here is very suitable for human health, with a monsoon rainfall pattern. This is the case in the study area as well. The study area is characterized by a moderate temperature, heavy monsoon rainfall and distinct cyclic variations. The average temperature of VDC is between minimum of 5.10°C in January and a maximum of 30.50°C in June.

The highest rainfall in the year is recorded up to 950mm.But in the dry winter season only up to 30mm rainfall occurs in the study area. Convectional hailstorms in autumn and hailstorms and strong winds during the dry spring are the occasional local climatic phenomena. Due to the average altitude ranges lower than 1500m from the sea level, most of the southern slopes are hotter than the northern slopes.

4.4 Natural Resources

Chisapani VDC is rich in natural resources as there are various types of natural resources found. The VDC is well known for community forestry as there are many such forests conserved by the community. Many types of medicinal herbs can be found in the jungle. Open grazing lands and beautiful fertile Chisapani valley is laid in the middle of the VDC. This VDC has 1321.54hec.agricultural land (Village Profile, 2067)

It has very important stream called Chisapani stream, which irrigates many parts of the VDC. In addition to this, Fedi Khola, Bumdi Khola, Dagdi Khola, Damahar Khola, Khahare Khola, Tara Khola, Gauri Khola, Bhaisepani Khola ect.are available.

4.5 Socio-Demographic Structure

Chisapani VDC has a total population of 5939 of which 2954 (49.74%) are male and 2985 (50.25%) are female. The number of the total household is 897, which shows an average family size of 6.62 persons per household (village profile, 2067). Greater numbers of female with male population is due to higher birth rates of female children. Also the male members are absent from the households in search of job. Among them a remarkable number of male members are absent due to foreign jobs. But in this ward, male population is found greater than of female population. Out of total population 919, the population of male members is 464 and female is 455 according to population (village profile, 2067). The population growth rate of the VDC is 0.61 according to the census report of 2001 whereas according to the village profile of the VDC, 2067 it has reached to 1.87 percent.

Literacy rate of Chisapani VDC is 88.34 percent where male literacy rate is 92.00 percent and female literacy rate is 84.70 percent (Village profile, 2067).

4.6 Economic Activities

Subsistence agriculture and livestock are the main basis of economy and major sources of livelihood of people in the district. In the VDC, 60.14 percent of the population is usually economically active population (aged 16 – 60 years). There are a remarkable number of retired ex-service persons who have been using their pension as a source of income so they are seen usually inactive.

The study area has an uneven land pattern. The land comprises a low fertile valley and steep rocky hills too. The land has been used for various economic activities since the ancient time.

People of the study area have involved in the various types of occupations, besides the agriculture as well to support their income and livelihood.

4.6.1 Agriculture

The economy of the study village is based upon agriculture. In the VDC, agriculture is the chief economic foundation and includes crop farming and animal husbandry. Paddy, maize, millet, potato, wheat, green vegetables are the main crops of the area. Most of agricultural methods are traditional and modern methods have not been actively employed. All the household of the VDC can't produce the required amount of food grain for their annual demand. Due to the limited cultivable land, traditional system of farming, and lack of irrigation facility 26.64 percent households produce only the food grain sufficient for 3 months, 20.85 percent produces for 6 months, 21.74 percent produce for 9 months, where 17.73 percent households produce sufficient food grain for their food needs and 13.04 percent household sell the surplus production. In the context of this studied ward 26, households produce surplus food grain and sell to others. In this VDC, 1310.54 hec. pieces land have been used for paddy, white, millet, and maize, where 4hec.land is used

for oil seeds, 10hec.for vegetables and 1hec land is used for horticultural development.

4.6.2 Livestock

Animal husbandry is a fundamental part of agricultural activity in this VDC. Most farmers rear buffaloes, goats, oxen, mule, and pigs either for dairy products like milk and ghee or for meat and manure for fertilizer and biogas. Buffaloes are mainly reared for their milk and meat whereas goats and pigs are kept only for meat. Normally oxen are reared for performing agricultural activities- plugging. Milk and meat fulfill their diet and sometimes they bring them an additional income. Poultry farming and bee farming are also getting momentum in this VDC. There are more than 200 hives of bees, in this study area and bee keeping is accepted as a subsidiary income.

4.6.3 Salary/ Wages and Expenditure

In this Chisapani VDC, people's main income sources are various. The amount percent is found as,18.14 percent from agriculture and livestock farming, 2.44 percent from business and industry, 17.02 percent from pension and services, 57.57 percent from foreign employment, 2.19 percent from daily labour and 2.64 percent from other sources (Village Profile, 2067. The per capita in come of the people in this VDC is 141.15$ where expenditure is 200.14$. This shows people's annual expenditure is higher than their annual income.

4.7 Ethnicity, Caste and Religion

Chisapani has a heterogeneous society having different caste and ethnic groups. The majority population of the VDC is from caste group. The following table describes the caste wise distribution of the population. Caste group comprise more than 50 percent of the population and the remaining are from ethnic group.

Table 4.1

Distribution of Population by Caste/Ethnic group

Caste/Ethnic Group	Frequency	Percent
Magar	2199	37.02
Brahmin	1673	28.16
Gurung	592	9.96
Chhetri	392	6.60
Bhujel	370	6.23
Damai	232	3.90
Kami	147	2.47
Thakuri	117	1.97
Newar	110	1.85
Sarki	108	1.81
Total	5939	100

Source: Village Profile of Chisapani VDC, 2067,

There is no domination of a single caste or ethnic group in this VDC. Magar, an ethnic group has the highest population in the area, which is followed by Brahmin caste group. The disadvantaged Communities are also living in this area in remarkable number.

Though there are different castes and ethnic groups, mainly two types of religions are practised in this VDC. The entire population of the VDC is practising Hinduism. They all perform their religious activities like festivals, norms, values, traditions etc. according to the principles of Hinduism.

Majority of the people speak both Nepali and their native languages within this VDC. Ungraveled road transportation, communication, electrification and some other facilities are available in the VDC.

This chapter has discussed setting of the study area. The physical setting has given idea of location, climate and resources of the area. The social setting has described population, ethnic and caste composition, culture religion, education and occupation of the area.

4.8 Micro-hydro Project site:

The Putpute micro-hydro project is located at the left bank of Putputte Khola in ward no. 8 of Chisapani VDC. The installed capacity of Putpute Micro-hydropower project is 44Kw and providing electrification to 436 households around it. The intake site lies at 83^0 63'35" E longitudes and 28^0 01' N latitudes is situated at the elevation of 945m above the mean sea level. The nearest pitched highway to the project site is at Dulegauda in the Tanahun district but seasonable ungraveled road goes just 2 km away of the site. Putputte Khola is the main source of water for this power project. This project has been located at a suitable and stable site. The canal alignment follows the hilly area and is 226m long up to the fore by site. After the fore by site there is a big fall of 85m. The power house has been constructed on a flat cultivated land lying down of this fall. Balamdi, lalahi, sirindanda, and chisapani are the main load centers of the project which are at the distance of 1km, 1km, 1.5km, and 2.5km from the powerhouse site respectively.

Putputte MHP

Putputte MHP is located in the bank of Putputte Khola (also known as Chisapani Khola) of Chisapani VDC, Syangja. It was constructed with the great efforts of local people in 2062BS. The electricity generating capacity of the project is 44KW, which is used to electrify 475 households of Chisapani VDC including 5, 6, 7, 8 and 9 wards. It has come in success with the active participation of local people both in cash and labour, donation from AEPC, Syangja DDC, Chisapani VDC etc. Total expenses of the project went beyond Rs.75 lakhs and local people collected more than Rs. 35 lakhs for the same. The project sold 1375 light bulbs for collecting that much capital. Butwal Power Company provided technical support for its construction. So far no serious technical and other crisis have been experienced in the project. It has generated various opportunity to the local people for changing their lifestyle and running new electricity based industries.

4.9 Some Selected Demographic Characteristics of the Respondents:

The socio-economic characteristics of respondents i.e. age; sex, ethnic composition, education, family structure, occupation and number of bulb glow have been given in the following paragraphs and tables.

4.9.1 Age-group of the Respondents

Age is an important demographic factor to do the type of work and involvement in decision-making process. Here, people above 16 years were taken as respondents. For analysis, the ages are categorized into five groups i.e. below 25, 25 to 35, 36 to 45, 46 to 55 and 56 and above. The number of respondents regarding to the age group are distributed in following table the table below has the age wise composition of the respondents.

Table 4.2

Distribution of Respondents by Age Group

S.N.	Age Group	Frequency	Percent
1	Below 25	2	2.2
2	25-35	4	4.4
3	36-45	23	25.6
4	46-55	25	27.8
5	56 and above	36	40.0
Total		90	100.0

Source: Field Survey, 2010

According to the collected data, the majority of the respondents (40%) range above 56 years, the second is of the age group between 46-55 years i.e. (27.8%). Similarly, the third highest percentages of the respondents (25.6%) were from the age group between 36-45 years. Respondents aged between 25-35 years range the fourth position in percentage (4.4%). The lowest percentages of the respondent (2.2%) were from the age group below 25 years.

4.9.2 Sex Composition of the Respondents

The respondents were distributed in different sex groups. Their gender structure was also studied. There is a difference in structure between men and women according to their involvement. Male are in majority (74.4%) while female are in minority (25.6%) following figure shows the gender structure of the respondents.

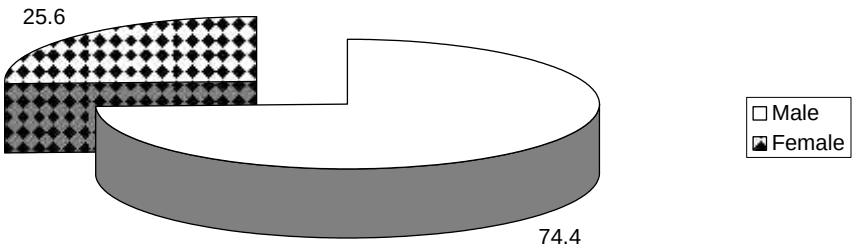

Fig. 4.1 : Distribution of Respondents by Age Group

Source: Field Survey, 2010

4.9.3 Educational Status

Literacy is the principal indicator of life that exposes the cheerful future. It plays a vigorous role for fulfilling awareness and change as well as economic development but the literacy of Nepal is very low. A caste wise distribution according their literacy status has presented in the following table.

Table 4.3

Distribution of Respondents by Educational Status

S.N.	Qualification	Frequency	Percent
1	Illiterate	36	40.0
2	Literate	47	52.2
3	+2/IA	3	3.3
4	Bachelor and above	4	4.4
	Total	90	100.0

Source: Field Survey, 2010

Due to the traditional perception in the society, most of the people have been found deprived from educational opportunity. Only 4.4 percent respondents have obtained bachelor and above degree, whereas 40 percent respondents were deprived from formal education. There were 52.2 percent respondents of literate status and only 3.3 percent have been passed +2 or Intermediate Level.

4.9.4 Caste and Ethnicity Composition

Chisapani VDC is a multiethnic and multicultural VDC. The composition of the caste and ethnicity is given in following table.

Table 4.4

Distribution of Respondents by Caste and Ethnicity Composition

Caste Ethnicity	Frequency	Percent
Brahman	41	45.6
Chhetri	28	31.1
Magar	8	8.9
Thakuri	4	4.4
B.K.	2	2.2
Others	7	7.8
Total	90	100.0

Source: Field Survey, 2010

As per the collected data the Bhramin respondents have highest percentage (45.6%). Likewise, Chhetri respondent were (31.1%) ccupying second position. Another ethnic group Magar has third position with 8.9 percent respondents. But in the whole VDC Magar occuy the first position on the basis of population. Similarly, Thakuri has been followed by Magar (4.4%), whereas Bishwokarma ranks the lowest with 2.2 percent respondents. Respondents of other category have 4.4 percentages.

4.9.5 Occupation of the people

In Nepal, especially in rural areas, main occupation of the people is agriculture, which is the main source of income. The livelihood of the users is mainly based subsistence type of agricultural economy. The only agriculture production is not sufficient for their livelihood. Brahmin, Chhetri and Magar community extended their occupation in service of government and foreign employment. In the study area, besides agriculture and foreign employment othe occupations or sources of income were- livestock, services (including pension) trade business, and others such as retail business, masonry, carpentry etc.

Table 4.5

Distribution of Respondents by Occupation of the people

Occupation	Frequency	Percent
Service	7	7.8
Trade/business	4	4.4
Farming	66	73.3
Foreign employment	2	2.2
Others	4	4.4
Unresponsded	7	7.8
Total	90	100

Source: Field Survey, 2010

In the above table, the number of households and their main sources of income are shown. Since, the households have more than one source of income. Out of 90 households, majority of the households, i.e., 73.3 percent have been involved in agricultural activities i.e., their only source or one of the income sources has been agriculture. Similarly, 7.8 percent households, have their income source as service. Number of people involve in trade and business range 4.4 percent among the respondents. Source of income either

only or mixed with other sources, is the foreign employment and the number of these households is 2.2 percent. Mainly the male adults go for the foreign job and send the remittance to their family. Here in their home, female members look after their children and do their household's work. Some of them do other types of works such as agricultural activities and animal husbandry.

4.9.6 Family Size and type

Family size is another important variable which affects the direction of mobility. It is also proposed to explore whether family size has association with occupational mobility rates. In this study, family size of the respondents ranged from minimum 4 to above 11 members. Following figure has mentioned the type of family.

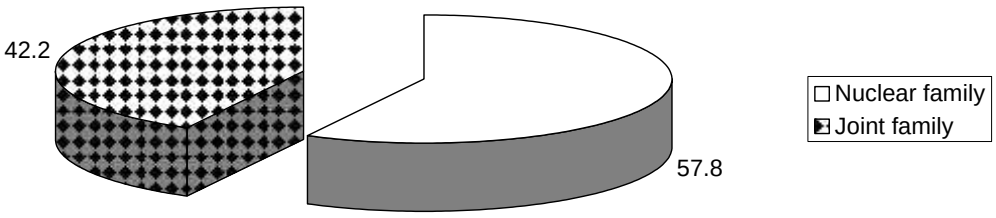

Fig. 4.2 : Distribution of Respondents by Family type

Source: Field Survey, 2010

Out of the studied population, only two types of family type are observed. Most of the households were of nuclear nature (57.8%) remaining 42.2 percent households were of joint nature

Here, the size of the family of the respondents was also found to be varied. The following table gives the idea about the family size of the respondents.

Table 4.6

Distribution of Respondents by Family Size

Members in Family	Frequency	Percent
4-6	51	56.7
7-10	34	37.8
above 11	5	5.6
Total	90	100.0

Source: Field Survey, 2010

Here 56.7 percent households were found having 4 to 6 members in their households, whereas, 37.8 percent households have 7 to 10 members. Only 5 households were of extended family nature with more than 11 members in their family. In the operational activity of the hydro-project family size has been found as strong determiner. Larger the family size effective involvement and smaller the family size less effective the involvement of people in different activities.

4.9.7 No. of the Bulb Glow in Each Household

Numbers of bulb were the main determinants of collecting fund for overall operation of the project. With great social understanding, stakeholders were given a chance to fix their needs of the amount of light bulbs according to their economic status and affordability. This policy was derived to make project successful with inclusion of all class households. Following table has given the distribution percentage of light bulbs below.

Table 4.7

Distribution of Respondents by No. of the Bulb Glow in Each Household

No. of the Bulbs	Frequency	Percent
1	4	4.4
3	25	27.8
4	33	36.7
5	16	17.8
6	12	13.3
Total	90	100.0

Source: Field Survey, 2010

As per the collected facts out of 90 households 36.7 percent households have contributed with four light bulbs. Another 27.8 percent households have fixed three bulbs. Similarly, 17.8 percent households paid for five bulbs. Those who have sound economic condition and need of more light bulbs (13.3%) electrified with six bulbs. But those households having poor economic affordability (4.4%) respondents only exposed with a single bulb.

CHAPTER FIVE
PEOPLE'S PARTICIPATION IN PUTPUTE MICRO-HYDROPOWER PROJECT

Putpute Hydropower Project was constructed with the active participation of local people in all of its stages that ranged from initial planning to benefit sharing. This study tried to find out the level of participation of local stakeholders i.e. people in different stages. Specifically the researcher attempted to know if all the local people participated to a more or less equal extent or not.

5.1 Participation in the Need Assessment Stage (Initial Planning Phase)

5.1.1 Participation in the Meetings

Need Assessment is the fore most and one of the most important stages in any development activity. Generally, all people of the place or village more or less have similar aspirations regarding infrastructural development. But all people are not able to express their desires due to different reasons. So the level of participation depends on how effectively people can express their desires. The researcher attempted to understand how actively people participated during the initial assessment phase of this hydropower project. The following figure has more data in this regard.

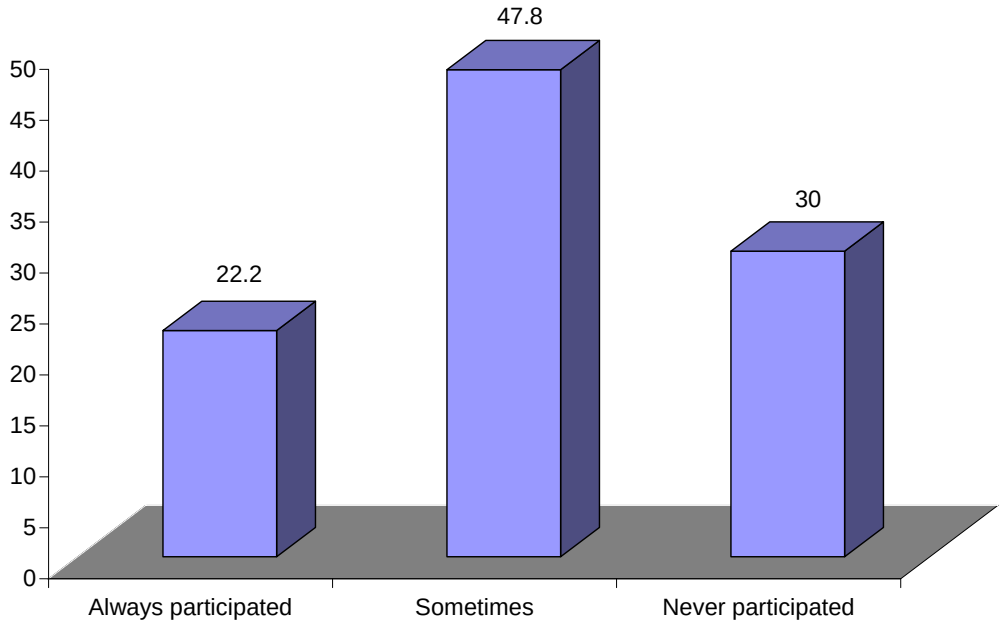

Fig. 5.1 : Distribution of Respondents by Frequency of Participation in Meetings

Source: Field Survey, 2010

This initial phase generally involves discussion of the issues of feasibility of a particular development project. Out of 90 respondents, 22.2 percent study that the participated in all the preliminary meetings in the feasibility determination phase. While large 47.8 percent participated sometimes only and 30 percent of them never participated. As answered by these respondents, in these easier meetings, they discussed about the issues like fund raising, site selection, managing participation etc. and took decision mostly by consensus.

Among those with never participated in the earlier meeting had their own reasons for non-participation. 15 respondents out of 27 men participants had no time for participation while 6 of them did not believe that there would be a successful hydropower project in the village and 6 respondents did not get information about those meetings. Those respondents who participated in the earlier meetings echoed that their voices were heard by the concerned personnel. There views were given adequate importance while making operational plan and program for the construction of the micro hydropower.

5.1.2 Participation in Fund Raising Activities

When the matter of planning of a development activity originates, the greatest issue used to be that of fund or financial sustainability of the project. This issue becomes more critical and gathers more serious concern in those programs planned in a rural setting like the study area. Thus attempts were made to find out people's participation in fund raising activities for Putpute Micro Hydro power project.

Table 5.1

Distribution of Respondents by Participation in Fund Raising Activities

Participation	Frequency	Percent
Yes	58	64.4
No	25	27.8
Not Responded	7	7.8
Total	90	100.0

Source: Field Survey, 2010

As the above table is evident, most 64.4 percent of the respondents actively participated in the fund raising activities while 27.8 percent of them did not take part they cited different reasons like lack of time, living away from village etc. Since about 2/3rd of the respondents had participated actively in those fund generating activities, the financial feasibility of the project had become possible.

As per the record of the PHCC, there were a number of agencies which provided financial support to the project. Among these, there were GOs, NGOs and local people. The following table has details on the funds collected from the different sources:

Table 5.2

The Major Sources of Fund for the Construction of Putputte Micro-Hydro Project

Contributors of fund	**Amount in Rs.**
Alternative Energy Promotion Centre (AEPC)	3,080,000/-
DDC Office, Syangja	400,000/-
Chisapani VDC	400,000/-
Raised from Stakeholders on the basis of the no. of bulb they demand	3,712,500/-*
Total	Rs.7,592,500/-

Source: Putpute MHP Record, 2009

**PMHP sold 13 hundred bulbs @ Rs.2700/bulb*

As per the operational plan of this MHP, each beneficiary house contributed Rs. 2700.0 per bulb installed at their house. Thus managing the required sum of money was a difficult and challenging affair. Even some of the respondents said that they had no money with them during the time of fund collection. But they managed that borrowing loan from others to pay the project. This shows a kind of devotion in the local people regarding the micro hydro-power project. From this MHP, all together 4 hundred and 75 households from ward no.5, 6, 7, 8 and 9 of Chisapani VDC are benefited. Surplus electricity of the project is supplied even to 18 households of neighbouring Chitre Bhanjyang VDC.

5.2 Participation in Implementation Phase

In any development undertaking, implementation of proposed plans, programs and policies holds the key to success. Constructing micro hydropower project in a rural setting like Magyam Chisapani is really a challenging affair especially considering the lack proper road access. Transportation of raw materials to the site was the most difficult and troublesome affair. Without active participation of local stakeholders, it would never be possible, thus the

Construction Committee of the project provided maximum efforts to ensure effective participation of people quoted by its chairperson.

The chairperson, who was also one of the key informants of this study and other key informant felt that every people in the village tried their best in implementation phase, that's why they were able to achieve their goal of electrification in the village successful one.

In this process, the researcher also asked the respondents about the difference in the level of contribution made by local people. Here, the aim was to find out if they saw any significant difference in their own contribution and other local beneficiaries of the project. The following table gives details of this query.

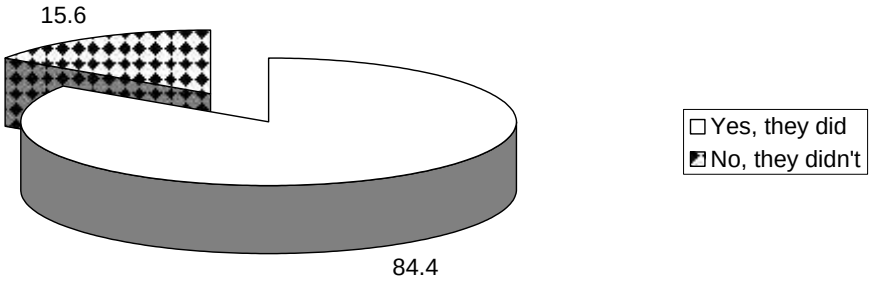

Fig. 5.2 : Distribution of Respondents by Level of Participation

Source: Field Survey, 2010

As demonstrated in the above table that 84.4 percent of the respondents did not feel much difference in the level of participation of different people in the society. But some 15.6 percent of them felt a certain level of differences in the level of participation by different people. The researcher could not become fully agree with the most of the respondents who did not see significant differences in each other's level of contribution considering the diversity in human thought and behaviour in all. Societies across the world as for example, one of the local villager was mentioning that while carrying sand for

the project from Seti River which is about 4 hr. walk away from the site, all people of the same age did not carry some or similar quantity of sand, some, people were deliberately carrying lesser quantity sharing different reasons.

5.3 Main Areas of Active Participation of the Respondents

During different phases of the construction of Putpute Micro Hydropower project, there were many areas which demanded people's active participation. It is natural that all people might not have participated equally active manner in all of these areas. Thus with the main of aim of understanding the areas of active participation of different respondents, the researcher collected information from them. The following table gives more data in this regard:

Table 5.3

Distribution of the Respondents by the Area of their Active Participation

Area of Participation	Frequency	Percentage
Feasibility Analysis	49	54.4
Fund-Raising Activities	58	64.4
Labor Contribution	72	80.0
Transportation of Raw Materials	73	81.1
Dispute Resolution	5	5.6
Purchasing Goods	14	15.6
Technical Support	3	3.3
Total	**274***	

Source: Field Survey, 2010

** The number of responses is quite higher than the number of respondents because the question was of multiple answer type one.*

The table above shows that 54.4 percent of the respondents actively participated in the early feasibility study of the project. So, not all people

were active at the beginning of the project. Those people who did not participate actively said that they had no belief that there could be made such a hydro-power project. Likewise, 64.4 percent of them actively participated in fund-raising activities. During this, they visited different GOs and NGOs, donor's offices, houses of local stakeholders, office of VDC and DDC etc. and were able to ensure financial security to the project.

Similarly, 80 percent of the respondents provided labor contribution needed to the project. Though they had contributed financially also, they effectively participated in construction as menial laborers. Remaining 20 percent of them had different reasons for which they themselves did not participate as laborers. For example some of them said that they were out of the village during its construction while others said that other members of the family helped the project as laborers. 81.1 percent of them actively participated in the transportation and supply of raw materials for the project.

Just five respondents actively participated in dispute resolution. These all persons were the executives in the construction committee so they assumed such a role. While three people having technical knowledge provided technical support to the project and fourteen respondents led the people during the purchasing of the neede3d raw materials.

Thus it is clear that all people actively participated in the construction of the project by contributing in one area or other. Actually, their participation was much fostered by their desperate need of having an important infrastructure of development in their place. Thanks to their active participation by which they were able to achieve the goal of electrification in the village.

5.4 Factors affecting People's Participation in a Development Work

People's participation holds the key of any development activity, so it was the case of PHCP. People's participation was an exemplary one which can be a source of inspiration for a number of similar projects. Thus, through the informal and formal discussion with the respondents, FGDs, interviewing of the key-informants and others, the researcher found the following factors as the decisive factor to foster or impede local people's participation in any of the development:

- Respectable representation or social inclusion in project cycle.
- Representation of people as decision-maker not the decision follower.
- Involvement of people as active creators rather than passive recipients.
- Development of sense of ownership among people.

In the view of Headmaster of the local school who is also an informant of this study, people's participation in development programs is not only affected by the environment in which participatory practices take place but also conditioned by the institutional framework, socio-economic as well as political backgrounds of the participants. Respondents frequently asserted that there must be respectable representation and social inclusion in all the stages of the project cycle i.e. respectable representation must be there from the criteria like sex, family status, education, social division and income level of the participants whose involvement must be in project identification, implementation, benefits and evaluation stage.

Likewise, the representatives of the construction committee had the opinion that local people should be viewed as powerful and effective decision maker than followers or replicators of other's decisions. Other views were highlighting the need to involve local people as active creators who can create the ways of getting their needs fulfilled. The true participation has a real influence on the decision, i.e., greater community participation makes it less

likely that the decision is determined by the external agency, this certainly proves to be vital in the sustainability of the project. When people themselves decide what they need, the way they can get this need fulfilled perpetually, it is sure that there will be a sense of ownership among local people and makes the project sustainable in the long run, quoted one of the key-informants who was from Syangja DDC and was closely looking after this project.

In this chapter, analysis of different variables which influenced the participation of people in MHP was made. Basically people's participation in general meeting of the project, participation in fund raising programme, carrying necessary materials from market to the construction area, implementation of the policies of the working committee in practice, and the factors of motivating people for thief effective involvement were analyzed. Facts and figures collected by the researcher himself from the field using different tools were the main basis of analysis.

CHAPTER SIX
IMPACT OF HYDROPOWER PROJECT IN PEOPLE'S LIFEWAY

Installation of micro-hydro project has brought remarkable change in various aspects of people's life. The respondents were asked for their view about the beneficial effects of the project in personal health and hygiene, changing lifestyle, using technical appliances, dependency on the forest and environment. All of them have given response to the researcher freely. Since the questions were open-ended and subjective, there were various types of answers. It was difficult to put each answer differently. So, similar types of answers have been put in a single category. Also due to the multiple response answer, each respondent has given one or more answers.

6.1 Improved Health and Education of Children

After the generation of hydropower project, many positive changes in health and education sector of the children have been observed. Previously, there was no facility of electricity in the village. When the micro-hydro project was completed, children were exposed healthy and bright lights replacing traditional kerosene lights. The researcher also found great changes in the effectiveness of educational activities among the children after electrification in the village. The following table has depicted the details.

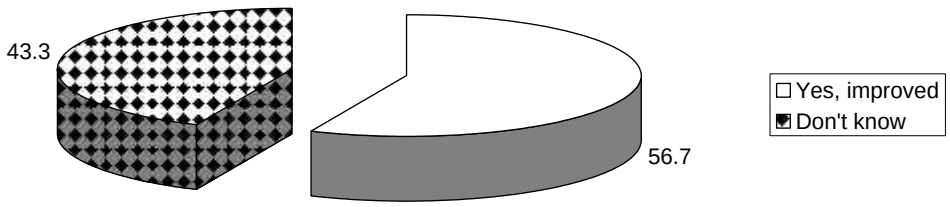

Fig. 6.1 : Distribution of the Respondents by Improvement in Health and Education of Children

Source: Field Survey, 2010

As the figure depicted that 56.6 percent respondent have felt the changes brought by micro-hydro project on health and education of the children. Similarly 43.5 percent of the respondent did not notice for this. After the construction of the project, the duration of time children spend for education has been increased. To some extend their quality of education also found improved.

6.2 Construction of Separate room for kitchen

Most of the traditional houses had attached kitchen along with their bedrooms. The electrification project has encouraged people to have such housing structure with separate kitchen. Even the uses of improved stoves were widely constructed. Many new constructions were made to adopt the electric bulb avoiding smoky rooms. Following table reveals the facts about the changes occurred after the completion of hydro-power project.

Table 6.1

Distribution of the Respondents by Construction of Separate kitchen

Separate Kitchen	Frequency	Percentage
Yes, it is separate	69	76.7
It is attached with bed room	21	23.3
Total	90	100.0

Source: Field Survey, 2010

The houses having separate room for kitchen ranged 76.7 percent in the study area. But the participants of group discussion revealed the fact that there were only a few houses with separate kitchen before the construction of the project. This fact tells about the increment of improved houses. But the number of houses still attached kitchen with bedroom is 23.3 percent. On the basis of this figure, it can be said that people are highly attracted towards new structure of houses but there are still some lacunae for fulfillment.

6.3 Changes in Life Style Due to Hydro-Project

People living in the electrified area have felt changes in their lifestyle and living pattern. People are enjoying exposing themselves to different mass media. It helps to improve their information level as well as to save the forest existing in the local village. The electricity has been found using for various daily affairs like- lighting houses, charging mobile battery, watching TV, listening radios, ironing clothes, operating mills, running computer and photocopy centers etc. structure of the houses are also found changed from traditional to improved cemented and having tin roof. Many of the houses have made improved stove (*sudhriyako Chulo)* cooking and constructed toilets. Sleeping late night and wake up late morning system is observed by researcher himself. Frequent contact with their family members with cell phone, getting informed about world happenings, adopting different habits exposed to media are some observed impacts of the project. People's overall activities are greatly shaped by electricity.

In the following figure, acceptance of respondents regarding their feel that lifestyle has changed due to hydro-project is mentioned.

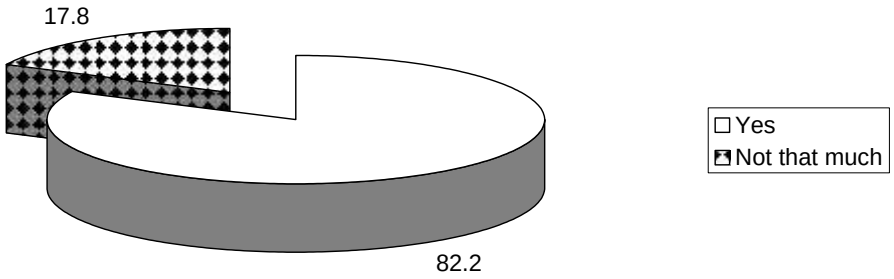

Fig. : 6.2 Distribution of the Respondents by Perspective towards Changes in Life Style Due To Hydro-Project

Source: Field Survey, 2010

In the study area out of 90 respondents 82.2 percent respondent have accepted some changes occur in their life after electrification in village. They are now familiar with some latest technological equipment and innovations. Even after the construction of project 17.8 percent respondents do not feel any changes in their life. They observe the life as continuation of pre electricity era.

6.4 Reduced Dependence on Forest Resources

Putputte MHP has brought some change in the dependency on the forest resources for their daily routine functions. Forest is the main source of fodder, fuel wood, leaf and others for local people living around. Before the project implemented, people's major source of energy was forest but after the project came into existence their dependency ratio has been found decreasing. Many of the households are using electric rice cooker for cooking rice. Construction of improved stoves decreases the amount of fire wood required for preparing food. Following figure peaks the rate of dependency of people on forest in numeric form.

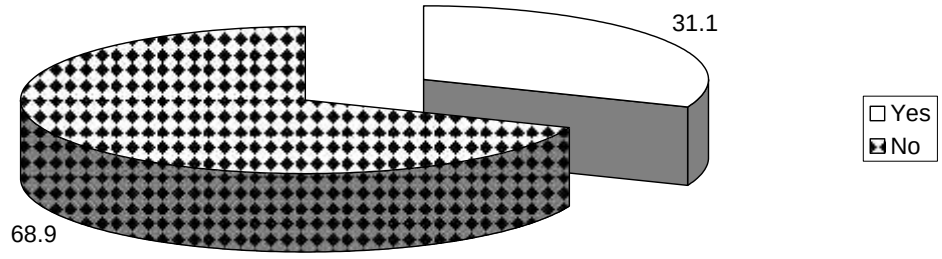

Fig. 6.3 : Distribution of the Respondents by Perspective towards Reduced Dependence on Forest Resources

Source: Field Survey, 2010

According to this above figure, out of 90 respondents' 68.9 percent respondent are still found using forest resource as before the project completed. In another side, 31.1 percent respondents have noted that their ratio of relaying over forest has been decreased at present.

6.5 Respondents' planning to run Some Businesses Based on Hydro-Power

With the availability of electric power some people are being interested to run some electric-based business firms. Computer institute, fish farming, furniture industry, photo studio, poultry farming etc. are the possible fields of business to the respondent people. Project extended the horizon of business with new hopes and possibilities. Local trained youths are found interested in running computer institute and photo studio. Other innovative respondent are very much enthusiastic to operate small different forms with reasonable investment. Respondents expect to run business based on hydro-power is stated in following table.

Table 6.2

Distribution of the Respondents by their planning to run Some Businesses Based on Electricity

Planning to run Some Businesses	Frequency	Percentage
Yes	15	16.7
No	75	83.3
Total	90	100.0

Source: Field Survey, 2010

As table stated that 16.7 percent respondents are interested to run business firms whereas other 83.3 percent respondents are indifferent about that. Those who wished to run business had said that they would run computer institute, furniture industry, poultry farming, photo studio or fishery.

6.6 Changes in Leadership Quality and Art of Speaking among the Respondents

Hydro-project has not only carried physical changes in the village but also brought intrapersonal confidence and skill of leadership among the stakeholders. Respondents believe that, participation in different phases of project directly and indirectly develop confidence and habit of speaking their feeling in front of the mass. As they responded to the researcher they discuss a lot and put their opinion about the project regularly from the beginning to till the date. Majority of the respondents thank to the project for providing suitable platform of improving themselves.

The following figure has presented the responses of respondents as below

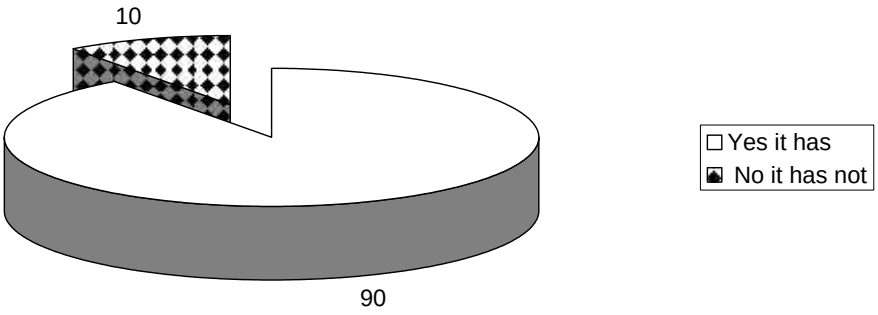

Fig. 6.4 : Distribution of the Respondents by perspective towards changes in Leadership Quality and Art of Speaking

Source: Field Survey, 2010

In the study area, 90 percent respondents agreed about the positive encouragement of project for their personality development. But only 10 percent of the respondents did not agree about this assumption. They responded as if this project has not brought any changes in their leadership and speaking habit in front of the mass. Those who said that their leadership and art of speaking had changed mentioned that due to continual engagement in the various meetings, discussions, formal and informal ceremonies during the project, their leadership quality got optimum chance to develop and so did their art of speaking.

6.7 Maintenance and Benefit Sharing

One of the important sides of the project is maintenance and benefit sharing. This aspect determines the sustainability and proper use of the benefit to the users. According the Chairman of working committee, regular maintenance of the project has been doing frequently with certain interval of time. All the households of the electrified community should donate their physical labour compulsorily. Working committee has sole authority to decide what to maintained and how? For the maintenance and operation of the technical aspect of the project 3 trained technicians were appointed on salary basis.

So far the project has Rs.90, 000 balances in its fund. That fund has been mobilizing for maintenance and deposited in different banks for interest. As per the saying of office secretary of the project per household contribute for minimum charge i.e. Rs.100 for using up to 10 units of electricity. For using additional amount of electricity every household should pay Rs.15/unit. The monthly income of the project is summed Rs.50 to 60 thousand and monthly expenses ranged around Rs.20 to 25 thousands.

Though there is no equal distribution of electricity in all houses, every household has been contributing labour donation equally without no misunderstanding and disputes.

6.8 Challenges faced by the Project

Puttpute MHP was carried out with the difficulty of topographical terrain with scattered settlements. There is great diversity of caste and ethnicity. Initially people had indifference about such projects and its potentiality. Overcoming from all the existed problems was not a easy task. Joint afford of all the stakeholders and working committee members could bring the challenging job in successful conclusion. According to the working committee, some of the challenges faced by the project so far are mentioned as bellows:-

- Inadequate information, lack of education and poverty of the people
- Participation of all sorts of people with their great differences in various social grounds like caste, ethnicity, education, income etc.
- Collecting fund for project
- Government's lengthy procedures and policies.
- Transportation of heavy machinery equipments from the long distant place to the steep hill (project sit).
- Management of labour contribution made by users
- Lack of technical and managerial skills for operation and maintenance among the rural population

- Wastage of surplus energy
- Expensive maintenance cost

In this chapter, impacts of Putputte MHP in people's life ways have been analyzed. Children health and education have been found changed after this project. Likewise, other variables such as change in house structure, daily routine activities and culture, dependence on forest resources, people's interest of running electricity based business firms, encouragement in their leadership and art of speaking, etc were descried. Moreover, mechanism of maintenance and benefit sharing and challenges faced by the project from its beginning to till the date were also the component of explained.

CHAPTER SEVEN
SUMMARY, CONCLUSION AND RECOMMENDATIONS

7.1 Summary of the Findings

The advent of modern development of MHP in Nepal dates back to only 1970s in Lalitpur district at Godabari VDC named "Godawari Fish Farm MHP" with installed capacity 6 KW manufactured by BYS. However, the history of hydropower started from centuries when some Nakarmis visited Tibet and transferred the technology of water wheels locally named as '*Pani Ghatta'*. More than 25,000 such *ghattas* are still being used to grind food grains in hilly and mountain rural areas of the country.

Now, the same technology has been widely used to make many villages of Nepal bright. The whole country has been facing hazardous problem of energy crisis, but rural and remote village people even don't know or hear about load shedding. At present about 20 MW electricity of the country is obtained from MHPs.

This study "People's Participation on MHP" was carried out in the Putputte MHP of Chisapani VDC of Syangja district. During this research, some specific objectives were there, they are: to find out the effectiveness of people's participation in putputte micro-hydro project, to find out the factors effecting in participation, to examine the changes of peoples' skill and knowledge. To fulfill these objectives, ward no. nine of the Chisapani VDC was selected as the research area. There were 160 house holds, among them 90 house holds were selected as the sample unit through the random sampling.

Some tools like questionnaire schedule, observation, key informant interview, and formal and informal group discussion were used to collect information. For more information primary and secondary data were also collected. Qualitative data were analyzed based on descriptive design. Quantitative data were tabulated and analyzed.

The research area, Putputte MHP is located in Chisapani VDC, Syangja district of Gandaki zone. Chisapani VDC is located in the south eastern part of Syangja district. There is only one MHP electrifying the different 5 wards. Putputte MH User Group is a multi-ethnic group where Brahmin, Chhetri, Magar and Gurung are found in majority. They all are Hindu in religion. Only few households are economically sound but rest of the majority people are in the chain of poverty. Agriculture is the main occupation of the people. Many youth have gone to the foreign employment in different countries. Tradition of joining in Indian and British Gorkha Army is also prevailed here.

There is a working committee of MHP, which has made operational plan and constitution with the help of the District Water Resources Committee. They have made rules for protection, management, benefit sharing and regular supervision and maintenance. High level participation of women was found in all the phases of project implementation. . There was not any type of biasness among the users according their caste/ ethnic groups, higher and lower castes, anybody's political thought, poor and rich, gender etc. All the decisions were taken on the basis of consensus of the users. Everyone's problems, suggestion and sayings have been taken seriously. Sort of participation was in cash, kinds and labor. A provision of technicians for the maintenance and other related works have been made. Information, other fees collection and secretarial jobs were performed from the office.

The collected fees are used for the operation and maintenance of the system and are collected as a fund. The fund is raised by its mobilization and other fund raising sources. It has also been used for community's wellbeing. Micro-hydropower projects have been proved the expensive ways to have electrification in the areas where main grid line can be easily installed. To reduce the total installation amount and sustainable management of the project government should think twice, whether the existing policies are appropriate for the massive extension of such projects.

7.2 Major Findings

- Participation initial phase generally involves discussion of the issues of feasibility of a particular development project. Out of 90 respondents, 22.2 percent study that the participated in all the preliminary meetings in the feasibility determination phase. While large 47.8 percent participated sometimes only and 30 percent of them never participated.
- As per the operational plan of this MHP, each beneficiary house contributed Rs. 2700.0 per bulb installed at their house. Thus managing the required sum of money was a difficult and challenging affair.
- Out of the total respondents, 84.4 percent of the respondents did not feel much difference in the level of participation of different people in the society. But some 15.6 percent of them felt a certain level of differences in the level of participation by different people.
- Regarding the impacts of project, 56.6 percent respondent have felt the changes brought by micro-hydro project on health and education of the children. Similarly 43.5 percent of the respondent did not notice for this.
- In the study area out of 90 respondents 82.2 percent respondent have accepted some changes occur in their life after electrification in village. They are now familiar with some latest technological equipment and

innovations. Even after the construction of project 17.8 percent respondents do not feel any changes in their life.

- According to the field survey, out of 90 respondents' 68.9 percent respondent are still found using forest resource as before the project completed. In another side, 31.1 percent respondents have noted that their ratio of relaying over forest has been decreased at present.
- 16.7 percent respondents are interested to run business firms whereas other 83.3 percent respondents are indifferent about that. Those who wished to run business had said that they would run computer institute, furniture industry, poultry farming, photo studio or fishery.
- In the study area, 90 percent respondents agreed about the positive encouragement of project for their personality development. But only 10 percent of the respondents did not agree about this assumption.

7.3 Conclusion

The Micro Hydro Project (MHP) is considered as the best options for providing electricity to hilly and mountainous rural villages. The rural villages can enhance their livelihood and style of living while preserving environment. Sites suitable for such MHP installations are abundant for e.g. traditional water mills, called ghattas are very common in hilly areas with streams and used for grinding grain, hulling rice and expelling oil. MHP has fulfilled community's requirement, such as, running agro-processing mills, bakery, mechanical workshops, rural enterprises (saw mills, poultry farming, computer training, photo studio etc.) and the like, in locations of the hills and mountains with low population density and scattered settlements. Hence, there is a high prospect of MHP development for all round and sustainable development in rural Nepal, particularly in rural areas. Nepal is facing energy problem due to the lack of electricity. Loadsedding up to 16 hours is our common acceptance. Despite of its huge potentiality large hydro power stations are not operated due to our economic problem. To over come from all

these problems and provide energy to the rural people in convenient way extension of micro-hydro programme is only one option.

People's participation enhances the effectiveness of micro-hydro programme. Putputte MHP has proved that people can construct such project themselves even with the small subsidy of the government. People themselves decided for various decisions. They fixed the amount for fund according to their economic condition. The very interesting basis of collecting fund was on the basis of light they installed. The household, which has good economic condition installed more bulbs and paid more amount, whereas poor family installed less bulbs and paid less amount. Before the completion of the project people were deprived from the uses of all sorts of electrical equipments. Now all most all of them have TV at their houses and getting information of the world immediately. Cell phones, CDMA phones are using for communicating with their relatives and family members. Tradition of ironing clothes has been advent over there. Health and educational consciousness is highly generated among the people.

Thus, the project Putputte Micro-hydro Project was selected as the best practice due to its users' participation and demand driven approach at all levels. The community people formed a Micro-hydro users' committee and actively participated in different phases according to their community work plan. Their active participation was needed at the construction phase. They collected local materials as well as labored for the project. They collected money as a fund for construction and maintenance purposes. There is an improvement in environment as compared to before. Dependency on the forest for fuel wood has been decreased. Structures of the houses have repaired are found electricity friendly. Kerosene lamp is totally replaced so that, children's education is getting improved. After the completion of the project for the operation and maintenance they collect the monthly fee

according to the consumption of electricity as much what the installed meter box shows. Who consumes larger amount of electricity pays more fees.

Hence, the project was implemented by the initiation of the beneficiaries by organizing themselves as it was their 'felt need'. The existence of a rural association is a must in mobilizing village resources. The MH users' committee came into being to mobilize cash, labor and material for the implementation of the project to the operation and maintenance phase. The sense of ownership of the users' is also an important aspect to the success of project and its sustainability. Besides, the users are mobilizing the fund like a micro credit system.

Hence, Putputte Micro-hydro project seems successful in its aim and it has shown a good example of people's participation approach which would be a message to the people living in other villages.

Participation of people is of utmost essence while identifying and implementing a development project. If their participation in ensured, they can best fit the need, nature and type of project according to their own need as well as challenges and constrains they possess. Even they can identify the core socio-cultural issues better than the staffs of different aid agencies. Moreover, their participation in project identification crops the sense of ownership among them which will, help during the implementation of the project in question. This makes the development undertaking truly a sustainable one.

7.4 Recommendation

The micro-hydropower deserves the high priority in view of its role in the socio-economic development of local villages of Nepal. The series of constraints being faced in this sector felt that unless the micro-hydropower

sector is provided with adequate technical, financial and managerial support, it will not be able to contribute to national development to the extent one can expect from it.

Based on the research study and conclusion, following recommendations and suggestions have been made.

- People's awareness has also a key function for the sustainability of a project. After the completion of the project, if there any carelessness has occurred; the project will end in a shorter existence. Active participation is persistently desirable afterwards the end of the project. All the members within the Users Group should be alert of the works wanted.
- Social problem like all the households contribute equal labour for the construction of MHP but the distribution of the electricity is unequal depending on demand(lower income families use less because to their inabilities to pay). Such problems are encountered in course of project works that should be properly addressed.
- Participation at once upon a time does not meet up the objective of the project. After the completion, it is required as before for the sustainability of the project. For this MH User Group should do its best as did during the construction phase. MH User Committee should pay attention to everyone's activities, if the number of members increases, there should be a proper management of the electricity in its benefit distribution and there should be a certainty that no new clash would emerged among the users.
- Guidelines and manual should be prepared for all Micro-hydropower related works.
- The government should emphasize on subsidy policy with equity for the development of MHP in the remote rural areas all over the country.
- Preliminary studies and detailed feasibility studies (data based information) of all possible sites of different streams of the country should

be done and keep in record for ready to use when local people require to install MHP.

- Priority in the rural electrification should be given by using indigenous materials and manpower during implementation and operational process.
- The people should be made aware of people's participation, good governance, responsibility for the sustainable development of MHP
- There should also be given the responsibility to advise the government in providing incentives, funds, encouragements, etc., to the people and organization related with micro-hydropower development and use.
- The development and dissemination of the micro-hydro plants in Nepal is taking place in a random manner. No scientific approach seems to have been adopted in this sector. The government's input is negligible, and there does not exist any responsible body to coordinate the activities being carried out, nor there any comprehensive plan, for its development. So that, a competent autonomous body within the government be formed for regular supervision and monitoring of such projects.
- In the long run MHPs are found expensive for maintenance and management so that, government should provide technical support and the repair facility to the project.
- For the profit maximization or full utilization of the plant, it should be connected to the national grid when the project is idle in the time
- The subsidy programme is encouraged for the development of MHP. The government has done right thing by providing subsidy. But subsidy should be provided according to the structure of the cost not by the district-wise.
- There should be clear and consistent government policies. If entrepreneurs and community groups are to be encouraged to invest in MHP plant for grid extension must be made available. At present many investors are deterred by the fear that the grid may be extended to their area, putting their plant out of business providing electricity at subsidized prices.

- The profit earned from the plant should be reinvested in micro-hydro itself.
- During the initial period of the plant establishment local people should be trained to transfer the pilferage and overuse of the electricity by the customer

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APPENDICES

Appendix-I

Questionnaire –Schedule

Researcher: Resham Raj Sigdel

Questionnaire No…… Household No: ……Date……

Tole…….

General Information

1 Name of the Respondent: ……. 2 Caste/Ethnicity… 3.Age…

4.Sex: Male Female 5.Religion… 6.Marital Status…

7.Educational Status… 8. Types of the family and numbers……

Name of Head of the Family:

Household Information

8. Number of bulb joined in the house……..

9. Number of employee from the household (Number with Sex and Country of destiny)….

10. Sources of Income: i. Agriculture ii. Live stock iii. Foreign- employment iv. Services (including retired)….. v. Others……..

11. Total income (monthly/ yearly) Rs:

12. Total expenditure (monthly/ yearly) Rs:

Other informations:

13. Would you imagine for lighting houses operating such MH projects from the nearby stream before this?

a) Yes b) Little bit c) No

14. There might have organized meeting during the initial phase of the project. How actively did you participate?

a) Regularly b) Occasionally c) Never participated

15. If participated, in what matters discussion were concentrated?

a) For rising fund b) Formation of working committee c) Others

16. How did such discussion come into conclusion?

17. If not participated, why didn't you participate in the meetings?

a) Not having leisure time b) No belief c) Not gets informed d) Others

18. If not believed, why?

19. Didn't you feel such meetings worthless running for long time?

a) Yes b) No

20. If yes, why?

21. If no, why?

22. Who involved frequently from your house?

23. Didn't you feel negative, while rising fund before launching the project?

a) Yes I felt b) No

24. If felt negative, why?

a) Not having believe for successful implementation b) Not having money

c) Others

25. Can you say, how much money did you pay so far for the project?

26. Are you actively participated in the project from beginning?

A. Yes B. Often C. Others

27. Did you never want to work in working committee?

A. Yes I want B. No

28. If yes then why did not you involved?

29. If No Why?

30. Do you need to think the working committee members are efficient on their work?

A. Yes B. No C. No idea D. Others

31. If not why?

32. During the major decision did working committee call all the members for discussion?

A. Yes B. No C. Often D. Others

33. If not, then why did not you raise the question?

34. Is there any type of irregularities or corruption in your notice during the completion of the project?

35. How did you contributed in the project?

A. Discussion prior to the project B. Coordinate with government authorities

C. Economic aspect D. mediating on disputes E. Labor work F. Technical support G. Purchasing of Goods H. Maintenance I. Others

36. Did you feel that some work more and some less in the project?

A. Yes B. No C. Not much

37. If yes Why?

38. How are you benefitted by the project?

39. What are the electrical appliances you use in your home?

A. TV B. Radio C. Iron D. Mobie E. CDMA phone F. Refrigerator G. Others

40. Do you change the structure of your house after installing electricity?

A. Yes B. No C. Others

41. Are there any changes in the study of children and the health condition of family?

A. Yes B. No C. Others

42. Is there separate kitchen in your house?

A. Yes B. No C. Outside D. Others

43. Which fuel do you use to cook food?

A. Fire Wood B. LP Gas C. Kerosene Stove D. Dung Gas E. Others

44. Do you use improved stove at your home?

A. Yes B. No C. Thinking of installing one

45. Do you think you have improved life style after electricity?

A. Yes B. No

46. If yes, How?

47. If No, how?

48. How is your dependency on forest remaining now?

A. Less B. Not changed C. More than before

49. Do you have any plan of doing business depend on electricity?

A. Yes B. No C. No Response

50. If yes what type of business you are planning?

51. Do you think there is improvement in your social practices such as:

A. speech delivery at program B. participation in social/political/religious gathering etc.

52. Are there any obstacles after the completion of project?
53. If yes, what are the reasons?
54. Do you know how much fund is available in the trust?
55. If Yes, How much?
56. If No, then why?
57. How do you handle the technical problem in electricity?
58. Could you please describe the problem occur during entire project?
59. What steps should be taken to manage the project in long run?
60. Do you have any other experiences regarding this project?

Appendix-II

Checklists

Key Informants Interview (Checklist for Working committee members): People's Participation in the Putputte Micro-hydro Project, Chisapani-9, Syangja

1. How many members are there in the present MH users' committee?
2. How often are the General Assembly meetings held?
3. What is about the caste /ethnic group and gender composition in the committee?
4. What are the project related works to be done by the Village Maintenance Worker?
5. What sorts of changes are seen in the village after electrification?
6. What types of problems and conflicts have been experienced so far in the project?
7. How the mechanism of supervision and maintenance been developed for the project?
8. How was the effectiveness of people's participation during construction period?
9. Have you seen any possibility of power based business in the village? What are they?
10. What steps are to be adopted for the sustainability of the project?
11. How often technical problems are happened in the village?
12. How have you been used the income of the project?

Appendix-III

Name of the Key Informants

1. Bhoj Raj Sigdel (Founder Chairman of the MH Users' Committee)
2. Janak Bahadur Rana (Tecnician)
3. Rajendra Bhujel (Office Secretary of the Project)
4. Iswori Prasadh Lamsal (Member of the User's Committee)
5. Khum Raj Sigdel (User)
6. Danda Pani Bhandari (Vice Chairman of the User's Committee)
7. Bidur Sigdel (Founder Secretory of the MH User's Committee)
8. Purna Kumari Thapa (User)
9. Bhimala Shahi (Users)
10. Gopal Sigdel (Teacher)

Appendix -IV

Construction Committee of Putputte Micro-hydro Power Project

(During the Initial Phase)

1. Bhoj Raj sigdel (Chairman)
2. Chandra Bahadur Gurung (Vice Chairman)
3. Bidur Sigdel (secretory)
4. Bhim Lal Lamsal (Member)
5. Ishwori Lamsal (Member)
6. Nanda Bahadur Thapa (Member)
7. Indra Kanta Sigdel (Member)
8. Buddhi Sigdel (Member)
9. Chet Bahadur Thapa (Member)
10. Giridhari Sigdel (Member)
11. Ghan Bhahadur Thapa (Member)
12. Sabitra Khanal (Member)
13. Dhan Maya Parajuli (Member)

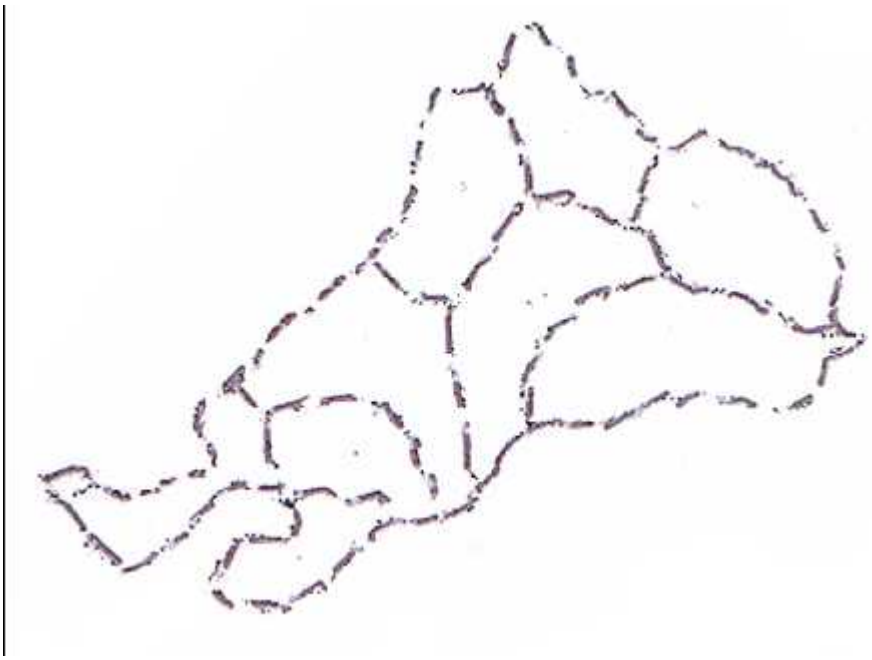
Working Committee of Putputte Micro-hydro Power Project (At Present)

1. Danda Pani Bhandari (Chairman)
2. Ishwori Prasad Lamsal (Vice Chairman)
3. Dhana Shyam Bhandari (Secretory)
4. Ramchandra Aryal (Member)
5. Bishnu Bahadur Rana (Member)
6. Som Prasad Koirala (Member)
7. Mithu Lamsal (Member)
8. Sabitra Khanal (Member)
9. Top Bahadur Thapa (Member)
10. Baburam Lamsal (Member)
11. Gagan Bahadur Thapa (Member)

Appendix-V

Map of Syngja District

Map of Chisapani VDC



Appendix-VI

Photos:

Researcher with respondent during field study

Turbine of the project

Penstock pipe

Cannel to supply water

Power house of the Putputte Hydro-project

The Putputte fall in the river

Electricity distribution through polls

Electrification in the rural traditional houses

A woman cooking *sel roti* in the improved stove "*sudhariyako chulo"*

Changes after electrification