

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background

Nepal is well endowed with enormous hydro-power resources. Water is the most important natural resource of Nepal. There are about 6,000 rivers and rivulets which give the potential of 83,000 MW hydropower, of which 44,000 MW can be economically harnessed. But less than 1% of the available economic potential has been exploited and only 40% of the population has access to electricity (Nepal Electricity Authority, 2006). Most of the people have no access to the electricity and, due to high power generation cost; there is low potential for export as well.

In the modern days, it was only in 1882 that the first hydropower plant was built in Wisconsin, USA. The first hydropower plant in Nepal was established in 1911 at Pharping (500 KW), 29 years after the world's first plant was established.

After the restoration of the democracy in 1990, Nepal adopted the economic policies of liberalization. As a result, the private sector has started to lead the economy. Privatization of the hydropower sector has not been an exception. Medium size hydropower projects such as Khimti (60MW), Indrawati (5MW), and Upper Bhotekoshi (36MW) **have been** absorbed by the private sector. At present, the total hydropower generation has reached 556.8 MW or just 0.7% of its potential.

The availability of electricity contributes significantly to the overall development of the country while its consumption reflects the economic condition of the **nation**. As electricity plays a crucial role in the balanced development of agriculture, industry and other sectors, it is necessary to supply power at reasonable price and its sensible consumption **is equally** important.

Currently, the urban population is consuming most of the electricity. But majority of people as well as most of the agro-industries, irrigation and cottage industries are concentrated on the rural areas. As the overall development of the nation premises on the development of the rural areas, balanced development can be achieved only through creating opportunity for equal consumption of power in the villages and the urban areas (National Planning Commission, 2001).

Population Census-2001 (National Report) shows that the population having access to electricity service has reached 40% with 33% of the population availing the

service from the grid (including Butwal Power Company) and NEA off-grid facilities, the remaining 7% being attributed to micro hydro plants developed by local entrepreneurs and other alternate sources. The Tenth Plan aims at increasing electricity services from 33% to 43% of the population through the Grid and NEA owned off-grid power generation facilities.

Nepal is at present facing a severe deficit in electricity supply, which hampers economic growth and development in the country (NEA, 2006). Energy demand is ever rising with an increasing population and the expansion of different developmental activities. Dependency on traditional sources of energy has not decreased and the increasing trend of forest depletion leads to a negative impact on the natural balance. It is a challenge to ~~make electricity~~ make electricity service available at an appropriate price by completing projects under construction in the shortest possible time to substitute such risks of natural imbalances (MoF, 2005).

Economic growth and energy use move together. Energy, especially electricity, is important in raising people's standard of living. High income countries use more than five times as much energy per capita as developing countries do, and with only 15% of the world's population they use more than half of the energy. ~~Despite increasingly~~ Despite increasingly high energy costs, and the Kyoto protocol which calls for reduction in Carbon dioxide emissions, fossil fuels are still the main source of energy and their use has been rising faster than any other source of energy (World Bank, 2006).

Expansion of electrification in the districts is underway where electricity has already been reached with the utilization of domestic resource. The electrification in an additional 27 districts is continued under the Rural Electrification and Distribution System Strengthening Project with the loan assistance of Asian Development Bank (MoF, 2005).

Electricity has both direct and indirect benefits for the people using it. Hydropower provides opportunity for people to expand income generating activities as well as helping to improve health and education services. It can have significant contribution in overall development of the region.

Rural distributions in the ~~past~~have been characterized by top down supply driven activity with more emphasis on generation and erection of transmission lines than on supplying electricity to the maximum number of rural people. Support primarily came from bilateral donors and banks (Pandey, 2006). A majority of Nepal's population (85%) resides in rural areas of the country and the provision of electricity to them has been hindered by a 'cost and benefit' analysis rather. A fairer assessment would focus equity considerations.

Khimti hydropower project is an initiation of a private sector (Himal Power Limited) under the Built Own Operate and Transfer (BOOT) scheme. Construction of 60 MW Khimti I Hydropower project was started in 1996 and was completed in June 2000. It has been in commercial operation and connected to Nepal Electricity Authority's national grid since July 2000. It is located approximately 100 km east of Kathmandu.

Poverty reduction, an agenda of the first quarter of the twenty-first century, is the main development goal of all developing countries. A high economic growth rate is desirable to make the goal of poverty reduction a reality. However, experience has proved that high economic growth rate alone is not sufficient to eradicate poverty. More equitable distribution of resources ~~are~~is a precondition to making progress toward poverty reduction.

## 1.2 Statement of the Problem

Inequality and poverty have become serious problems in the Nepalese economy and society. Despite the various development efforts of the past with large foreign aid budgets, the population living below the poverty line has been steadily increasing and a majority of impoverished people live in rural areas. Solving these problems is the biggest challenge for the government and people of Nepal.

The Khimti Hydropower Project has identified ten village development committees (4 VDCs of Dolakha District and 6 VDCs of Ramechhap District) as affected areas in terms of common property utilization and environmental hazards. ~~Although its proponents claim the project has had minimum environmental impacts,~~ Himal Power Limited (HPL) has been carrying out rural and community development programs for the affected communities. As a part of that, Jhankre Rural Electrification and Development Project (JREDP) was established by the HPL in order to reciprocate by

providing rural electrification to the local area and, after an appropriate time, handover of the plant to a local user group. To achieve this objective, the 500 kW Jhankre Minihydro Power Plant (JMHP) was built.

The community has developed well-being-ranks with the help of CARE Nepal. Various strata of any community has a varying capacity of exploiting this energy source in order to improve their living standard. All members of the community have an equal right to access services like electricity but the quantity of use by each family is generally seen as unequal. A study to explore the inequality of use of the electricity by different socio economic classes of the community is needed.

Natural resources of the area have been exploited by the project. The poor and marginalized people of the community are more dependent on the natural resources for their daily livelihood. The following questions arise to be answered in the case that the different affordability of different strata of the community:

1. Is electricity affordable to the poor people of a community?
2. What are the differences of electricity use among the four strata of the community?
3. Are the poor people using the electricity for income generating activities?
4. What are the different plans of different strata for the use of electricity (anticipation)?
5. Are there any adverse impacts of electricity projects on local people?

### **1.3 Objectives**

The overall objective of the study is to explore the inequalities among different socio economic classes for the consumption of the electricity supplied in affected area of the Khimti I Hydropower project. Although the access to electricity by every member of the community is equal, the consumption capacity is different. The specific objectives are:

1. to explore the electricity consumption pattern of different socio economic strata,
2. to find out how the anticipation of imminent electrification by households of various strata differs, and
3. to analyze the use of electricity as a source of income and production for different well-being-ranks.

### **1.4 Significance**

Since its construction, electricity has been supplied to some areas neighboring the Khimti I hydropower project. ~~Many~~ many natural resources have been exploited during its construction. In reciprocation, electricity is being supplied for consumption by the local population.

The community lacks social cohesion and several class and caste stratum exist. Each individual stratum have different responses regarding the changes within their community. ~~Perceptions of affordability for fee-based services like electricity differs~~ Perceptions of affordability for fee-based services like electricity differ among diverse community stakeholders. This study ~~has attempted to~~ will explore the affordable capacity of the different stratum of the community for the utilization of electricity facility. The resulting document ~~will be~~ is hoped to be useful for planners and development policymakers to address issues of equity in the future. This will further assist work on the issue of inclusion of different strata in the social mainstream.

### **1.5 Limitation of the study**

This study is being carried out in one of the affected area of the Khimti I hydropower project, Rasnalu VDC of Ramechhap district. For this reason, the study may not represent the situation elsewhere within or outside of the country.

### **1.6 Organization of the Study**

The first chapter is the introductory chapter, which discusses about the background information, statement of the problem objectives etc. Literatures related to electricity, energy and inequality been reviewed on the second chapter under the heading of 'Literature Review'.

Third chapter is all about the research methodology applied for this research. Chapter 4, 5 & 6 are the analysis of data. Chapter four is about the introduction of the study area; chapter five discusses about the anticipation and affordability of the electricity by different well-being ranks and chapter six is the summary, conclusion and recommendations.

## CHAPTER TWO

### ✦ REVIEW OF LITERATURE

#### 2.1 Electricity

A government task force on rural electrification has reported about the benefits of the electricity on the rural communities. The commonly described benefits of electricity are identified as: increased agricultural and industrial productivity; promotion of tourism in remote areas; conservation of fuel wood and petroleum fuels; provision regional government services by electrifying remote district headquarters; increased productivity in rural households; and promotion of the use of social and other services in remote communities (Ministry of Water Resources, 1988).

The report is not optimistic on the above results of electricity in the rural areas. The electrification has not had the desired impact on the agriculture (Ministry of Water Resources, 1988). Electricity has not seen widely used in irrigation sector in the rural areas of Nepal. The impact of the electricity on rural industry has been minimal (ibid.). Rural households mostly demand electricity for lightening purpose.

Transportation costs are high and unless Bhutan can ~~think certain~~ think certain niche products, her exports are not going to be competitive. It is expected that by 2020, the entire country will have access to electricity (Tshering and Tamang, 2004). There is however, a need to ensure that internal electricity tariff is kept affordable so that it becomes the main source of energy in the country and also to stimulate industrial activities (ibid.). This is also true in Nepal, where widespread poverty

stands as a barrier for mass consumption of the expensive electricity. Citizens' inability to afford electricity has been identified even in the case of Bhutan.

According to Sharma, there is no evidence that electricity either promotes or hinders tourism in rural areas (1993). Tourists visiting remote areas want to experience a less developed lifestyle, which is obviously lacking electricity.

Surveys showed almost negligible savings of fuelwood due to electricity (Ministry of Water Resources, 1988). Electricity was found to be too costly to replace wood for cooking and heating.

Conversely, Sharma (1993) posits that improper development of hydroelectricity can lead to social inequality, environmental destruction, social conflict, collapse of growth and ultimately to aggravation of poverty. The NPC (2001) recognized this fact and stated that given the purchasing power of the majority of people, the current electricity tariff is very high and reducing it is a significant challenge. For this reason of expensive tariff rate, use of electricity is limited for lighting only in the villages and also in the urban areas. And thus the tenth plan has stated its one of the objective to supply reliable and high quality electricity at reasonable price throughout the [kingdom-country](#) by integrating economic activities.

Productivity of rural households is not increased through electrification. Most demand serves lighting while a small remainder powers appliances such as fans and radios. The report has stated that only 3% adult age population added income earning activities due directly or indirectly (lighting) to electricity.

Although the report was written 18 years ago, the conclusion it draws is still applicable in terms of rural setting. Affordability stands as the primary barrier in to better exploitation among the poor. The report makes it clear that electrification in itself is not sufficient to uplift the rural poor. The other utilities of electricity are yet to be exploited by the vast rural populations.

(Pun, 2003) mentions on his article assessing the existing government policy that the hydropower development policy of Nepal is not fair in regard of the small and micro hydropower the can be established with the local Nepali investment. The policy is more in favor of large hydro project. He reveals that the electricity produced using the local investment is much cheaper than that of the foreign investment. Chief tariff rate is only possible with the local investment, as the foreign investment has to cope with the inflation of exchange rate. He concludes that high dams are not appropriate in the case of Nepal. (Pandey, 2003) on his article mentioned that the will be Nepalese

people to consume the electricity in cheaper rate after the restoration of democracy in 1990 has not been addressed.

(World Bank, 1993) describes about the power sector efficiency with advanced lighting units. The bank's 1990 Electricity Transmission and Conservation project in Brazil aimed to increase public lighting by replacing 175 watt incandescent bulbs with 80-watt fluorescent lamps and 50- watt high –pressure sodium fluorescent bulbs. The program was expected to save about 103 GW/h year, enabling the government to defer installation of 27 MW of additional capacity. In the case of Nepal as well, such project could contribute not only to meet the national demand but also to make the household to easily afford the electricity.

(ADB, 1993) states regarding energy efficiency that for electrified households, alternatives for increasing lighting efficiency are the same as for urban users Compact Fluorescent Lamps (CFL) and fluorescent tubes provide significant savings compared to the incandescent bulbs.

Sector wise consumption of electricity in FY 2003/04 was that the industrial sector accounted for 38.1%, household sector 37.3%, commercial sector 6.0% and export 7.8 % ( MoF, 2005).

Government of Nepal has emphasized Rural Electrification (RE) to be the key and indispensable element for the overall economic development of the country (Pandey, 2006). Vast majority of population living in rural areas exemplify mass need of electricity available in rural areas. Government's priority seems to have its rational basis for electrifying rural areas also in order to address the rural poverty. Though the government is far behind to make this policy a success. Low consumption, geographical remoteness, high investment and low level of revenue which is insufficient to cover even the cost of operation and maintenance of distribution system, high pilferage, and high level of rural receivables has been revealed as the reasons for not achieving the objectives of rural electrification is spite of 30 years effort on it. But (Gyawali, 1996) states in contrast that South Asian infrastructural planning is dictated by short-term strategic gains for the political parties jousting for power, backed by large business interests with an unjustified belief that bigger is necessarily better. He further indicates that while the age of high dams may have ended in North America and Europe, the starting gun has just been fired in Asia.

Development of hydropower contributes to the development of rural electrification meeting the domestic need, employment generation, stemming deforestation and expanding domestic agricultural production and development of industry as well as business, there by contributing to sustain poverty reduction(Kafle, 2006).

The need to accelerate the pace of expansion of the electricity distribution network into the rural areas to create market, provide access to electricity and to uplift the rural stagnant economy has become ever more demanding (ibid.). In order to achieve these goals in favor of rural residents, if government resource is insufficient, the alternatives such as community participation or private sector involvement can be the choices. Government of Nepal through NEA in the fiscal year 2003/04 has adopted a new concept of community participation in sustainable rural electrification to garner the active participation of local communities, co-operatives, and User groups for the extension, operation and maintenance of rural electrification scheme with substantial amount of subsidy from the government.

(Pandey, 2006) further states that active participation of community will help to supply the electricity to the rural people in a more simplified effective and reliable way.

(Ming, 1999) has illustrated about the energy development and its role in sustainable rural development in China. He mentions that improvement of energy use has facilitated the cultural and social advancement in rural areas of China. More than 85% of farmer households are supplied with electricity which has helped to improve living conditions of farmers.

Local community participation has been felt in the hydropower sector of Nepal as well. Corporate plan of Nepal Electricity Authority (NEA) states- In order to accelerate the pace of expansion and conduct management of rural distribution systems in a sustainable manner, NEA has adopted a concept of community participation in rural electrification schemes. The overwhelming response from user groups and cooperatives to NEA's invitation for proposals on operating the distribution system by the community themselves has led to 80 agreements already in place (NEA, 2006). This also makes clear that local peoples' voices are significant in making the hydro-power project success.

(Adhikari, 2006) states that rural electrification has eased to increase the living standard of the rural people. Rural electrification projects are based on the labor intensive technology and from this rural unemployed will get job opportunity in the villages during the construction phase. After electrification, increased facility in education, health, industry and commercial activities will promote the living standard of the rural people. (Rijal, 1999) describe the women's participation in energy programs. It shows that gathering of fuel wood is time consuming and exhausting work that is traditionally the responsibility of women who are thus diverted from other activities such as education and farming that could eventually improve their productivity and living conditions. Similarly, the combustion of biomass which is the main source of energy for cooking and heating in rural areas, produces pollutants that are hazardous to human health and these affect women more because they are mostly involved mostly in cooking.

(USAID, 1994) mentioned that installation of micro hydropower plants has brought technical revolution in the rural areas where people had not been exposed to modern technology. Micro hydropower plants give them opportunities to utilize modern technology to improve their living standard. These plants also help them to link their subsistence village life to the modern market through value added goods produced by micro enterprises e.g. milling cottage industries and so on developed in the course of time.

(Junejo, 1994) states that participation; interest and material contribution by the prospective beneficiaries is very important aspects for success of micro hydro in the remote and underdeveloped mountain areas. Efforts are required to generate this kind of participation. The representatives of the beneficiary community or local entrepreneurs should be made aware that they are the owners of the plants and responsible for the overall well being of the plant.

(Shrestha, 1991) reveals that the small micro hydropower has been widely practiced in Nepal for the rural electrification. But he comments that the weaknesses of the present small hydel projects and micro hydropower plants for rural electrification as they cannot meet the future needs because they have low voltage. This electricity will be ineffective in the productive works of the rural areas because the villagers will be unable to pay the electricity bills, thus they only use the electricity on lighting purpose only. He mentions on how the rural people can benefit

from the rural electrification programs that unless there is development of integrated approach for along with the small scale industry, irrigation and labor intensive program to raise the purchasing capability of the rural people; the rural electrification program will be uneconomical.

## 2.2 Energy

Development and economic growth have improved the quality of life for many people, but the gains have been uneven and economic growth has often had negative environmental consequences, with profound impact on poor people. Using the environment wisely is crucial for reducing poverty. Many poor people depend on environment for their livelihood (World Bank, 2006). As the consumption pattern of energy and degradation of environment is directly related, the renewable energy sources be looked for alternative to conserve environment. The energy further should be able to be supplementary for income generating activities of the poor people. We have the fact that income derived from the environment is a major source of livelihood for many people, particularly for the rural population.

(ADB, 1993) states that oil price shocks of the 1970s encouraged for flurry of research in to the technology of electric power generation.

At the end of the 19<sup>th</sup> Century, people were heavily dependent on wood and coal to warm them, cook their food and light their homes. These fuels made their houses dirty and had an adverse impact on human health. The discovery of electricity ushered n a new age of technology and made a tremendous impact on the way people ~~lived~~lived (United Nations, 2004). It further states that almost a third of human population today has no access to electricity, those who do have access to it can vouch for the considerable improvement in their living conditions. It depicts the miserable position with regard to the energy consumption that at the dawn of 21<sup>st</sup> ~~century~~century, we still live in houses that waste energy, and use inefficient lighting, heating and cooling systems and appliances.

(Adhikari, 2006) states that conventional energy plays an important role in the energy sector of Nepal. The role of conventional energy is more significant in the rural areas where around 85% of the population resides. The fuel-wood supply is constrained because of environmental considerations and depleting forest resources. In contrast, the country's enormous hydropower potential is virtually untapped to meet its energy needs, creating a unique endowment. Large increase in population resulting

in the big loss of per-capita land and the poor state of the development of other types of renewable energy has left Nepal no space except to rely on hydropower.

The increases in the price of fossil fuel based energies during the last two decades have made us conscious of the need to conserve energy and adopt energy efficiency in our day to day activities (United Nations, 2004).

(Dahal and Gurugarana, 1998) stressed on the environment and sustainable development. These both aspects are inexorably interlinked with each other. Vicious cycle of poverty and environmental degradation is reinforced by the growth of population. People use traditional as well as commercial energies.

Generating energy from fossil fuels produces emissions of carbon dioxide, the main green house gas contributing to global warming and climate change. (World Bank, 2006) have cited the energy consumption pattern of the world , illustrates that Renewable energy 13%, Gas 21%, Coal 24%, Oil 34% and Nuclear 7%.

(Acharya, 2006) admits that the danger of global warming and greenhouse gas emissions due to extensive use of conventional energy sources in developed countries and also fast depletion of fossil fuel products in several countries posed no option to world community than to promote hydropower. Nepal also particularly lacks conventional source of energy and deserves high potential of hydropower. Developing hydropower is the one and only sustainable solution to meet the growing demand of energy in the country.

NEA, Annual Report 1999/2000 shows that Nepal with per capita energy consumption of about 15 GJ is one of the five least energy consuming countries in the world despite the fact that there is 2.27% of the total hydropower potential in the world. The preponderance of a rural sector characterized by a subsistence economy and low economic growth largely explains the low level of energy consumption. Evidence reveals a close association between economic development and per capita energy consumption.

Economic Survey 2004/05 of Nepal states that of the total energy consumption by sector in FY 2003/04, the share of household use was 90.1%, industrial use 3.8% and other use 0.2%. Whereas in FY 2004/05, household sector is expected to occupy 90.6% and industrial, commercial, agricultural other sectors by 3.6, 1.1, 0.7 and 0.1 respectively (MoF, 2005). This means the energy consumption for the economic productivity, which is always a larger objective for the hydropower plant, is minimal.

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Major source of energy in the rural areas for cooking and heating is fire wood in Nepal. Nepal's average annual deforestation rate is 1.6%.

(World Bank, 2006) states that Nepal had produced 5501 thousands of metric tons of oil equivalent in the year 1990 where as it is increased to 7795 in 2003. Similarly, 5806 TOE was used in Nepal in the year 1990 and 7795 TOE in the year 2003 with the average annual growth of 3.2%. Nepal's net energy import in the year 1990 was 5% where as it increased in the year 2003 to 11%.

(Shakya, 2000) mentions about the energy use pattern of Nepal that being agrarian, it is not surprising that the country is highly dependent upon the forest and farm products for its main source of energy. Uses of forest and farm product as energy have direct negative impact on the productivity of farm field. (Thapa et.al., 1995) states that Nepal's energy scenario reflects an imbalance between energy consumption and energy resources endowment. Development of water resources is essential in order to meet human needs like increasing agricultural and industrial production, meeting energy needs and earning foreign exchange.

Proper utilization of hydro energy in different industrial sector, transportation sector besides electrification, heating, cooking, etc. can reduce the present investment of more than 25 billion Nepalese Rupees to import of fossil fuel products, contributing the economic growth of the country (Kafle, 2006). Hydropower source in Nepal is abundant and if exploited adequately can export in a large quantity. This can enable Nepal to earn foreign currency from the sale of electricity, instead suffering from the high dependency on other countries for the energy supply.

(Rijal, 1999) shows that traditional energy forms predominate in the energy sector of Nepal. About 91% of the total final energy consumption (260 million GJ) in 1994/95 was met by traditional forms for energy such as fuel wood 81%, agriculture residue 4% and animal waste 6%, the rest came from commercial sources such as petroleum products 7%, coal 1% and electricity 1%. There has been little transformation over the last decade. The share of traditional energy has declined only marginally, from about 95% in 1984/85 to 1994/95

RETRUD, 2003 states that renewable energy sources are indigenous and can contribute towards reduction in dependency of fossil fuels. It also provides national energy security at a time when decreasing global reserves of fossil fuels threatens the long-term sustainability of the economy. Renewable energy sources assume special significance in developing country like Nepal when viewed in the context of the

geographic diversity and size of the country, not to mention the size of its rural economy. Since the renewable energy sources are appropriate as local energy sources, meeting ever expanding and diversified energy needs. In this perspective, they offer numerous possibilities for meeting the basis energy needs of the rural poor. Thus, the increased use of renewable energy sources/technologies is necessitated by the inability of conventional systems to meet growing energy demands in an equitable and sustainable manner, need to efficiently and economically meet the energy needs of all the country's citizens, particularly the rural poor, large-scale impact of conventional energy production and consumption on the physical and human environment.

(Pandey, 2006) states that need to energy being demand driven rather than supply driven and people empowerment to demand energy services. Power delivery in south Asia is totally supply side oriented and bureaucratic. Use of electricity energy by the poor rural society still remains a dream. Analysis of cost-benefit merely may not work while planning of distributing the electricity in rural areas.

(ICIMOD, 1999) pointed out that the experience of alternative energy technologies implementation has not been very encouraging. Despite their attractive economic and financial performance, potential in the overall energy scenario is still unrealized. A number of issues have been emerged related to their development. The issues can be classified as social issues (non acceptance of technologies), planning and policy issues (lack of willingness at the policy level), institutional issues (non-existence of responsible coordination bodies), financial issues (high initial investment), technical issues (weak infrastructure), and managerial issues (lack of marketing skills).

### **2.3 Inequality**

The term inequality refers to unequal distribution of income among the inhabitants of a country. This results from unequal earnings of the people in a society. Unequal earnings are, in turn, due to unequal opportunities, unequal abilities, unequal ownership of assets and a lot of other institutional factors. Income inequality is a universal phenomenon existing in almost all the countries of the world but in different degree (Deo, 1997). He further states that there is close relationship between poverty and inequality. Generally, a high degree of inequality is associated with high extent of

poverty. But these two are distinct concepts and neither subsumes the other. Theoretically, inequality can exist without absolute poverty for inequality refers to only an unequal level of income or wealth. Such unequal levels may exist even among the poor.

(Tumin, 1967) states about the social stratification that the arrangement of any social group or society into a hierarchy of positions that are unequal with regard to power, property, social evaluation and/or psychic gratification. Power refers to the ability to secure one's ends in life, even against opposition. Property may be defined as rights over goods and services. Evaluation refers to a societal judgment that a status or position is more prestigious and honorable than others, or more popular, or preferable for one or another reasons. Psychic gratification includes all sources of pleasure and contentment that are not otherwise classifiable as property, power, or evaluation.

A society consists of various strata arranged in a hierarchical order based on the amount of power, property, evaluation, and psychic gratification that the strata characteristically receive. This is ~~the general~~the general picture of a stratified society, and all societies are stratified in this way to some ~~degree~~degree (Tumin, 1967). This accepts the fact that every society is stratified in one or other way. The indicator of stratification is not only the income and assets known as pure economical indicator but it consists variety of other components.

The theory of personal distribution of income, as described in (Deo, 1997) states that for a long time, the maximum emphasis was given to the growth rate of the country leaving the distribution of income untouched. To use Lewis metaphor, it is like riding the horse of economic development and leaving the horse of economic inequality to feed itself. He further states about the solution of inequality that public expenditure programs are also effective instruments for removal of income inequality and poverty. The government can reduce these problems to a great extent through designing schemes of public expenditure in favor of the poor or the weaker section of the society. The Nepalese government has been devoting a huge amount on development work since a long time but the fruits of development do not go to the weaker section of the society. So the government should pay special attention in this regard.

(Thakur, 1996) reveals that by the turn of the century, world population will be six billion of which five billion will be living in poor countries. While the rich

countries including the rich oil producing Gulf countries will have nearly the 15% of the world population and, these countries will be enjoying the 80% of the total world income.

(World Bank, 2006) portrays the numerical description of the poverty scenario. Inequality existed every where- among the countries and within the country. Report of the World Bank states that the extreme poverty in developing countries fell from 28% in 1990 to 19% in 2001. But Nepal has its 31% of the total population below the poverty line and the poverty in rural areas is much higher (34.6%) than its urban counterpart (9.6%) in 2003-04. The report further reveals the fact regarding share of income and consumption that lowest 10% population enjoyed only 2.6% of the total consumption where as the highest 10% population enjoyed 40.6% of the total consumption in the year 2003-04.

(Narayan D., 2000) states on the subject of the approaches to poverty assessment that a variety of different data collection instruments are necessary to understand the cultural, social, economic, political and institutional realities that determine the opportunities and barriers poor people face in their efforts to move out of poverty. This report suggests ~~that~~ ~~at~~ ~~that~~ ~~a~~ multitopic household survey aims to gather information on a wide array of topics intimately linked with household welfare. The most well known of these surveys, the Living Standard Measurement Surveys (LSMS), were piloted in the Côte d' Ivoire and Peru in 1985 and have since been implemented in dozens of countries. Such surveys provided crucial information on living conditions: measures of income, expenditure, health, education, employment, agriculture, access to services, and ownership of assets such as land and so on. ~~This further mentions~~ This further mention about the Participatory Poverty Assessment (PPA) which is described as an interactive, participatory research process that seeks to understand poverty from the perspective of a range of stakeholder, end to involve them directly in planning follow-up action. The most importantly involving poor man and women.

The corporate plan of NEA mentions that in order to provide affordable electricity supply in selected rural areas, which will help raise the living standards of people residing in such areas, facilitate establishing proper physical and social infrastructure and income generating opportunities to support sustainable economic growth in rural areas, and thus reduce disparities between rural and urban standards of living, a Rural Electrification and Renewable Energy Project is being formulated. The

project will include reinforcement and development of associated transmission and distribution system in existing service areas (NEA, 2006). This clarifies that the policy makers have realized the existing rates of electricity is not affordable by the people living in the rural areas. The proposed study being located in rural area, question arises- is the electricity affordable by the people there?

[Pandey\(Pandey \(2006\)](#) explains the experience regarding tariff rates in terms of community participation that communities are following their own tariff system and providing electricity at a lower tariff than that of standard NEA rates.

(Kafle, 2006) on his article 'Hydropower for Sustainable Development of Nepal' states that for sustainable development sound and equitable distribution of economic benefits should be demonstrated making efficient use of economic resources. The abundant potential of water resources utilization in the hydropower development is the basis of sound economic practice. Equity consideration in supply of electricity has been emphasized for achieving sustainable level of development.

The main outcomes of hydropower project development in the social aspects are providing improved living condition of affected people, improving public health condition of the affected people, improving public health condition, ensuring equitable distribution of benefit sharing particularly to the affected and vulnerable communities by the process of revenue sharing, training program and educational facility, and supporting additional benefits of infrastructure development for drinking water supply and electrification services associated with project(Acharya, 2006). Equity consideration in the matter of electricity supply and other benefit sharing such as revenue sharing are important component of the hydropower generation. Other services such as health and education are equally essential to carry out by the hydropower project.

(Pandey, 2006) states in his report' A Case Study on Rural Electrification Program of NEA/CRED, Nepal" that before the initiation of Rural Electrification program rural people were completely ignorant about the electricity; they did not know who invest in rural electrification and what type of structure are constructed from the investment. He further admits that electricity network has been running just in front of their houses but avoided from using it. He also has pointed out the fact that within the same community, heterogeneity exists and many people are unable for consumption of electricity which unable the slogan "Electricity for All" to be in action. This has been the truth in many rural areas or poverty dominant society that

many poor people are relied on fuel wood and Biomass as the energy sources. Their children read under the conventional *tuki* light. People are completely ignorant about the uses of electricity; an economic activity has been less and people are forced to live under extreme poverty and darkness.

(BHA, 2004) mentions about the project affected people and areas. It states that the project development needs to fully address potential impacts and demonstrate the sound and equitable distribution of economic benefits, ensuring that the people directly affected share the benefits. Economic sustainability decisions should be based on comprehensive evaluation of resources affected along with project costs and benefits.

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## CHAPTER THREE RESEARCH METHODOLOGY

### 3.1 Research Design

This study has attempted to assess the affordability of electricity by the different socio-economic strata of the study site. This means the research project is an evaluation type. The research project is intended to evaluate the structure of the electricity consumption by different well-being-ranks.

### 3.2 Study Site

As the study is measuring the different end use of electricity according to the different socio-economic classes, the place where electricity is produced and electrified has to be selected for the study. The area of Khimti I Hydropower project has been selected as the study site. The study is measuring the different benefits taken by different strata of the same community. The study site for this purpose should have well-being-ranks analysis. CARE Nepal in cooperation with a local NGO have facilitated the local people to prepared a well being rank analysis of the area. With the

availability of the well-being rank analysis, Rasnal VDC of Ramechhap district has been selected as study site.

The people of the affected area have lost their common property during construction (and operation) of hydropower plant. So, Rasnal VDC of Ramechhap district have been selected as a study site. The 9 wards of the Rasnal VDC ~~will be~~ has been studied in order to gather information.

The other reason for selecting Rasnal VDC as a study site is that Rasnal is the largest VDC among the 10 affected VDCs of the project. Selecting largest group for study make the study more representative.

### **3.3 Sampling Design**

The sampling methodology been selected for the proposed research for its advantages of its efficient use of time, money and human resources. The household is the sampling unit. A total of ~~6372~~ households ~~has been~~ will be included in the sample, 2 household from each of rank B, C and D and ~~four ranks~~ 1 household of rank A from all the nine wards of the VDC. The household data collected by CARE Nepal (an international organization working in the area in the field of advocacy), which is also useful as for the sampling frame, ~~will be~~ has been used. Then simple random sampling method ~~will be~~ has been applied, using the sampling frame, to select household to be included in the study.

### **3.4 Techniques of Data Collection**

The data has been collected from both primary and secondary level. The household survey has been carried out to generate a primary level of information. In depth information has been solicited through Focused Group Discussion (FGD). Information gathered from field observation has been used as a primary data in order to back up the information collected from questionnaire survey and FGD.

Informal discussion at *Chautara* and local tea shop has also been taken into consideration to elucidate information collected through other instruments.

Secondary level of information has been obtained from different published and unpublished literature. Internet has also been used to get the information related to the proposed undertaking.

### **3.5 Analysis and Presentation**

The gathered data has been categorized, tabulated and analyzed using several methods. Statistical tools such as frequency, average, ~~age percentage~~, mean etc. has been used for the analysis of data. Qualitative data has been analyzed so that the real situations can be mirrored. Photographs are included in the report to visualize the situation. The report has been presented at the SAGUN/ CARE Nepal and at the to the university and is planned to present it to local people of Rasnal VDC.

## **CHAPTER FOUR INTRODUCTION OF THE STUDY AREA**

### **4.1 Well Being Rank**

Pahadi Community Health Organization in cooperation of SAGUN/CARE Nepal has prepared a well-being-rank analysis of the Rasnal VDC. The rank analysis divides the total population in different ranks based on well-being status of the households. The well-being status is measured through the different socio-economic indicator such as assets, land ownership, education, property etc. The criteria for the different ranks have been developed by local people of Rasnal VDC Pahadi/SAGUN adopting the participatory method which was facilitated by Pahadi/SAGUN. The characteristic of different well-being ranks is as follows:

#### **Characteristics of different Well-Being-Rank in Rasnal VDC**

Rank "A"

1. Ownership of concrete home and have house or property (Ghaderi) in an area of city/bazaar with access to many city services
2. Adequate food production (from own land) to be self-sufficient for 12 months as well as provide income through marketing
3. Ownership of buffalo (for milk and husbandry), a pair of oxen, goats, chickens, and have the means to buy and sell these livestock and fowl
4. Employment at a profession level (governmental officer) and/or own cottage industry, or opportunity to work as a contractor
5. Access to higher education and capacity to support children's higher education

Rank "B"

1. Twelve-month food security from own land
2. Ownership of home constructed of stone, tin, and tile
3. Ownership of buffalo (for milk production and husbandry), a pair of ox, goats, and chickens
- ~~4.~~ Medium-level employment and/or small business
5. Access to higher education and/or capacity to support children's higher education

Rank "C"

1. Ownership of simple house with veranda/porch
2. Six-month food security from own land
3. Ownership of one buffalo, ox, goat, and chicken
4. Low-level employment
5. Fulfillment of SLC and/or capacity to support children to the SLC level

Rank "D"

1. Ownership of simple house
2. Three-month food security from own land
3. Full or half ownership of one buffalo, ox, goat, and chicken
4. Employment as a daily-wage laborer

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5. Attainment of 10th grade education and/or capacity to support children to the high school level

The criteria above states that well-off families lies in the rank A, and it further comes down to the rank D in descending order. Rank D in the analysis represents the poorest of the poor families of Rasnal VDC.

#### 4.2 Facilities Available in the Village

There are seven government schools in the VDC; one secondary level; one lower secondary level and five are primary level. One health post is located in the VDC office in ward number 4 of the Rasnal. Drinking water facility is also available in almost all wards of the village. One public telephone line is serving the entire VDC; there was post office as well but was destroyed in the insurgents.

#### 4.3 Households Distribution by Different Well-Being-Ranks in Rasnal VDC

Majority of the households (about 60%) in Rasnal VDC belongs to rank B; very few (only about 4%) of the total households represent rank A. More than 18% of the total households are in rank D and an equal ~~percentage~~ of households in rank C.

**Table 4.1: Household Distribution**

Category	HHs	Percentage
A	40	3.92
B	614	60.14
C	183	17.92
D	184	18.02
Total	1021	100

Source: Pahadi/SAGUN, 2006

The ~~percentage~~ of households belonging to rank D and its nearest rank, C, accumulates to about 36% of the total population.

#### 4.4 Population Distribution by Different Well-Being-Rank

Population distribution pattern according to different well-being-rank is very close to the situation of household distribution. This also reveals the fact that average family size according to different well-being-rank is almost equal.

**Table 4.2: Population Distribution**

Category	Total	Percentage
A	269	4.68
B	3497	60.82
C	952	16.56
D	1032	17.95
Total	5750	100

Source: Pahadi/SAGUN, 2006

About 61% of the total population belongs to the rank B, which is also near to the percentage of household lying in rank B. About 18% of the total population lies in the group D, the poorest of the poor in the village.

#### 4.5 Sex Composition of Total Population

In all ranks, the male population is slightly higher than that of the female population; this also meets the national sex composition.

**Table 4.3: Sex Composition**

—%age (Percentage in Parentheses)

Category	Female	Male	Total
A	127(47.21)	142(52.79)	269(100)
B	1729(49.44)	1768(50.56)	3497(100)
C	448(47.06)	504(52.94)	952(100)
D	494(47.87)	538(52.13)	1032(100)
Total	2798(48.66)	2952(51.34)	5750(100)

Source: Pahadi/SAGUN, 2006

The female population in 2004 is estimated to be 49.97% and rest 50.03% male (CBS, 2004). The sex composition of Rasnal VDC shows that female population comprises to 48.87% where as male population is 51.34%.

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#### 4.6 Ethnicity/Caste Composition

Table below (Table 4.4) reveals two distinct fact regarding ethnicity/caste composition. One is the share of different caste on the total population and the other is caste representation of different well-being-ranks.

**Table 4.4: Ethnicity/Caste Composition**

Category	Sunuwar	Chhetri	Sherpa	Tamang	Lama	Sarki/Kami	Total
A	55.56	33.33	<u>0</u>	11.11	<u>0</u>	<u>0</u>	100
B	33.33	<del>50.00</del>	5.56	5.56	5.56	<u>0</u>	100
C	44.44	16.67	11.11	22.22	<u>0</u>	5.56	100
D	22.22	16.67	22.22	22.22	5.56	11.11	100
Total	38.89	29.17	9.72	15.28	2.78	4.17	100

Source: Field Survey, 2006

Population of Sunuwar caste is the highest (38.89%) among all the caste. Second highest (29.17%) in number is the Chhetri caste which is followed by the third highest (15.28%) by Tamang. The population of Sherpa comprises to 11.11%, Lamas are 3.17%, and *Dalits* (Sarki/Kami) comprised to 4.76% of the total population.

Analysis by rank shows that Sunuwar is the majority caste in all ranks except in rank B. In rank A, majority (55.56%) are Sunuwars, and there is no number of *Dalit* caste in group A and B. Highest in rank B is the Chhetri(50%); 33.33% of total in rank B are Sunuwars.

~~There is no household from Dalit in rank B too.~~

44.44% of the total households belonging to rank are C are Sunuwars. Tamang is the second highest (22.22%); and Dalits are 5.56%.

Rank D has the nearly equal distribution of caste-Sunuwar, Sherpa, and Tamang each are 22.22%. Dalits are highest in this group 11.11%.

#### 4.7 Average Family Size

Average family sizes of the sampled households have been presented in the following table.

**Table 4.5: Average Family Size**

Category	Total	Total	Family Size
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	HH	Population	
A	9	63	7
B	18	122	6.78
C	18	106	5.89
D	18	99	5.50
Total	63	390	6.19

Source: Field Survey, 2006

Average family size is highest (7) in rank A where as lowest (5.50) in rank D.

#### 4.8 Age Composition

Children's population (1-14) is lowest (20.63%) in rank A where as highest in rank D. Rank B and C has almost equal %age %age (about 325) of population of this age group.

**Table 4.6: Age Composition**

Category	1 to 14	15-35	36-59	60+	Total
A	20.63	36.51	28.57	14.29	100
B	32.79	41.80	23.77	1.64	100
C	32.08	41.51	20.75	5.66	100
D	38.38	34.34	18.18	9.09	100
Total	32.05	38.97	22.31	6.67	100

Source: Field Survey, 2006

Population of age 60 years and above is highest in rank A where is lowest in rank B.

#### 4.9 Residential Status

A large portion of population from rank A is not living in the village. This is one of the reason that they belonged to the rank A. only 55.74% of the total population from rank A are living in the village, where as 29.51% are living in other cities of Nepal and 14.75% in other countries. Even those members of rank A who tell that they live in the village frequently go to the cities.

**Table 4.7: Residential Status**

Category	Home (in %)	Other Cities (in %)	Other Countries (in %)	Total (in %)
A	55.74	29.51	14.75	100
B	85.25	13.11	1.64	100
C	84.93	10.96	4.11	100
D	89.02	8.54	2.44	100
Total	80.77	14.50	4.73	100

Source: Field Survey, 2006

Almost similar number of population has been reported to be residing in the village by ranks B, C and D. Although highest number of population (about 90%) from rank D are residing in the village. This reveals the fact that poor people's access to outside world is very limited. About 85% of the total population is residing in the village from both the ranks B and C.

#### 4.10 Status of Education

Literacy classes were conducted in the village, as a result quite good number of population said that they can read and write. Their saying of literate is somehow influenced by their participation in the literacy classes organized in the village.

The data following reveals the fact that educational status and poverty are directly correlated. Poorest of the Poor (PoP) population has the highest percent age (40.26%) of illiteracy rate.

**Table 4.8: Status of Education**

Category	Illiterate	Literate	Grade 1-5	Grade 6-10	SLC	10+2 and above	Total (in %)
A	14	16	26	22	6	16	100
B	16.33	19.39	27.55	26.53	8.16	2.04	100
C	28.13	23.44	25.00	10.94	12.50	0	100
D	40.26	9.09	40.26	9.09	1.30	0	100
Total	25.61	16.96	30.10	17.65	6.23	3.46	100

Source: Field Survey, 2006

Acquiring higher level of education and well being rank has seen to be directly correlated. 16% of the population from rank A has received the education of 10+2 and above where as none of the population from rank C and D has received such level of education. Illiteracy rate is also lowest among the all ranks in the population of rank A (only 14%). Population having an education of class 6 to 10 is also lowest in rank D (only about 9%).

#### 4.11 Occupation

In this analysis of occupation of the population, the economically active part of the population has been taken in to account. Students and old age population has not been included for the analysis. So, the %age %age in the table below includes the %age %age of the total economically active part of population.

**Table 4.9: Occupation**

Category	Farming	Local Labour	Local Business	Porter/Labour in other cities	Local Service	Skill Job	Work in Other Countries	Service in Nepal	Total
A	65.79		2.63		7.89		13.16	10.53	100
B	63.04	4.35	8.70	6.52	6.52	2.17		8.70	100
C	30.43	34.78	2.17	17.39	4.35	4.35	6.52		100
D	15.15	54.55	3.03	12.12		12.12	3.03		100
Total	43.56	22.09	4.29	9.20	4.91	4.29	6.75	4.91	100

Source: Field Survey, 2006

Majority of population (about 66%) from rank A have their occupation of farming, which is followed by about 13% of the total economically active population working in the other countries.

Percentage of total economically active population involved in the farming occupation is in decreasing ratio while comparing it according to ranks A, B, C and D respectively. About 66% of the population from rank A, about 63% from rank B, about 31% from rank C and about 15% from rank D have their occupation as farming.

About 55% of the economically active population of rank D is involved in local labour work, while 34.78% is in this occupation from rank C, only 4.35% from rank B and none from rank A.

Rank B has the highest ~~%age %age~~ of population involved in the local business while compared it with other ranks. Highest ~~%age %age~~ of population is involved in local service sector if compared it with the other ranks; rank D have no one to work in local service sector. Similar is the situation with the occupation of service sector of Nepal.

#### **4.12 Water Mills and Electric Mills**

There are six water mills in Rasnal VDC; two of them are under private ownership and ~~rest four rests four are~~ under community ownership. Community forest users' group has been assisting to the water mills in community ownership for its maintenance.

There are two electric mills in the VDC. From the FGD it was revealed that the rate of grinding cereals is slightly cheaper in electric mills than the water mills. It was reported in the discussion that grinding one *Pathi* of maize/wheat in water mill costs 5 *Muthi* of maize/wheat while for grinding the same quantity in electric mills costs 4 *Muthi* of maize/wheat. It was reported in the discussion that there is no any diesel mills in the VDC.

#### **4.13 Use of Electricity in Other Sectors**

Electricity has not been used for irrigation and drinking water purpose in the VDC. Electric pumps are not in use either for drinking water or irrigation purpose.

Electricity can also be used for telephone services in the village. In Rasnal, there is one telephone service, which utilizes the solar energy.

Health post of the VDC utilizes the electric power to sterilize the needles and other equipment.

#### **4.14 Activities Carried Out by the JREDP**

Jhankre Rural Electrification and Development Project (JREDP) is initiated by the Himal Power Limited (HPL) which has implemented the Khimti I hydropower

project. The working area of JREDP is the ten affected VDCs of the hydropower project. JREDP has carried out different socio-economic activities for the people of the affected areas.

JREDP has carried out income generating activities by providing skills and implementing goat keeping programs in the village. The project's school support program included the fencing of the school area, roof support, building maintenance. Road from Jiri to the village has been constructed by the project which has been greatly admired by the local residents. The projects other activities in Rasnalu includes medicine support for the local health post, implementing toilet program, drinking water, literacy classes etc.

Strengthened & Action Governance Utilization of Natural Resources (SAGUN) is -a project initiated by an international organization, CARE Nepal. SAGUN has been working in the area for the last two years in the field of empowerment of the local people and good governance.

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**CHAPTER FIVE**  
**DATA ANALYSIS ON ANTICIPATION AND**  
**AFFORDABILITY OF ELECTRICITY**  
**ANTICIPATION AND AFFORDABILITY**

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Rasnal VDC is one of the affected 10 VDCs of the Khimti I hydropower project. Electricity is being supplied in the 10 VDCs through the Jhankre Rural Electrification and Development Project (JREDP). This project is turning to be a cooperative which will be run by its consumers. The beneficiaries have to pay for the consumption of the electricity. If the tariff rate is expensive or there is no increased source of income through electricity to the local people, affordability of the electricity by local people might be minimal.

And in the other, people plan to utilize the electricity in one or other way. They see some sort of future-probably through raising income by utilizing electricity energy. For the households which are already electrified, anticipation means the other future plans they have made to utilize the electricity energy available in the village. If the household is not electrified because the electricity has not been supplied in the village, although it is under construction to supply electricity to rest of the unelectrified area, what are their plans with the forth-coming electricity in the village?

#### **5.1 Status of Electrification in the HH**

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Electrification in Rasnal VDC was started since 4 years and more. Few households reported that their houses were electrified 4 years before, while many households have been electrified in the last one year of period.

All the ward of the Rasnal VDC is electrified except in ward number 1. In ward number 1, the process of supplying the electricity is under progress.

Similar percentage of households from ranks A, B and C are electrified in the village. 88.89% of the total households from rank A is electrified, 83.33% of the total households from rank B is electrified, and 88.89% of the total households from rank B is electrified. But only 66.67%<sup>rd</sup> of the total households from rank D is reported to be electrified. In one household of rank D, the electricity is not working because of the technical problem occurred and no technical support easily available.

**Table 5.1: Status of Electrification in the HH**

Category	Yes	No
A	8(88.89)	1(11.11)
B	15(83.33)	3(16.67)
C	16(88.89)	2(11.11)
D	12(66.67)	6(33.33)
Total	512(80.5495)	12(19.05)

Source: Field Survey, 2006

For those houses which are not electrified, when sought the reason, one of the household reported that the concerned authorities denied because their house is small and hut. A woman from rank D said that the ~~children raises~~ children raise many trouble such as breaking the electricity bulbs so that she doesn't want to have the electricity in her house while many of her neighbors are enjoying it.

*Note: ward numbers 5, 6 & 9 were electrified for more than 4 years. Ward numbers 2, 3 & 8 were electrified within the last one year. 40% of the households from ward number 4 have been electrified within the last one year; about 40% households were electrified since last 3 years and remaining 20% households electrified since last 4 years. About 50% of the households of ward number 7 were electrified in the last one year and remaining households understudy were electrified since last 3 years. Ward number 1 is not electrified and under the progress of electrification.*

## 5.2 Type of Electrification

The tariff rates of the electricity consumption in Rasnalu VDC are different than only the meter system prevailing in Nepal. The new practice of Cut-Out system is introduced in the village where the household can determine which system for payment of the electricity consumption they prefer as according to their requirement

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and capacity. In Cut-Out system, households will have access to limited capacity of voltage for use and the monthly payment for electricity use is fixed.

Almost of the houses (87.5%) from rank A have the meter box installation in their house while only 16.67% of the electrified houses from rank D have meter system for the payment of the electricity use.

80% of the households from rank B have meter box system and remaining 20% have the 100W Cut-Out system. 62.5% of the electrified houses of rank C have meter box system, 31.25% have 100W Cut-Out system and 6.25% have the 150W Cut-Out system.

**Table 5.2 Type of Electrification**

Category	Meter Box	50W Cut-Out	100W Cut-Out	150 W Cut-Out	250W Cut-Out	Shared with Neighbor	Free of Cost	Total
A	7(87.5)				1(12.5)			8(100)
B	12(80)		3(20)					15(100)
C	10(62.5)		5(31.25)	1(6.25)				16(100)
D	2(16.67)	2(16.67)	3(25.00)	1(8.33)	1(8.33)	1(8.33)	2(16.67)	12(100)
Total	31(60.78)	2(3.92)	11(21.57)	2(3.92)	2(3.92)	1(1.96)	2(3.92)	51(100)

Source: Field Survey, 2006

Electrified houses from rank D have almost all system. Only 16.67% of the houses have meter system, similar number of houses use the 50W Cut-Out system, 25% have the 100W Cut-Out system, 8.83% of houses have 150W Cut-Out system and similar houses have 250W Cut-Out system. 8.83% of the houses have shared the system with their neighbors. Although it was reported that the authority of electricity do not allow any households to share the single service cable.

It is worth reporting here that 16.67% of the households have electricity facility provided free of cost. There has been a decision made by JREDP that two poorest of

the poor families will be supplied the electricity in free of cost. These houses are selected from rank D in general.

### 5.35.3 Monthly Expenses of Electricity

#### 5.3.1 Practiced Tariff Rates

A new concept of tariff rates has been practiced in the village. Energy meter system is the one unit measuring system practiced widely in Nepal. Another system of Cut-Out has also been practiced in the village. In Cut-Out system, monthly electricity utility charge is fixed as well as the power capacity.

Meter system is widely practiced by the Nepal Electricity Authority (NEA) with the minimum charge of NRs 80. For the extra units above the maximum 20 units, NEA rate is NRs. 7.30 per units while in Rasnalu it is only NRs. 3.50.

**Table 5.3: Practiced Tariff Rates**

Category	Monthly Charges(NRs.)
Meter System	80*
50W Cut-Out	40
100W Cut-Out	65
150W Cut-Out	85
250W	115

Source: Field Survey, 2006

\* NRs 80 is fixed for maximum of 20 units in meter system. The rate after the 20 units is NRs 3.50 per unit.

In the beginning of the electrification in the village, many households had Cut-Out system. There have been some technical problems such as not good service, frequent fusing of electrical bulbs.

The cooperative is planning to replace the Cut-Out system by meter system. When there comes any problem in the Cut-Out system, they have planned to replace it by meter system. But it was reported that 50W Cut-Out provision will be continued.

### 5.3.2 Monthly Payment for Electricity Energy

The monthly expense is varied because of the varied energy unit charge system. Few households have shared the single line with their neighbors. The monthly expenses here only include the monthly payment for the use of electricity energy.

**Table 5.4: Monthly Payment for Electricity Energy**

Category	NRs. 40	NRs. 65	NRs. 80-90	NRs. 115	Free of Cost	Total
A			87.5	12.5		100
B		13.33	86.67			100
C		31.25	68.75			100
D	16.67	41.67	25		16.67	100
Total	3.92	23.53	66.67	1.96	3.92	100

Source: Field Survey, 2006

Most of the households (87.5%) of the rank A have seen to be expending NRs. 80-90. Which is directly related to the previous data that most of the households of rank A have the meter system where minimum charge is NRs. 80. Most of the households from ranks B and C also pay NRs. 80-90 per month for utilization of electricity energy. Most of the households (41.67%) from rank D pay NRs. 65 per month. Only few households from rank D have the 50W Cut-Out system as a result 16.67% of the households from rank D pay NRs. 40 per month. Only 25% of the households pay NRs. 80 per month.

16.67% of the total households from rank D do not pay any amount of money for the utilization of electricity as they are provided the free of cost electricity.

### 5.4 Average Electric Energy Consumption

Very few households know about energy unit consumption of every month. On the other hand very few have meter system where they can find the unit consumed in a month.

**Table 5.5: Average Electric Energy Consumption**

Category	Average Unit Consumption (in %)	HHs which Don't Know (in %)
A	16.75	28.57
B	16.5	33.33
C	13	50
D	7	50
Total	14.6	23.53

Source: Field Survey, 2006

The average unit consumption of rank A is 16.75 unit, 16.5 unit of rank B, 13 unit of rank C and 7 unit of rank D. The consumption pattern shows that the rank A consumes the highest energy and rank D consumes the lowest energy.

### 5.5 Monthly Kerosene Consumption Prior to Electrification

A question about the consumption of kerosene consumption was asked to the households in order to figure out the expenses of the households on lighting their house. Almost all of the households used to use kerosene for lighting their house which has been replaced by electricity.

**Table 5.6: Monthly Kerosene Consumption Prior to Electrification**

Category	0.5 Liter(NRs.30)	1 Liter(NRs.60)	1.5 Liter(NRs.90)	2 Liter(NRs.120)	3 Liter(NRs.180)	4 & + Liter	Total
A		25	12.5	37.5		25	100
B		5.26	21.05	26.32	31.58	15.79	100
C		16.67	41.67	33.33	8.33		100
D	6.67	33.33	13.33	40.00	6.67		100
Total	1.85	18.52	22.22	33.33	14.81	9.26	100

Source: Field Survey, 2006

Most of the households (33.33%) used 2 liters of kerosene prior to the electricity which is NRs 120 in the local market.

37.5% of the total households stated that they used to use 2 liters of kerosene per month where as households using 4 liters and more kerosene per month from rank A is 25%.

Most of the households (31.58) from rank B used to use 3 liters of kerosene, 26.32% of households used to use 2 liters of kerosene, 15.79% used 4 liters and more kerosene per month.

Most of the households (41.67%) from rank C reported that they used to use 1.5 liters of kerosene; 33.33% stated for 2 liters per month.

6.67% of the households from rank D reported that they used to use 0.5 liter of electricity per month prior to electrification; 33.33% used 1 liter; 13.33% used 1.5 liters; 40% used 2 liters and 6.67% stated that they used to use 3 liters of kerosene.

But almost all households reported that they still need to buy kerosene as the service of the electricity is not reliable. This means electrification has not been able to replace the kerosene completely.

## 5.6 Monthly Expenses of Battery

Many households in rural areas where electricity facility is not available use batteries for running their radio/cassette. Although battery is also used for torch light. In this analysis, pre-electrification battery expenses has been taken in to account for the households which is electrified and for those households which are not electrified, their present expenses on battery has been taken in to account.

**Table 5.7: Monthly Expenses of Battery**

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Category	NRs. 20	NRs.25	NRs. 30	NRs.50	NRs. 60+	No Radio/Cassette	Total
A		2(22.22)	1(11.11)	3(33.33)	3(33.33)		9(100)
B	2(11.11)	4(22.22)	5(27.78)	5(27.78)		2(11.11)	18(100)
C	1(5.56)	5(27.78)	2(11.11)	2(11.11)	2(11.11)	6(33.33)	18(100)
D		3(16.67)	2(11.11)	2(11.11)	2(11.11)	9(50)	18(100)
Total	3(4.76)	14(22.22)	10(15.87)	12(19.05)	7(11.11)	17(26.98)	63(100)

Source: Field Survey, 2006

Most of the households from rank A pay out more than NRs. 50 per month on their battery expenses. Every households of rank A own/ed radio/cassette. 27.78% of

the households from rank B pay out NRs 30 for battery and similar %age %age of households pay NRs. 50 per month. 11.11% of the households did not have radio cassette in the past.

27.78% of the households from rank C reported that their expenses on the battery is/was NRs. 25; 11.11% of households is/was NRs. 30; similar %age %age of households reported for NRs. 50 and NRs. 60 and above. 33.33% of the households from rank C did not own radio/cassette prior to electrification

50% of the households from rank D did not have radio/cassette prior to electrification. 16.67% of the total households from rank D said that their expense on battery is NRs. 25 per month.

### 5.7 Affordability

When an opinion soliciting question was asked about how they feel about the present tariff rate of electricity, none of the households said that it is highly expensive except 10% of the households from rank D.

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**Table 5.8: Affordability**

Category	Highly Expensive	Expensive	Affordable	Cheap	Very Cheap	Total
A			62.5	25	12.5	100
B		33.33	60.00	6.67		100
C		43.75	56.25			100
D	10	50	40			100
Total	2.04	34.69	55.10	6.12	2.04	100

Source: Field Survey, 2006

62.5% of the households from rank A take the present tariff rate is affordable, while 25% from the same rank think it is cheap and for 12.5% of the households, it is very cheap.

60% of the households from rank B said that the present rate of electricity is affordable to them. 33.33% of the total respondents said that it is expensive to them. 6.67% of the total respondents said it is cheap to them.

43.75% of the total respondents reported that the present tariff rate is expensive to them while 56.25% of the households reported it is affordable to them.

For 10% of the total households from rank D, the present tariff rate of electricity is highly expensive; for 50% of the total households, it is expensive and 40% respondents stated that it is affordable.

Still, many households reported that they still need to buy kerosene for lighting as the electricity supply is not reliable in the area. This had made the lighting system expensive for the households.

Other cost of electrification in the households includes frequent bulb fuse, not able to consume all the minimum 20 units of meter system. These costs are accounted by house holds to determine that the consuming electricity has become expensive to them.

## 5.8 Income Sufficiency to Pay Electricity Bill

If the households are able of paying the electricity bill with their existing income source, then it is considered here that their income is sufficient for paying electricity bill. The ~~%age %age~~ of respondents to say that their income is sufficient for monthly electricity bill is in descending order while comparing it with the descending order of rank from rank A to rank D.

**Table 5.9: Income Sufficiency to Pay Electricity Bill**

Category	Yes (in %)	No (in %)	Total (in %)
A	87.5	12.5	100
B	53.33	46.67	100
C	43.75	56.25	100
D	16.67	83.33	100

Total	47.06	52.94	100
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Source: Field Survey, 2006

87.5% of the electrified households from rank A stated that their income source is sufficient to pay for monthly electricity bill. 53.33% of the electrified households from rank B, 43.75% of the electrified households from rank C and only 16.67% of the households from rank D stated that their income is sufficient to pay for the monthly electricity bill.

Households who stated that their existing income is not sufficient to pay for electricity bill stated that they have been managing to pay for the electricity bill either by the increased sale of chicken, goat, *Ghee* or working porter/labour etc. to meet the electrical expenses.

## 5.9 Lighting

Lighting has been the major use of electricity in the villages. And there is variation among the different ranks to use the electricity for even lighting purpose.

### 5.9.1 Average HH Consumption of Electricity for Lighting

The average consumption of electric power by households has been calculated by accumulating the number of bulbs and tube-light installed by households in their house. The average consumption of electric power by households is also in descending order while comparing it with the descending order of ranks i.e. from rank A to rank D.

**Table 5.10: Average Household Consumption of Electric Energy for Lighting**

Category	Average Consumption
A	337.50 W
B	272.69 W
C	136.67 W
D	110.45 W

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Total	195.93 W
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Source: Field Survey, 2006

The average consumption of electric power by households from rank A is 337.5 W where as rank B is 272.69 W. Households from rank C uses 136.67 W of electric power where as rank D has only 110.45 W.

### 5.9.2 Lighting at Public Places

Lighting at public places such as street, *Chautara*, Schools and temples are not seen. This is reasoned for the low level of power generation of JREDP which is insufficient for lighting the street specifically and other public places. In the group discussion, participants showed their desire to have the public places electrified though.

### 5.10 Distribution of Electrical Appliances in the Electrified Households

One household may own more than one electrical appliance. On the basis of this statement, the percentage of the electrified households owning each of the appliances is described here below.

87.5% of the electrified households from rank A have radio/cassette where as 37.5% of the households have television and 12.5% of the households have electric rice cooker.

20% of the electrified households from rank B have the radio and 60% have the radio/cassette. 26.67% of the households own television, 6.67% have electric rice cooker, 13.33% have chargeable emergency light and 6.67% of the households from rank B own electric iron.

**Table 5.11: Distribution of Electrical Appliances in the Electrified Households**

Category	Radio	Radio/Cassette	TV	Electric Rice Cooker	Chargeable Emergency Light	Electric Iron
A		87.5	37.5	12.5		

B	20	60	26.67	6.67	13.33	6.67
C	18.75	43.75				
D	8.33	33.33	8.33			
Total	13.73	52.94	15.69	3.92	3.92	1.96

Source: Field Survey, 2006

18.75% of the households from rank C have radio and 43.75% of the households have radio/cassette.

It may be surprising to see here that 8.33% of the electrified households from even rank D have television, where as similar percentage of households own radio. 33.33% of households have radio/cassette.

### 5.11 Desired Rate of Electricity

A question to acquire the desired rate of electricity was raised to each and every respondent. Most of the respondents seem to be quite satisfied with the present tariff structure and system of payment (i.e. meter as well as Cut-Out system).

**Table 5.12: Desired Rate of Electricity**

Category	NRs.80	NRs.60	NRs.50	NRs.40	NRs.30	No Cost	Total
A	100						
B	40	26.67	13.33	13.33	6.67		100
C	38.46		38.46	23.08			100
D	7.14	21.43	21.43		14.29	35.71	100
Total	28.57	16.67	23.81	11.90	7.14	11.90	100

Source: Field Survey, 2006

100% of the electrified households stated that NRs. 80 is appropriate rate for them. Only 40% of the households stated that NRs. 80 is appropriate for them where as 26.67% stated that NRs. 60. 13.33% of the total households from rank B stated that NRs. 40 would be the fair rate of electricity for them, where as 6.67% of the households said it would be only NRs. 30 as fair rate.

38.46% of the households from rank C stated that NRs. 80 is appropriate rate for them; where as similar %age %age of population from the same rank said NRs. 50 would be the proper monthly rate of electricity for them. 23.08% of the households form rank C have reported that NRs. 40 would be the proper monthly rate of electricity for them.

For rank D, only 7.14% respondents stated that NRs. 80 is ok for them as monthly expenses where as 35.71% of the total households replied that they can not afford any monthly expenses for electricity consumption.

## 5.12 Electricity for Income

### 5.12.1 Additional Employment due to Electricity

When electricity facility is available in the village, it is assumed that the cottage industries or micro enterprises based on electricity energy will be established and flourished. And the better-off families are supposed to get the better benefit out of it. In the case of Rasnalu, although not much of employment has been generated by the electricity, more people from better-off families have got the employment opportunities generated by the electricity.

**Table 5.13: Additional Employment due to Electricity**

Category	Yes	No	Total
A	3(33.33)	6(66.66)	9(100)
B	5(27.78)	13(72.22)	18(100)
C	4(22.22)	14(77.78)	18(100)
D	1(5.56)	17(94.44)	18(100)
Total	13(20.63)	50(79.37)	63(100)

Source: Field Survey, 2006

33.33% of the total households from rank A stated that they have got employment due to the electricity facility in the village; 27.78% from rank B; 22.22% from rank C and 5.56% from rank D stated that they have received employment opportunities due to the electrification of the village.

For those who have received employment, they have received the work in rice mill, furniture in neighboring village, job in hydropower project, sale of electric bulbs,

work in Nepali(*Lokta*) paper production in the village, work as a electric technician etc.

### 5.12.25.12.2 Electricity use in Cottage Industry

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Negligible households have used electricity in cottage industry. A household from rank B has used the electric power to run his rice/grinding mill located in the village. None of the respondents except this one stated that they have used in electricity to run cottage industry in the village.

A company to produce Nepali paper(*Lokta*) has been established in Rasnalu VDC with the initiation of an NGO, Pahadi Society Welfare Center in collaboration with the local Community Forest Users' Group and private investment. This cottage industry utilizes the electricity energy available in the village. The company has given priority to the poorest of the poor people to receive (rank D in this case) training now and to offer employment to them in the future.

### 5.13 Support of Electricity

Electricity has multiple usefulness in a person's life. New technologies are easier to bring in practice when there is electricity. Electricity has been used by different people in different perspective. For many people, use of electricity is limited to lighting their house.

The answers to this question have received the multiple responses. So, percentage in the parenthesis measures the weight of each response.

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**Table 5.14: Support of Electricity**

(Percentage in Parentheses)

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Category	Lighting	Radio/Cassette	Work at Night	Study	No Need of Battery/Kerosene	TV	Mills	Total
A	5(50)	2(20)		1(10)	1(10)	1(10)		10(100)

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B	12(54.55)	3(13.64)	1(4.55)	3(13.64)	1(4.55)	1(4.55)	1(4.55)	22(100)
C	10(66.67)		3(20)		1(6.67)		1(6.67)	15(100)
D	13(56.52)	4(17.39)	4(17.39)	1(4.35)	1(4.35)			23(100)
Total	40(58.82)	9(13.24)	8(11.76)	5(7.35)	4(5.88)	2(2.94)	2(2.94)	68(100)

Source: Field Survey, 2006

A majority of respondents stated that electricity has helped them in lighting their house. 50% of the respondents representing rank A stated that electricity has supported them to have better lighting in their house. 20% of total responses is on behalf of the radio/cassette that electricity has provided the cheaper source of energy to run these appliances. 10% of the response has been on behalf of the study at night; and same percentage is for television. 10% of the respondents viewed that electricity facility has freed them from the burden of battery and kerosene.

54.55% of the responses from rank B have been given on behalf of the lighting support of electricity to them. 13.64% of the response is on behalf of radio cassette; 4.55% stated that electricity has helped them to work during night.

66.67% of the responses from rank C have stated that electricity has helped them for better lighting their house; where as 20% of the respondents stated that electricity has supported them to work during night.

A majority (56.525) of respondents from rank D also experienced that electricity have given them the better lighting facility. 13.24% of responses have been supported by electricity in running their radio; 17.79% is for working during night; 4.35% is for study and same percentage of response is on behalf of the free from burden of battery/kerosene.

Few respondents from stated that electric light has eased them to work during the feast and festivals when guests and neighbors are invited in their house. Besides lighting, electric energy for playing music during feast and festivals has been recognized by them all.

## 5.14 Access to Television

### 5.14.1 Frequency of Watching Television

When electricity facility is available in the village, many capable families will bring television in their house. People visit their neighbor's house to watch television who can not afford to buy the television. In this analysis, it is not only about the respondents but also the other members of the family have been taken in to account.

**Table 5.15: Frequency of Watching Television**

Category	1-3Hrs/Day	Once a Week	Occasionally	No	Total
A	22.22	11.11	22.22	44.44	100.00
B			33.33	66.67	100
C			50	50	100
D			38.89	61.11	100
Total	3.17	1.59	38.10	57.14	100

Source: Field Survey, 2006

Only few households from rank A watch television every day; 22.22% of the households watch television 1-3 hours per day. While 11.11% of the households from rank A reported that they watch television once a week and 22.22% of the households occasionally watch the television.

33.33% of the members from rank B; 50% of the members from rank C and 38.89% of the members from rank D occasionally watch the television in the village where as 61.11% of the respondents stated that they have never watched television in the village.

#### 5.14.2 Program Generally Watched

Rank A and B own television in their house. For this reason their frequency to watch daily programs is higher. Another problem of this village is that the general antennas in most part of the village do not catch the wave of any TV channels. As a result, they have bought VCD player to watch the movie or songs.

**Table 5.16: Program Generally Watched**

Category	News/Information	Movie/Songs	Not Fixed	Total
A	50	25	25	100
B	20	70	10	100
C		66.67	33.33	100
D		83.33	16.67	100
Total	15.38	65.38	19.23	100

Source: Field Survey, 2006

50% of members of the television watching population of rank A watch news or information based programs in the television; while 25% generally watch movie/songs with VCD player and for 25%, there is no fixed program to watch.

20% of the members among who watch television from rank B prefer news or information based programs. 70% watch movie/songs and 10% do not have fixed program to watch.

Among the population who watch television, 66.67% of the respondents from rank C stated that they watch movie/songs while for 33.33%, there is no fixed program to watch. 83.33% of the total television watching population from rank D watches movie/songs while for 16.67%, there is no fixed program.

## 5.15 Trainings

### 5.15.1 Trainings in the Village

A number of NGOs and projects are working in the village and many of them organize different trainings for the local people. It is important to see who participate in those trainings because it is generally found that better-off families have better access to participate in the trainings than the needy people.

The trainings organized in the village have been reported by the respondents. Some of the respondents do not know about the title of the trainings but they remember that they had received trainings in the village. Some respondents are unknown about the training name or subject participated by the other member of the family.

The following are the trainings reported by the respondents:

- ) Cooperative Training
- ) Health and Literacy Training
- ) School Management Training
- ) Training about *Allo*
- ) Training on Drinking Water Management
- ) Good Governance Training
- ) Training on Goat Keeping
- ) Training about Nepali (Lokta) Paper

Most of the trainings reported are 3-7 days long while few trainings are 15 days, one month and one training is 60 days long. Again, few respondents have forgotten about the duration of the trainings or unknown about the duration of trainings received by other family members.

#### 5.15.2 Households Received Trainings

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In the analysis below, for those households who have received trainings, one or more of the members from the same households may have received trainings. It is also not accounted here that one member may have received more than one trainings.

**Table 5.17: Households Received Trainings**

Category	Yes	No	Total
A	44.44	55.56	100
B	66.67	33.33	100
C	61.11	38.89	100
D	66.67	33.33	100
Total	61.90	38.10	100

Source: Field Survey, 2006

44.44% of the households from rank A have received trainings by one or more members of the household. 66.67% of the households from rank B; 61.11% of households from rank C and 66.67% of the households from rank D have participated in the trainings organized in the trainings.

### 5.15.3 Participants by Gender

It is worthy here to analyze the participants by gender perspective. Nepali society is without doubt, a male dominated society. When a opportunity such as training comes in the family, male member of the family is preferred to participate supposing that woman can not catch the training subject and cannot implement it.

50% of the total participants of rank A are female in the trainings organized in the village. Female participants, compared to male participants, are in descending order with regard to the descending order of ranks from rank A to rank D.

**Table 5.18: Participants by Gender**

Category	Male	Female	Total
A	50	50	100
B	58.33	41.67	100
C	54.55	45.45	100
D	66.67	33.33	100
Total	58.97	41.03	100

Source: Field Survey, 2006

~~50% of the total participants of rank A are female in the trainings organized in the village. Female participants, compared to male participants, are in descending order with regard to the descending order of ranks from rank A to rank D.~~ 41.67% from rank B, 45.45% from rank C and 33.33% from rank D are the female participants.

### 5.16 Literacy Class after Electrification

As a number of NGOs have been working in the village and many of them have organized literacy classes in the village in the past. Literacy class for women is always preferred to take place during night and when electricity facility is available the effectiveness of the training is better.

But none of the respondents stated that there was literacy classes organized in after the electricity facility in the village.

### 5.17 Delayed Time for Going to the Bed at Night

Once there is electricity facility in the village, it is expected that the villagers' time of going to the bed will be delayed. And there is different time of delay among children, woman and man. And this also has been revealed here that the women are more likely to work until night than men. This resulted the increased workload on women following the ~~road construction~~ electricity facility which is more dominant in rank D.

**Table 5.19: Delayed Time for going to the bed at Night**

Category	Man	Woman	Children
A	25	12.5	12.5
B	46.67	46.67	46.67
C	41.67	38.46	20
D	36.36	80	55.56

Source: Field Survey, 2006

25% of the man from rank A stated that their time for going to the bed has been delayed. 12.5% of the children's time for going to the bed at night has been delayed and the same ~~%age %age~~ of woman's time for going to the bed has been delayed from rank A.

46.67% of the man from rank B said that their time for going to the bed at night has been delayed; same ~~%age %age~~ of woman and children also experienced that their time for going to the bed at night has been delayed.

41.67% of man; 38.46% of woman and 20% of the children from rank C stated that their time for going to the bed at night has been delayed following the electricity facility in their house.

36.36% of the man; 80% of the woman and 55.56% of the children ~~stated of rank D stated~~ that their time of going to the bed has been delayed following the ~~road construction~~ electricity facility.

### 5.18 Use of Extended Time

Among those people who stated that their time of going to the bed has been delayed, it was sought to find out that where they use the extended time.

100% of the man from rank A whose time of going to the bed has been delayed stated that they use this extended time in watching television. 50% of the women stated that they use this extended time in television and remaining 50% stated for household work. 50% of the children from rank A watch television and 50% said that they study for longer than before at night.

50% of the man from rank B stated that they watch television during the extended time following the electricity facility in the house; 37.5% spend on household work and 12.5% in talking in the family and with neighbors. 50% of the women from rank B spent their extended time in watching television; 25% women in household work; 16.67% on knitting/weaving work; 8.33% work until late in the field because due to the electricity, it has eased them to cook food at night. 50% of the children watch television and 50% children study in their extended time

**Table 5.20: Use of Extended Time**

Rank "A"	TV	HH work	Knitting/Weaving	Study	Talking	Work Until late in the field	Total
Man	100						100
Woman	50	50					100
Children	50			50			100

Rank "B"								Formatted: Justified
Man	50	37.50			12.50		100	Formatted: Justified
Woman	50	25	16.67			8.33	100	Formatted: Justified
Children	16.67			83.33			100	Formatted: Justified
Rank "C"								Formatted: Justified
Man		50				50	100	Formatted: Justified
Woman						100	100	Formatted: Justified
Children				100			100	Formatted: Justified
Rank "D"								Formatted: Justified
Man	35	40			25		100	Formatted: Justified
Woman	14.29	71.43				14.29	100	Formatted: Justified
Children	16.67					83.33	100	Formatted: Justified

Source: Field Survey, 2006

~~100% of the man from rank A whose time of going to the bed has been delayed stated that they use this extended time in watching television. 50% of the women stated that they use this extended time in television and remaining 50% stated for household work. 50% of the children from rank A watch television and 50% said that they study for longer than before at night.~~

~~50% of the man from rank B stated that they watch television during the extended time following the electricity facility in the house; 37.5% spend on household work and 12.5% in talking in the family and with neighbors. 50% of the women from rank B spent their extended time in watching television; 25% women in household work; 16.67% on knitting/weaving work; 8.33% work until late in the field because due to the electricity, it has eased them to cook food at night. 50% of the children watch television and 50% children study in their extended time~~

50% of the man from rank C who said that their time of going to the bed at night has been delayed stated that they do household work at night and remaining 50% stated the work until late in the field. 100% of the women who said that their time for going to the bed at night has been delayed stated that they work until late in the field. 100% of the children from rank C use their extended time in study.

35% of the man from rank D who said that their time for going to the bed has been delayed watch television; 40% of man spent on household work and 25% of man

on talking with family and neighbors. 14.29% of the women from rank D who said that their time for going to the bed at night has been delayed stated that they watch television. 71.43% of the women on household work and 14.29% of women from rank D spent their extended time by working until late in the field. 16.67% of the children watch television on their extended time while 83.33% work in the field until late.

### 5.19 Educational Performance of Children

Following the electricity facility in the house, it is generally supposed that the children's educational performance will be improved. Although scientific measuring indicator was not applied in this research, an opinion soliciting question was raised to every electrified house.

**Table 5.21: Educational Performance of Children**

Category	Improved (in %)	Not Improved (in %)	Total (in %)
A	33.33	66.67	100
B	50	50	100
C	30	70	100
D	30	70	100
Total	37.14	62.86	100

Source: Field Survey, 2006

33.33% of the respondents from rank A stated that they feel their children's educational performance has been improved following the electricity facility in their house. 50% of the households from rank B; 30% of the respondents from rank C and 30% of the respondents from rank D stated that they think their children's educational performance has been improved following the electricity facility in their house.

Participants of FGD also have experienced that the educational performance of the children have increased following the electricity facility in the village.

### 5.20 Future Plan for other Electronic Appliances

Many households desire and plan to bring other electronic appliances in their houses.

**Table 5.22: Future Plan for other Electronic Appliances**

Category	TV	Rice Cooker	Radio	Cassette	No Plan	Total
A	37.5	25			37.5	100
B	38.46	7.69	7.69	23.08	23.08	100
C	30.77	7.69			61.54	100
D	20	13.33	20	6.67	40	100
Total	30.61	12.24	8.16	8.16	40.82	100

Source: Field Survey, 2006

37.5% of the households from rank A have a plan to bring television in the house; 25% of the households have planned of bringing electric rice cooker; and 37.5% of the households stated that they have no plan. Many people from rank A do not reside in the village regularly and most of the households from rank A have either already have the appliances or they have these in their house located at city or market area.

38.46% of households from rank B plan to bring television in their house; 7.69% have planned for electric rice cooker; same ~~percentage~~ of households plan for radio; 23.08% plan for cassette and 23.08% have no any plan.

30.77% of the households from rank C plan to bring television in their house while 7.69% plan for electric rice cooker and 61.54% have no any plan.

20% of the households from rank D desire for bring television in their house; 13.33% for electric rice cooker; 20% for radio; 6.67% for cassette and 40% have no any plan.

### 5.21 Electricity for Income Generating Activities

Electricity can be a means for raising the income level of families if there is easy access to technology, skill and capital.

### 5.21.1 Possibility of Using Electricity for Income

When an question on the possibility for the households to use electricity for income generating of the families, some respondents have some idea while many from rank B, C and D don't know about it.

**Table 5.23: Possibility of Using Electricity for Income**

Category	Answered	No Need	Don't Know	Total
A	33.33	55.56	11.11	100
B	27.78	16.67	55.56	100
C	44.44	11.11	44.44	100
D	33.33	5.56	61.11	100
Total	34.72	22.22	43.06	100.00

Source: Field Survey, 2006

55.56% of the respondents from rank A reported that they do not need to generate income through the use of electricity, while 55.56% of the respondents from rank B don't know how they can use electricity for income generating of the family. 61.11% of the households from rank D reported that they don't know how they can use electricity for generating income.

### 5.21.2 Future Plan for Income through Electricity

When electricity is available in the village, people can plan for operating cottage industries or small scale enterprises for generating income of the family. Very few respondents are known about operating enterprises utilizing the electricity energy.

Most of the respondents stated similar type of entrepreneurships when asked how they can generate income through the utilization of the electricity energy. Most of the respondents plan for rice/grinding/oil mill or furniture when asked about the enterprises.

One household from rank A stated about establishing sleet (stone) factory while another thought about establishing Nepali hand made (*Lokta*) paper industry. Hindrances for establishing these industries stated were road and high voltage power line.

Few households from rank B stated their plan of establishing furniture industry utilizing electricity facility and one household stated about noodle factory. Hindrances pointed out by the respondents to make their plan in to action were capital and skill.

Many respondents from rank C also stated furniture and mills can be the means of generating income for their families while few respondents opinioned about working during the night. Problems stated were skill, market and capital.

Respondents from rank D have very different answers than that of the other ranks. Almost all respondents who have some idea about raising income stated that they would prefer to have a skill based work that can be done during night with in the electric lighting facility. Problems to their plan were pointed as skills and market.

## 5.22 Advantages of the Electricity

A question to each respondent was asked to solicit the understanding about the advantages of electricity. Multiple responses have been received on this question and each value is %age %age taken as weight for that component.

Most of the respondents(53.85%) from rank A stated that lighting is the benefits of the electricity while 23.08% stated for operation of industries, 7.69% of the total response of rank A is for television, similar response for radio/cassette and study at night.

21.62% of the total responses of rank B is on behalf of lighting as a benefit of the electricity; 24.32% response is on behalf of industries; same %age %age of response is for radio/cassette; 8.11% of the total response is particularly focused on smokeless lighting as a benefit of the electricity. 2.70% of the total respondents don't know the benefits of the electricity when asked a direct question about it. Few

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responses are also on behalf of rice cooker and no burden of kerosene as benefits of electricity from rank B.

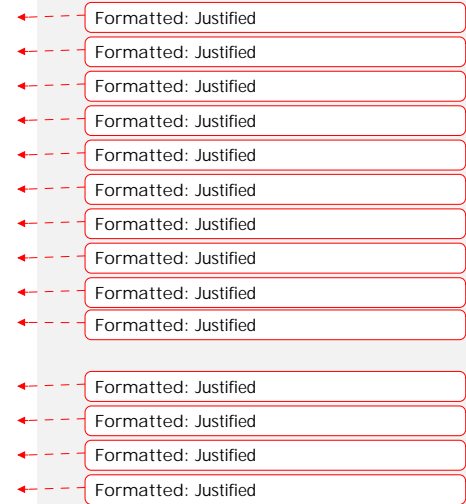
**Table 5.24: Advantage of Electricity**

Category	A	B	C	D
Lighting	53.85	21.62	24.39	14.29
Industries	23.08	24.32	9.76	9.52
TV	7.69	8.11	12.20	
Radio/Cassette	7.69	24.32	17.07	19.05
Work at Night		2.70	19.51	14.29
Study at Night	7.69			14.29
Rice Cooker		5.41		
Smokeless Lighting		8.11	4.88	
No Kerosene Burden		2.70	2.44	
Poultry			2.44	
Boring of Water				4.76
Don't Know		2.70	7.32	23.81
Total	100	100	100	100

Source: Field Survey, 2006

Majority of the responses (24.39%) from rank C is on behalf of lighting as a benefit of the electricity. Radio/cassette has been stated by 17.07% as a benefit of the electricity. For 19.51% of the total responses from rank C, work at night due to electricity has been recognized. 7.32% of the respondents do not know the benefits of electricity when asked a direct question about it.

14.29% of the total responses of rank D stated that lighting as a benefit of electricity. 19.05% of total responses pointed cheap energy for radio/cassette as a benefit of the electricity; 9.52% of responses is for industries as a benefit of electricity; 14.29% of total responses stated that electricity gives good opportunity for people to work during night; same percentage of responses have stated that electricity give best lighting for study at night. 23.81% of the respondents said that they do not know the benefits of electricity when raised a direct question about it.



### 5.23 Affects of Khimti Hydro Project on the Household

Rasnal VDC have been declared as one of the affected 10 VDCs of Khimti I hydropower project. A understanding soliciting question was raised to each household about how they think that the hydro project has been harmful to them or what the villagers had to lose due to the project.

Very few people have stated that the hydropower project has made some loss to them.

**Table 5.25: Losses Due to Khimti Hydro Project**

Category	Yes	No	Don't Know	Total
A		9(100)		9(100)
B	4(22.22)	12(66.67)	2(11.11)	18 (100)
C	3(16.67)	9(50)	6(33.33)	18(100)
D		7(38.89)	11(61.11)	18(100)

Source: Field Survey, 2006

100% of the households from rank A stated that there has been no any losses to them due to Khimti I hydropower project. 22.22% of the total respondents from rank A stated that there are few losses to them such as trees were cut down for the purpose of electric poles and wires, the pole occupied the farm land. 66.67% of the total respondents from rank B think there have been no any losses to them due to the hydropower project and 11.11% stated that they do not know the losses.

16.67% of the total respondents from rank C stated that there have been some losses such as electricity road has occupied their private land without compensation. 50% of the total respondents from rank C stated that there have been no any losses due to the hydropower project while 33.33% do not know about it.

None of the respondents from rank D stated that there have been losses to them due to the hydropower project. 38.89% of the total respondents stated that there are no any losses to them due to the hydropower project while 61.11% said that they do not know about it.

In the group discussion, participants stated that there have been no measurable affects brought by the hydropower project.

#### 5.24 Casualty

Electric power is dangerous and if people are not aware about it, people can die with the electric shut or by not following any other precautions to be safe. None of the households stated that they had any casualty.

It was revealed from Focused Group Discussion (FGD) that three person from a family of ward number 7 of the VDC were injured when a thunderbolt hit the electric circuit of a house. The injured were of situation to be taken to hospital in Jiri.

#### ~~28. Why and how is the electricity in Rasnalu?~~

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## CHAPTER SIX

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 6.1 Summary

1. Nepal is well endowed with enormous hydro-power resources which have the potential of 83,000 MW, of which, 44,000 MW can be economically harnessed. At present, less than one percent of the available economic potential has been exploited and only 40% of the population has access to electricity. The vast majority of electricity consumers are from urban area.
2. Economic growth and energy use move together. The availability of electricity contributes significantly to the overall development on one hand, and its consumption reflects the economic condition of the nation on the other.
3. Rasnalu VDC, Ramechhap District lacks social cohesion and class and caste stratum exist. Each individual stratum has different responses regarding changes within their community. For fee-based services like electricity, thresholds of affordability differ among community stakeholders.
4. Low consumption, geographical remoteness, high investment and low levels of revenue, which are insufficient to cover operational costs and maintenance of the distribution system, high pilferage rate, and high levels of rural receivables, are reasons for not achieving the objectives of rural electrification despite 30 years effort.
5. Renewable energy sources assume special significance in developing nation like Nepal when viewed in the context of the geographic diversity and size of the country, not to mention the size of its rural economy.
6. Inequality is not just about the wealth; it is the combination of many factors such as power, property, social evaluation and/or psychic gratification.
7. Services available in Rasnalu VDC includes seven schools, one health post, one public telephone line, electricity, drinking water and transportation (except during monsoon).
8. About 18% of the total population of Rasnalu VDC belong the poorest of the poor group (rank D in the well-being-rank analysis). The wealthiest population is estimated to be four percent of the total.
9. A majority of households of Rasnalu VDC (about 60%) belong to the rank B of the well-being rank, wealthiest group (rank A) comprises to only about four

Comment [MSOffice1]: Remind us of which specific community you are writing about.

Comment [MSOffice2]: I don't know what "receivables" is, but that may only because I am not familiar with this research.

Comment [MSOffice3]: I'm not sure if you want this word here, it seemed a little strange...

Comment [MSOffice4]: Since you tell us how the entire population is divided into ranks in #9, you should probably delete this sentence, since it's redundant.

percent and rank C comprises about 18% of the total households. The remaining 18% households fall within the poorest of the poor (rank D). Similar average family size distribution exist across all ranks, population distribution among the different well-being-ranks is also similar to the household distribution.

10. Sex composition of the total population of Rasnalu VDC is quite similar to the nation sex composition situation. Forty-nine percent (48.66%) of Rasnalu VDC's total population is female.

11. A majority of the population of Rasnalu are Sunwar by caste. Rank D consists of equal numbers of Sunuwar, Tamang, Lama and Chhetris.

Comment [MSOffice5]: Aren't these the same?

12. The economically dependent population (age 1-14 and 60 years and above) is highest (47.47%) in rank D. The economically active portion of the population (age 15-59 years) is highest in rank B.

13. Only about 56% of the total populations of rank A lives in the village area whereas more than 80% of the total population from B, C and D are living in the village. About 15% of the total population of rank A is living in the other countries. Among other ranks, the population living abroad comprises less than five percent.

14. The illiteracy rate is higher in rank D than among the other ranks. About 40% of the total population from rank D reported that they are illiterate. Approximately 14% of the total population from rank A is illiterate, 17% of rank B and 28% from rank C. Only 1.3% of the total population from rank D reported that they have acquired education to SLC level and no one from rank D have acquired the education of 10+2 and above.

15. Sixty-six percent of rank A, compared to only 15% of the rank D, report their occupation to be farmers. About 55% of the total population from rank D stated that their occupation to be local labor. No members of rank D report their occupation to fall within the service sector; this compares to 18% of the rank A population.

16. The VDC has six water mills that continue to operate. There are two electric mills in the community which, surprisingly, provide cheaper services than that of the watermills.

17. Electricity services have not been used for irrigation, drinking water or cottage industry purposes. The local health post has been using electricity to sterilize

needles and other equipments. The Nepali Lokta paper industry will use electricity in the near future.

18. About 90% of the total households from rank A have been electrified. The remaining 10% is not electrified because one ward of the VDC is in the process of installing the electrical infrastructure. Only 67% of the households from rank D are electrified. Households without electricity cited an inability to afford the cost and administrative obstacles as the primary reasons for not being on the grid.

Comment [MSOffice6]: Don't write etc...either leave this as two examples or write out others.

19. Among electrified households (meter box), 87.5% are from rank A and only 16.67% are from rank D. Seventeen percent (16.67%) of the total households from rank D are provided the electricity in free of cost. Twenty-five percent of the households from rank D have 100W Cut-Out system and approximately 17% have 50W Cut-Out system. Only households from rank D (nine percent) report sharing electricity line with neighbors.

20. Different levels of tariff rates on electricity have been levied in the village. The minimum rate varies from NRs. 40 to NRs. 115. For the meter system, the minimum rate is NRs. 80 for a maximum of 20 units per month, similar to the NEA tariff. The rate for the units exceeding the minimum 20 units is NRs. 3.50 per unit, cheaper than that of the NEA.

21. Eighty-eight percent (87.5%) of the households from rank A pay an average of NRs. 80 to 90 monthly. Forty-two percent (41.67%) of households from rank D pay an average of NRs. 65 monthly.

Comment [MSOffice7]: How come you have a range for rank A above and just one number here?

22. Among all ranks, rank A has highest average energy unit consumption with 16.75 units per month. Average monthly consumption of rank B is 16.5 units, 13 units for rank C and 7 units of rank D. Many households which have meter boxes take an active interest in their monthly unit consumption.

Comment [MSOffice8]: What is the unit?

23. Prior to electrification, most households consumed two liters of kerosene for lighting. Currently, two liters of kerosene costs approximately NRs. 120 at the local market. About seven percent of households from rank D reported that their consumption of kerosene was 0.5 liter prior to electrification, although none of the households from other ranks described monthly consumption this high. Twenty-five percent of households from rank A used four liters or more of kerosene per month prior to electrification.

24. A majority (about 67%) of households from rank A used to consume batteries costing in excess of NRs. 50 per month in the absence of electricity. This energy was principally used for the purpose of operating cassette/radios (every member of the group possessed at least one). About 17% of the households from rank D spent NRs. 25 per month on battery (only 50% of the rank D households had radio/cassettes).

Comment [MSOffice9]: About or was is 67%?

25. Sixty-three percent (62.5%) of households from rank A stated that the present tariff rate for electricity was affordable while 25% considered it cheap. Thirteen percent (12.5%) of the households from rank D reported that the present tariff rate was highly expensive, 50% considered it expensive and the remaining 37.5% regarded it affordable. For 60% of the households from rank B and 56.3% rank C household, the present tariff rate is affordable. Thirty-three percent (33.3%) from rank B and 43.8% from rank C deemed that the present tariff rate of electricity was expensive.

26. Average number of bulbs and tube-lights installed in the households decreases in order from rank A through rank D. The average of total Wattage of bulbs and tube-lights in households for rank A amounts to 337.5 W while rank D's is only 110.45 W. The average sum for rank B is 272.69 W and rank C is 136.67 W.

27. Eight-eight percent (87.5%) of the households from rank A have radio/cassettes while only 33.3% of rank D possess them. Eight percent (8.3%) of rank D households own only a radio. Thirty-eight (37.5%) of the households from rank A have a television and 12.5% have an electric rice cooker. Forty-four (43.8%) and 33.3% of households from rank B and rank C respectively own radio/cassettes.

28. Respondents from every rank A household considered NRs. 80 a fair price for electricity while 35.7% of the households from rank D felt they could not afford electricity with any charge . Forty percent of the households from rank B and 38.5% from rank C stated that NRs.80 per month was a fair rate of electricity. Thirteen percent (13.3%) of rank B and 23.1% of rank C stated that NRs 40 per month would be the fair rate of electricity .

Comment [MSOffice10]: NRs 40 per what unit?

29. Sixty-seven percent (66.7%) of the households from rank A, 72.2% from rank B, 77.8% from rank C and 94.4% from rank D stated that electricity had not played a part in increasing their income. No cottage industries of note nor

entrepreneurships have been initiated utilizing the electricity energy in the village.

30. Fifty percent (50%) of the responses from rank A, 54.6% from rank B, 66.7 from rank C and 56.5 from rank D stated that electricity had benefited them by lighting their house. Seventeen percent (17.39%) of the responses from rank D and 20% from rank C state that electricity has reduced the difficulty of working during the night. Respondents also report a relief from the burdens of using batteries as a benefit of electricity.

31. Twenty-two percent (22.2%) of the households from rank A watch television almost every day; none of households from the other ranks exceed xxxx. Thirty-nine percent (38.9%) of households from rank D watch television occasionally at either their own or neighbor's houses while the remaining 61.1% has not watched television.

Comment [MSOffice11]: You fill in an appropriate number.

32. Forty-four percent (44.4%) of the households from rank A, 66.7% from rank B, 61.1% from rank C and 66.7% from rank D stated that at least one of their family member had received trainings in the village. The trainings they have participated in are: Cooperative Training, Health and Literacy Training, School Management Training, Training about *Allo*, Training on Drinking Water Management, Good Governance Training, Training on Goat Keeping, Training about Nepali (Lokta) Paper. The number of females who participated in trainings is slightly higher males.

33. Thirteen percent (12.5%) of women from rank A stated that their usual bedtime was later following the installation of electricity in their house. Conversely, 80% of women from rank D experienced a delayed bedtime. Men and children of all ranks also went to sleep later at the night. Seventy-one percent (71.4%) of the women from rank D who's bedtime had changed were using the extended time for household work.

34. Thirty-three percent (33.3%) and 50% of the respondents from rank A and rank B respectively, and 30% from both rank C rank D, believed that their children's educational performance had improved subsequent to provision of electric facility in the household.

35. Thirty-eight percent (37.5%) of the households from rank A plan to purchase a television in the future and a similar percentage have no plans to buy any electronic appliances. Twenty-five percent intend to obtain electric rice

Comment [MSOffice12]: It is fine to write "a similar percentage" occasionally for readability, but you should probably write the actual percentage in parenthesis. For example: Thirty-eight percent (37.5%) of the households from rank A plan to purchase a television in the future and a similar percentage (39.2%) have no plans...  
If it is exactly the same percentage write: The same percentage of respondents (37.5%) plan to...

cooker. Twenty percent of the households from rank D stated that they plan to buy a television for their house and a similar percentage plans to purchase a radio. Forty percent stated that they will not buy any electronic appliances. Twenty-three percent (23.1%) of the total households from rank B plan to buy cassette.

36. About 33%, 28%, 44%, and 33% from ranks A, B, C and D respectively, reported that they have considered using the newly available electricity for income generating projects. Most of these thought about grinding mills or manufacturing furniture. The high level of interest raises the question of the market's ability to absorb the new production, if many households were to follow through on these enterprises. Only a few households from rank D stated that, with the acquisition of new skills, their income level could potentially be increased.

Comment [MSOffice13]: Again, put the number in parenthesis

37. When asked a knowledge soliciting multiple response question regarding perceptions of electricity, about 54% of the responses from rank A identified night lighting as a benefit, 23% mentioned the benefit to industry, and the remaining responses identified television, radio/cassette and the opportunity to study at night. Nineteen percent (19.1%) of the responses from rank D cited power for radios as a benefit and 23% of responses were on 'don't know'.

38. All respondents from rank A, 66.7% of rank B, 50% of rank C and 38.9% of rank D felt they had experienced no losses due to the construction of the Khimti I hydropower project. Sixty-one percent (61.1%) of the respondents from rank D stated that they are unsure.

Comment [MSOffice14]: Also you could write: All respondents from rank A, 66.7% of rank B, 50% of rank C and 38.9% of rank D felt they had not been detrimentally impacted by the construction of ...

## **6.2 Conclusions**

Every society is stratified and Rasnalu VDC is not an exception. Using stratification criteria developed by the community themselves; a well-being rank classification system was developed. A large number of populations constitute the poorest of the poor group in the village.

The intended beneficiaries of the trainings organized in the village by different organizations have given priority to the poor people, following the well-being-rank analysis. The analysis is more useful for poor intended programs by any organizations.

Most of well-off population of the village is oriented to live out side the community in other parts of the village or in other countries.

The literacy rate of the community is directly proportional to the well-being situation of the households. Lower the well-being status, lower the literacy rate. Poor people's access to service sector has been minimal; most of them are employed as daily wage labor.

Higher ranks of the same community have the higher percentage of households electrified. Poor households have low access to electricity facility which has been witnessed in Rasnalu VDC. The well-off families use more lighting systems and electrical appliances where as poor households use less; and their future plan about this is also in the similar trend.

Electrification in this village have adequately been able to substitute kerosene and batteries, which were mostly used for lighting and radio/cassette respectively. The relief from frequent uncertainties of availability of kerosene in the village has been recognized by all households in the village following the electricity facility.

Compared to the present rate of kerosene in the village, the use of electricity energy has been cheaper to the local people. Majority of the households used to consume 2 liters of kerosene per month which is equivalent to NRs. 120 in the local market and on the other hand the highest payment for the electricity per month is NRs 90. Batteries for radio/cassette are another additional aspect in this regard.

Awareness of electricity as an energy source for income generating activities is very minimal in the village. Electricity has been perceived by majority of the people of Rasnalu as a synonym of lighting. Working until late in the field and working during the night has been mostly experienced by poor segment of the population, particularly women of the poor households.

For fee based services like electricity, what is considered affordable differed among community stakeholders. Higher rank of the same community consumes higher percentage of electricity and vice-versa. Poor people having meter box installed are paying equal amount same as well-off households consuming higher amount. So, the tariff rate of the electricity in the village is well-off favored.

80% of the women from rank D (poorest of the poor) stated that their bed time has been delayed following the electricity facility in their house where as only 36% of the man have the similar experience. Only 12.5% women from rank A (best-off population) has experienced the same. The delayed time is used in household and

farming activities by the women. While most of the man of the poorest of the poor households watch television or talk with neighbors. The workload on women has been increased following the electricity facility.

About 30% of the households from each strata of the community believe that their children's educational performance has been improved following the electrification.

Majority of poor people in the village do not have radio while a lot of well-off families have television as electronic appliances.

Best-off families plan to purchase television and electric rice cooker where as poorest of the poor families plan to buy a radio. About 40% of the poorest of the poor households have no any plan to buy any of the electronic appliances. Well-off populations benefit more than poor people from public services such as electricity.

## **6.2 Recommendations**

1. Acknowledging the fact that every society is stratified, different approaches of addressing the various needs of different strata need to be formulated. Special attention should be given to poorest of the poor if the program's aim is poverty reduction.
2. Income and employment generating activities are very limited in Rasnalu. Most poor people live in the village while better-off people migrate to cities for the services available there and/or the employment and income opportunities. Therefore, small cottage industries and entrepreneurship should be promoted in Rasnalu so as to provide job opportunities for poor people.
3. Awareness about the different cottage industries which utilizes electricity energy should be promoted in the village. The people of Rasnalu possess limited in knowledge about technologies that could be used to increase income.
4. Village residents belong to rank D (poorest of the poor) should be given preference for the provision of electric services, based on the equity considerations. Most of the non-electrified households of rank D cited an inability to afford the monthly charge as well as administrative impediments as the main obstacles to them installing electricity in their homes.
5. Cut-Out system has been favored by many households especially by rank C and D. The advantage of the Cut-Out system is that households can order a

system according to their need and capacity although a drawback is that the service quality is not reliable. The average energy unit consumption of rank D is very low; for this reason they prefer the Cut-Out system. Therefore, best quality Cut-Out system technologies should be promoted in the village.

6. A minimum charge of NRs 80 for 20 energy units in the meter system is expensive for the poor people (rank C and D); moreover, they can not consume all 20 units in a month's time. The average unit consumption of rank D households with a meter box was only seven units. Therefore, households that either cannot afford or consume all their initial 20 units, should be allowed to share a meter with their neighbors.

7. Well-being-rank analysis should be available to every other organization which plans to work in the village. Organizations working for poverty alleviation should use the analysis in order to reach poor people, their target population.

8. Most of the people in the village have understood electricity only as an energy source for lighting. Information regarding other utilities of electricity, such as raising income and employment or awareness, should be conveyed to local people.

9. Awareness on gender issues should be raised in the village as women's work load has been increased following the electricity facility while male population is engaged in watching television and chatting with neighbors.

Comment [MSOffice15]: At Cornell, a professor disapproved of the term "target population" – a target is some thing you shoot at, right? He preferred we use "intended beneficiaries". We say intended since we all know of cases where the beneficiaries of a project didn't really benefit.

Comment [MSOffice16]: You should organize your conclusions so the ones that are related are one after another. Number 7 breaks the continuity of 6 and 8.

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**APPENDIX 1**  
**An Assessment of Rural Electrification among Different Well-Being Ranks**  
**(With Particular Reference to Rasnalu VDC, Ramechhap)**  
*Questionnaire for Household Survey*

**1. General Information:**

Ward Number: \_\_\_\_\_ Tole: \_\_\_\_\_

Name: \_\_\_\_\_ Well-Being Rank: \_\_\_\_\_

Ethnicity/Caste: \_\_\_\_\_

**2. Household Detail:**

Relation with householder	Age	Gender	Marital Status	Residential Status	Educational Status	Occupational Status(primary)	Occupational Status(secondary )
Self							

**Legend**

01-Spouse	01- 1 to 14	01-Male	01-Single	01-Home	01- Illiterate	01-Farming	01-porter
02-Son	02-15 to 35	02-Female	02Married	02-Other cities	02-literate	02-Localbusiness	01-causal labor
03-Daughter	03-36 to 59		03Widow	03-Studying in 02	03-Grade 1-5	03-Business outside	03-others
04-Parents	04- 60 and above		04Divorce	04-Working in 02	04-Grade 6-10	04-traditional occupant.	
05-Uncle/Aunt				05-Working in India	05-SLC	05-job in India	
06-Cousins				06-Working in other countries	06- +2 and above	06-service in Nepal	
07-Others						07-porter	

**A. Is your house electrified?**

If yes.

3. Since when \_\_\_\_\_

i. Have own meter box \_\_\_\_\_

ii. Connected to neighbor's house \_\_\_\_\_

What is the reason for not having own meter box:

a. can not consume all the minimum unit

b. cannot pay for the installation cost of meter box

c. administrative burden/obstacles \_\_\_\_\_

d. others \_\_\_\_\_

iii How much money do you pay for electricity every month?

\_\_\_\_\_ Rupees

iv. Average energy unit consumption per month

4. How much kerosene do you used to consume before electricity facility every month?

Liters

5. If you are having a radio/cassette since before the electricity, how much money you used to expend for battery every month?

6. What is you reaction on present energy unit rate?

i. Highly expensive      ii. Expensive      iii.

Affordable

iv. Cheap      v. Very cheap

Reason for

7. Is your income sufficient to pay for your monthly electricity charge? Y / N

If not, how have you managed to pay for electricity?

8. Use of electricity in your family:

S.N.	Use Types	Number	S.N.	Use Types	Number
1.	Lighting		7.	Computer	
	200W bulbs		8.	Cooking heater	
	100W bulbs		9.	Room Heating	
	60W bulbs		10.	Water Pumping	
	40W bulbs		11.	Iron	
	25W bulbs		12.	Fan	
	0 W bulbs		13.	Refrigerator	
2.	Tube light		14.	Battery Charger	
3.	CFL Bulb		15.	Cordless Telephone	
4.	Radio		16.	Emergency light	
5.	Radio/Cassette				
6.	Television				

9. What would be the fair rate or minimum charge of electricity for you?

10. Do you have electricity use in small enterprise that you own?

i. Agro processing      ii. Water pumping for irrigation      iii. Saw mill/ carpentry

iv. Grinding Mill      v. Hotel/Shop      vi. Photo Studio

vii. Poultry

viii. Electronic shop      ix. Others (specify)

11. Have/had you got additional employment opportunity due to electricity in the village?

If yes, type of work and place

12. How is the electricity helpful for you?

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13. How far is the place to pay for your electricity bill?  
 \_\_\_\_\_  
 Minutes.

14. Was there any Literacy Class conducted for women or adult after electrification? Y / N  
 If yes, did any one from your family participated? Y / N  
 If yes, who \_\_\_\_\_

15. Has there been any casualty in your family due to electricity? If yes, what are they?  
 \_\_\_\_\_

16. How often do you watch television? (if not in your house then in neighbor's house)  
 \_\_\_\_\_  
 Hours a day  
 \_\_\_\_\_  
 times a week  
 Program generally watched \_\_\_\_\_

17. Do you or your family members have participated in trainings? Y / N

<u>S.N.</u>	<u>Training about</u>	<u>Participated by</u>	<u>Duration of Training</u>	<u>Organized by</u>

18. What was/is the time for going to the bed at night?

	<u>Before Electricity</u>	<u>After Electricity</u>
<u>You</u>		
<u>Your Children</u>		
<u>Women in the house</u>		

If it has been delayed, how do you spend the extended time?  
Man in the house \_\_\_\_\_

Women in the house \_\_\_\_\_

Children \_\_\_\_\_

19. Is your children's educational performance improved following with the lighting in your house?

Yes/No. If yes, How \_\_\_\_\_

20. What are the other electrical/electronic appliances that you are planning of bringing in your house in near the future?  
\_\_\_\_\_

21. Have you thought of using electricity for generating income and employment? If yes, What are your plans?  
\_\_\_\_\_

What are the hindrances/problems that affect your plan to bring in action?  
\_\_\_\_\_

**B. If your house is not electrified,**

22. What is the reason for not having your house electrified?

- i. cannot afford the monthly expenses of the electricity \_\_\_\_\_
- ii. cannot afford the meter installation cost \_\_\_\_\_
- iii. distribution line is far away and cost expensive for the service cable \_\_\_\_\_
- iv. Administrative obstacles such as \_\_\_\_\_
- v. Others(Specify) \_\_\_\_\_

23. Do you wish your house to be electrified? Y / N

If yes, how much money will you be willing to pay for electricity per month just for lighting in your house? \_\_\_\_\_

And for the installation of meter box in the house? \_\_\_\_\_

24. How can you use electricity for income generating for your family?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

25. In your opinion, what are the benefits of electricity?  
\_\_\_\_\_  
\_\_\_\_\_

26. Has there been any losses to you due to Khimti Hydropower project?  
\_\_\_\_\_  
\_\_\_\_\_

27 What do you know about why and how the electricity is in the village?

**APPENDIX 2**

**An Assessment of Rural Electrification among Different Well-Being Ranks**

**(With Particular Reference to Rasnal VDC, Ramechhap)**

**Focused Group Discussion (FGD)**

**CHECK LIST**

**Name of the settlement:** \_\_\_\_\_ **Participants from the ward**

**number:**

**Total number of household:**

1. How is it to have electricity in the village? (introducing the topic)

2. Has there been any environmental hazards/casualties in the village since the Khimti hydro project

started its work? Yes / No

If yes, what are they? Human, animal land slide, flood and when they occurred?

3. Has the public places (like street, Chautara, school, temples) have adequate lighting?

If yes, how has this been managed? Who pays for it?

If no, what is the reason?

4. Is the tariff rate of the electricity affordable to everyone in the village?

If no, did you have negotiation with the service provider? Please give details:

5. Is every household in the village enjoying the electricity facility?

If not, what are the reasons?

6. Do you think all house holds in the village should have access to electricity facility?

If yes, how can this be possible in your opinion?

7. How many water mills (Pani Ghatta) are there in this VDC? \_\_\_\_\_

How many were replaced following the electricity facility in the village

What is the rate of grinding one Muri of paddy in Pani Ghatta

" " " Diesel Mill

" " " Electric Mill

8. Has there been any electric pumps used in the village for irrigation or drinking water?

If yes, how many and how are they managed?

9. Is electricity used for health services like X-Ray?

If yes, what are the uses?

10. Is means of communication using electricity(if telephone or such appliances are there)?

11. Have there any literacy classes carried out in this village following the electricity facility?

If yes, for whom? What was/is the time for the class? How many classes?

12. Do you see any effect of electricity on forest? If yes, how are they affected?

13. Have you experienced the sanitation situation of the village has been improved following the electricity facility?

14. Could you provide the information regarding the installation of development programme?

Prior to and following the Khimti hydropower project?

Facilities prior to hydro plant construction

Facilities following the hydro plant construction

- |    |    |
|----|----|
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |
| 4. | 4. |
| 5. | 5. |
| 6. | 6. |
| 7. | 7. |

15. Has the migration increased /decreased following the hydropower plant construction?

16. Has irrigation canal been destroyed due to the hydropower project?

If yes, please provide some examples.

Yes / No

17. What were the means of energy that have been in use which has been replaced by the electricity?



25. Established cottage industries? (please mention the dates of establishment if possible)

a. water mill      b. Rice mill      c. Smith      d. Furniture  
 e. Shoe/leather      f. Tailor      g. Dairy      h. Gold smith  
 j. others

26. Shops and other services (how many)

a. food shop      b. Readymade and garments  
 c. Cloth shop  
 d. Veg./Fruits      e. Dalbhat hotel      f. Tea shop  
 g. Vessel shop      h. Barbour      i. Haat Bazar  
 j. Agriculture cooperative      k. others

27. Transportation

S.N.	Type	Daily plying number	Transportation cost from (fare too)
1	Truck		
2	Mini Truck		
3	Bus		
4	Mini bus		
5	Tractor		
6	Jeep		
7	Motorcycle		
8	Horse		
9	Porter		
10	Khachchad		

Other information:

- Price of a liter of kerosene (probably bottle)
- Price of a pair of batteries of different varieties
- Local tariff rates
- Cost of meter installation

**APPENDIX 3: PHOTOS FROM THE FIELD**



**Photo 1: Inequality - every where! Some children going to school while others looking after the goats.**



**Photo 2: Kale Sherpa is provided the electricity for free of cost. He is enjoying the light and music!**



**Photo 3: Web of wires! Web of Electricity Service cables in ward number 7.**



**Photo 4: Participants of Focused Group Discussion (FGD) at ward number 8.**



**Photo 5: What made this disc antenna possible? The answer is not other than electricity!**



**Photo 6: Waibini Aamai(Bimala Waiba), Who cared about her? She is still in the dark.**

← Formatted: Centered