

EXAMINING INEQUALITY IN WATER CONSUMPTION
(A Case Study of the Shaktijhoda Water Supply and Sanitation
Project Shantinagar-3, Jhapa)

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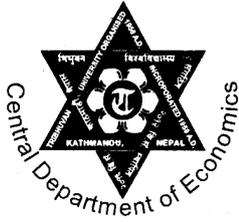
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RECOMMENDATION LETTER

The thesis entitled 'Examining Inequality in Water Consumption: A Case Study of the Shaktijhoda Water Supply and Sanitation Project Shantinagar-3, Jhapa' has been prepared by Parbatee Rijal under my supervision. I hereby recommend this thesis for the examination by thesis committee as a partial fulfillment of the requirements for the Degree of Master of Arts in Economics.

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APPROVAL LETTER

The Thesis 'Examining Inequality in Water Consumption: A Case Study of the Shaktijhoda Water Supply and Sanitation Project, Shantinagar-3, Jhapa' submitted by Parbatee Rijal to the Central Department of Economics, Faculty of Humanities and Social Science, Tribhuvan University, in partial fulfillment of requirements for the Degree of Arts in Economics has been found satisfactory in scope and quality. Therefore, we accept this thesis as a part of said degree.

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CHAPTER – ONE

INTRODUCTION

1.8 Background of the Study

Nepal is a beautiful Himalayan country of the world. Nepal is land-locked country which covers 147, 181 sq.km. area of the world. It is a country of rural areas in which almost 85 percent people are living in the rural area. It is one of the least development countries of the world. But it is very rich in terms of natural resources. Nepal is a second richest country in the world of water resource number of river and rivulets flow from the north to south originating from the showy of mountain Himalaya range, however, are still under exploited.

Nepal has huge potentials on water which can be used on variety of purposes including generation energy, irrigation facilities and drinking water. However access to drinking water quite low.

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 the Government of Nepal. 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 balance between the demand and supply has brought various problems. It has caused the shortage of drinking water, pollution and environment 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 main cause of water borne diseases in rural as well as in urban areas of Nepal. (Bhandari,2009).

In adequate access to safe water supplies, combined with poor environment sanitation conditions and personal hygienic practices are major factor impeding the improvements of health condition in Nepal poor water supply sanitation and hygienic conditions 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 demand of health services, which have only limited resources to combat these outbreaks.

There is a direct linkage between the livelihood and well being of human beings and water supply and sanitation services. Improved water supply and sanitation ultimately contribute towards nation building and prosperity by enhancing the health status of the common mass and thus, their economic productivity.

Poverty in Nepal has geographical and social dimensions. It varies by regions and social and economic groups. The productivity incidence was as low as 3.3 percent in urban Kathmandu to as high as 44.8 percent. In mid-western development region in 2003/2004; 9.6 percent in urban areas and 3.46 percent in rural areas. By caste and ethnicity, it widely varied from 14 percent among Newar caste to as high as 45.5 percent among dalits (CBS, 2005; and CBS The world bank, DFID and ADB, 2006). Moreover, the decrease in poverty was higher in urban than rural area. Thus regional balance, and social and economic inclusion are important development challenges for Nepal today. One of the policy options is appropriated price mechanism including water tariff for promoting inclusion and protecting the poor and excluded so that they get higher benefit from state (Tiwari, 2008). Nepal is one of the poorest countries in the world. There is wide gap in the income distribution. In Nepal some people are rich and they are more facilitated. On the other hand, others peoples are very poor while comparing with living standard, housing, educations, health, drinking water, communication and other economic and social infrastructures. Nepal is poor developing countries with a per capita gross national income of US \$ (MOF; 2008). In spite of decade- long conflict started in 1996, proportion of population below national poverty line decreased from 41.8 percent to 30 percent during 1995|96- 2004|05 (CBS, 2005). Remittance served as a major source of poverty reduction. However, income inequality increased and decreased in poverty incidence was not uniform.

Inequality refers to situation in which a particular variable under inquiry does not show equality in its value. Main economic variables such as income, wealth; land, education etc. are not distributing equally (Kanel, 1993). The poverty and inequality are related to each other through complex chain reinforcing each other i.e. increasing inequality leads to poverty and increasing poverty leads to inequality in society. The

concept of poverty in Nepal belongs to rural poverty which is mostly with land ownership pattern because it is the most important works of rural income.

Inequality of income refers to unequal distribution of income among persons or households in a country. It refers to the state of society in which some get more income in consumptions to others. This results from unequal earnings of the people in the society owing to the large unequal distributions of wealth and economic power. As a consequence of the poor income distribution. There is wide variation within the regions, districts, VDC and households due to their consumption behavior. Due to inadequate income, the poor families are going to be poorer and unable to meet their basic requirements such as food, clothing, housing, education and health, while the rich families are going to be richer and richer and are able to enhance their standard of livings, rural people are suffering from poverty as well as the grip of inequality in the distribution of incomes (Jhingan,1994).

Consumption and income are widely used monetary indicators of well-being. Consumption may be a better substitution than income for three reasons. First is an actual consumption measure a person's well-being in terms of meeting current basic needs while income is just an element that allows such consumption. Second is usually measured with more reliability than income. Third consumption reflects a family's long-term welfare as it captures that family's ability to smooth out income fluctuations. But income also has its own advantages if one wants to analyze welfare in terms of monetary sources, and to look at welfare opportunity rather than achievement. There have been changes in the consumption level of the people in Nepal over the years. At the national level, nominal per capita consumption increased more than five times in the past 15 years (between 1995/96 and 2010/11). During this period, the gap in consumption shares between the bottom twenty percent and the top twenty percent of population has become even worse. The per capita consumption, in nominal terms, increased from NRs. 6,802 in 1995/96 to NRs.34, 829 in 2010/11. There has been a remarkable growth in per capita consumption across all the population groups over the last fifteen years: 412 percent for the bottom quintile and 415 Percent for the top quintile. In 1995/96, the share of consumption for bottom twenty percent of the population accounted for 8 percent of the total consumption while the richest twenty percent of the population accounted for 45 percent. Even

after 15 years in 2010/11, the share of the bottom twenty percent and the richest twenty percent of the population is similar to that of 1995/96 NLSS (2010/ 11).

Inequality is one of the most important issues in under development countries like Nepal. Generally, inequality implies the situations of the country in which people are classified into many economic categories on the basis of economic situation or living standard, such as unequal distribution assets, land, educational attainment, drinking water attainment etc.

There is large global deficit in the provision of water services. The proportion of people without access to water is around 15 percent in Latin America and Caribbean, 20 percent in Asia and 40 percent in Africa (Winpenny, 2003). Most of the countries of South Asia are likely to meet the MDG target on drinking water but not on sanitation. However, there are several challenges water sector including lack of safe water, poor management of water utilities, low cost recovery and perverse flow of public subsidy and/or resources from rural to urban areas and from poor to better of households to better of households.

There are so many drinking water projects which are under construction and operation around the country, nevertheless, many of them are not operation in full fledge due to lack of proper management. Many of them are tentative tariff rate which arises so many problems to the management committee. From the present study, it will be easy to adopt the tariff rate for the upcoming drinking water supply project in the future. So that it will be easy to make proper maintenance to round of development of the project. It's evident that due to poor execution most of the governmental plan had got poor results than expected. So many drinking water projects in the Nepal are either to be lunched or running without the proper road map to fix the tariff rate. The question, "What is the primary determinant while analyzing or fixing the tariff patterns?" Still remained unanswered.

1.9 Introduction of the Study Area

The Present Study is carried out in Shantinagar VDC of Jhapa District which is located in eastern development region in Mechi Zone.

Jhapa is one of the district of mechizone, it covers that land of Mechi zone which is divided into two part by the Kankai river. Jhapa district is bounded by west Bangal and Bihar states of Indian the east and south respectively, Ilam is north and Morang district in the west. The measure river of the district are Mechi, Kankai, Ratuwa and Deoniya.

The proposed study has been concentrated on the ward no. 3 of Shantinagar VDC in Jhapa district. The people of this study area are not identical in terms of their income. Some are very poor, some are in average line. While very few are rich. The Shatinagar VDC is a sample is highly suitable in order to verify the hypothesis . The economic status of this District is normal. Agriculture is main occupation in study area. The study area is select for this study because it is assessable for the researcher and such kind of research has not be done in this area

1.10 Statement of the Problem

Human development and equitable distribution of resources from the major developmental need of developing countries like Nepal. Provision of safe water supplies constitutes the primary step in achieving these needs. Almost 85 percent people are living in rural areas, and the majority of them still lack safe drinking water facilities. As the demand for safe water supply increases there is an evident rise in the level of competition for sharing of available resources.

Although Nepal is one of the poorest countries in the world it is rich in various natural resources. Nepal is known as the richest country in water resources, but its utilization has not been satisfactory because of poor economic condition and other domestic problem such as lack of technology, unskilled manpower and corruption. Therefore, these resources are not properly used safe drinking water and the environmental sanitation are the recent development issue in Nepal. Most of the urban water supply schemes are intermittent, seasonal and contaminated by human and animal wastes.

The increasing population in Jhapa district demands more pure drinking water than before. They also need pure drinking water than they used with essence deep towel and well drinking water than ever before consequently, the supply of drinking water

needs to be increased as the increase in demand has not been made by corresponding increase in water supply.

There is income inequality in the village so that cost of drinking water is not equal among different income groups. It is economically burden to the poor people in the village. Inequalities lead to great economic wastage. Due to this there is loss of human capital and also to the capital formation. Not only have these inequalities brought the social and economic crisis but also caused social unrest and dissatisfaction in the society. The unequal distribution of income is becoming one of the most important features in Nepalese context. So poverty is not a new phenomenon in developing countries like Nepal but it is becoming serious and complex day by day.

The present study is based on the safe pipeline drinking water and sanitation project program launched by District Development Committee (DDC) in Shantinagar-3 or Jhapa district along with the people participation and its impact in the community. This study is in general aims at answering following basic questions.

- i) How does provision of drinking water varies according to different connection?
- ii) How consumption of drinking water does varies according to socio - economic status of households?

1.11 Objective of the Study

To provide basic needs of people government has to offer so many public goods to the people. One of the basic needs is safe drinking water there are so many projects that are undergoing to fulfill the people needs of safe drinking water either private or public. Especially, those projects which are public in nature are running in huge losses because of inappropriate tariff system inefficient management, due payment of customer etc. On the other hand due to strict tariff rate structure, efficient management timely maintenance and better supervision, the private project is enjoying profits.

The general objective set for the study is to identify the economic implications of the drinking water project implemented through people's participation in rural areas of Nepal.

The main objective of the study area as follows:

- 1) To examine consumption of water among different socio economic characteristics.
- 2) To examine the cost effectiveness of drinking water provision according to the different type of connections.

1.12 Significance of the Study

Water is the indispensable element for the human beings. So, it must be safe and potable whatever may be its source and it has always played a major role in influencing the human activities. There are various schemes and system to supply water and around them settlements in order to meet basic requirement need for drinking and other household purposes.

To address this issue, drinking water supply and sanitation programmed of Shantinagar VDC has been playing to improve the services level of only increasing quantity and reducing cost but also by upgrading the quality of supplied water along with improved continuity, reliability and accessibility. In this context, the user's committee has emphasized quality improvement in drinking water and sanitation in Shantinagar VDC.

This study examines and explains the degree of inequality in water consumption. Status of the water supply in the study area willingness to pay and various other parts related to water supply and sanitation sector. This study helps the management of VDC how it distributes water supply, in which sector it charges the cost. This study alerts to apply the appropriate policy in drinking water and sanitation efficiently used in community. It will also be useful to researchers, students and persons interested in this sector.

1.13 Limitation of the Study

This study has mainly concerned with one of the VDC of Jhapa district so this study may not represent the problems of the district or country as whole. Shantinagar-3 of Japan district directly benefited by this project so this study limits only one ward no. 3 of VDC. The main limitations of this study areas as follows.

- i) The context of this study may or may not be applicable to other places or communities.
- ii) This study was conducted with limit amount of financial resources and time framework.
- iii) Simple statistical tools were used to analyze the data.

1.14 Organization of the Study

This study has been organized into five chapters. Chapter one deals with background of the study, introduction of the study area, statement of the problem, objective of the study, significance of the study, limitations of the study and organization of the study. Chapter two mainly includes the review of the literature from related published materials. Chapter three contains the research methodology including research design, source of data, method of data collection and data analysis. Chapter four presents results and discussion. This chapter covers age and sex structure, educational status, main source of the income, monthly income, size of the land holding and distribution of water consumption among different income grouped, ethnic grouped, family size and size of land holding. The last chapter presents the summary conclusion and recommendation of the study.

CHAPTER – TWO

REVIEW OF LITERATURE

2.4 Concept

In the context of Nepal, drinking water and sanitation sector is widely studied. The earlier studies concentrated mainly in technical field providing the piped line drinking water supply in the country. In the beginning, technical issue related with the supply of drinking water in the rural areas taken prominently to study. Such studies, the socio-economic components such as; the ethnicity, income level affordability and cost sharing have been considered in the selection in the scheme on top of these factors the piped drinking water was taken as the important requirement for the notation of the rural drinking water projects in the country. In this chapter, we review the literature on the both the National and International Level.

Water is one of the most important and precious of natural resources. A regular and plentiful supply of clean water is essential for the survival and health for living organism. Drinking water and sanitation sector is widely studied in Nepal. The earlier, studies concentrated mainly in technical field providing the piped drinking water in the country. In the beginning, technical issue related with supply of drinking water in urban areas where taken prominently to study. Later on, the issue of water supply in the rural area was taken the support of UNICEF 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 part 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 phases onwards. In such studies, the socio economic concepts such as ethnicity, income level, affordability and cost sharing have been considered in the selection of the scheme on top of this factor the

piped line drinking water was taken as the important requirements for the initiation of rural drinking water project in the country.

2.5 International Context

The World Bank has published an issue paper related to water supply and sanitation. In this paper several issues have been discussed with various experiments. World Bank in its publication the first priority should be given to availability of drinking water and sanitation facilities and control on the contagious water on diseases to the people of the rural areas. This paper has also the pricing criteria and it has stated that tariffs on the Marginal consumption should reflect average incremental cost, i.e. price which should have to be charged third for each incremental cubic meter to re-cover operating investment cost associated with producing and distributing including the opportunity cost of capital (WB, 1993).

The world faces a huge challenge to provide improved water supply and sanitation, especially in urban areas in the developing world, where population growth rates have been highest. The latest figures from the World Health Organization (WHO)/UNICEF Joint Monitoring Programme (JMP) indicate that in 2008, more than 2.6 billion people were living without access to improved sanitation, and nearly 900 million people lacked improved drinking water supplies (WHO/UNICEF, 2010). The 2010 WHO/UN-Water Global Annual Assessment of Sanitation and Drinking-Water (World Health Organization, 2010) indicates that diarrhea is the second leading contributor to the global burden of disease—more than heart disease and HIV/AIDS. The same report estimates that 1.5 million children die from diarrhea each year. The health care and productivity costs from these diseases place a huge burden on low-income countries. Despite the impacts of poor sanitation and inadequate drinking water supplies, many countries allocate insufficient resources to address these needs. At the same time, confused sector policies, weak institutions, and lack of incentives create bottlenecks to progress (Wyatt, 2010).

The state cannot neglect social services or goods. The state has to ensure internal peace with social services to the people and right of the weak and strong will be equally safeguarded. This expenditure does not directly increase national income or welfare of the community. However, in its absence production and happiness of people may considerably be jeopardized. Safe drinking water is the birthright of every citizen. It is the duty of the state

to protect its people against disease or any sort of illness. These would arise the question of sufficiency to provide safe drinking water to all people. Good health is essential for happiness and efficient work. It has been that due to illness the average number of working week lost per worker in Nepal is about two or three weeks in a yearend loss of efficiency is about 20 percent (UNDP, 2006).

External agencies have been trying to supplement government providing subsidy and grant to the poor, yet result have not been encouraging, as sustainability is frequently not guaranteed. Past years community participation and cost-sharing strategies has been gaining recognition as main pillars for long lasting outcomes in water supply and sanitation intervention. Community action is seen as a required component to ensure greater effectiveness and sustainability and at the same time, it is seen as progressive social change promoter through empowerment women and poor people (Clever and Toner, 2006).

IRC in its newsletter concludes that domestic water services have multiple benefits it is the combination of these that add up to an appreciable impact on livelihood and poverty. Further it summarizes that the narrow approaches of water supply, that neglect productive uses of domestic water, are an opportunity missed. Worse still, because in practice people will use water for productive activities, failure to account for this additional demand at the design stages may well lead to system failure it is therefore much better to include small scale productive use in initial system planning and design IRC, highlighting the livelihood approaches, states that livelihood approaches provide a useful way forward for the WATSEN sector ,supporting it in broadening its focus addressing need for productive water use, and improving its poverty reduction aims and potential. In addition, they offer potential for better applications of WATSAN specific initiatives such as demand responsive approaches and cost recovery (IRC, 2004).

About the water's value from supply to demand, the ADB observes that water is always been recognizes as a social good, but is now day also recognized as an economic good. Many authorities have noted that the wastage and inefficiency resulting from the construction of the schemes for which cost are not recovered from consumers and which cannot be maintained. Costly supply- driven policies also inhibit the spread of facilities to the least well-off. Rural schemes suffer frequent breakdowns “at the end of the line”. In urban schemes, leakage and illegal take off are common. For a variety of socio-political

reasons, the better – off almost invariably receive the benefit of water services and subsidies in both rural and urban areas (Black and Hall, 2004)

Simon Kuznets conducted a study on “Economic Growth and Income Inequality” in underdeveloped as well as developed countries. His study is mainly focused on income distribution pattern in the Under-Developed Countries (UDCs) and causes of its long-term change. In his study he has found that the income distribution in UDCs is more unequal than that of the developed countries. With the help of this study, the relationship between inequality of income and economic growth as well as factors affecting it was indicated. It also described the trend of income inequality in secular level. At the initial phase, inequality seems to be wider and then becomes narrower. His study was based on cross-sectional data of United State of America, United Kingdom and Germany for the developed country and for UDCs case; he had used the data of India and Srilanka. He derived the conclusion that inequality at first increases and begins to decrease as the level of development increases. In the UDCs as well as developed countries, inequality is less in the agricultural sector than in the non –agricultural sector. The central causes of greater inequality in UDCs are due to the greater concentration on the ownership of the income earning assets (Kuznets, 1975).

Human development report carried out that the HDI provides a snapshot of average national performance in human development. However, averages can obscure large disparities within countries. Inequalities based on income, wealth, gender, race and other inherited disadvantage, as well as location can make national averages a misleading indicator for human well being. According to Human Development Report 2006, on “Income Inequality”, “Inequality raises important questions rooted in normative ideas about social justice and fairness in all societies. Because income distribution patterns directly affect opportunities for nutrition, health and education, income inequality is also intimately related to wider inequalities in capability and in some cases to absolute deprivation. Regional variations in income inequality are large. The Gini coefficient a measure of inequality calibrated on a scale from 0(perfect equality) to 100(perfect inequality), ranges from 33 in South Asia to 57 in Latin America and more than 70 in Sub-Saharan Africa”(Human development report, 2006).

2.6 National Context

"Mid-Term Evaluation of Drinking Water and Sanitation Program" published by center for research on environmental health and population activities have evaluated the program conducted by Nepal Red Cross Society and Japanese Red Cross Society. The main objects of the midterm evaluation are to access the impact of drinking water and sanitation program on the community in the project area of Terai and hill districts. Impacts of the program have been studied in terms of sanitary behavioral change among the community members. The performance of DWSP activities in term of hardware and software components, involvements of woman and program sustainability have been analyzed in this evaluation. The evaluation is based on participatory rural appraisal (CREPHA, 1996).

Dahal explains about the importance of water as: the animal internal renewable fresh water resources of Nepal is 8,88 thousand cubic meters per capita which is about four times the figure for India and Pakistan in a country with immense water resources. It is a pity that only 66 percent of urban population has access to "safe drinking water, which too, is hit really safe for drinking without further treatment by households such as boiling and filtering and is available only for a few hours per day. There are also acute shortage of waste water disposal facilities, sewage system and solid waste collection and disposal system. In addition, the lack of latrines in most semi-urban houses and traditional habits of defecating on backyard, public defecations places, roadsides, the bank of ponds, rivers and streams etc. Lead to contaminated water supply and wide spread transmission of excreta related diseases such as diarrhea, dysentery, typhoid and parasitic infections. Apart from painful human suffering, poor health and loss of lives poor environment sanitation causes unnecessary expenditure on medicines and health care in a country that has to import of its medicines and serve scarcity of hospitals health manpower and other medical facilities. Moreover it also leads to lower productivity of the Nepalese labor force and degradations in the scenic beauty of an otherwise (Dahal, 1998).

Planned development in Nepal was initiated only in 1956 when the first five year development plan for the country was launched. As for the water supply sector although some major works were carried out to provide services to prominent townships like Pokhara, Dhangadi and Hetauda, it took more than 16 years to establish a separate department to deal with water and waste water services in the

country department of irrigation and water supply that was established in 1966 was divided in two in 1972 into department of water supply and sewage and department of irrigation. DWSS continued with its responsibility for larger systems, while local development with UNICEF assistance started a program for small rural water supply. Until the seventh plan all water supply program were run under the department of water and Nepal drinking water Corporation. The government gave an importance to optimum mobilization of non-governmental sector, private sector and public participation only from eight plans (DWSS, 1997)

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 plan development among them, public participation did not get the main focus until the seventh plan. The government gave on importance to optimum mobilization of non-government sectors, private sectors and public participation of non governance sector, private sector and public participation only from the 8th plan. But in beginning expected success could not be achieved and only 60 percent of the total population got and access of drinking water at the end of this plan period. Among them 77 percent of the peoples of rural areas and 56 percent of urban areas were affected during the plan period(NPC; Ninth plan).

Safe Drinking water as the basic right of human must be afforded by the government. The analysis of planning of the government (5 year) i.e. particularly tenth plan infers that tenth plan had targeted to provide the safe drinking water to 22.680 million people of 85 percent of the total population, but failed to provide only 76.6 percent of the population, i.e. 2034. To achieve the proper target of the tenth plan what could be the minimum tariff rate so that the projects will run without any financial crises is the prime issue. After the present study, it will help to the upcoming projects how to fix tariff rate, which could be optimal, so that project will function smoothly(NPC; Tenth plan).

Three-year Interim Plan (2007/08-2009/10) has shown extreme increment of involvement and participation of users committee in the construction, conduction and maintenance of drinking water system 90% household in urban area. 80% households in rural area benefited for drinking water. In the same way 37% households in urban area and 20% households in rural area are benefited for using improved latrine in the

context of sanitation. As administrative record mentioned about 77% have the access for drinking water and 46% people have used improve latrine.

The plan (2007/2008-2009/2010) has also focused on the strategies and the policies for drinking water and sanitation. This has planned to pay attention for the quality of drinking with widespread access of people in the place where drinking water facilities are not available. This has also planned to initiate the sanitation program as inseparable organ of drinking water plan. Sanitation facility will be widespread by constructing the drain having purifying system in the area tending towards city and urban area and latrine of appropriate technology in rural area. This has also planned to make women participate institutionally from central level to local level for the above mentioned purpose (NPC, 2007).

Rayamajhi (2006) report of 'Rural Water Supply and Sanitation Fund Development Board' has focused on the third year of the launching of the second rural water supply and sanitation project (RWSSP-II) remained encouraging for the rural water supply and sanitation fund development board. This could be attributed largely to demand driven and participatory approach in water supply and sanitation projects implemented by the board with direct involvement of the community and transparency maintained in regard to flow of funds.

He has found the major achievement of board in 2006 were among others the inclusion and empowerment of excluded and disadvantaged groups like the indigenous people Dalits and woman and ensuring access of water supply and sanitation facility also to the population residing in the geographically remote areas.

He has concluded the health, hygiene and sanitation programme being a major component has been successful in bringing about significant change in the knowledge attitude practice and behavior of the target population in his report. Furthermore, the poor indigenous people and Dalits have been found to be in the forefront of those benefiting from the Sanitation Revolving Loan and Fund (SRLF) under the board to construct toilets. As a result, the villagers have been largely free from diarrhea and other water borne disease. Previously, they had been easy victims of those diseases due to lack of sanitation and consumption of unsafe water.

He has also concluded three years 2006 has also been able to add a new dimension to the livelihood of the target groups with women's group being able to make saving, people using time save (as a result of water supply and sanitation schemes) to run various income generating livelihood activities like vegetable farming, goat raising, shop keeping etc. in his report.

Roark (1980) on this report "Rural Water Supply and Community Participation in Nepal" focused community participation in the rural water supply and explained the mechanism of its functions. He has also stressed the women's participation for the success of rural water supply projects. The study is related with rural water supply and focused the role of women.

NCCBS, 2001 to maximize the potential impacts of improved water supply and sanitation it is vital that improved hygiene practices are also practiced washing hands critical times, such as after defecation and before eating, can do more to reduce the spread of disease than the access to safe water itself (National Census, Central Bureau of Statistics, 2001).

Vaidya in his report "present water supply situation in Lumbini zone has expressed about the quality of ground water in Kapilvastu district and use scientific technique to find out the water quality. He concluded the quality of ground water is generally good for drinking purposes. In shallow aquifers, the iron and the organic and other materials reach the ground water from the surface and cause contamination (Vaidya, 1994).

Generally financial dimension is given more focus than other in poor developing countries. Despite this fact that, many system fail to sustain because of lack of adequate finance. The reason for lack of finance is many of them the most important regions are under pricing of water and sanitations and belief that water is a social good rather than and economic good. Effective water resources management requires that water be trade as an economic good. The 1992 Dublin statement stipulates that "water was an economic value in all its competing uses and that it should be recognized as an economic good. " Debate continues over theoretical and operational implications of this concept and its impact on poor. However, now it is widely accepted that water is both social and economic good. In fact, there is need for

making it more as an economic good than social good. If one wants to sustain it with its efficient use, and decrease over –dependence on foreign assistance.

While institutional arrangement of water and sanitation intervention is of significance from the view point of sustainability more focus on institutional aspect is not the ultimate solution to sustainability of services in poor developing countries. This is evident from the practice prevailing in Nepal, Where in water user groups have been involved in planning and decision making and front line services providers are local people in most of water utility managements but many water utilities are staggering mainly because of lack of adequate financial resources. Therefore, with extensive use of the user group approach and decentralize management of water system in Nepal, the need of day is to focus on proper financial arrangement including pricing of water and improved timely collection of water tariff (Tiwari, 2008).

“Income inequality and welfare in Nepal” welfare in Nepal tries to study the poor inter VDC income inequality and welfare index by land holding and family size etc. He has used various statistical tools measures the inequalities as the Gini index, welfare index, correlation – coefficient etc. Both primary and secondary data were use to analyze income inequalities and welfare of Nepalese rural households. He concludes that welfare is more sensitive to average income than to income inequalities. So to get maximum welfare, income inequality should be minimized (Adhikari, 1994).

Nav Raj Kanal,(1993) has published an article on the Economic Journal about “Lorenz Curve and Gini Coefficient Conceptual Consideration.” The main objective of this article is to show a method of deriving the formula for calculating Gini coefficient from definition, the Lorenz Curve. The great important of this article is to show the proof of the formulation clearly and in a simplified manner. In the article, the concept of the Lorenz Curve and Gini Coefficient are very nicely and clearly examined, and formulas for the computation of the Gini coefficient are derived.

CHAPTER – THREE

RESEARCH METHODOLOGY

This section describes the research design, sample design, tool of data collection, process of data collection and data processing and analysis techniques in details.

3.1 Research Design

The research design that has been adopted for this study can be said as descriptive in nature. The research is done at Shantinagar VDC in Jhapa district. Research wants to investigate the consumption of drinking water among socio-economic characteristics at Shantinagar VDC with special emphasis on examining inequality in water consumption. The inquiry made during the field survey obviously speaks of exploratory nature of research. However this particular of research design is translated a descriptive analytical from which has been utilized during out data analysis process. The data interpretation has been interpretation has been supported by the tabular analysis followed by their explanations.

3.2 Source of Data

This study is based on both primary and secondary data. All primary data are derived from field survey, group discussion and direct field observation which are the main components of the study. The secondary data are obtained from various sectors such as books, Journals, research report, magazine, village profile, available literatures and other reliable source.

3.3 Method of Data Collection

To collect the required data and information, the head of each sampled household was interviewed. For the personal interview a pre designed questionnaire was used. When required the observation method was used. The data were thoroughly checked, edited and tabulated to the data set suitable for analysis. Data processing was performed with the help of a calculator, computer and other electronic and manual devices. Under this

study primary data will be collected from questionnaire, observation and interview, secondary data will be collected from various books, unpublished and electronic sources related with drinking water and sanitation.

3.4 Sample and the Population

Among the total beneficiaries of drinking water and sanitation project at ward no 3 of Shantinagar VDC in Jhapa District, 14 percent were selected as the sample on the basis of simple random sampling method in different cast and different standard of living of households. The actual households a beneficiaries were identified from the project office. Among the 350 beneficiary households only 50 were taken for the study purpose, which follows structured and unstructured interview.

3.5 Data Analysis

Data has been analyzed with various statistical tools which are given below.

(i) Gini Coefficient (Gc)

Gini coefficient is the measure of inequality or concentration based on Lorenz curve which is the proportion of the total area of the triangle under the diagonal that lies in the area between the diagonal and the Lorenz curve. Gini coefficient is given by

$$Gc = \frac{\text{Area between Lorenz curve and equality line}}{\text{Total area below the equality line}}$$

Mathematically,

$$Gc = \frac{1}{100} [(\sum X_i Y_i + 1) - (\sum X_i + 1 Y_i)] \%$$

Where,

Gc = Gini coefficient.

X_i = The cumulative percentage of the population in the class interval.

Y_i = The cumulative percentage of the income in the class interval.

If the value of Gc is 0 then there is no inequality and if Gc is 1, there is maximum inequality. Therefore the value of Gc is always lies between 0 and 1 or $0 \leq Gc \leq 1$.

(ii) Lorenz Curve

This is statistical tool to measure the inequality of a variable. It was developed by Max. O. Lorenz .It is a graphical representation. Lorenz curve is a special type of cumulative frequency graph known as a curve of concentration and it is useful for studying the concentration of wealth of income in relation to certain segments of the population and in similar other situation. The greater the departure of the Lorenz curve from the line of equal distribution, the higher is the concentration of the total value in a few individuals.

(iii) Range

The range of a set of numbers is the difference between the largest and smallest numbers in the set. So it shows the difference between the maximum and minimum observation of the distribution. As the value of range tends to zero, there is equality in the distribution of income and vice versa. Range is calculated by the following formula:

$$\text{Range} = \frac{\text{Max } Y - \text{Min } Y}{\bar{Y}}$$

Where, Max. Y = Maximum income

Min. Y= Minimum Income

\bar{Y} = Mean income

CHAPTER – FOUR

RESULTS AND DISCUSSION

4.4 Social Profile

Nepalese society is a layer of multiethnic groups of people living together in a community with different races, languages and cultures. Even today, the multi-racial and multi-linguistic characteristics are quite visible in the population of Nepal.

In the present study, an attempt has been made to highlight on some of the social and economic characteristics of the study area. So far as the social study is concerned, it includes households and average family size, caste /ethnicity composition and educational status. Similarly, the economic condition of the households such as sources of income and monthly income are discussed.

4.4.1 Households and Average Household Size

The total population of the 50 sampled households in the study area is 262. It was found heterogeneous society with various caste/ethnicity groups of the people, such as Brahimin, chhetri, Adibasi/Janjati and Dalit.

Table 4.1: Population and Composition

Caste group/Ethnicity	Number of Households	Population	
		Number	Percentage
Brahimin	22	116	44.27
Chhetri	14	70	26.72
Adibasi/Janjati	10	52	19.85
Dalit	4	24	9.16
Total	50	262	100

Source: Field Survey, 2013

From the above table we can see that out of total population, Brahimin represents the highest of the 44.27 percent population followed by chhetri 26.72 percent Adibasi/Janjati 19.85 percent and other Dalits are 9.16 percent. Also out of the total household 22 are of Brahimin followed by 14 of the Chhetri, 10 Adibasi/Janjati and 6 are Dalit. It can be known as that Brahimins are majority groups in the study area.

4.4.2 Age and Sex Structure

Age play an important role for human beings. Man can achieve his target in a fix time of his age. If every man actively participates in a economy, social religious and other organization then they can achieve their goals for their life. By this, not only a single man but a family, village and a country can run smoothly on a way of development. Without participating in these institutions the country always remains underdeveloped. But for active participation, the age of human beings is very important .Before 15 and after 60 it is known as suitable age for active participation. It is like a universal truth that the age between 15 to 60 is suitable for participating in every economic and other activity. If this age group did not function properly then no any country can be developed.

Table 4.2: Age and Sex Structure

Age (Years)	Male		Female		Total	
	Number	Percent	Number	Percent	Number	Percent
0-15	28	18.92	32	28.07	60	22.90
15-59	104	70.27	68	59.65	172	65.65
60 above	16	10.81	14	12.28	30	11.45
Total	148	100	114	100	262	100

Source: Field Survey, 2013

From the above table we found that the total population of 50 Households are 262 and among of them 18.92 percent male and 28.07 percent female are in between age of 0-15 while 70.27 percent male and 59.65 percent female are in between age of 15-59 and 10.81 percent male and 12.28 percent female are age of 60 or above than it.

Among the total population of 262; 56.49 percent are male and 43.51 percent are female.

4.4.3 Settlement Pattern

The settlement pattern of the study area is densely populated. The majority of private houses are made by brick and cement. There are some traditional types of houses but now the replacement of these houses, with modern houses increasing rapidly.

Table 4.3: Housing Condition of Houses

Type	Household	Percent
Pakki cement	32	64
Kachchi-stone	18	36
Total	50	100

Source: Field Survey, 2013

From the above table we found that 64 percent households are pakki cement and 36 percent households are kachchi-stone among 50 households.

4.4.4 Educational Status

Education is a better means which human beings may step in to a brighter side of life. Education is learning process. It is an acquisition of such knowledge and skill as it will help the individual to earn his/her livelihood and find a place in adult society. It is a harmonious and all round growth and development of human power of mental and physical. Education is an essential factor for the development of the society. It also helps to achieve upward mobility.

As a means it does various works for the benefit of the people. Education brings consciousness. For country like Nepal education plays vital role in developing knowledge and skill of the people. Thus education becomes one of the sources of economic development. The educational status in the study area was found satisfactory. Most of the people are positive towards the education and they think that

education is most needed. From the table below we can see the educational status in the study area.

Table 4.4: Educational Status of the Studied Population

Level	Male		Female		Total	
	Number	Percent	Number	Percent	Number	Percent
Illiterate	10	6.76	8	7.01	18	6.87
Literate	25	16.89	23	20.17	48	18.32
Primary	12	8.10	9	7.90	21	8.01
Secondary	30	20.27	32	28.09	62	23.67
SLC pass and above	71	47.98	42	36.85	113	43.13
Total	148	100	114	100	262	100

Source: Field Survey, 2013

It reveals from the above table that among total population of 262; 6.76 percent male and 7.01 percent female are illiterate. But after this 16.89 percent male and 20.17 percent female are literate. 8.10 percent male and 7.90 percent female's educational status is of primary level. Again in secondary level education there are 20.27 percent male and 28.09 percent female can be found. 47.98 percent male and 36.85 percent female are found to have obtained SLC and above level of education. In conclusion , we can know that most of the is literate in the study area. Only few people are found illiterate but most of them aged male and female who did not get chances to study at their time when they were young. All respondents think that education should be provided compulsory to their children for both boys and girls. The researchers found that most of the respondents are educated so they are interested to sent their children to the school.

4.5 Economic Profile

Economic condition of the household is the main factor to establish a good status or social prestige in the society. While discussing the general feature of the Nepalese economy, it is found that Nepal is an agriculture country. Most of the people live in the rural area and adopt agriculture as their main of livelihood. Almost two third of the total area of the country is covered by hill and mountainous region. The cultivable lands are confined in the tarai and inner tarai parts of the country. Nepal is facing

many constraints on the way of development. Geographical and topographical feature of the country presents a big barrier which have always created obstacle in the development process. In the field of industrialization, the country has not achieved significant progress. Therefore, the level of the poverty varies from village to village because of the topographical and landscape variation.

This study is basically concerned with the general economic activities of the people of the study area. Though the main economic activities of the people lie in the agriculture, salaried job, foreign employment, business and wage labor are equally important in every community. Economy plays a vital role in development of any country. The study area is located in Jhapa district and the land of this district is extremely stronger than other district of the country in the case of producing crops and other activities of development. So the people are also quite stronger in the financial and economical aspects. Because of having fertile land they are able to maintain their lives easily produce the food for their family.

4.5.1 Main Sources of Income

The economic condition of the people of the study area is satisfactory. They earn money sufficient to feed the households. Almost all the respondents are engaged in different types of occupation like agriculture, salaried job, foreign employment, business and wage labor. Besides their occupation they also have their own land. Here the researcher has tried to find out the main sources on income of respondents. It can be seen the table below.

Table 4.5: Main Sources of Income

Main Sources	Respondents	
	Number	Percentage
Agriculture	20	40
Salaried job	12	24
Foreign employment	7	14
Business	6	12
Wage labour	5	10
Total	50	100

Source: Field Survey, 2013

Here, from the above table it can be seen that for the majority of respondents 40 percent the main sources of income was agriculture. While for 24 percent income mainly comes from salaried job either in the form of private or government job. 14 percent and 12 percent income come from foreign employment and business respectively and 10 percent depended on wage labor. In conclusion, most of the people in the study area had agriculture as their main source of income.

4.5.2 Monthly Income

As mentioned before almost all of the respondents are economically strong to take care of themselves and their families; their monthly income varies in to different ranges. According to the types of the job, size of the holding and other sources of income some has their monthly income. It can be interpret from the table below.

Table 4.6: Monthly Incomes

Monthly Income (In Rs)	Respondents	
	Number	Percentage
10,000- 20,000	16	32
20,000-40,000	17	34
40,000-60,000	13	26
60,000-80,000	4	8
Total	50	100

Source: Field Survey, 2013

Here From the above table it can be seen that the majority of the respondents 34 percent had monthly income of Rs 20,000-40,000 and 32 percent monthly income was Rs 10,000- 20,000. Similarly 26 percent monthly income was Rs 40,000-60,000 and 8 percent monthly income was Rs 60,000-80,000 it is high level of income. From this, it is seen that most of the respondents economically well off.

4.5.3 Size of Land Holding

One of major causes of the people's poverty is their ownership of the land well as the ownership of the land as well as the ownership of limited quality land. Most of agriculture land is in the form of 'khet' that lays irrigated category that is very limited. Rest of the other land is the poorest of all that lies in two categories, sim and chahar of pakho. Land distribution patterns seem to be dependent upon the rank or position of the caste and ethnic status of the people. Brahmin and Chhetri caste groups have more land, and the occupational castes are found more disadvantaged than the others.

Nepal is an agriculture country where more than 81 percent of the population depends on agriculture for their food . In the case of Nepal, if any person has a large amount of land and sells his agriculture products, he/she is known as a prestigious person. His political social and economic status is ranked high in the society. But on the other hand, poor people who do not have sufficient land for their daily life they are known as lower class poor people so they have to process their life with extreme poverty. At first in the Terai area of eastern Nepal like Jhapa and other districts there was a affect of malaria so people do not want to live there but, after the eradication of malaria, people from hilly area started to migrate in these place and settled there and till now it has become the highly populated area. In the study area almost all people are owner of their own land and they don't have the problem of land to mouth except few. They have either in big or small size of land. By the table below some interpretation can be made.

Table 4.7: Size of Land Holding

Size of Land (bigha)	Households	
	Number	Percentage
0-1	9	18
1-2	15	30
2-3	16	32
3-4	4	8
4-5	4	8
5 or more	2	4
Total	50	100

Source: Field Survey, 2013

The above table shows that out of total 50 households. All of them have their own land and no respondents were found landless .Here we can see that 9 respondents (18 percent)own land between 0-1 bigha.15 respondents (30 percent) own between 1-2 bigha. 16 respondents have 2-3 bigha. 4 respondents has 3-4 bigha, again 4 respondents has 4-5 bigha and only 2 respondents (4 percent) has 5 bigha or more land.

Table 4.8: Inequality on Water Consumption

Quintile	Mean	Std. Dev	Min	Max
Lowest	345.00	76.19	250.00	500.00
Second	372.73	100.91	200.00	550.00
Third	430.00	100.55	300.00	600.00
Fourth	470.00	46.84	450.00	600.00
Top	533.33	93.54	350.00	650.00

Source: Field Survey, 2013

The above table shows that, inequality on water consumption among different income groups. Out of the five income groups, lowest income group consume average 345 l water per day. It is low level of water consumption. While second income group’s consumption of water is average 372.73 l per day. Third and fourth income groups consume average 430 l and 470 l respectively per day. Top income group’s consumption of water is high. They consume average 533.33 l water per day.

Lorenz curve is graphical method which shows the inequality in income distribution. It shows the difference between actual distribution and equal distribution of income. In this method, degree of inequality is indicated by the area of concentration which is the area between equal distribution and Lorenz curve. The higher the area of concentration, the greater is the inequality and vice-versa.

Table 4.9: Income Quintile

Quintile	Gini Coefficient
-----------------	-------------------------

Lowest	0.109
Second	0.144
Third	0.123
Four	0.035
Richest	0.088
Overall	0.139

Source: Field Survey, 2013

This table shows inequality among the quintiles of population in water consumption. There is higher inequality in second quintile (0.144) and lowest inequality in fourth quintile (0.035). From above table the overall inequality on water consumption is 0.139.

4.6 Distribution of Water Consumption

The study has found distribution of water consumption in Shantinagar VDC of Jhapa districts is in equal according to household's characteristics such as different ethnic groups, family size and size of the land holdings. These all characteristics and water consumption patterns are shown in tables below;

Table 4.10: Consumption of Water among Different Ethnic Groups

Caste	Average Daily Consumption of Water
Brahimin	400 l
Chhetri	515 l
Adibasi/Janjati	360 l
Dalit	325 l

Source: Field Survey, 2013

From the above table, out of the four ethnic groups, Chhetri consume average 515 l per day. It is highest level of water consumption than other ethnic groups. While Brahmin's consumption of water is average 400 l per day and Adibasi/Janjati consume average 360 l. Dalit consumption of water is lowest. They consume average 325 l water per day.

Table 4.11: Consumption of Water among Different Income Groups

Monthly Income in Rs	Average Daily Consumption of Water
10,000-20,000	300 l
20,000-40,000	350 l
40,000-60,000	450 l
60,000-80,000	500 l

Source: Field Survey, 2013

Here, from above table, water consumption of Rs 60,000-80,000 income group is high. they consume average 500 l per day. While Rs 40,000- 60,000 income group water consumption is average 450 l per day and Rs 20,000-40,000 income group is average 350 l per day. Rs 10,000-20,000 water consumption is lowest. They consume average 300 l water per day.

Table 4.12: Consumption of Water among Different Family Size

Family Number of Households	Average Daily Consumption of Water
2-4	300 l
4-6	350 l
6-8	450 l
8-10	500 l

Source: Field Survey, 2013

Here from above table. It can be seen that water consumption of 8-10 family number of household is high. They consume average 500 l per day. While 6-8 family number of household water consumption is average 450 l per day and 6-4 family number of the household is average 350 l per day. 2-4 family number of the household water consumption is lowest. They consume average 300 l per day.

Table 4.13: Consumption of Water among Different Size of Land Holding

Size of the land (bigha)	Average Daily Consumption of Water
0-1	300 l
1-2	350 l
2-3	400 l
3-4	425 l

4-5	450 l
5 or more	450 l

Source: Field Survey, 2013

The above table shows that water consumption of land owner between 4-5 and 5 or more bigha is equal. They consume average 450 l per day. While land owner between 3-4 bigha is average 425 l per day. Land owner between 1-2 and 2-3 bigha water consumption is average 350 l and 400 l per day respectively. Water consumption of land owner between 0-1 bigha is lowest. They consumed average 300 l water per day.

CHAPTER – FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter comprises the summary, conclusion and recommendation. The first two sections highlight the overall situation of socio and economic characteristics of study area. The recommendation sectors provide distribution of water consumption according to household characteristics.

5.4 Summary

The major objectives of the present was to focus on examining inequality in water consumption of Shaktijhoda drinking water project in Shantinagar VDC of Jhapa district. The main aspects studied included socio and economic characteristics of respondents, distribution of water consumption of study area and examine the cost effectiveness of drinking water provision according to the different type of connections. Method of the data collection comprised participant observation, unstructured as well as structured questionnaire interviews. Many secondary sources have also been used to support and strengthen the findings of this research. The data and information have been analyzed descriptively.

The major findings of the study are summarized as follows:

- Most of the people in the study area are Brahmin followed by Chhetri, Adibasi/Janjati and Dalit
- The people are well educated. They give more priority to the education of their children both male and female.
- Most of the people are engaged in economic activities. Their average monthly income is Rs 31,000. Their main sources of income are agriculture, salaried job, foreign employment etc.
- Almost all people have their own land from which they can feed their household for the whole year.
- Distribution of water consumption is unequal among different income groups, ethnic groups, family size and size of land holdings.

- This study has proved that the consumption of water in high income grouped is high than low income grouped.
- Consumption of water in Chhetri is higher than other groups found in Shantinagar VDC they belong to high class family having better income and land holding size.
- This study has also proved that, the consumption of water in large family size is higher than small family size.
- This study has proved that the consumption water is in equal among different size of land holdings. Who have more land their consumption of water is high.
- Before the initiation of present drinking water supply projects, people of the study area used to get water from tubewell, well and kuwa.
- Although, the people had to spend more than 10 to fetch water before the initiation of this project, the water was not safe for drinking and cooking.
- The people of the study area have observed significant changes after the initiation of this project especially for safe water for drinking and cooking.
- The people are fully satisfied with drinking water supply projects of Shantinagar VDC of Jhapa district because of sufficient water and minimum cost.
- People from all backgrounds e.g. rich , poor upper castes and lower castes are participating in this project.
- People of the study area are getting water more than 15 hours daily and the water supply is always regular except on the days of treatment of the water.
- Technical problems however occurred frequently in the taps of the consumer especially pipe leakage the consumer then complain to the project's technicians for maintenance.
- People of the study are satisfied with the present water users' committee, which is framed by them election. They are also satisfied with the present cost of the water use.

5.5 Conclusion

Water is fast becoming a positional commodity distributed inequality amongst co-users falling under the same supply regime, even in Nepal that boasts of its vast water resources. Ismail Serageldin, The world Bank Vice- Chairman, says 'Many of the wars of the centuries were about oil, but wars of the next centuries will no be over water (ITN, 1995:1)

From this study we concludes that, there is high inequality in the distribution of water consumption in Shantinagar VDC of Jhapa district. In this VDC charge of the water use for poor, rich, low cast family and high cast family is equal. The drinking water corporation collects Rs 60 monthly as per the tax but the economic burden is greater to the poor and low cast family. This proves that richer can pay such amount easily because low income poor and low cast family cannot pay such amount in easy way. because of income, there is in equal distribution of paying all though it is fixed by the water corporation for the tax.

5.6 Recommendation

Drawing on the major findings and conclusion of this study, the following recommendations are made:

5.6.1 Recommendation for Improvement

- The present water user's committee should continue the trend of its progress made so far.
- The project should be made easily accessible to the poor and low cast people by reducing the charge of water use by the committee.
- For the shake of getting equity the project should charge its tariff rate on the basis of residence on the community, because if income of the people is high then such people tend to live on quite developed area so comparatively tariff rate should be higher level for them.
- The user's committee should be strengthened with even more appropriate motivational and training programs to the confidence among them. The training related to the operation and maintenance of the water supply is essential for the sustainable operation of the project.
- The committee should be capable of controlling the water leakage.
- The operation cost of the water supply project should be reduced by employing the skilled manpower in the project.

- The committee should increase the present pipe- line coverage and water tank capacity keeping in the mind the process of rapid urbanization in the study area.

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**Questionnaire about examining inequality in drinking water system of
Shantinagar VDC**

Name of the Household Head:

Date:

VDC:

Age:

Caste:

Ward No:

1) Detail information of family:

S.N.	Name	Age	Sex	Education	Occupation	Religion
1.						
2.						
3.						
4.						
5.						

Codes:

Code	Caste
1	Brahmin
2	Chhetri
3	Adibasi /Janajati
4	Dalit

2) Housing condition of your house?

i) kachchi- stone ii) pakki-cement iii) others

3)How much land does your family have?

i)Bigha ii).....katha iii)Dhur

4) What is your total income last month?

Rs.....

5) How much average monthly expenditure is there in your family?

Rs.....

6) How much average monthly saving is there in your family?

i) saving

ii) loss

7) Do you have Radio in your home?

i) Yes

ii) No

8) Do you have Television in your home?

i) Yes

9) Do you have Telephone/mobile in your home?

i) Yes

ii) No

10) Do you have toilet in your family?

i) Yes ii) No

11) Which type of toilet do you have in your family?

i) kachchi

ii) Pakki

12) What is the main source of drinking water in your house?

i) Hand-pump ii) pipe-line iii) well iv) rivers

13) Have you done the arsenic test on your water source?

i) Yes

ii) No

14) How much is your daily consumption of water in your house?

Lt.....

15) How do you consume the above mentioned amount of water?

i) drinking ii) washing iii) irrigation iv) other

16) How do you pay charge of your water?

i) fixed rate ii) on the basis of monthly bill

17) How does approximate charge do you pay per month?

Rs.....

18) What type of drinking water source that is used by your family?

i) private tap ii) partnership tap iii) public tap

19) How much distance do you have to cover get drinking water?

i) less than 10 minutes ii) 10 to 30 minutes iii) 30 minutes above

20) How many hours do you get water supply per day?

i) less than one hour

ii) 5 to 10 hours

iii) 10 to 15 hours

iv) More than 15 hours

21) How much storage cost of drinking water?

Rs.....

22) How much initial cost of drinking water ?

Rs.....

23) Are you satisfied with the present water supply?

i) Yes ii) No

* if yes, why? i) safe water ii) sufficient amount of water iii) time save iv) others

* if no, why? i) costly ii) irregular supply of water iii) lack of quality iv) others

24) Since how long you have been operating using this project ?

Years.....

25) Do you have any comments suggestions regarding this project ?

i) Yes ii) No

* if yes, please mention.....?