CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Nepal is a landlocked country situated on the lap of the world's highest mountain range of the Himalaya, bordered between the vast plains of the Indian subcontinent to the south, east and high Tibetan plateau of China to the north. The total area of the country is 147181 square kilometers covering 0.03% of the world in area and 0.3% of the Asian continent; lying between $80^0$4' to $88^0$12' east longitude; and $26^0$22' to $30^0$27' north latitude, administratively, Nepal comprises five development regions east, central, west midwest and far west, 14 zones and 75 districts. Each development region has a development center and from there development activities for the region are administered. Within each district, there are nine illakas, each of which comprises a varying number of village development committee areas. The national capital, Kathmandu, is situated within the central development region. (FNCCI: 2000).

Topographically, the country can be divided into three well-defined physio-geographical belts running parallel to each other from east to west. The Terai region covers 23% of the total land area with 44% of the total population. This region is located to less than 600 meters above the sea level, which is predominantly flat and alluvial land. The Hill region covers 50% land of the total land area of the nation with 48% of the total population. It is located to 600-2000 meters above the sea level including the various ranges of the Himallayan foothills. Similarly the Mountain region covers 27% of the total land area with 8% of the total population over 2000 meters above the sea level comprising the Himalayan range and touching some portions of the Tibetan Plateau. (FNCCI: 2000).

Due to the variation in altitude, there are considerable differences in climate. The Terai is subtropical with three seasons: a hot dry summer from March to June, the

monsoon from mid-June to mid-September, and cool winter season from November to February. The hill region has a temperate climate and four seasons: a hot season (April-August), a cold season (Feb-March and September-October). The mountain belt has an alpine climate, winters are long, cold and severe, while summers are short and cool. Precipitation of the belt is strongly affected by the mountains themselves. The southern slopes and valleys receive ample rainfall and snow, whereas the northern valleys and plateau that lie behind the Himalayan range are extremely dry.

The monsoon period with heavy rains occurs between mid-June and mid September. About 80% of the precipitation is confines to the monsoon period. Average annual precipitations ranges form 1500 mm to 2500 mm.

Number of rivers and rivulets flow from north to south originating from the snowy of the mountain Himalayan range. The river system of the country is made up of four main rivers and their tributaries. The Saptakosi , the Narayani, the Karnali and the Mahakali. There is plentiful perennial streams in the Hill, and seasonally fluctuating rivers and shallow and deep ground water in the Terai. There is an average of 53 village development committees in each district having the total of 4016 village development committees in 75 districts.

The population has always been chasing because of its high growth rate each year. The number of birth is higher than the number of death. The world's population is growing up by 80 millions per year. In Nepal, the total population will reach to 32.7 million by 2015 (UNDP/HDR 2000). The annual population growth rate is recorded as 2.1%. About 81% of the total population is depending on agriculture. The large and rapidly growing population makes reversal contribution to all environmental problems. It is the main obstruction for the development of the country. Regarding the literacy situation of Nepal, about 39% of the total population, i.e. 54% male and 25% female are literate. Which is very low. It indicates the poor literacy rate of the country.

The population census of 2001 by development region is given below.

Table 1

Population by Development Region

Area	HH. Number	Average HH size	Population			Population growth Rate	Sex Ratio
			Male	Female	Total		
Nepal	4311747	5.38	11587547	11627134	23214681	2.27	0.997
Eastern devt. Region	1026328	5.23	2677659	2685736	5363395	1.87	0.997
Central Devt. Region	1502425	5.36	4118659	3939391	8058050	2.65	1.046
Western Devt. Region	869991	5.25	2196734	2372331	4569065	1.92	0.926
Mid-Western Devt. Region	541231	5.58	1504655	1517555	3022210	2.26	0.991
Far western Devt. Region	371772	5.92	1089840	1112121	2201961	2.71	0.98

Source: CBS: Preliminary Results of Population Census 2001

Nepal has an underdeveloped economy with per capita income of $ 220 and more than 90% people live in the rural areas. Most of the households are below poverty line. Low level of per capita income specially in rural areas with the rate of saving causing low rate of capital formation and investment along with the reliance of the farmer and traditional inputs and prevailing technology can also be assumed as the case of poverty. Not only the economic condition but also the socio conditions have much to do with poverty and in the rural areas, the lower caste groups are mostly poverty stricken people. Thus it is not an exaggeration to say the most of the people in rural areas live in deprived condition with the lack of basic essentials of life. The basic needs of the people increase as the number of population increases it pressurizes the government to manage for more people of the rural as well as the urban areas of the country.

Poverty is widespread and open problem in Nepal. It is the manifestation of historically ordained access to resources, particularly land, social structure discriminating one group of population against other and inaction of the state.

About 50% of farm households own less than 0.5 hectare of farmland. The incidence of poverty is not uniform across various groups of population. It has regional, gender and caste dimensions. Poverty increases with the expansion of the altitude, incidence of poverty is high among the people living in inaccessible hills and mountains. Poverty is a rampant in rural areas; almost double the incidence in the urban areas and its periphery. Population of dalit caste group is invariably poor. Women are extremely disadvantaged.

The assessment of employment scenario of the country, which is very essential to understand, indicates that it lies between population and poverty. Employment is a means to generate income for the livelihood of the people that helps to reduce poverty. It is estimated that about 300 thousand labor force enters into the market of Nepal for employment every year. By the end of the Eighth plan, 4.9% of 11.7 million economically active labor forces remained completely unemployed. (MOF, 2000:40)

Drinking water is the basic minimum need of all human beings and provision of convenient, safe, clean and adequate drinking water is the declared commitment of His Majesty's Government of Nepal. It has been realized that the development of water supply and sanitation sector (WESS) brings in enhanced socio-economic benefits and public health improvements. Population growth, rapid urbanization and industrialization are imposing rapidly growing demands of water resources. The growing imbalance between the demand and supply has brought various problems. It has caused the shortage of drinking water, pollution and environmental degradation. As a result, a high incidence of water related diseases cause significantly low productivity in our small country, inadequate system access to safe water supplies with poor environmental sanitation and personal hygienic practices is the main cause of water born diseases in rural as well as in urban areas of Nepal.

Inadequate access to safe water supplies, combined with poor environmental sanitation conditions and personal hygiene practices are major factors impeding the improvements of health condition in Nepal. Poor water supply, sanitation and hygiene condition have given rise to diarrhea, dysentery, hepatitis and parasitic diseases, and have exacerbated anemia and malnutrition among children. These diseases frequently take an epidemic form causing sudden heavy demands of health services, which have only limited resources to combat these outbreaks.

Most of the people accept that water supplies should provide free as a social services, because they argue that water is freely gifted by nature. Water supply, traditionally in Nepal, has also been considered as a social service and it is felt to be the obligation of a government or those in power to supply water very cheaply, and, of necessary, even free. It should be remembered that there is in such thing as a free lunch in the world, because everything has a cost for production. Supply of water also incurs cost. So, with increasing cost of providing services the responsible authorities cannot provide freely or heavily subsidized drinking water in Nepal.

There is a long-standing tradition of charging a very small amount for water. So, the revenue received from this system is very low. This has not only placed a heavy burden on the government but also has often led to inflationary borrowing.

Thus the service inevitably deteriorates falling progressively further behind demand. This is the problem of the nation as whole. Parbat district is not an exception for it. Being a hilly area there is a high cost involved in supplied water and the revenue received form water tariff is normal. In the other hand, the demand for water is increasing every day, and the supplied piped water is insufficient to meet the demand of the people due to several causes as well as the leakage of water. So the current question is how to increase the supply of water and reduce the leakage of water. The appropriate pricing of water can help an increase in water supply and a decrease in leakage of water. The empirical question asks

which price is appropriate for solving the above problems. So, one of the objectives of this study relates to the understanding of how much price of water supply be fixed to sustain the water supply system without string resistance from the public.

1.1.1 Overview on Water Supply and Sanitation Sector

For the first time in Nepal in 1984 AD, late Rana prime Minister Bir Shumsher JBR had conducted a pipe water supply system from a spring named Mahadev Khola, flowing on the northern fringe of Kathmandu valley. It was used only for the Rana families, some of their close relative and very close high and confidential government officials. The system was also provided in some public stand posts at important and well-known squares of Kathmandu city to let the people to draw water for the domestic use. Major quantity of water was taken into their places trough bigger size pipe systems, not only for their domestic consumption but also for recreations like fountains and ponds built in their palace-compound. In fact, only a small section of the city area had been supplied water with public stand posts in limited number. Other population of the city area had been getting water from prevalent or widespread “Dhunge Dhara”, the stone spouts, and wells for domestic consumption, which were constructed more than five centuries ago, during the periods of Malla and Lichhavi regions. Then the next late prime Minister, Chandra Shemshere J.B.R and Bhim Shemsher J.B.R. constructed water supply systems for Patan, Bhaktapur and Tri-Bhim Dhara for Kathmandu city respectively.

1.1.2 Planned Development and Budget Allocation

As per need for development planning in the less developed countries, Nepal has also started to allocate the planning objectives and strategies to fulfill those objectives to seek the meaningful economic development. The objective of poverty alleviation and balanced regional development implies specially keeping in view for the welfare of unprivileged groups of the country. This is the reason for which the Ninth Plan has mentioned poverty alleviation as one of the main objectives as

the five-year development plan of the country. It has prepared a program for alleviating poverty with the concept of twenty-year prospective plan, which has to formulate a clear and about the living standard of the poor community effectively. The plan has made an outlay of Rs. 189.58 billion, out of which social services are getting the highest share of 33.3%, followed by agriculture, irrigation and forestry 27.05%, electricity, gas and water 18.7%, transport and communication 17.59%, trade, hotel and restaurant 1.54%, industry 0.84%, finance and estate 0.13% and the miscellaneous 0.85%. (NPC: Ninth Plan)

To provide safe drinking water and to control water born diseases, various efforts were made by the government sectors as well as by private sectors at the beginning of the planned development. Among them, public participation did not get the main focus until the seventh plan. The government gave an importance to optimum mobilization of non-governmental sector, private sector and public participation only from the 8^{th} plan. But in the beginning, expected success could not be achieved and only 61% of the total population got an access of drinking water at the end of this plan period. Among them 77% of the people of rural area and 56% of urban area were effected during this Plan period. (NPC: Ninth Plan).

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Ninth Plan also has given an emphasis on delivering safe drinking water and sanitation facility to all the people of the kingdom. 7850 thousand additional people of rural and 1,850 thousand additional people of urban areas will be benefited form drinking water and sanitation facility.

With the advancement of democracy in Feb. 1950, and more prominence has been given to the drinking water since the First Five Year Plans to Ninth Five Plan, with the increasing allocation of annual budgets and in plan periods development of urban water supply projects gradually extended to the urban areas could fulfill the limited peoples demand of drinking water supply. But in the beginning of the first and second plan periods, more funds and construction of water supply systems were conducted only in important urban centers and district head quarters.

Table 2

Budget Allocation to the Water Supply and Sanitation Sector

(Rs. In million)

Plan Period	**All Sector**	**Water/Sanitation Sector**	**% Share only in water supply and sanitation**
Third Plan	2101	31	1.5
Fourth Plan	5048	92	1.8
Fifth Plan	10985	437	4.0
Sixth Plan	21750	1000	4.6
Seventh Plan	29000	989	3.4
Eight Plan	87080	5258	6.04
Ninth Plan	18958	1190.20	6.28

Source: National Planning Commission

From Third Five Year Plan the construction of drinking water was also extended to rural areas of Nepal during the past 10-15 years. Approximately 2000 rural and urban pipe water supply projects have been implemented by various governmental and non-governmental agencies up to the end of 1990.

1.1.3 Agencies Involved in the WSS Sector

Some national and international governmental and non-governmental agencies are involving to delivering safe drinking water and sanitation in both rural and urban areas. These NGOs and INGOs have been playing an effective role in the drinking water and sanitation sector through the implementation of water supply projects that are usually integrative in nature and incorporate with a high level of community involvement. However NGOs are constrained by the existing regulatory framework administered through the SSNCC, their activities are not properly coordinated with government programs, and they would benefit from technical support in some areas. The regulatory framework should be reviewed in order to effectively facilitate the work of NGOs and their activities should be coordinated at the district level through integrated district teams.

The most active providers of the services in the WES sector are the Department of Water Supply and Sewerage (DWSS), Local Authorities (DDCs & VDCs) External Support Agencies (ESAs), Non-Governmental Organizations (NGOs) Private Sector Community Based Organizations (CBOs), and user's Committees.

The National Planning Commission (NPC) is responsible for the overall WES sector planning and coordination. It overlooks development plans and policies and approves annual budget estimates. The Ministry of Finance (MOF) is responsible for mobilizing and allocating resources for the WES programs. The Ministry of Housing and Physical Planning (MHPP) is responsible for formulating the overall policies and looks after all rural water supply development and 22 urban water supplies. The Nepal Water Supply Corporation (NWSC), also within MHPP, is an autonomous body responsible for water supply and sewerage is 13 urban centers in Nepal, including the Kathmandu. The Central Human Resource Development Unit (CHRDU) is mainly responsible for planning, co-coordinating, organizing and training activities in the WES sector.

MLD is involved in providing water supply facilities through integrated rural development projects. Within MLD, the Women Development Division (WDD), and Remote Area Development Committee (RADC) are also providing a number of water supply and sanitation facilities, in addition MLD also provides grants to DDCs and VDCs for the implementation of water and sanitation facilities.

The Ministry of Health (MOS) is mainly responsible for public health hygiene education, and to some extent, promotion of on-site sanitation facilities. The Environmental and Community Health Section under the Health Education, Information and Communication Center of the Department of Health undertakes these activities. The Ministry of Education and Culture (MOEC) provides health education through classroom lectures. It also has a Non-formal Adult Education program that includes hygiene and health sections.

UNICEF has been providing technical assistance to the DWSS since 1987. Prior to this UNICEF used to support MLD for about one and half decade. Now, UNICEF supported CWSS program is active in the Central and Eastern Development Regions. UNICEF is primarily responsible for community based planning and implementation procedures. It also supports training programs.

European Union (EU), GTZ, SNY, USAID and ODA shares providing support in the WES sector through Gulmi-Arghakhanchi, Dhading, Mechi, Karnali-Bheri, Rapti Koshi Integrated Development Projects respectively. In addition, GTZ supports Urban Development through Local Efforts (UDLE), an integrated program in the Kathmandu Valley. EU is providing funds for UNICEF. ODA has supported DWSS in implementing water and sanitation projects in the Central and Eastern Development Regions.

Often External Support Organizations that are providing assistance to the water supply and sanitation sector are FINNIDA, HEVETAS, ASDB/M, World Bank UNDP and WHO. FINNIDA has been providing support in the Lumbini Zone

since 1990. Under its second phase the focus will be DDCs even though the executing agency will be DWSS. HELVETAS is now supporting Self-Reliant Drinking Water Support Program (SRWSP), which will implement water and sanitation facilities through NGOs and CBOs. The World Bank and UNDP are providing support to the development of the sector as well as to NWSC. ASDB/M had provided three separate sectoral loans to DWSS and project preparation is underway for the Forth Water Supply and Sanitation Sector Project. UNDP/WHO is mainly involved in human resources development, capacity building and production of training materials.

JAKPAS supported by the World Bank is engaged in pilot projects implemented by NGOs and CBOs. It is endeavoring to establish the proposed Water Supply and Sanitation facility in the community through NGOs and CBOs. Water Aid, an international INGO supports Nepal Water for Health (NEWAH) in implementing WES projects.

The Social Welfare Council (SWC) broadly coordinates national and foreign NGO activities. In most cases, NGOs are required to register with SWC and funds and approvals for NGO activities are often routed through it.

Nepal Red Cross society (NRCS) and Nepal-Water for Health (NEWAH) are two major NGOs that are implementing water and sanitation projects in Nepal. NRCS is active in 12 districts whereas NEWAH has four branch offices in for regional centers (except Depayal) and is active in 25 districts.

The Rural Development Bank with the assistance if UNICEF is also engaged in water and sanitation activities especially among the poorest population in the Eastern and the Far Western Development Regions Japanese International Cooperation Agency (JICA) has supported DWSS to rehabilitate 15 water supply projects mostly in the urban centers. DISVI, an Italian Development Agency, is

supporting WES activities in the Eastern Development Region through Environment and Public Health Organization (ENPHO) a local NGO.

The American Peace Corps (APC) provides volunteers to implement water and sanitation projects, Norwegian Save the Children (Redd Barna), Save the Children UK, Save the children US, are also supporting water and sanitation activities in a limited scale.

Kadoori Foundation, British Gorkha Welfare Trust and India Army Welfare are providing assistance to the communities involving in the implementation of water supply and sanitation projects, mainly in the Eastern and the Western Development Regions.

Apart from these, there are more than a hundred national and local NGOs, mothers' groups and local clubs that are involved in the implementation of water supply and sanitation facilities.

These agencies are struggling to provide safe drinking water facility in both rural and urban areas. For delivering safe drinking water, the environmental sanitation program can control more water born diseases. It increases the life expectancy and helps to decrease infant mortality. In Nepal's contest, life expectancy and infant mortality have been slightly improved over recent decade after a large exercise. This is due to the improvements in safe water supply and sanitation.

Thus governmental and non-governmental sectors are trying to deliver safe drinking water to the people of rural as well as of urban areas. 'Fund Board' is one of the agencies. Which gives an importance to the promotion of safe drinking water and sanitation to some rural areas of the country. 'Rural Water Supply and Sanitation Fund Development Board' was established in 1996 by His Majesty's Government through 'International Development Agency (IDA), which provides credit to manage safe drinking water to the rural communities of Nepal. 'Found

Board' was established on the basis of demand-led principle. The 'Fund Board' implements its program through Support Organizations (SOs) including Non Government Organization (NGOs), 'International Non-governmental Organizations' (INGOs) and other private forms. Consultancy services are also conducted by 'Fund Board', which provides research study, project appraisal and monitoring work.

1.1.4 Operation and Maintenance Problems

In the past, efforts were made in WSSS sector specifically oriented to achieve physical targets, and no serious monitoring and evaluation activities seem to have been carried out to see whether the water supply projects were running successfully or not for delivering the anticipated services to the people and whether any socioeconomic, health and environment change has been brought in standards of living of the people. The associated programs, such as human resource development and technology dissemination processes, were not given adequate attention. All organizations concerned with the implementation of water supply projects were very much lacking on inter-organizational interactions and coordination. Similarly, mobilization of community participation in a unified way in all the phases of the scheme cycle was not observed.

Failures of all types of drinking water supply project can often be traced to the fact that either the community or the water agency has been unable to carry out the necessary regular maintenance to keep the installed facilities functioning. Due to this, many water supply systems have resulted into non-operating. Therefore, the main objective for proper functioning of water supply systems in designing construction and managing reliably to provide the intended services to the people of the area, and the funds needed for keeping them functioning continue to flow from the beneficiaries without interruption.

The pre-condition for the reliable function of the water supply system, especially a piped water supply, is to ensure that pumps, pipes, valves and taps are regularly

maintained, leaks are to be promptly repaired. Fuel and lubricants are supplied continuously and spare parts are made available locally when needed. It also depends on the availability of sufficient quantity of water at the sources to cope with the growing demands and on suitable drainage facility being provide around the area and maintained to dispose of extra wastewater form the consumers.

The problem of operation and maintenance can normally be traced back to poor planning in the program. It is very much important to plan the program in the areas where communities feel the need of such facilities and do share in it to contribute their resources and are willing to manage themselves their piped water supply systems after completion. Proper planning and simple designing acceptable to local culture and situation are the essential ingredients of long-term success. It is equally important to plan to look into cost recovery mechanism of the project form the consumers, which is essential to ensure its viability and sustainability for operation and maintenance.

Realizing these inherent institutional weaknesses, a recent approach of government has been shifting form traditional role of HMG/N as a provider or implementers to that of a supporter of non-government organizations (NGOs), donor agencies community based organizations (CBOs) and communities themselves.

On the basis of the various studies carried out by different agencies, it can be claimed that the working system for drinking water supply projects has to changed. However, the system under CWSS program has better managed than that of DWSS program.

There have been some positive developments in operation and maintenance after the Jhapa Conference in 1982. But HMG and ESAs have realized that the operation and maintenance are insufficient. DWSS has prepared “Operation and Maintenance Manual for Community Based Gravity Flow Rural Water Supply Schemes” and “Policy and Procedures Volume and Reference Documents

Volume", January 1993. Yet, preventive maintenance is far behind. The demand driven approach is likely to improve.

DWSS operates and maintains about 850 smaller schemes. "Strategic Planning DWSS Project" estimated that their annual cost to operate all these schemes is around NRs 66 Million. It is worth nothing that all CWSS schemes are operated by the beneficiaries. The government has been allocating funds for about 500 projects, which are still on-going for several years. As the project period increases community participation cannot be sustained. Consequently, operation and maintenance would have to be subsidized. There is a need to provide increased resources to clear the backlog of these incomplete projects.

1.1.5 Technology Options

In the hill and mountain districts, the technology used for water supply is gravity-flow piped schemes and sprinkle protection works. In the Terai districts, drinking water is supplied by either deep tube well hand pumps of hand pumps or shallow dug wells. Apart from these, there are 32 pumping schemes (14 municipals and 18 non-municipals) operated by DWSS. These schemes pump water from ground and send to the overhead tank. Then it is distributed to the consumers through pipes.

The provision of safe and convent water supply is of paramount importance to the health of people living in the developing countries. In short, the adequate supply of drinking water, personal hygiene and other domestic purposes and adequate means of waste disposal are very essential to public health and well-being. So most of the developing countries, now a day, have also given higher priority to drinking water systems. The types of latrine promoted include pit. VIP, pour flush, double pit and concrete lined pits. Under the new plan of operation (1992-96), UNICEF \ DWSS lunched an intensive hygiene education and sanitation program in 11 selected district. The program will gradually spread to other districts implementing strategies include:

- Use of multi-media channels to create awareness,

- ❖ Involvement of women (staff & community) at all stages of the project cycle.
- ❖ Training of all field level personnel.
- ❖ Low cost design options.

1.1.6 Causes of Failure of Water Supply Sectors

The lack of proper investment is main cause of failures in drinking water and sanitation sector. The Eighth Plan has highlighted on the four causes of past shortfalls in drinking water and sanitation sector, such as, over ambitious targets, lack of institutions for service delivery especially in the rural areas, over costly project design and excessive costs due to delays in funding, inflation and central procurement.

These deficiencies are largely institutional in origins and results form the inherent inability of central institution to deliver local services to a country like Nepal where there is the diversity and poor communities. The system under which every project included in the central budget was open to pressurize at local and central levels to over program and so implementation periods were excessive, projects were designed to fit centrally defines guidelines but there was no careful review of local demand, facilities, or available resources.

Large contractor-built that promised to cover the maximum number of beneficiaries (sometimes duplicating existing facilities) were preferred, even when smaller schemes would have served well. Centralized procurement of materials did not avoid lapses in quality but did cause delivery delays. Inadequate government salaries and incentives led to poor supervision of construction work carried out by contractors. Staff was not accountable for the quality of work, and there were no systematic procedures to monitor performance. Frequent staff transfer damaged project by removing staff knowledge, opportunities for using technical skills and personal responsibility for project performance.

Investment has also failed to provide services because of a lack of focus on the technical, financial and organization requirements for operations and maintenance

communities to undertake operational responsibilities have been lacking or deficient. For example, pumping scheming requires electricity and maintenance that cost more then the communities are prepared to pay. As a result the DWSS has had to take “temporary” responsibility for operation and maintenance. Without adequate budget or personnel however, the schemes are found deteriorated. There has also been little effort to modify household behavior to reap the health benefits of improved supplies. Coordination or extension activities by MOH village health workers with DWSS schemes have been largely lacking.

To fill the gap created by the DWSS poor performance delivering service, many NGOs have initiated programs to provide rural water supply and sanitation services. The success of some of such program contrasts with the poor performance of any DWSS schemes. The experience of many NGOs and some bilateral donors, such as, the Finnish International Development Agency (FINNIDA) shows that better results come form alternative approaches which avoid central interference in implementation and maximize community ownership of schemes, successful program share certain features: first, more substantive interaction with target communities at all projects stages. Typically, private and NGO schemes have involved initial community consultation on needs, health education with a heavy emphasis mostly by international NGO’s on empowering women, significant community contributions on labor and funds for construction and total community responsibility for operation and maintenance. Successful NGO schemes have involved in a much higher degree of community trust and sense of ownership than government schemes. Other important features are higher staff remuneration and travel and subsistence allowances, high staff commitment to the objectives of projects independent of remuneration, and links between tenure and adequate performance. The NGO sector has also had some failure, of course, often related to lack of technical capacity or obscene of the above factors.

1.2 Statement of the Problem

Though, Nepal is one of the poorest countries of the world, it is rich with the various natural resources. Nepal is know as the second biggest country in water resources, but it has been found no satisfactory utilization because of the poor

economic condition and other domestic problems, such as lack of technology, unskilled manpower, corruption etc. therefore these resources are not properly used. Safe drinking water and the environmental sanitation is the recent phenomenon in Nepal. Most of the urban water supply schemes are intermittent seasonally and contaminated by human and animal waste.

The increasing population in Parbat district demands more drinking water than ever before. Consequently, the supply of drinking water needs to be increased. As the increased in demand has not been met by corresponding increase in water supply. Parbat has been experiencing water shortage in recent years.

The present study is confined to safe drinking water supply and sanitation availability lunch by His Majesty's government the government RWSSFDB in Mudikuwa of Parbat district of the republic of Finland and along with the people's participation and its impact in the society. The total population of Mudikuwa VDC is 2131 out of which 1436 are males and 1395 are females. The total households are 435 (Census 2002), The study is focused on drinking water supply and sanitation availability in ward No. 5 of the VDC with 232 population 79 households.

Some interactions are conducted during the study period with the villagers. The subjects of the interaction are as follows:

1. How do villagers get drinking water?
2. How did they show their participation in water supply problems?
3. What is the impact of the project handled by 'Fund Board' to the villagers?

1.3 Significance of the Study

Water is recognized as one of the most important basic needs of the people provision of safe drinking water in adequate quantities in the present requirements of the people. Public water supplies are in operation to meet the changing requirements of the consumers. Subsequently, the quality of drinking water has become a prominent issue in these days. The government policies are to ensure sustainability and ownership by the users groups, particularly in the rural areas.

To address these issues, RWSSFDB has been planning to improve the service level not only by increasing quantity and reducing cost but also with additional of upgrading the quality of supplied water along with improved continuity, reliability and accessibility. In this context, the board has emphasized for quality improvement in drinking water and sanitation in Mudikuwa VDC of Parbat district. In order to accomplish this work RWDC is selected as a consultant to the assigned work.

This study depicts the people's participation in the scheme construction, affordability towards scheme, willingness to pay various other parts related to water supply and sanitation sector. The study may help in the formulation of strategies and policies while constructing water supply scheme in rural areas. It will be also helpful to researchers, students and persons interested in this sector.

1.4 Objectives of the Study

The general objective set for the study is to identify the economic implications of the drinking water projects implemented through people's participation in rural areas of Nepal. The main objectives of the present study are as follows:

- To identify the status of water supply and sanitation sector in the study area,
- To assess the level of local people's participation, absorptive capacity affordability in drinking water and sanitation sector in the study area.
- To review the modalities of people's participation in Rural Water Supply and Sanitation Fund Development Board supported projects.
- To identify issues related with the financing, cost effectiveness and cost sharing in rural drinking water system.
- To access the gender sensibility through gender awareness, income-generation and participatory programs for women in the project area.

1.5 Limitation of the Study

This study is mainly concerned within one VDC of the Parbat district. So this study may not represent the problems of the country as a whole. But the study has observed some social conditions, economic conditions, and affordability to

drinking water and sanitation sector in a micro level conducted within a limited time. The study is based on the safe drinking water and environmental sanitation problems.

1.6 Organization of the Study

This dissertation has been divided into six chapters. The first chapter deals with the introduction of the subject matter including issues and problems, objectives and rationale of the study. Similarly, various studies are made in the second chapter through review of literature. The third chapter is about research methodology of the proposed study. The fourth chapter is the brief description of Mudikuwa VDC. The fifth chapter is analysis and interpretation of data and sixth chapter is summary, conclusion and recommendation.

CHAPTER TWO

LITERATURE REVIEW

2.1 General Overview

Drinking water and sanitation sector is widely studied in Nepal. The earlier studies concentrated mainly in technical field and in providing the piped drinking water supply in the country. In the beginning, technical issues related with the supply of drinking water in the urban areas were taken prominently to study. Later on, the issues of water supply in the rural areas were taken with the support of UNICEFF to improve the life of the people of the rural areas. Nepal Red Cross Society was selected as the implementing agency to work in the rural areas as catalyst between the people and the donor agencies.

With the support of Asian Development Bank, HMG of Nepal has been implementing rural water supply programs in different parts of the country for the last one and half decade. This has really increased the coverage of drinking water in the country. The ADB supported program has initiated from the third phase onwards. In such studies, the socio economic components, such as, the ethnicity, income level affordability and cost sharing have been considered in the selection of the schemes. On top of these factors, the community participation was taken as the important requirement for the initiation of the rural drinking water projects in the country. Under the ADB Project, 22 District Plans were prepared. These plans have districts.

It is found that more than 40 governmental, national and international level non-governmental organizations are involved in providing drinking water in the rural areas of Nepal. But the coverage modalities of these organizations vary. Most of the non-governmental organizations are involved in the provision of the water supply rather than doing studies in the sector.

His Majesty's Government/National Planning Commission has published the Ninth Plan Document emphasizing the need for more decentralization, cost

recovery community participation, and private sector involvement in drinking water and sanitation sector. The plan has been analyzing the broad issues of development water supply in the rural areas. It has adopted an ambitious target of providing drinking water to all by the end of the Plan.

"Mid-Term Evaluation of Drinking Water and Sanitation Program" published by Center for Research on Environment Health and Population Activities have evaluated the program conducted by Nepal Red Cross Society and Japanese's Red Cross Society. The main objective of the mid term evaluation is to assess the impact of drinking water and sanitation program on the community in the project areas of the Terai and Hill districts. Impacts of the program have been studied in terms of sanitary behavioral changes among the community members. The performance of DWSP activities in terms of hardware and software components involvements of women and program sustainability have been analyzed in this evaluation. The evaluation is based on participatory rural appraisal.

S. Ammen, Joseph has given only the notion of meter system for the continuity and sustainability is domestic water supply, but there is no sign of pricing techniques. There should be metered system in domestic water supply as he had concluded.

Ministry of Housing and Physical Planning (1989) had reported on the existing situation of the after supply systems in some towns of Nepal. It has also highlighted the needs and investment required for the water supply. It has pointed out several shortcomings and also forwarded many proposals for reforms. These include need for more water treatment plants upgrading the existing supply networks and proposals for the control of contagious water borne diseases.

The World Bank has published an issue paper related to water supply and sanitation. In this paper, several issues have seen discussed with various experiments. According to this paper, the first priority should be given to the

availability of safe drinking water and sanitation facilities and control on the contagious water borne disease to the people of rural areas. This paper has also focused the pricing criteria and it has state that tariffs on the marginal consumption should reflect average incremental cost, i.e. the price which would have to be charged for each incremental cubic meter to recover operating and investment costs associated with producing and distribution it including the opportunity cost of capital.

A book entitled “Plan of Action: Drinking Water and Sanitation Program” published by Nepal Red Cross Society have discussed the plan of action to enable people to break away from the vicious circle of poverty, to a better quality of life though various strategies. The first priority will be given to ensure maximum impacts on health through access to knowledge about personal, domestic and environmental hygiene with the involvement of women. The plan with work to increase maximum involvements of communities of water supply schemes and sanitation components. It will help community to obtain sufficient quantity of safe drinking water for personal, domestic and environmental hygiene purposes, Similarly, it will help to reduce incidences of disease caused by poor quality of water through measures to prevent contamination at source and to promote safe handling of storage practices for potable water. Moreover, it will help and enable communities especially women, to interlink water, sanitation and health with other aspects like nutrition, food and fodder production, and income generation for a better quality of life. ‘Environmental Education Source Book’ published by IUCN-The World Conservation Union have discussed about some issues of water pollution. According to this book, drinking water is the most serious public health issue. Yet the vital connection between water and health is given little emphasis in the government policy on water supply (UNICEF, 1987). Until 1950, the drinking water supply was limited to the urban areas of Kathmandu. Now, the most of the 33 urban centers in the country have piped water (CBS, 1998). However, many supply systems provide water for only a few hours each day (ADB, 1995) and

despite the varying levels of treatment, bacteriological contamination remains high.

A report named ‘Performance Indicators For Water Supply Systems’ prepared by WSA have presented some key aspects that is to be taken into account in the definition of a general framework of performance indicators in the scope of water supply aimed only to be a starting point for the analysis and systematic discussion of the problem.

The Nepal Water Supply Corporation Published ‘Management Information Report’ for all its staffs, specially to all departmental/Sectoral heads, to provide monthly record and data/information related with production of water, connections, metering and meter-reading, tanker service, billing and collection, financial position, store inventory and others keeping this in mind that the Water Supply and Sewerage to be managed systematically.

Some of the operational aspects, bilateral water relation between Nepal and India, past treaties with India on various water resources development has been discussed in various volumes of WECS Bulletin published by Water and Energy Commission Secretariat.

Another book entitled ‘Water Supply and Sanitation Sectoral Agency Outline’ have presented the list of 21 NGOs and INGOs and their involvement in water supply and sanitation sector.

‘Sarasafai Sambandhi Nepalko Niti Tatha Karyakram Sambandhi Digdarshan’ a book published by DWSS, has discussed on various issues and policies related to water supply and sanitation sector.

It was found that only one dissertation entitled ‘Water Supply in Kathmandu District. ‘A Case Study of Water Storage Problem’ is written in the Department of

Economics by Miss Indira Joshi. It has concentrated on the problems of urban areas only.

The general review of the documents available in this sector reveals that these documents are concentrated more on the holistic issues of the water supply in Nepal than on the issues at the micro level. The present study has considered in-depth study of the people's participatory projects of Parbat district supported by the Fund Board. This will definitely provide a lot of insights in the field of drinking water and sanitation project in the rural areas of Nepal.

2.2 An Introduction of Rural Water Supply and Sanitation Fund Development Board

His Majesty's Government through IDA credit to bring portable drinking water to the rural communities of Nepal had established the Rural Water Supply and Sanitation Fund Development Board in 1996. In 1993 to 1996, the World Bank Conducted a field-testing pilot project entitles Janata Ko Khane Pani Ra Safai Karakram of JAKPAS. The successful implementation of the JAKPAS project in emphasizing the use of participatory methods in community development work and the promotion of a demand led approach of the Fund Board. The Board comprising seven members representing the Ministry of Housing and Physical Planning, Ministry of Finance Ministry of Local Development, National Planning Commission, Non-Governmental Organization and other private firms currently manages the RWSSFDB. An executive director appointed by the Board, handles the Fund Board and conducts the overall management and administration of the project.

The Fund Board has implemented its project activities through contraction Support Organization (SO), responsible to implement work at the community level. These include Non-Governmental Organization (NGOs), International Non-Governmental Organization (INGOs) and private firms. The Fund Board also procures consultancy services from Service Agencies (SAs) to do research study,

project appraisal and monitoring work along with community capacity-building training programs. The SAs include consultancy agencies, and freelance individual consultants. The Fund Board on a competitive basis hires the SAs when required professional and consultancy services especially during extremely the period of workload pressure.

2.2.1 Objectives of the Fund Board

The primary objective of the Fund Board is to raises the living standard of rural people by implementing technically, environmentally and operationally sustainable water supply schemes. More specifically the main objectives of the Fund Board are:

- To deliver sustainable health and hygiene services to the rural population through improvements in water supply and sanitation facilities.
- To improve rural income by assisting woman identify ways to earn income form the time saved carrying water, and
- To strengthen government and non-government capabilities to undertake and sustain the community projects.

2.2.2 Strategy of the Fund Board

The Fund Board has advocated a demand led participatory approach to the all stages of project work for planning, implementation, evaluation and monitoring as well as operation and maintenance of water supply schemes, Emphasis is also given to gender equity, which upholds the role of woman decision-making and project management. The strategies employed by the Fund Board to meet objectives include.

- Collaboration with SAs and to work directly with the communities to help them planning, implementation and establish a functional waster supply system.
- Developing community ownership of the project by encouraging the community to share the capital cost of a scheme in the form of cash labour or other contribution in kind.

- Encouraging water user to take a lead in decision-making, especially on technical options and service level of a scheme based on their capacity to manage and willingness to contribute. This is achieved by requiring villagers to elect a legal body known as Water Users' Group to make the decision in a democratic manner. The WUG forms a Water User's committee to handle the daily administrative and management work, including mitigation of any public disputes.
- Advance woman projects and income generating activities with mandatory integration of environmental sanitation, source projection, hygiene and sanitation education; and
- Strengthen the communities institutional capacities through training, consultation and monitoring when needed and organize comprehensive training and orientation programs to enhance the decentralization effort of the government.

2.2.3 Role of Fund Board Partners

The Fund Board enters into a long-term partnership with WUGs to achieve its objectives and targets. This has proven to be an effective and efficient means of delivering development projects in rural areas. Each of these institutions serves different function, role and responsibility that are described below.

2.2.4 Support Organizations (SOs)

The Fund Board incites services to deliver the water supply and sanitation services at the community level. There is delectated by the Fund Board for possible cooperation by assessing and applying following criteria.

- Legal registration certificate;
- Constitutional provision to engage rural water supply and sanitation or rural development activities;
- Recent audit report prepared by authorized firm;
- A proven track record of at least two year's successful experience community development or rural water and sanitation activites; and

- Sufficient staff or demonstrated capacity to access required professional and support staff.

The Primary roles and responsibilities of the SO includes;

- Identification of the needs;
- Community mobilization and support;
- Provide liaison services between the Fund Board and the community, and
- Conduct regular community supervision and monitoring work of the progress of scheme and provide timely reports in its progress to the Fund Board.

2.2.5 Water Users' Groups (WUGs)

The WUG is a legal body registered at District Development Committee, under Water Resource Act 2051 that represents the actual beneficiary group of the water supply and sanitation scheme. WUG registration is requisite implementation Phase Contract with the Fund Board. They are required to assist the user communities representative of one person from each household of the particular users community. The primary role and responsibilities of the WUG are as follows.

- To protect the water source and system;
- To make decisions on technical options and service level of scheme;
- To prepare community action plans and implementation, proposal in cooperation with SO;
- To provide active participation of the operation and maintenance of the system.

The WUG forms an executive committee through a Water Users Committee (WUG) to represent the larger WUG. The WUG is expected to have at least seven representatives out of a total of 17 committee members form the targeted scheme area with a fair representation form each cluster. In the committee, at least two women members are encouraged to be included. The method of selection of the representatives is left to the decision of the community. The Fund Board, however, requires that the entire community is involved in the selection process and that there is consensus within the community as to the selection method. The WUG

includes a chairperson, Vice-Chairperson, Treasurer (Preferably women), Secretary, and 11 general members. The primary role and responsibility of the WUG are:

- To act on behalf of WUG by representing it.
- To handle daily management and administration work such as account keeping, record keeping and store keeping.
- To coordinate community action planning work.
- To supervise construction and program activities.
- To manage local material collection and labor force required as community contribution; and
- To establish function and practical operation and maintenance system

2.3 Scheme Selection Criteria

The Fund Board applies certain criteria to select schemes that can be used during the pre-development phase to implementation. By the end of the development phase, and before entering into the implementation phase contract, these criteria have to applied as demonstrators to fulfill the goals of the Fund Board for its satisfaction. Eligibility criteria determining the selection of a scheme includes;

2.4 Need And Economic Viability

- The benefit cost ratio of 1.5 has to computer of a scheme. While determining benefit costs ratio, it should be ascertained in the pre-development phase. The time saving per household per day is at least 2 hours for gravity scheme and deep tube wells ¾ hours for dug wells. It determines whether the estimated per capita cost would be less than RS 1600 for gravity scheme, Rs. 1300 for deep tube wells, Rs. 230 for shallow tube well and Rs. 1000 for dug well; or
- Average per capita water availability is less than 15 liters a day and per capita costs are within the threshold as referred above; or
- A majority of the households are dependent upon heavily polluted water, source and proposed could provide cleaner through protection of existing

sources on the case of hills, and through amelioration of existing source in the case of Terai, while per capita costs do not exceed the threshold set forth above.

For a proposed scheme to be technically eligible, the Social Orgination ensures that the following conditions should met:

- The water of proposed sources should be undisputed, unpolluted and able to yield 45 liters of water per person per day but if there is no other solution and existing sources are heavily polluted or provide less than 15 liters of water per person per day, a scheme that could provide 25 liters of water per person per day would be accepted'
- The proposed water supply scheme must meet the standards and service level set forth in the boards Technical Guidelines and have followed measures mitigating adverse environmental consequences.

2.5 Sustainability

The following qualities of a community are to be present to ensure sustainability of a scheme:

- The community has to make following contribution towards the capital cost of a scheme to promote feeling to community's ownership of the project.
- All unskilled labor, locally available materials and porter age.
- Cash contribution of 2.5% on the hardware cost in the case of gravity scheme and 20% on the ground water schemes; and
    - 100 % additional costs for higher service levels than as mentioned in the boards Technical Guidelines (Seven households per tap for gravity scheme and 20 households per well for ground water)
- There should be following arrangements for satisfactory operation and maintenance:
    - Establishments of operation and maintenance mechanisms engaging Village Maintenance Worker with the system of collection maintenance funds on the regular basis; and

- Up-front cash contribution of the first year's maintenance costs, estimated at 3% of the total hardware cost in the cost of gravity scheme and 4% of ground water schemes.

- The water user's group has to be established and registered as according to the Water Resources Act.
- There is a complete coverage of the clusters of the users' communities that are willing to participate.

2.6 Project Phases

There are three phases:

Phases	Duration (months)
Pre-Development phase	13
Development Phase	10
Implementation phase	13
- Pre construction activities	3
- Construction activities	7
- Post construction activities	3

2.6.1 Pre-Development Phase

The main objective of this phase is to identify and select *Support Organizations* and support them to canvass potential schemes by conducting a pre-feasibility study. During this phase, the board selects new Support Organizations and evaluates the old support Organizations based on their past batch performance. For each batch, the Fund Board publishes and invites letters from newer. The pre-qualified newer are evaluated through interview and site appraisal of their past development work. The selected then conducts pre-feasibility studies to collect information on present and proposed sources yield, and make preliminary assessment of the community needs, willingness and capacity to launch a scheme. At the end of this phase, they prepare a development phase proposal. The Fund Board generally considers three to ten schemes per batch to a Support

Organization for the development phase and economic viability, technical feasibility and sustainability of the proposed scheme. The Fund Board does a site verification visit of each scheme by contracting SAs to insure the information provided by community if they are accurate and to minimize risk on investment. A period of 13 months is allocated for this phase.

Evaluation process is another important part of this phase. The main purpose of this process is to identify the working skill and ability of Support Organizations, it they are working as directed by the Board or not. It is an ongoing process. The evaluation is based upon the written reports provided by the portfolio manager. At each payment visit the portfolio manager is required to summarize the action done by Support Organizations at that point in time. The reporting will cover a range of performance indicators, including numerical rating to compare the performance of one Support Organizations with another to a point in time. The evaluating process is also based on the reports provided by financial audits. The board will not enter into future contracts with any Support Organizations if it is found that they have not established a satisfactory financial book keeping system, Moreover, it is also based upon the reports provided by technical auditor.

2.6.2 Development Phase

The main objective of this phase is to provide the services necessary to make the community able for planning, designing and managing the scheme. It also develops the feeling of ownership of water supply and sanitation among the communities. It installs confidence and motivation in women, to increase their participation in constricting the proposed scheme. This phase also includes community participation and organization and tides series if intervention, which evoke creative problem solving and planning to tackle water and sanitation needs of the community and lead to the preparation of community action plan. During this phase, the board assists to the communities to prepare a community action plan of both technical and social development activities and lunch some sanitation, training and orientate on program.

2.6.3 The Community Action Plan

The components are required to the formation of the community action plan on the basis of the implementation phase proposal are summarize below.

The Community Action Plan

- A1 Scheme layout plan
- A2 A sanitation plan, including the possible / optional use of the resolving sanitation fund.
- A3 A plan for health and education support to mother and child groups.
- A4 A plan for household and village environmental improvement.
- A5 A plan for women technical support services.
- A6 A plan for non formal education activities.
- A7 A plan for environmental sources protection.

Plans necessary for the implementation of the work

- A8 A plan for local material collection.
- A9 A community cost contribution plan.
- A10 A community procurement plan.
- A11 A community person power plan.
- A12 A SO person power plan.
- A13 A plan for operation and maintenance.
- A14 A plan for the community monitoring and evaluation.

Sources: RWSSFDB

2.6.4 Optional/Additional Plan

The communities and the SO's are furthermore encouraged to include additional components in their plans as directly relevant to the needs of the individual community, such as school health promotion plan etc.

Plan A1-A14, but not plan A6, The Non-Formal Education Plan for Implementation phase, will received direct funding form the Fund Board. From optional/additional activities proposed, the Fund Board will give direct funding only to School Health Promotion Program.

The details of the individual components plans A1-A14, in terms of what the community and the SO are expected to do, are presented below:

2.6.5 Implementation phase

A1 Scheme Layout Plan

Type of Technology

To SO must present possible types of technology to the community to supply water. This includes the major choice between (e.g. point source improvements or gravity system) dug wells or tube wells. Fund Board cost calculation based on average per capita cost can be used to explain the cost of implication of different types.

The Layout Plan

The community should identify and assess all the potential sources that can be used and decided and that would be used by the households. The lay out of water supply system, intakes, tank sites, tap stand location and other major structure should be agreed, as far as possible, with all community members. All sources must be undisputed and agreed to be taken into water supply use.

It is vital that this lay out is a result of cluster wise discussions involving all the community members.

A1 Technology Option and Tap-stand Group Choices

- The community should be presented the different technical options such as different kinds of tanks, tap stands, different subsystem divisions, and single reservoir vs. multiple reservoir, tube-wells or dug-wells etc. implications to cost and labor contribution of different options must be clarified.
- Service level options must be discussed. The service level provided with the board contribution must be explained to the community. If the community wishes to increase the services level, the cost for the additional taps / wells and other structures must be financed from outside the Fund Board budget.

- The tap stand option should be discussed and agreed at the individual tap stand group. The cost of implications of the different technical options and the influence towards the amounts of portage should be explained.
- The location of proposed tap stand / wells should further be clearly identified and marked with markers following the agreement on the scheme layout, prior to the field design.
- The location of any structure i.e. tap stands, wells, reservoirs etc. must be undisputed and if planned to construct on private land, no objections from the owner should be obtained.
- The layout plan, as with all other plans, should be endorsed finally by the entire. Community in a general meeting (meeting to agree on the community action plan) for which minutes in the form of a memorandum of understanding between the community and the SO should be provided

A2 Sanitation Plan and Possible Utilization of the Sanitation Revolving Fund.

- The present sanitation situation of the community should be established participatory tools like community mapping or healthy home survey can be helpful in facilitating the community's participation and understanding the discussions.
- The sanitation plan should include the types of latrines suitable for the ground conditions, economic situation and habits of the households. Cost of different types should be analyzed and presented to the community other resources like person power, training, material and transportation / portage requirements for the program should be discussed.
- The concept of the sanitation fund should be presented to the community. Terms and condition of lending out the money should be discussed and decided.

A3 A Plan for Health Education Support to the Mother and Child Tap Stand Group.

- The present health situation of the mothers and children in the community should be served using participatory methods. Mother and child health

groups should be formed in each tap stand point source or well for this purpose. The information gathered should be analyzed, discussed and a plan for the health improvements program should be present in the cluster wise meeting

- To achieve the above training sessions 1, 2, 3, 8 and 10 described in Basic and Sanitation education Training Program (refer implementation manual vol. II Training Manual, Training Module B 3 Code D220) may be undertaken.
- A Village Health Promoter should be identified for the community.

A4 A Plan for Village Environmental Hygiene

- The situation and problems of village cleanliness and environmental hygiene should be surveyed and discussed in each cluster.
- The discussion should be held with all households about possible activities to improve environmental hygienic conditions. The communities should consider improvements as drainage and garbage disposal. An action plan of the proposed improvements should be formulated and presented in cluster wise meeting.
- To achieve the above goals, the training sessions 1,2,3,8 and 10 described in Basic Health and Sanitation Education Training Program (refer implementation manual vol. II Training Manual, Training Module B 3 code D 220) may be undertaken.

A5 A Plan For Women's Technical Services

- The So should facilitate discussions among the women's group to encourage them for their development and income generation activities they would be interested to undertake. If the women in the community show interest, an action plan for woman's technical services should be formulated.
- The action plan should describe the training, saving group and other specific activities with in the confines of the five keys defined by the board. These key areas are:

1. Skill enhancement training to help women to develop additional skills required to realize the benefits form improved water and sanitation services;
2. Improvements in the access of the women in the formal credit system;
3. Promotion of women in the planning and implementation of water supply and sanitation scheme;
4. Operation and maintenance and resource mobilization activities on water collection, collection of dues form the users' group, monitoring and evaluation;
5. Gender training and information from SAs and community leaders.

- The SO must explain the community members about the contribution of the board that will contribute Rs 200 per women participants. The women's group should be encouraged to add to these grant funds on whatever activities they like.

A6 A Plan For Local Education Activities

- Literacy problems of the community should be surveyed and it required / wished, a plan for undertaking a Non-Formal Education program during the implementation phase should be drawn up. A service agency, which is specialized in the literacy programs, may be organized as a link organization. The need for a service agency will depend on the previous experience of the SO in undertaking literacy programs.
- This plan, however is not subject to direct Fund Board financial support (Unlike the support for the NFE program during the Development Phase)

A7 A Plan for Environmental Source Protection

- The Community and the SO should discuss on the potential sources and pollution of the source and what could be done to ensure the protection of source form pollution. The SO should instruct the community members about the possible dangers of deforestation and pollution brought form human activity in the watershed area. The community members should be convinced and action should be taken for the protection and promotion of the immediate source environment.

Plan Necessary for the Implementation of the Work.

A8 A Plan for Local Material Collection

- The SO must explain the collection of local materials needed for the construction work, their approximate quantities and the approximate numbers of portage trips (per household) required to collect the materials for the construction of the scheme meant for the community.
- The community must decide the best sites for the sand / stone / gravel collection.
- They should also discuss and agree the timetable for the collection and transportation of the local materials.
- The SO must explain their responsibility to the community to get the local materials near the construction sites. It is their responsibility to convince the community so that all the households may participate during the construction period.

A9 A Community Cost Contribution

Community's up-front Cash Contribution upward Scheme Construction:

The SO must explain the community about the Board's requirements for the community with an emphasis about the need of the community's contribution towards the capital costs of the scheme, as defined in The Scheme Eligibility Criteria of the Board. The Fund Board's requirements of up-front community contribution will be provided before each batch.

Operation and Maintenance Funds form the Community

- The SO must explain the community about the board's requirements of the community with an emphasis about the need of the community's contribution towards the operation and maintenance costs of the scheme as defined in The Scheme Eligibility Criteria of the board. The board's requirements of the operation and maintenance funds will be provided for each batch.
- The SO must deposit the moneys targeted for the sanitation fund to the community / water user committee account.

- The SO must explain to the community the purpose and use of the operation and maintenance funds and rationally behind contributing towards the scheme costs. The community together with the SO must prepare a plan for the future utilization and future collection of the maintenance funds.

A10 A Community Person Power Plan

- The SO must inform the community of their responsibilities concerning the management of their funds and the procurement procedures.
- The community together with the SO must prepare a plan for procurement of the non-local materials. The SO should explain the approximate quantity and quality of the materials to be procured by the community.
- The SO should train the WUC and select community members in the quality control of materials to be procured.
- The community should make a plan for whom, when and where the materials are to be purchased.

A11 Community Person Power Plan

- The SO should explain the community about the responsibilities, job descriptions and selection criteria of the Village Maintenance Worker, Water User Committee, Female Treasurer and Village Hygiene Promoter.
- The SO should help the community in the selection of the required personnel. The training that the SO should organize to the community-based personnel is described in the training modules, which are provided by the human resource development division of the Fund Board.
- The SO should explain the community about the requirements of unskilled / voluntary labor, preferably in terms of maydays per household after preparation of the estimation. The SO should help the community to prepare a plan for supplying voluntary labour, taking into consideration the peak agricultural seasons.

A12 Person Power Plan

- The SO should introduce its staff to the whole community and explain how long they are going to stay in the village, along with the description of job and services it can offer to the villagers.

- The SO should train the water user committee and select community members by filling up the time sheets and monitoring the staff performance. The SO's permanent field staff are:
    - The overseer
    - The community Worker
    - The community Technician
    - The Software Supervisor

The Software supervisor and the overseer will be nominated as the Field Coordinator.

A13 A Plan for Operation and Maintenance

- The SO should assist the community to plan the future operation and maintenance activities. There should be a clear plan for training the village maintenance worker, for his remuneration and job description.
- There should be a plan for regular cash / king collection for the purpose of the operation and maintenance of the scheme. The SO should make an estimate of the annual maintenance cost.
- There should be a plan for the joint activities and necessary voluntary labour for the annual scheme maintenance.

A14 A Plan for the Community Monitoring and Evaluation

- The SO should train the community in quality control of construction works, time sheet keeping and information should be given to the community and explain their purpose in the meetings of the Fund Board. The SO must also explain the community about the system of compliance monitoring (monitoring of the fulfillment of contracts) by the Fund Board. The system of endorsing proposals, payment requests and site appraisals must be explained to the community.
- The SO is to train the community in the self-monitoring activities, so that the community can follow up the progress of the sanitation, health education, literacy and other community development programs.
- A plan for undertaking the community monitoring activities is to be drawn up.

Optional Plan (s)

School Health Promotion Plan

- The SO should inform the community of the possibility of having a school health promotion plan. The SO should also inform the community that the Fund Board would contribute direct funding towards the school health promotion plan.
- The school health promotion plan may include health education, health classes, construction of school toilets and the other activities.

  Other optional plans are to be discussed as per the discretion of the community.

The Field Survey

- The field survey should be done in accordance with the field survey manual and technical guidelines.
- The SO should note particularly the route of transmission and distribution line whether it is clearly marked in the scheme site or not. This is one of the major tasks that should be done and verified by the site appraisal team of the Fund Board.

The Technical Design

- The technical design should be undertaken “according to the design guidelines provided by the Fund Board manual.
- It is possible that the guidelines do not cover all the eventualities. Both the SO and community can discuss and suggest for their approval, options that they can consider more appropriately and recommend to the Fund Board.

The Bill of Quantities and Financial Proposal

- Once the contract has been signed, the SO is committed to provide the quantities of materials and inputs specified in the contract within the contract amount. Further the board names with specified in the design must be provided. The materials delivered on site will be verified according to the amount and brand names.
- The Fund Board has established a system of price norms, which is based upon the market prices. The market is however prone to sudden fluctuation.

To protect the SO against sudden price increases it is recommended that the SO obtain quotation invoices for the materials prior to the signing of the contract and that these quotations be valid for a period enough for the SO to be able to conform the order.

Other Activities

Health and Sanitation Education

Apart from the self-investigating and planning activities of the community mentioned in the plans A3 and A4, the SO should attend regular health education classes. It has been presented in the 'Basic Health and Sanitation Education Training Program for Community Workers' of the Fund Board. The SO may undertake the following health education sessions for the tap stand group / mother and child healthcare groups or may use the SO's own health education package with the same overall objectives.

Non-Formal Education Activities

During the Development Phase, the SO may code to use NFE as an entry point tool to the community. Depending on the SO's previous experience in the conduction of the Non-Formal Education activities, the SO may identify and suggest potential link organization which will support the proposed plan for literacy classes. The Fund Board fibers direct funding to the NFE classes and the funds given to the SO for the purposes of the non-formal education should be transferred to the selected link service agency. The service agency would be responsible for the management, training etc of the literacy program in the community.

Each class should have on average 25 participants; with preference to woman one female (15 years and above) from each household should be encouraged to participate in the program.

The community action plan (A1-A14) includes loans, schemes layout and other supplemental water-related software activities such as HSE, WTSS / Gander Sensitivity and NFE programs plans. The Fund Board organizes

community action plan training to facilitate the planning process at community level to increase participation and to make scheme effective. In addition, the Fund Board provides technical training to the community people to inform them on the technical norms that have to be followed during the construction work and quality control measures that shall have to be addressed. The expected outputs of the include:

- Formation of WUG and WUC with registration of WUG.
- Commencement of some household and village environmental sanitation activities.
- Reconfirmation of the board scheme qualifying criteria;
- Well prepared, documented community action plan;
- Demonstrated community interest and commitment for the scheme; and
- Proven capacity of SO to assist community to implement the scheme.

The requirements and activities are thoroughly monitored on site by the Fund Board, with the assistance of SAs. At the end of this phase, the board prepares an implementation phase proposal forming a point of reference to the community action plan together with refined technical and social information. The phase takes around 8 to 10 months to conclude.

The development phase has two district parts. The first part includes the community conceptualize and agreement on the plan. At the end of this process, the community is familiar with all aspects of the plan. The second part of the process requires that the conceptual plan should be converted into facts and figures that enable clarity of what will be needed and how much it will cost. The detailed field survey follows together with the detailed field survey follows together with the detailed documentation of the intended activities, which make up the implementation proposal. During this phase, the Board gives trainings such as community action plan training, community technician sanitation, software and CAP, Overseer Community water Supply Orientation and HSE training to the community worker.

The main purpose of the implementation phase is to undertake the activities as they are described in the community's plan, which will include the completion of the water supply scheme and sanitation activities. This phase also includes continued and full scale Hygiene and Sanitation Education (HSE) and appropriate mitigation measures for many adverse environmental impacts as a result of construction activities and skill management training in support of operations and maintenance. Post construction activities will not only consolidate the achievements of the community in water and sanitation, but also to be a boon to help their capacity to manage, operate and maintain facilities and take optimum advantage of the project benefits. In this phase the Fund Board enters into a tripartite contract with the SO and community. The community with assistance of Fund Board, constructs the drinking water system and concludes all the activities as underlined in the community action plan (A1-A14). By the end of this phase, communities will have:

- Functional water supply system;
- Trained WUG and WUC with active operation and maintenances system;
- Demonstrated environmental source protection measures;
- Visible use and maintenance of sanitation facilities with functioning Sanitation revolving Loan Fund (SRLF) carried under HSE program especially focusing on mother and child groups;
- Technical linkage and support services to enable women to access credit and training related to productive activities that are launched under WTSS program.
- Completion of Non-Formal Education classes (optional); and
- Increase community's management capacity to handle community development activity.

Some training is also given in this phase. Such as, Training provided by the Board to SO / SA staff, and, training provided by SO to the community. During the phase the Fund Board undertakes intensive technical and social monitoring to insure the quality of construction work, and to measure the progress software activities. This

phase concludes the project cycle or work of an entire batch where activities are carried out within the period of 10 to 13 month's.

2.7 Scheme Details

2.7.1 An Overview of the Implementation Agency (RWDC)

Rural Women Development Center RWDC is a non-profit making and non-governmental community based social organization registered in 1991 by the initiation of the group of Lunkhu Deurali VDC of Parbat district. Literate and illiterate, Professional and non-professional women are the members of his organization. At present RWDC is operating its activities mainly six VDCs of this district and some village of Chitwan district. The main focus of RWDC is to strengthen the capacity of the deprived communities and groups of people to meet their basic needs through participatory and sustainable development intervention. Rural drinking water, non-formal education income generating activities, health and sanitation programs and community awareness activities are the main focused working areas of RWDC, RWDC has been involving in such activities since it's establishment in Parbat district.

RWDC is working with INGO/ NGOs / SOs of which RWSSFDB, Water Aid Nepal, GTZ, CECT and Asia Foundation of Nepal major organizations. The main office of RWDC is located to Kusma Bazaar, the district headquarter of Parbat. RWDC has worked with JACKPAS and successfully competed some schemes in the district.

2.7.2 Introduction of the Study Area

Mudikuwa Water Supply Scheme is a gravity type water scheme located to ward no. 5 of Mudikuwa VDC of Parbat district. The scheme is providing water supply facility to 232 populations of 79 households. The source of this scheme is Tato Pani 232 is 5 kilometers far from the community. The scheme was started on 3 Jestha 2054 and completed on 15 Jestha 2057. It was originated by the effective initiation of the users themselves. Before the scheme implementation, the

community was fetching water with more time from their traditional existing source points, with poor quality water. People used to fetch water from Dhunge-Dhara that was 45 minutes far form the community and the round trip time to haul the water was 55.80 minutes. Thus, hardship and felt need of safe, clean and adequate drinking water were the major positive factors for the scheme formulation. So, they requested to RWDC personnel to provide water supply facility in the village. Ten tap stands were constructed during the project period with the total cost of 2090031.89 NRS. Household per tap is 6.3. The phase wise construction detail is given below.

2.7.3 Pre-Development Phase

As the main object of this phase is to identify and select SO's and support them to canvass potential schemes by conducting a pre-feasibility study, the Board has been selected RWDC and support organization on the basis of evaluating its past performance. The board also calculated tentative cost and community contribution. It also identified the place (ward no. 5) with 79 HH and 232 populations, where the scheme was necessary. It also decided all software and hardware component including its source during this period.

Table 3

Pre-Development Details of the Scheme

S. No.	Description	Total	Remark
1	Date of PF study submitted	13 Jestha, 2054	
2	Type of scheme	Gravity / Ground	
3	Name of source	Tato Pani	
4	Tentative estimated cost	692749.94	

2.7.4 Development Phase

Development phase is the second phase. This phase also includes community participation and organization and tide series of interventions which evoke creative problem solving and planning to tackle the water and sanitation needs of the community and lead to preparation of community action plan. During this phase

the SO assists the community to prepare a community action plan of both technical and social development activities and search some sanitation, training and orientation programs.

According to the board and RWDC, the development phase was contracted on 29 March 1998 and the total budget for development phase was 944476.50. The contact duration of this phase was for eight months and completed delaying six months due to some source disputes, lack of coordination and adequate interaction within the community.

Table 4

Development Phase Scheme Details

S. No.	Description	Total	Remark
1	Development phase contract awarded date	29 March, 1998	
2	Total budget for development phase	944476.50	
3	Contract duration	8 month	
4	Action time taken to complete the scheme	8 months	

2.7.5 Development Phase Payment Details

The payment system of the board is based on the past performance of the community action. The first payments were made after observing and monitoring the scheme by the board's experts. Then the second and third payment was made the contract date and details are given below.

Table 5

Development Phase Payment Details

S. No.	Payment type	Schedule date	Actual date	Amount
1	First payment	March 29, 1998	March 29, 1998	420063.60
2	Second payment	July 31, 1998	17 Nov, 1998	262206.45
3	Third payment	Nov. 13, 1998	May 25, 1999	26226.45
	Total cost			**944476.5**

Source: RWSSFDB / RWDC

2.7.6 Implementation Phase

Implementation phase is the last phase. All the construction including software and hardware has been done during the phase. The proposal submission for this phase was 2055-08-28. Board appraisal data was 2 Baisakh 2056. the tentative cost estimated for this phase was 573362.00. Actual total cost for this phase was 692749.94. The board contributed 452805.45 and community contribution was 239944.49.

Table 6

Implementation Phase Scheme Details

S. No.	Description	Total	Remark
1	Proposed submission date	055-08-28	
2	Originally proposed estimate cost	573352.00	
3	Board appraised date	May 17, 1999	
4	Contract date	May 19, 1999	
5	Total implementation cost	692749.94	
6	Community contribution	239944.49	
7	Board cost Nrs	452805.45	
8	Completion date	2057-02-15	

Source: RWSSFDB / RWDC

During the implementation phase, he system was built property and satisfactory, but at the end of the construction period, the intake and pipeline were swept away by the flood and landslide that was resulted in delays of the completion of the work and repair and maintenance of the structure. The construction of institutional latrine and installation of metal gate were not done in time. The delay was due to the involvement of the community in agriculture work at the time of construction too.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The main object of this chapter is to throw light on the methodology used in the present study. The purpose of the study is basically to explore the problem impacts, socio-economic status and changes, and environmental sanitation problems of the Mudikuwa VDC, In fact, it is because water plays a significant role in the overall development of the country, indirectly. In order to alleviate poverty and develop the overall socio-economic status of the nation, natural resources, mainly water resources, should properly be utilized.

One village development committee of Parbat district namely Mudikuwa has been studied on the basis of purposive sampling because 'Rural Water Supply and Sanitation Fund Development Board' implement the water supply and sanitation project. So the village is purposively selected to find out the actual impact and situation of water supply.

3.2 Source of Data

This study is based on both primary and secondary data. Primary data is collected through developing a set of questionnaire and testing among the user's group to know the present status and peoples' view on drinking water and sanitation sector.

The secondary data are taken from different offices, such as, NWSC, DWSS, RWSSFDB, RWDC, DDC, VDC, etc.

3.3 Research Design

The research is exploration in nature. In order to identify the problem, available literatures are studied. This has helped in identifying the problems of the particular study area. This study explores a descriptive research framework.

3.4 Populations and the Sample

The total population of Mudikuwa VDC is 2831, out of which 1436 are males and 1395 are females. The total households are 435 (Census 2002). In the study area, the sample population is 232 with 79 households of ward No. 5 of the VDC.

3.5 Data Generation Procedure

To carry out the present study, following techniques is adopted:

- Participant observation
- Interview schedule
- Focus Group Discussion

3.5.1 Participant Observation

The study area is visited and observed in terms of water supply and sanitation system. The observation is mainly focused on the impact of drinking water supply and sanitation. Therefore, the basic information is collected through the observation.

3.5.2 Interview Schedule

During the research period, a set of questionnaire had been developed to obtain the information about drinking water supply project in the villages and the people's participation including the former status of drinking water system.

3.5.3 Focus Group Discussion

In addition, Focus group discussion was held with user, users group personnel and VDC officials to obtain the level participation, affordability and willingness to pay to the service.

3.6 Technique of Data Analysis

The statistical tools are used in this study are percentage, ratio, average and annual growth rate etc.

CHAPTER FOUR

A BRIEF DESCRIPTION OF MUDIKUWA VDC

4.1 Location, Boundary and Administrative Division.

This Village Development Committee is located in between $38^0$10’31” to $28^0$12’ 08” Northern altitude and $83^0$3’52” to $83^0$41'23" eastern longitude. There are Shankar Pokhari and a part of Khani Gaun VDC in the east, Baglung district in the west, Katuwa Chaupari and Shivalaya VDC and a part of Baglung district in the north and Devisthan and Khani Gaun VDC in the south. In accordance to political division, this VDC lies under constituency 2 and area no. 6. There are nine wards and twenty villages in this VDC and the administrative office, the office of the VDC, is located in ward no. 1.

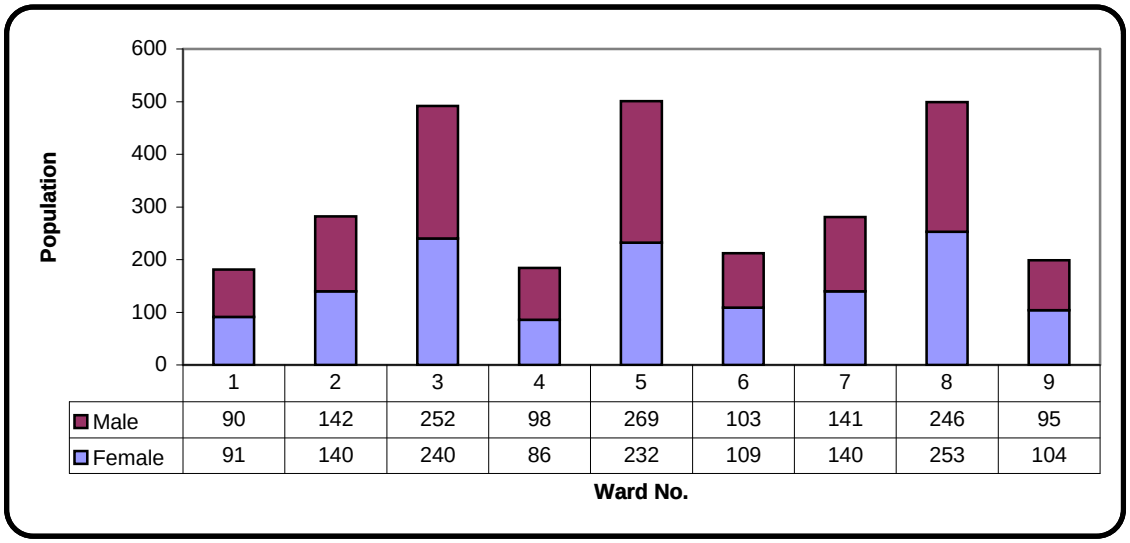
4.1.1 Area and Land Utilization

There are slope land and plain land in this VDC where the highest land of 1360 meter is in ward 6 and the lowest land of 660 metre is the field in ward no. 5 near Jimirghat. The total land area of this VDC is 514.43 hectare.

4.1.2 Population

As per the fact collected for the purpose of preparing this profile, the wardwise villages, house numbers and population are as follows.

Figure No. 1 (Gender Division of Population)



	1	2	3	4	5	6	7	8	9
Male	90	142	252	98	269	103	141	246	95
Female	91	140	240	86	232	109	140	253	104

Source: Field Survey

Wardwise Population Division

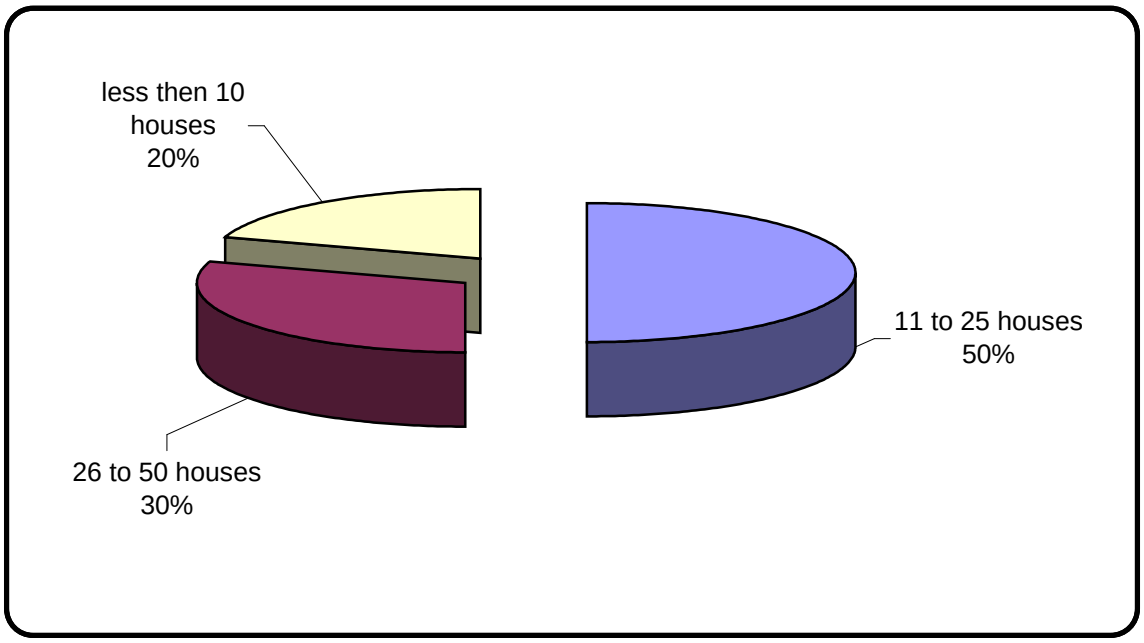
Table No. 8

Ward No.	1	2	3	4	5	6	7	8	9	Total
Villages	1	1	4	1	5	3	1	3	1	20
Houses	26	83	77	32	79	31	45	75	27	435
Population	181	282	492	184	501	212	281	499	199	2831

Source: Field Survey

Out of 20 villages in this VDC, 4 are scattered, 10 are medium sized and 6 are large villages. The average house number in per village is 22. There are minimum 8 and maximum 49 houses in those villages. The figures of houses are as follows.

Figure –2 Size of Villages (The No. of Houses)



Source: Field Survey

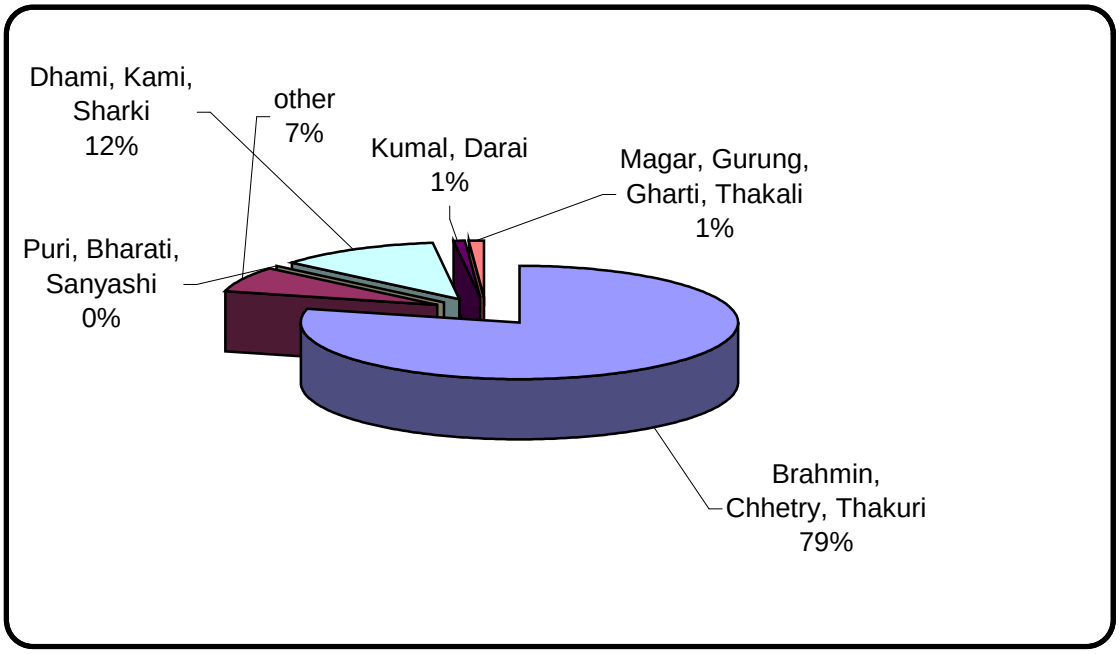
4.2 Social Situation

4.2.1 Racial Status

There are Brahmin, Chhetry and Thakuri in majority in this VDC, 79 percentage of the population are of the above-said races, while Kami and Sarki occupies the second largest position with 12 percentage of the population. Only 9 percentage of the population is occupied by Magar, Gurung, Gharti, Thakali, Newar, Kumal,

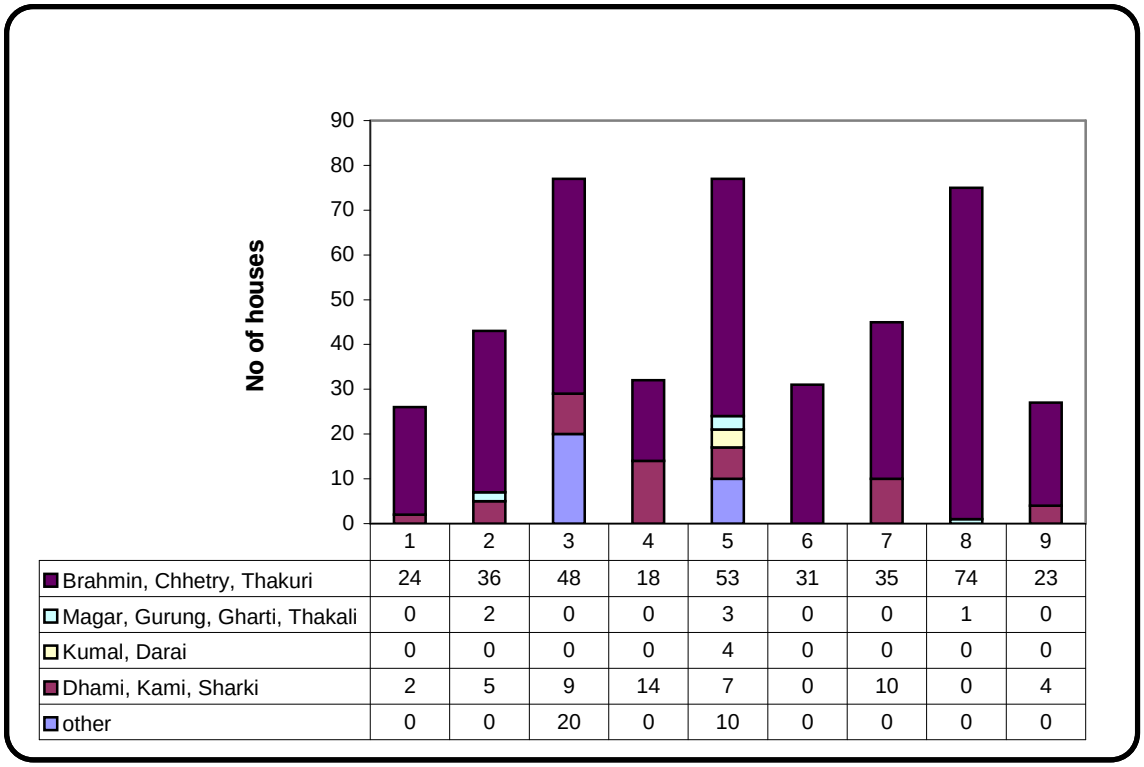
Darai, Puri, Bharati, Sanyashi and others. The racial and wardwise Population distributions are given in figure no. 3 and 4 respectively.

Figure – 3 (Racial Position of Population)



Source: Field Survey

Figure-4 (Wardwise Division of Racial Community)



	1	2	3	4	5	6	7	8	9
Brahmin, Chhetry, Thakuri	24	36	48	18	53	31	35	74	23
Magar, Gurung, Gharti, Thakali	0	2	0	0	3	0	0	1	0
Kumal, Darai	0	0	0	0	4	0	0	0	0
Dhami, Kami, Sharki	2	5	9	14	7	0	10	0	4
other	0	0	20	0	10	0	0	0	0

Source: Field Survey

4.2.2 Language, Religion and Festivals

The people in this VDC speak their own mother tongue as well as Nepali Language; the people of all races use but Nepali language for official purposes. The native languages are mainly used among the family members. There is no provision of teaching in school in native (Local) languages. So, their progress has been hampered.

Almost all the people here follow Hindu Religion. All celebrate the festivals such as Rakshyabandhana, Teej, Dashain, Tihar and Shrawan, Magh and Baisakh Sakranti, Gurung people celebrate Arghaun festival also. Besides these festivals, they also follow the rituals like Nuaran, Pashni, Chudakarma, Bratabandha, Bibaha and funeral rites as per their own custom. Magar and Gurung people have their own clothing's. But, now a day they use them mainly in especial occasions.

4.3 Financial Status

4.3.1 Main Source of Income

According to the supervision done at the time of preparing this research study, agriculture has been the main source of income of 42% of the houses in this VDC. 41% of the houses have their income source on internal employment, 6 and 4% of the houses have their income source on external employment and business respectively. 7% are wage earners. The following table shows the description of family income source.

Table No. 9 (Main Source of Family Income)

Number of houses						
Ward No.	Agriculture	Service		Trade	Wages	Not known
		Internal	Foreign			
1	5	17	0	2	2	0
2	25	10	0	1	7	0
3	19	44	10	3	1	0

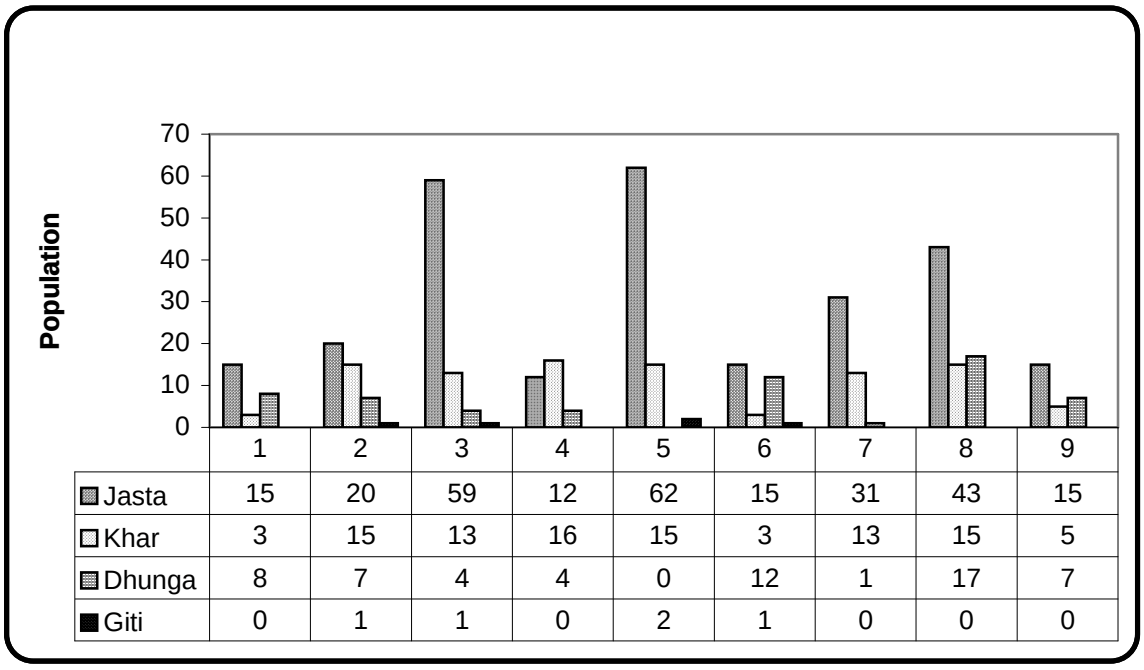
4	13	12	0	0	7	0
5	31	19	11	7	11	0
6	16	10	0	5	0	0
7	21	22	2	0	0	0
8	41	30	3	0	1	0
9	11	14	2	0	0	0
Total	182	178	28	18	29	0

Source: Field Survey

4.3.2 Roof of the Houses

62.5% of the houses have tin roofs while 22.5% have straw roofs. Stone-roofed houses are 14% and 1% house are concrete roofed. In this regard, wardwise descriptions of house have been given below.

Figure No.5 (Roof of the Houses)



	1	2	3	4	5	6	7	8	9
Jasta	15	20	59	12	62	15	31	43	15
Khar	3	15	13	16	15	3	13	15	5
Dhunga	8	7	4	4	0	12	1	17	7
Giti	0	1	1	0	2	1	0	0	0

Source: Field Survey

4.3.3 Road

12 Villages out of 20 have rough roads that are accessible only in dry seasons. But, Kusma Bazaar is within 8 km from all villages, which has motorable road in all seasons.

4.3.4 School

There are three primary schools, one lower secondary and one secondary school in the VDC. Total number of enrolled students are 871. The following table shows the description of schools. Students and employees in the VDC.

Table No. 10 (School)

Ward No.	School's Name	Number of student			Staff / Teacher			Toilet		Facility of Drinking water
		Girls	Boys	Total	Male	Female	Total	Ordinary	Concrete	Tap
1	Matedawal Secondary school	196	172	368	13	1	14	3	0	Insufficient
5	Gahate Ambot Primary School	70	82	152	4	1	5	2	0	Insufficient
7	Bal Primary School	38	25	63	2	2	4	1	0	Insufficient
8	Sarada Lower Secondary School	100	110	210	9	0	9	0	0	Insufficient
9	B.P. Memorial primary school	34	44	78	1	1	2	0	0	Insufficient
	Total	438	433	871	29	5	34	6	0	

Source: Field Survey

4.3.5 Other Service Motive Offices

The offices of VDC, Sub-Health Post and Post Office in ward No. 1 and there is also one Post Office in ward 3. In this relation, the table has been given below.

Table: 11 (Information of Service Oriented Offices)

Ward No.	Name of Office	Staff			Toilet		Facility of Water
1	Sub-Health Post	1	1	2	0	0	Non-avail
1	Post Office	1	0	1	0	0	Avail
1	VDC Office	2	0	2	0	0	Avail
3	Post Office	1	0	1	0	0	Non-avail
	Total	5	1	6	0	0	

Source: Field Survey

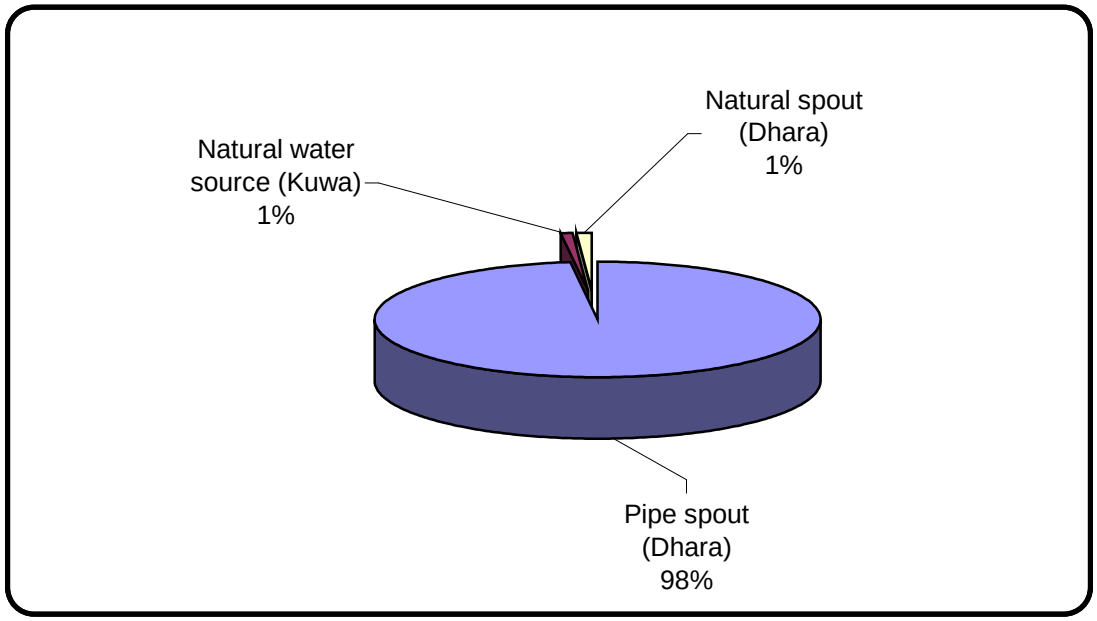
CHAPTER FIVE

ANALYSIS AND INTERPRETATION OF DATA

5.1 Present Condition of Drinking Water

Cent percent of the people have been using drinking water from different sources. At present, 98% of the people are using water from pipe system water supply. And water from traditional well and natural spout are being used by 1% each of the people respectively. The figure below shows the percentage of people using water from different sources.

Figure-6 (Present Condition of Drinking Water)



Source: Field Survey

5.1.1 Grade of Facility

Facility of drinking water shows how probable the facility of water is. It has been described on the basis of the index decided by His Majesty's Government.

5.1.2 The Index to Determine the Quality of Water

The primary sources used for the division of facility have been made on the basis of the following index.

Table No: 12

Facility Determination

Division of facility	Quality	Quantity L/P/D	Time (Minute)	Reliability (Month)	Continuity Hour/ Day
1st (Good)	Secured sources	> 45	<15	12	> 6
2nd (Average)	Acceptable sources	25 – 45	16 – 30	11	5 – 6
3rd (weak)	Weak Sources	15 – 24	31 – 60	10	4 – 5
4th (Bad)	Bad sources	Remaining all condition			

Source: Field Survey

A. Quality of Water

In order to examine the quality of water, mainly biological and chemical examination is required. But, because of the lack of laboratory in the district, people's consciousness and source and equipment, the following basis has been undertaken to determine the quality of water.

Secured Source

One of the following has been considered to be secured source.

- The natural spouts from where water flows to the whole year without having any external pollution.
- Stream-water that flows through good forest area.
- Water supplied after applying modern technology such as water filtration / water treatment even of the source is not pure.
- Rain-water used after having well managed.

Agreeable Source

- Pure spout water if not well conserved.
- Pure stream water if not stored in sedimentation tank.

Unacceptable source

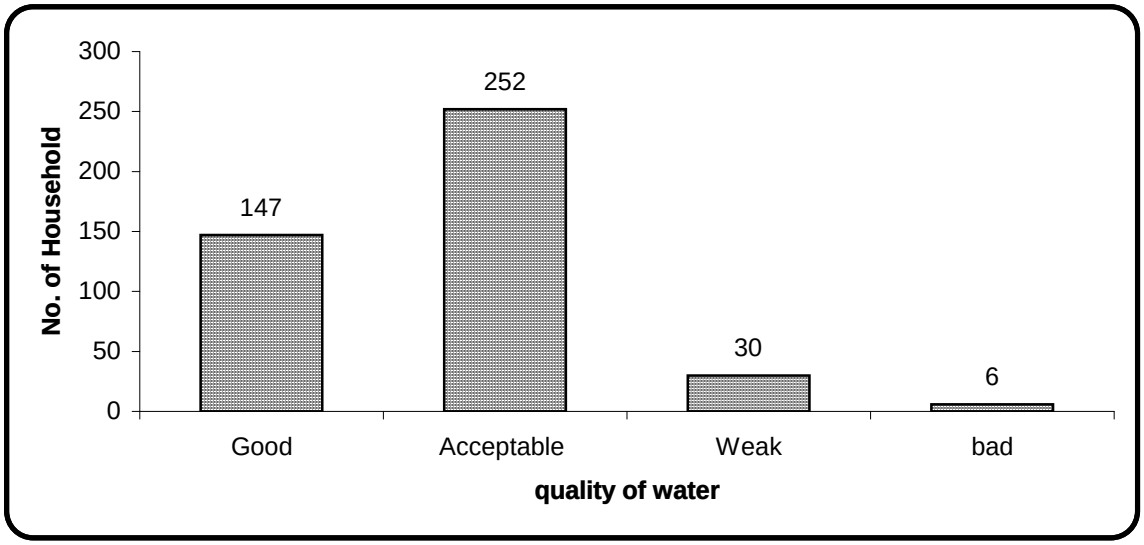
- Rain water used without filtration / water treatment.

Bad source

- River water, well or lake water if directly used.

The following figure shows the number of houses on the basis of using water of different quality.

Figure-7 Uses of Water (On the basis of quality)



Source: Field Survey

According to the figure above, 147 families use water of good quality, 252 houses use agreeable water, 30 houses use unacceptable water and 6 houses use bad water sources. The village-wise distribution of quality water has been given in schedule No. 2.

B. Quantity of Water

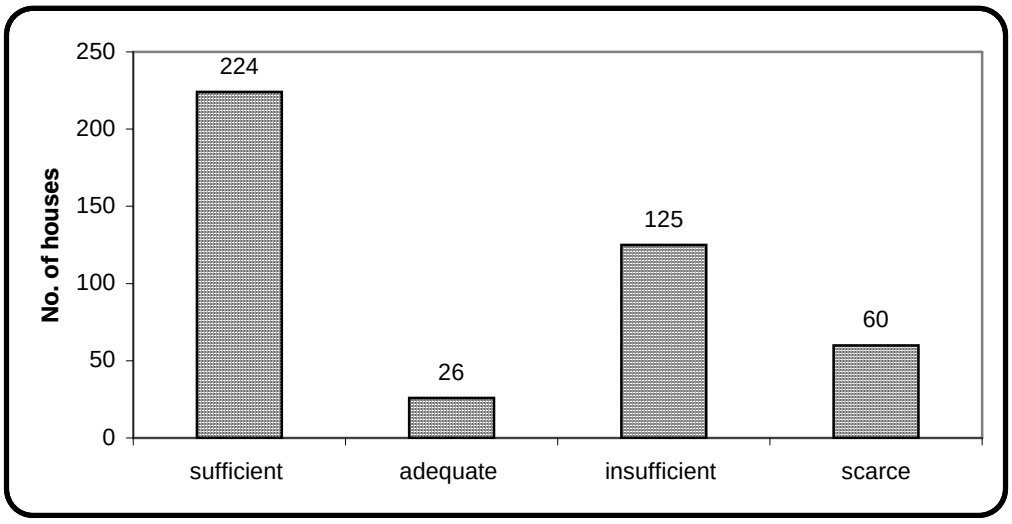
Quantity of water required for daily use is the main basis for facility division. According to national measurement of drinking water, 45 litres a day per head is required for house-use in villages. 60 litres in semi-cities and 125 litres in cities, water required for pet animals is also included in this data.

Facility division, according to quantity of water.

- Sufficient: 45 litres of water available per head a days.
- Exact quantity: 25 to 45 litres of water per head a days.
- Insufficient: 15 to 25 litres of water available per head a days.
- Quite insufficient: less than 15 per head a days.

No. of houses on the basis of quality of water.

Figure No. 8 Available Quantity of Water



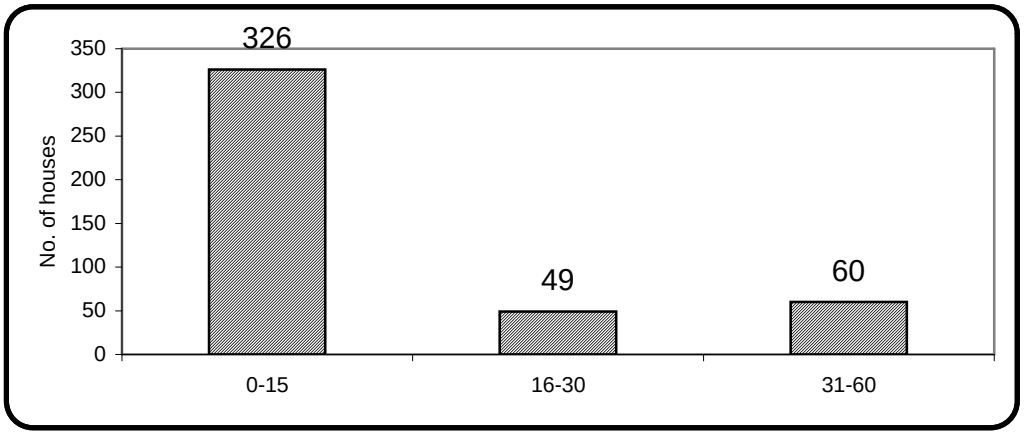
Source: Field Survey

According to the figure, 224, 26 and 125 houses are being able to get sufficient, exact quantity and insufficient water respectively. In comparison ward no. 5, 4, 2 and 1 are using insufficient water.

C. Time

The index that shows the time to fetch water is very important. If the required time is 15 minutes, it is considered to be good. But if it takes 30 minutes and an hour time, then it is supposed to be bad and worse respectively. The time consumed to carry water has been given in following figure.

Figure No. 9 [Time Consumption for Fetching Water (Minute)]



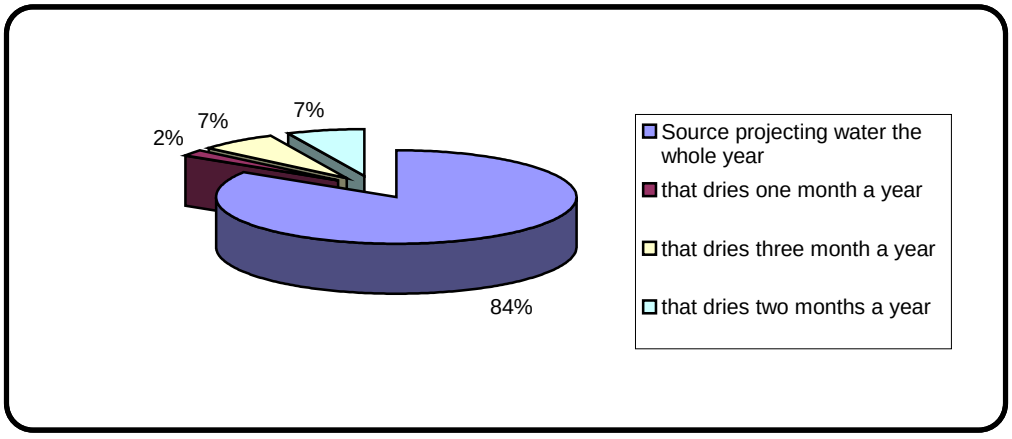
Source: Field Survey

According to figure-9, the time to fetch water for 326 houses is less than 15 minutes, but the time taken for 49 and 6 houses is 16 to 30 minutes and 31 to one hour respectively.

D. Reliability of Sources

Another index for measuring drinking water facility is reliability of sources. In order to good facility of drinking water, the main water sources should supply water for the whole division of facility, therefore, depends on whether the water sources dries or not. In this relation, the source that never dries is considered to be a good source. The source that dries for one month in a year is an average one. If it dries for two months, then it is a bad source. Lastly, the source that dries for more than two month in a year is the worst source.

Figure-10 (Reliability of Water Sources)



Source: Field Survey

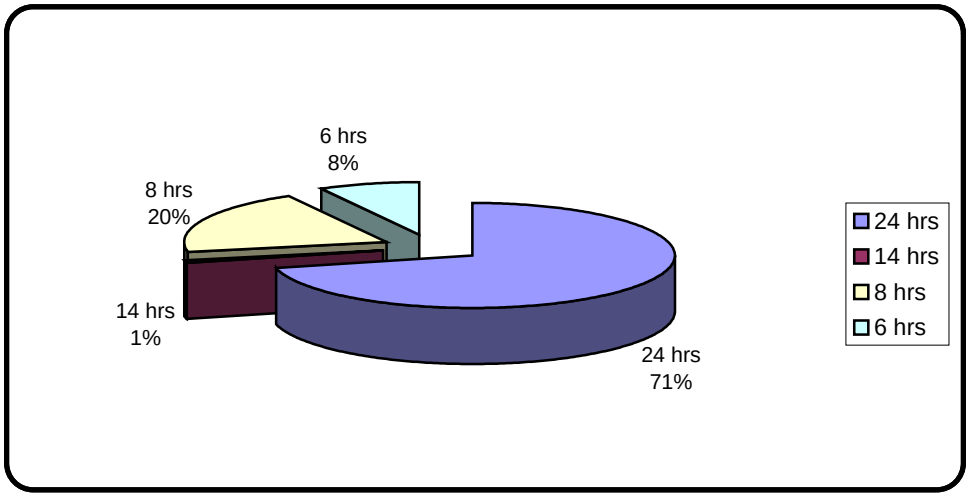
The figure shows that 84% houses use water from the source that never dries. On the other hand, the sources that dries for 1, 2 and 3 months in a year have been used by 2%, 7% and 7% houses respectively.

E. Continuity of Facility

According to the national measurement, the state of water being supplied for 6 hours a day is good. If it is supplies for 5 to 6 and 4 to 5 hours a day is considered

as medium and bad facility. Lastly, if it is supplied for less than 4 hours, then it is categorized as the worst state of the facility of water supply. This is shown in detail in figure 11 below.

Figure – 11 (Continuity of Facility)



Source: Field Survey

5.2 Sources of Drinking Water Located Within This VDC.

A source of drinking water has been categorized in three types in research study. First type of sources are those which are in use at present but have no probability of their use for the construction of future plan of drinking water second sources are those which are not in use now but can be used for future plan. Finally, the third type of sources that have been used now and can also be used later for the above said plan. The sources of drinking water in this VDC have been given in detail in table 10 and 11 above.

5.3 Collection of Rain-Water

Rain-water is pure-water indeed. If rain-water is stored and circulated in proper manner. If can be of high quality. The following points are to be taken into consideration for the proper storage and circulation of rain-water.

- Water collection roof and gutter should be properly cleaned before the commencement of rainy season.
- Water should be flushed out before its collection for the first 15 minutes of rainfall.

- Water pot for collecting rain-water should be cleaned at least once a year.
- Water spout should be kept closed.
- Water from other sources should not be put in the rain-water pot.
- Water pot should always be kept closed with a lid or net.
- Water spout should only be used to let the water flow out.
- The area around the water pot should always be kept clean.

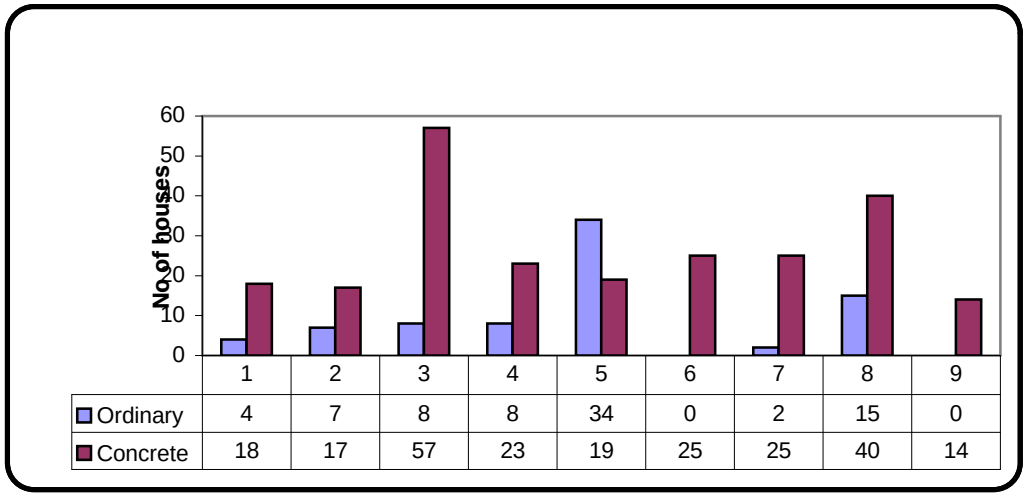
5.4 Condition of Sanitation in Mudikuwa VDC

5.4.1 Domestic Toilets

While surveying the condition of sanitation in this VDC, the indicators such as the use of toilet the installation of cowdung gas-plant, management of garbage, management of cattle-dung and urine and the management of the spot for washing kitchen utensils.

The toilet where water-sealed pan has been fixed with a leak-proof tank is called concrete toilet. The toilet, which has an ordinary tank, is not considered as concrete toilet. At the end of 2060, 238 (55%) houses were using concrete toilet. 78 (18%) houses were using the ordinary toilet. Lastly, 119 (27%) houses were not using any toilet. The following figure tells us about the wardwise use of the different type of toilets.

Figure – 12 (Domestic Toilets)



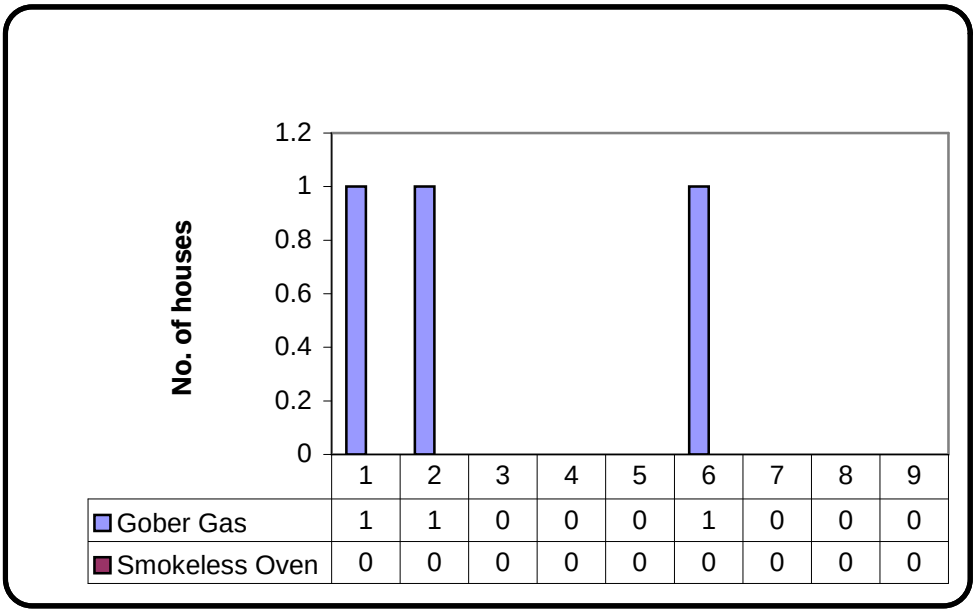
	1	2	3	4	5	6	7	8	9
Ordinary	4	7	8	8	34	0	2	15	0
Concrete	18	17	57	23	19	25	25	40	14

Source: Field Survey

5.4.2 Gober Gas Plant and Smokeless Oven

In order to remain safe from smoke, to preserve the forest areas and to keep positive effect on environment, gober gas plant and smokeless over can be used. According to the data, there are only three houses that have been using smokeless oven. Wardwise description of the use of gober gas plant and smokeless oven have been given in figure no. 14 below.

Figure – 13 (Gober Gas Plant and Smokeless Oven)



Source: Field Survey

5.4.3 VDC-Wise Garbage Management

Management of garbage and animals' excrement filthy water, animals' excrement and garbage, which come from 335, 409 and 412 houses respectively have been well disposed.

Table 13 (VDC-Wise Garbage-Management)

Ward No.	No. of houses	No. of houses			
		Proper management of drain-water	P.M. of garbage's	P.M. of animal excrement	P.M. of Kitchen refuse
1	26	22	26	26	25

2	43	37	32	18	40
3	77	77	77	77	77
4	32	31	22	31	32
5	79	5	79	79	80
6	31	30	31	31	28
7	45	35	45	45	45
8	75	75	75	75	75
9	27	23	25	27	27
Total	435	335	412	409	429

Source: Field Survey

5.4.4 Condition of Street Sanitation

According to the data, street sanitation in this VDC is in general condition. Street sanitation has been categorized into three conditions they are good condition, general condition and bad condition. The street where water accumulates rainy season and people excrete feces alongside the street comes under bad condition of the street sanitation.

Table No-14 (Wardwise Condition of Street Sanitation)

Ward. No.	Total houses	Condition of street sanitation (No. of village)		
		Good	Medium	Bad
1	1	0	1	0
2	1	0	1	0
3	4	0	4	0
4	1	0	1	0
5	5	0	5	0
6	3	0	3	0
7	1	0	1	0
8	3	0	3	0
9	1	0	1	0
Total	20	0	20	0

Source: Field Survey

5.5 Disease

According to the data (2061/062) of the health-post of this VDC, people suffer form the disease such as look-worm, skin-disease, typhoid, respiratory, eye disease etc. At least 71% of the diseases are relation to drinking water and sanitation. Even if the state of sanitation is dissatisfactory, cholera and dysentery has not been seen in this VDC in the recent years.

5.6 Efforts Made for the Improvement of Sanitation

5.6.1 Institutions Involved

The main institution involved for the improvement of sanitation in this VDC is Mudikuwa Sub-health post has been concentrated in remedial treatment rather than preventive activities.

5.6.2 Efforts of the VDC and DDC

Due to high investment on rural roads and schools, the VDC has not been able to invest on sanitation for its improvement. The study of the index of planning and budget investment shows that the expenditure for making toilets in 053/059 is Rs. 35000/-. In order to improve sanitation and drinking water situation, the VDC has launched public consciousness programme form time to time.

5.6.3 Available Manpower

State of sanitation can be improved only if local manpower are mobilized for the implementation if its programmes.

5.6.4 Identification of the State of Hazardous

The nation has decided seven bases of the identification of the state of hazardous in sanitation four of them are in relation to the use of safe toilet.

- More than 50% of the children have been afflicted with look-worm.
- Dysentery, typhoid, jaundice and itch are also seen within the time span of a year.

- Excreting faeces around the source of pure drinking water.
- Excreting faeces within 100 metre distance from the village.
- Having bad state of the health condition of the people due to improper management of garbage.
- Children's Malnutrition has been above the level of the nation.
- Less than 80% of the people wash hands with soap before and after meal.

Thus, the state of hazardous has been categorized as follows:

i. High hazardous area.

ii. Medium hazardous area.

iii. Low hazardous area.

5.6.5 Indicator of Sanitation

Use of toilet is the main indicator of sanitation, Forming habit for using ordinary toilet can be supposed to be positive in terms of environmental sanitation, but it can't be a full indicator for human health, this is only because, people should have total awareness in ordinary toilets for their daily use and maintenance which may not be possible in the weak rural circumstances. Therefore, in order to reduce water-borne diseases, use of concrete (water sealed) toilets becomes necessary. Keeping the above face in view, sanitation index has been developed by using the following formula.

$S = (P_1 \mid 1) + (Kl \mid 0.33)$

S = Sanitation index

P_1 = Percentage of concrete (water-sealed) toilet.

K_l = Percentage of ordinary toilet.

5.7 Conclusion and Future Work Procedure

5.7.1 Drinking Water Facility

According to the drinking water facility index, 27%, 22%, 36% and 15% of the people are using 1^{st}, 2^{nd}, 3^{rd} and 4^{th} grade of water respectively. Since first and second grade are considered to be of sufficient drinking water facility 49% of the

people are using drinking water facility 49% of the people are using drinking water and 51% are deprived of the facility.

5.7.2 Sources of Drinking Water

- Out of 36 sources, there are 32 natural spouts in the VDC, these sources are located within the distance of one kilometer.
- According to wardwise location of the sources there are 8 sources in ward 5 and 1 each in ward 1 and 2.
- According to quality of water, one percentage of the people are drinking water from well which is of 4^{th} grade.

Finally, 64% of the sources are secured and 36% are acceptable. So, drinking water facility can be considered to be satisfactory in this VDC.

5.8 The State of Sanitation

The state of sanitation in this VDC is dissatisfactory. The data collected while preparing this research study indicates that an epidemic of diseases may spread at any time in this VDC. Five schools and four government offices located in this VDC also do not have the facility of concrete (water-sealed) toilet.

5.9 Future Plan

This research study is the base of the future planning for drinking water and sanitation. The study of present situation in the field of drinking water and sanitation will be the base and work as a tool to draft the planning for drinking water and sanitation; the following aspects are to be considered.

5.10 Use of the List of Difficulties

The research study suggests to implement the programmes on drinking water and sanitation on the basis of difficulties. If means, priority is to be given to such places where the people are deprived of the facility.

- **Use of rain-water**

Rain-water should be collected and supplied to such places where water from pipe-system is not possible and are deprived of other water sources as well.

- **Sanitation**

The sanitation-situation in this VDC is also dissatisfactory. So, in order to enrich human awareness, the following programmes are to be implemented.

- Carrying out health and sanitation education in schools.
- Implementation of people awareness programmes on health and sanitation.
- Building toilets in each and every village.
- Organization of yearly sanitation-week with rally and seminar and establish the provision to award the village for being best in sanitation.
- Carrying out radio programme on sanitation.

5.11 People's Participation

Community participation in urban areas is more complex than in rural areas for many reasons. Communities are less cohesive and the water supply infrastructure is often technically more difficult to manage. Furthermore, new scheme construction is less open to self-help contribution because of the community being involved in formal wage earning activities and the schemes complexity. However, there still remains a need to fundamentally involve the community in the planning and decision making process for water supply scheme development in order to develop a civic responsibility. However, sanitation is one particular in which community participation can be fostered in a similar manner to rural areas.

It is now generally accepted by the major development agencies that women are key change agents in the process of improving hygiene behaviors in households and communities. His Majesty's Government of Nepal has also endorsed initiatives to involve women in the development process through inclusion of specific WID related objectives in recent policy documents, Furthermore, women, as the primary beneficiaries of improved access to water supplies and sanitation facilities, have a potentially stronger vested interest in effectively management of

water supply systems, promoting improved sanitation and hygiene practice and this has been taken up recently as an element of board's program. There is a need to access the relative merits of the various approaches that have been taken toward involving women in water supply sector development.

Table 15

People's Participation

Types of Participation	No of Households	% of Households
Labor and Cash	39	49.37
Only Labor	24	30.38
Only Cash	16	20.25
Total	79	100.00

Source: Group Discussion 2005

People's participation can be seen as an example during development phase; implementation phase and construction period, male and female were equally inspired to participate for collecting local materials, trench excavation and portage as expected during feasibility study made by the Fund Board. Above table shows that 49.37% households have contributed both labor and cash 30.38% households, especially from oppressed group, have contributed only labor, Similarly 20.25% households have contributed only cash. It can be noted that 100% households were participated while constructing the scheme. The community contribution was around Rs 239944.49.

5.11.1 Labor Participation by Sex

In the Project area, the community has decided to make compulsory participation on equal numbers of person from each household to collect local materials turn by turn by male and female. They emphasized on the number of person from each 79 household and they have divided their job based on sex and ethnicity. The group leader has kept daily record of work and worker and the person present at each day

work. It has shown women's very strong commitment and their highly appreciating contribution.

Table 16

Labour Participation by Sex

Labor by sex	No. of households	% of Households	Remarks
Male	56	70.89	
Female	23	29.11	
Total	79	100.00	

Source: Group Discussion 2005

Above table shows that male form Brahmin, Chhetri, Gurung are leading higher labor participation from 70.89 households. Similarly, the women involvements in the construction work form low cast can be seen as an example. The table shows 29.11% women form Demai, Kami, Sharki have worked hard and contributed their labor in the project.

5.11.2 Participation in Construction Committee and WUC

For the sustainable development of the water supply project a construction and users' committee is required that works after the completion of the project. In the present most of the activities launched by RWDC were found effective, though the volume of the program activities was not enough. The frequency of training and orientation to the WUG / WUC members, tap stands, mother child groups, leaders and other beneficiaries were insufficient.

Table 17

Participation in Construction Committee and WUC

Name of the committee	Participation			
	Male	Female	Male %	Female %
Construction Committee	12	5	70	30
Water User's committee	9	2	81	19
Total	21	7	75.5	24.5

Source: Group Discussion. 2005

Above table shows that male and female have involved both in construction committee and users' committee. 75.5% male and 24.5% female of the total population have been involved in both committees because female are permitted only in household work rather than other social activities.

The constriction committee was organized with a view to make capital contribution for purchasing non-local materials i.e. cement, pipe, tools and fittings as well as transportation cost.

5.11.3 Other Activities

A. SRLF and Sanitation Activities

The community was previously informed about the health and sanitary condition of the people in the community and as per criteria established by the Fund Board were accepted by the community and was mobilized for the same purpose, as for the construction of the latrine by taking loan of RS 750 to 1000.00 per household for 3 months period without interest. They, the community people initiatives, and some 20 others made some of 45 latrines by using SRLF loan.

B. Loan Distribution

WUC has decided to provide loan for Rs 750-1000 in the project area to interested / selected household. The loan repayment period was for three months. No interest was charged as penalty, according to the decision made by WUC meeting. It was compulsory to build latrine, who take loan. If somebody did not built latrine after taking loan, he will be fined at Rs 50.

WUC informed the community people regarding this issue by oral and written information. Fixed criteria to whom, they provide loan. They collected the application form who are interested to take loan. They provided loan to selected household.

But some problems have been felt such as delay in returning loan to WUC, Delay to constrict latrine, difficult to supervise and monitor, difficulties to follow rules and regulation adopted by WUC for the mobilization of SRLF.

C. WTSS (Women's Technical Support Services)

Fund Board has organized the programme of saving and credit for income generating activities, for women in the project area. They have started income generating activities such as goat rising, poultry farming in small scale, vegetable farming etc. No. of members were 30 in the project area. Fifth day of each month they are organizing meeting to collect their fund form the members and mobilizes the fund among the members. The women members of WTSS group have started saving and credit program. They have collected Rs 5 per month in their fund by each member.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Summary

Drinking water is the basic minimum need of all human beings and provision of convenient, safe, clean and adequate drinking water is the declared commitment of Nepal government. It has been realized that the development of water supply and sanitation sector (WSSS) brings in enhanced socio - economic benefits and public health improvements. Population growth, rapid urbanization and industrialization are imposing rapidly growing demands of water resources. The growing imbalance between the demand and supply has brought various problems. It has caused the shortage of drinking water, pollution and environmental degradation. As a result, a high incidence of water related diseases cause significantly low productivity in our small country, inadequate system access to safe water supplies with poor environmental sanitation and personal hygienic practices is the main cause of water born diseases in rural as well as in urban areas of Nepal.

Inadequate access to safe water supplies, combined with poor environmental sanitation conditions and personal hygiene practices are major factors impeding the improvements of health condition in Nepal. Poor water supply, sanitation and hygiene condition have given rise to diarrhea, dysentery, hepatitis and parasitic diseases, and have exacerbated anemia and malnutrition among children. These diseases frequently take an epidemic from causing sudden heavy demands of health services, which have only limited resources to combat these outbreaks.

Some national and international governmental and non-governmental agencies are involving to delivering safe drinking water and sanitation in both rural and urban areas. These NGOs and INGOs have been playing an effective role in the drinking water and sanitation sector through the implementation of water supply projects that are usually integrative in nature and incorporate with a high level of community involvement. However NGOs are constrained by the existing regulatory framework administered through the SSNCC, their activities are not

properly coordinated with government programs, and they would benefit from technical support in some areas. The regulatory framework should be reviewed in order to add actively facilitate the work of NGO and their activities should be coordinated at the district level through integrated district teams.

In the past, efforts were made in WSS sector specifically oriented to achieve physical targets, and no serious monitoring and evaluation activities seen to have been carried out to see whether the water supply projects were running successfully or not for delivering the anticipated services to the people and whether any socioeconomic, health and environment change has been brought in standards of living of the people the associated programs, such as human resource development and technology dissemination processes were not given adequate attention. All organizations concerned with the implementation of water supply projects were very much lacking on inter - organizational interactions and coordination. Similarly mobilization of community participation on a unified way in all the phases of the scheme cycle was not observed.

The general objective set for the study is to identify the economic implications of the drinking water projects implemented through people's participation in rural areas of Nepal. The main objectives of the present study are as follows.

- To assess the level of local people's participation, absorptive capacity affordability in drinking water and sanitation sector in the study area.
- To review the modalities of people's participation in rural water supply and sanitation fund development board supported projects.
- To identify issues related with the financing cost effectiveness and cost sharing in rural drinking water system.
- To access the gender sensibility through gender awareness, income generation and participators programs for women in the project area.

This study is based on both primary and secondary data. Primary data is collected through developing a set of questionnaire and testing among the user's group to know the present status ad peoples view on drinking water and sanitation sector.

The research is exploration in nature. In order to identify the problem, available literatures are studied. This has helped in identifying the problems of the particular study area. This study explores a descriptive research framework.

The total population of Mudikuwa VDC is 2831, out of which 1436 are males and 1395 are females. The total households are 435 (Census 2002). In the study area, the sample population is 232 with 79 households of word No. 5 of the VDC.

To carry out the present study, following techniques is adopted.

- Participant observation
- Interview schedule and
- Focus group discussion.

The statistical tools are used in this study are percentage, ratio, average and annual growth rate etc.

Community participation in urban areas is more complex then in rural areas for many reasons. Communities are less cohesive and the water supply infrastructure is often technically more difficult to manage. Furthermore, new scheme construction is less open to self-help contribution because of the community being involved in formal wage earning activities and the schemes complexity. However, There still remains a need to fundamentally involve the community in the planning and decision making process for water supply scheme development in order to develop a civic responsibility. However, sanitation is one particular in which community participation can be fostered in a similar manner to rural areas. Out of 36 sources, there are 32 natural spouts in the VDC, these sources are located within the distance of one kilometer. According to wardwise location of the sources there are sources in ward no 5 and 1 each in ward no. 1 and 2. According to quality of water, one percentage of the people are drinking water from well

which is of 4th grade. 64% of sources are secured and 36% are acceptable. So, drinking water facility can be considered to be satisfactory in this VDC.

The state of sanitation in this VDC is dissatisfactory. The data collected while preparing this thesis indicated that an epidemic of diseases many spread at any time in this VDC. Five schools and four government offices located in this VDC also do not have the facility of concrete (water - sealed) toilet.

The research suggests to implement the programmes on drinking water and sanitation on the basis of difficulties. If means priority is to be given to such places where the people are deprived of the facility. Rain-water should be collected and supplied to such places where water from pipe system is not possible and are deprived of other water sources as well. The sanitation situation in this VDC is also dissatisfactory. So, in order to enrich human awareness, the following programmes are to be implemented.

- Carrying out health and sanitation education in schools.
- Implementation of people awareness programmes on health and sanitation.
- Building toilets in each and every village.
- Organization of yearly sanitation - week with rally and seminar and establish the provision to award the village for being best in sanitation.
- Carrying out radio programmes on water supply and sanitation

This VDC is located in between 38^0 10' 31" to 28^0 12' 08" northern altitude and 83^0 03' 31" eastern longitude. There are Shankar Pokhari and part of Khani Gaun VDC in the east. Baglung District in the west, Katuwa Chaupari and shivalaya VDC and a part of Baglung district in the north and Devisthan and Khani Gaun VDC in the south. In accordance to political division, this VDC lies under constituency 2 and area no 6. There are nine wards and twenty villages in this VDC and the administrative office, the office of the VDC, is located in ward no. 1.

Out of 20 villages in this VDC, 4 are scatters 10 are medium and 6 are large villages. The average number in per village is 22. There are minimum 8 and maximum 49 houses in those villages.

According to the supervision done at the time of preparing this thesis, agriculture has been the main source if income of 42 percent of the house in this VDC. 41 percent of the houses have their income source on internal employment, 6 and 4 percent of the houses have their income source on external employment and business respectively. 7 percent are wage earners.

There are three primary schools, one lower secondary and one secondary school in the VDC. Total numbers of enrolled students are 871. The literary rate of the study area is 85.75 percent, which is higher than national literacy rate.

6.2 Conclusion

RWSSFDB has planned for quality improvement in Mudikuwa VDC of Parbat district through Mudikuwa Water Supply scheme to upgrade the quality of supplied water along with improved continuity, reliability and accessibility. Despite the successful completion of the scheme, some changes have to bring for the sustainability, continuity of the water scheme. The system frequently breaks down during the monsoon due to the interruption caused by landslides and floods. The analysis report reveals that there is no problem of turbidity for Tato Pani source, however, the local people reveal that the water become turbid during the initial period of rainy season.

People's participation during development phase, implementation (construction) phase can be seen as an example of their ownership feeling on the water supply scheme. Both male and female were found equally participated for collecting all types of local and non-local materials including digging and filling of trench lines and portage.

The software activities regarding HSE, SRIF and WTSS and job training for VMW were found satisfactory. It has brought a lot of positive impacts in the community, specifically in the area of health, sanitation and environmental condition.

The SO had conducted several community-based programs beforehand, and most of the activities have been completed satisfactorily. According to the training details conducted by SO in the community, VMW, WUC, MCTG trainings were found satisfactory. They have used their acquired knowledge adequately in practice. They were able to conceive Fund Board Policy, strategy and their own roles and responsibilities.

All the members and the users are active and enthusiastic, and the effort they made, were encouraging. The SRLF and WTSS fund is found effectively mobilized. The community empowerment through various programs had established active involvement of the community people even in the hardware activities. Gender sensibility has been found encouraged through various income-generation and direct participation in the scheme.

Community mobilization and their participation in relation to construction is remarkable. The performance of the staff was found satisfactory. All the activities told by both SO staff and WUC members were conducted and found satisfactory. The technical monitoring from SO side was reported not to be much satisfactory. According to the respondent, technician and engineer had visited only one time in the project area.

Affordability and the willingness to pay of the consumers were also studied, which were found to be positive. The consumers who can afford are also willing to pay for the additional cost incurred due to the addition of the water treatment component. In addition to this, local people are also willing to contribute for the improvement of the project as per the policy of the RWSSFDB.
HSE sessions and training program are not found properly conducted VMW has not got any formal training. The absence of the technician and engineer is seriously hampering to maintain and supervise the quality of construction work. The record keeping as well as book keeping system in the WUC is not found satisfactory. The

WUC was found concerned more to complete the scheme physically than completing qualitatively.

6.3 Recommendations

The necessary issues and shortcomings according to the first hand field study and secondary information, which have been found during this study are recommended as followings:

6.3.1 Training and Awareness Raising Programmes

- The users' committee should be strengthened with even more appropriate motivational and training programs to develop confidence among them. The training related to the operation and maintenance of the water treatment component is essential for the sustainable operation. Training awareness and motivational program should be implemented for effective and sustainable operation of water treatment components.
- As a part of the software component, awareness campaign should be launched through health education giving more emphasis to domestic hygiene, including construction, use and maintenance of the toilets and personal sanitation. Proper storage and use of drinking water is another most important aspect to which people should be made aware. It is the lack of the awareness of the people that water is often contaminated during collection, carriage and storage and use.
- To substantiate the software component, motivational program, sanitation program, management training and operation and maintenance training to the user members and technicians are essential for the effective and sustainable operation and maintenance of the project.
- More refreshment programs for awareness related to water supply system along with the integrated programs with it should be given to the users. The main objective of the program is to create awareness about households sanitation, personal cleanliness, solid waste disposal, method of storage and use of drinking water, contamination of drinking water during collection, carriage, storage and use, knowledge about water borne

disease. Consequences of impure water and importance of safe sanitation condition. The awareness program should be focused at household level and should be conducted through poster, pamphlets, audio-visual, gathering and mass meetings.

6.3.2 On-Site Sanitation and Waste Disposal Training

- On-Site-Sanitation training and waste disposal training should be given to the user to create awareness about latrine and waste management. The training regarding the benefits of the toilets, construction methods, operation and maintenance of the toilets etc. should be provided to the user members and community leaders. Waste disposal component should include wastewater management, surface water drainage at household level, livestock management etc.

6.3.3 Institutional Strengthening

- Effective and appealing water supply and sanitation oriented health education and community participation program making use of mass media and traditional communication methods should be developed and transmitted regularly. Adequate training in health education and social aspects should be given to all technical personnel, members of WUC, VHP etc.

6.3.4 Operation and Maintenance Training

- The management, accounting, book keeping and banking training should be provided to the members of users' committee for effective management of the system. Operation and maintenance training should be given to the WUC-members and technicians for effectiveness and sustainability of the scheme.
- Point source protection program with material contribution from beneficiaries should be launched in the community to preserve the nearby alternative water sources.

6.3.5 Health and Sanitation Education

- More effort to create public awareness of the health benefits of safe water and adequate sanitation for improved users' participation has to be made

through medium of health education and motivational program. Inclusion of water supply and sanitation aspects in school curricula should be initiated. Duties / responsibilities and authorities of the users' committee has to made clear and known to them. This can be done through publicity of subject matter in different media, training and seminars especially involving women about their decisive role in the overall process of water supply and sanitation.

- Hygiene and sanitation education in schools should be strengthened. Provision and management of water supply services and sanitation facilities for schools in project areas have to be reviewed for improvements in contents.
- The capacities of the communities to paln, implement and manage their own water supply schemes will be limited in many cases, and extensive training may be required to introduce specific skills to the users' committees. The areas of the greatest skill are planning, contract management, and accounting.
- Training and health education programs will need to be designed carefully in order to achieve maximum impact. Literacy rates and exposure to formal education methods is low in rural areas and training materials and strategies to be used care fully designed, then tested and refined to ensure their effectiveness in this context.

6.3.6 Increasing Women involvement in Social activities.

- In order to impart more effective messages to involve women in all aspects of water supply projects' planning, implementation and management, and to ensure that women's issues adequately addressed, a number of new posts in water supply sector should be crated to provide jobs for the qualified women so that more job oriented women could be produced making them more active in the community.

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QUESTIONNAIRES FOR THE STUDY

Name of the Household Head: Date:

VDC: Ward No.:

1. Households, Population and Percentages

Caste/ Ethnicity	Nos. of HHs	Total Nos. of Population	Percentage
Bramhin/ Chhetri			
Other Ethnic Groups			
Occupational Caste			
Total			

2. Major Religious Groups in the Study Area:

Religion	Percentage	No. of Households
Hindu		
Buddhist		
Islam		
Christian		
Others		

3. Time Utilizing by Gender in the Study Area:

Descriptions	Participations %		
	Male	Female	Children
Fetching Water			
Collection of Fuel Wood			
Collection of Fodder for Livestock			
Child Care			
Agriculture Farming			
Marketing of Products			
Attending Public Meeting			
Access to Credit			
Decision Making			

4. Land holding Pattern in the Study Area:

Land Availability	Number of Households	Total No. of Population	Percentage
0-15			
15-50			
Over 50			
Landless			
Total			

5. Food Availability in the Study Area

Months	Households	Population	Percentage	Remarks
0-3				
3-6				
6-9				
9-12				
Surplus				
Total				

6. Economically Active Population

Occupation	Nos. of Population by Occupation and Employment	Percentage
Agriculture		
Business		
Service		
Labor		
Others		
Total		

7. Households and Per Capital Income by Level

Level	HH	Average per day Income	Average Annual Income	Average per capita Income/ month/HH
Rich				
Medium				
Poor				

8. Participation:

In the Development Phase

- Who initiated?
- Who participated?
- How participated?
- Types of participation?

In the implementation phase:

- Name of Users Committee
- User member
- Labor work
- Cash contribution
- Kind contribution
- Rate
- Are you satisfied in your project? Yes/No
- Why

User Committee:

- Method of formation
- No. of women in the WUC:
- Treasurer Male/Female

Operation and Maintenance

- Village maintenance work selected Yes/No
- Frequency of water supply facilities repair ……
- Stock and supply of spare parts ……
- Remuneration for VMV ……
- Name of VMA ……

- Monthly fund rising. Yes/No
- How much from each household? ……

11. Positive Impact of Water Supply

- Is the life better than before? Yes/No
- If 'No' Give reason: ……
- Are quantity and quality of supplied water adequate? Yes/No
- Decrease in Diarrhea Yes/No/Unknown
- Decrease in skin disease Yes/No/Unknown
- Utilization of free time Yes/No/Unknown
- WTSS group formed? Yes/No/Unknown
- What are the ongoing WTSS activities?
- Why are the WTSS programs in future?
- Are you utilizing wastewater? Yes/No/Unknown
- Is yes, how are you utilizing?

12. For what purpose and how are you using the saved time from the new water supply scheme?

13. Do you have any suggestion about the overall program and for its sustainability? If "Yes" please mention.

PARBAT DISTRICT

ZONE: DHAWALAGIRI **District Code: 42**