# ADDIS ABABA UNIVERSITY
# SCHOOL OF GRADUATE STUDIES
# COLLEGE OF DEVELOPMENT STUDIES

## FACTORS AFFECTING SUSTAINABILITY OF RURAL WATER SUPPLY SCHEMES IN BASSO LIBEN WOREDA, AMHARA REGION

**A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Masters (MA Degree) in Development Studies, Rural Livelihood and Development**

**BY:**

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**June, 2009**

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## *Title*

## *Factors Affecting Sustainability of Rural Water Supply Schemes in Basso Liben Woreda, Amhara Region*

**By**
***Aklilu Getinet***

**DEVELOPMENT STUDIES**

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## ACKNOWLEDGEMENTS

*I thank the Almighty God for "Through Him all things were made, with out him nothing was made that has been made"* **(John 1:3).** My parent who has always been the source of my initiation and aspiration for success also deserves credit.

I would like to express my deep gratitude to Dr. Mulugeta Fesseha, my advisor, with out his invaluable counsel; the production of this thesis would not have been possible. I have sincere appreciation for his encouraging, constructive and very democratic approaches for advising. I would like also to thank Dr. Belay Semane, who greatly assisted in refining of the research topic and the research proposal.

I am very obliged to and wish to express my thankfulness to ERCS, East Gojjam Branch Board and staff, Ato Anemaw, Dr. Ezekiel and Ato Esubalew who pay the necessary costs of my stay in the college.

Yet, I would like to express my heart felt gratefulness to Senhiwot, Telahun, Selish, Nebrte, Mussie, Mengestu, Fekadu, Gedeno and Jebessa who in one way or another supported me. My special gratitude goes to my wife Masetwal whose consent support and encouragement was with me during my stay in the university.

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## List of Acronyms

| | |
|---|---|
| AMCO: | Africa Ministers' Council on Water |
| ANRS: | Amhara National Regional State |
| BLWHO: | Basso Liben Woreda Health Office |
| BoWMRD: | Bureau of Water and Mines Resources Development |
| BoH: | Bureau of Health |
| BOI: | Bureau of Information |
| CBO: | Community Based Organization |
| DFID: | Department for International Development |
| E.C: | Ethiopian Calendar |
| EEA: | Ethiopian Economic Association |
| ETB: | Ethiopian Birr |
| FGD: | Focus Group Discussion |
| HDW: | Hand Dug Well |
| HH: | House Hold |
| IDRC: | International Development Research Centre |
| IDWSSD: | International Drinking Water Supply and Sanitation Decade |
| IRC: | International Water and Sanitation Centre |
| KII: | Key Informant Interview |
| MDG: | Millennium Development Goal |
| MoFED: | Ministry of Finance and Economic Development |
| MoH: | Ministry of Health |
| MoWR: | Ministry of Water Resources |
| NGO: | Non Governmental Organization |
| O & M: | Operation and Maintenance |

| | |
|---|---|
| ODI: | Oversees Development Institute |
| PASDEP: | A Plan for Accelerated and Sustained Development to End Poverty |
| RWS: | Rural Water Supply |
| RWSS: | Rural Water Supply Scheme |
| SD: | Standard Deviation |
| SIWI: | Stockholm International Water and Sanitation Institute |
| SSA: | Sub Saharan Africa |
| UNICEF: | United Nations Children's Fund |
| UNSECO: | United Nations Science, Education and Culture Organization |
| UNDP: | United Nations Development Program |
| WATSAN: | Water and Sanitation |
| WB: | World Bank |
| WEO: | Woreda Education Office |
| WHO: | World Health Organization |
| WoFP: | Woreda Office of Finance and Plan |
| WSD: | Water Supply Development |
| WSDP: | Water Sector Development Program |
| WSS: | Water Supply Scheme |
| WSSA: | Water Supply and Sewerage Authority |
| WSSP: | Water Supply and Sanitation Program |
| WWRDO: | Woreda Water Resource Development Office |

## Glossary of Some Terms

***Bega:*** Dry season in Ethiopia

***Dega:*** An area with an altitude 2,300 to 3,000 meters above sea level, and relatively high level of rainfall

***Got:*** Village in the study area

***Idir:*** Voluntary community based organization formed mainly for funeral purpose

***Kebele:*** Government's smallest administrative unit

***Kirmet:*** Wet or rainy season in Ethiopia

***Kolla:*** An area characterized by an altitude of 500 to 1,500 meters above sea level, low level of annual rainfall and hot temperature(20-30 °C)

***Woreda:*** District level of government's administrative unit

***Woyena Dega:*** An area with an altitude of 1,500 to 2,300 meters above sea level, relatively moderate level of rainfall and temperature (15-20°C)

***Wurech:*** An area characterized by an altitude greater than 3,000 meters above sea level, with very low temperature and high rainfall

***Zone:*** Government's administrative structure next to region.

## Operational Definition of Terms

In order to avoid confusion in the meaning of words used in the thesis, operational definition of some terms is described below.

**Community:** refers to a group of households living in a particular area that share a water supply system.

**Community Management:** refers to the capacity of the community to control or at least strongly influence the basic decisions over the construction and management of the water supply system (Musonda, 2004:11)

**Developed or Improved Water supply:** a water source (spring, well, etc) which was constructed by qualified people and protected from any possible contamination

**Functionality:** refers to the state of water supply scheme that was not stopped to provide service because of some technical or administrative defects at the time of survey.

**Operation and Maintenance:** refers to mechanisms put in place for effective management and repair of water supply facilities (Musonda, 2004:11).

**Participation:** refers to any contribution of the rural community to the development, operation and management of water supply.

**Rural Water Supply Scheme:** refers to water supply facilities put in place in rural areas that include developed springs, protected hand dug wells, shallow wells or deep wells or bore halls.

**Rural Water Supply:** provision of potable water to the rural community through the construction of water supply schemes.

**Sustainability:** refers to the provision of safe and adequate water supply facilities at a reasonable cost on a long term basis. Specifically, sustainability in rural water supply is the continuance of project benefits after the termination of the project (Asuguide, 2003:51).

**Traditional Water Source:** refers to any water source used by the rural people for domestic purpose which is not properly constructed by qualified people to protect from any possible contamination

**User Fee:** Payments charged in rural area for water supply service.

**Water Committee:** Elected members of the community who are responsible for the overall management of developed rural water supply schemes. Their number is about seven and at least two of them are females.

**Water Supplying/Implementing Agencies**: refers to institutions which support in the provision of water supply to the rural community through financial, material, technical etc assistances.

**Water supply:** refers to human use of water such as drinking, water for livestock use, water for industrial use, and water for municipal use (MoWR, 1999: IV-V).

## Abstract

*Sustainable access to safe and adequate WS in the rural areas of Basso Liben woreda is very marginal. Efforts made so far towards ameliorating the situation are threatened by system failures to provide service as intended. Hence, this study has attempted to identify factors that affect sustainability of WSSs in the study area. To this end, a cross-sectional descriptive study was conducted in 3 selected kebeles using a pre-tested structured questionnaire in a total of 101 household beneficiaries chosen by simple random sampling from six water points. Data was also obtained from 12 FGDs and 23 physical site observations. Both quantitative and qualitative methods of data analysis were employed. In due course, the study revealed the following results. First, in the rural settings of Basso Liben woreda traditional sources are found to be the main source of drinking water. The total time, 24.6 minutes, required for water collection and 10.71 liters of water per capita consumption was also different from the WHO standards. More than 35.5% of developed water points were not functional and 87.1% of the respondents have experienced non functionality problem since the schemes get underway. Second, 97.0% of the surveyed households didn't have demand for improved WS prior to construction, 88.2% didn't participate satisfactorily during the planning phase and the involvement women at any stage of the WSD was very limited. Besides, the water committees were not capable of managing the system properly and communities have weak or no sense of ownership to the developed water supply facilities. Specifically, conflict among members of the committee and lack of transparency, accountability and commitment are the major indicators to problems related with local water management board that affect sustainability of the system .Lack of adequate training and follow up from implementing agencies, lack of power to enforce rules, lack of incentives, and absence of working manuals are also identified as major problems that constrained the water committees from managing their schemes properly. Third, all capital costs are covered by implementing agencies and the user fee required for operation and maintenance has not been collected. In the study area, communities are able and willing to pay for the WS service. However, inability to raise adequate fee, misuse of the collected fund, and lack of proper book keeping and saving are found to be the major financial threats to the sustainability. Fourth, failure to consult beneficiaries in technology choice, lack of community skill required to operate and maintain the schemes properly because of absence of trained local technicians, unavailability of tools and spare parts either at woreda or community level and poor construction quality are found to be major technological threats to sustainability of RWS in the study area. Fifth, the institutional capacity of the leading office is limited and the external support service given to the community from implementing agencies to effectively manage their water systems is found to be inadequate. Therefore, the findings call for adopting demand responsive approach, strengthening community participation, building community capacity to manage WSSs properly, establishing effective user fee collection system, developing trusted and transparent system of funds management, choosing appropriate technology, building local technicians' capacity, minimizing problems related with availability of spare parts, improving construction quality as well as strengthening the capacity of the leading office at woreda level to support rural communities in managing water supply.*

# CHAPTER ONE

## 1. INTRODUCTION

### 1.1. Background

Sustainable access to safe and adequate drinking water is a basic need and human right. Thus, access to potable water is a crucial human development goal, for millions of people not having the service is a daily source of indignity as well as a threat to wellbeing. Subscribing to this, Bruno Jean Richard ITOUA, Minister of Energy and Water of the Congo, states that water is not just vital for health. It is also an investment with economic return contributing to social development and to the conservation of the environment (UNDP, 2006; AMCO, et al., 2008: v).

On the other hand, the absence of reliable water supply facilities and inadequacies in these services contribute to a poor food security and has been the main cause of deaths of millions of children (Kingo, 2005; Mengesha, 2002:1). Studies revealed that more than two million people die every year from water related diseases. Every fifteen seconds a child dies of the same reason. Sanitation related diseases kill 5000 children every day, five times the number of deaths from HIV/AIDS (MoWR, 2008:3). In other words, without basic sanitation the benefits of access to clean water supply are diminished and the health, gender and other inequalities associated with sanitation deficient systematically undermine progress in poverty reduction. Hence, access to safe and adequate water supply and sanitation is repeatedly shown to be a key intervention to improve health, education and environmental outcomes – and therefore, alleviating poverty. For this reason, safe drinking water supply has always been one of the highest priorities of governments.

The International Drinking Water Supply and Sanitation Decade (IDWSSD) was launched with an objective of providing safe and adequate water

supply to all people in the world by the year 1990. To this end, different programs at all levels (global, regional and national, and local community level) have been designed, required resources were allocated and implemented. Besides, one of the Millennium Development Goals, promulgated by the United Nations in 2000 is to halve the number of people who are unable to reach or afford a safe water supply by 2015(Dagnew, et al., 2007:iv).

Despite its crucial benefits and efforts made globally, supply of safe drinking water is far below its demand. At the beginning of 2000, 1.1 billion people of the world's population was without access to improved water supply and two fifth (2.4 billion people) lack access to improved sanitation (IRC, 2004). Currently, as reported by MoWR (2008:4) and SIWI (2008:2) over one billion people in the world use unsafe drinking water and 2.6 billion people have nowhere to go to the toilet.

According to World Bank (2004) report, about two of every ten people in the developing world were without access to safe water; five out of ten often live without adequate sanitation. Similarly, the UNDP (2006) Human Development Report indicated that the proportion of the population with sustainable access to improved water supply in Less Developed Countries is 79 %.

In SSA, the proportion of the people with access to potable water supply and adequate sanitation is 56% and 37% respectively (UNDP, 2006). AMCOW, et al. (2008: vii) indicated that 300 million Africans who did not have access to basic sanitation in 2002 have increased. Therefore, if the current trend continues, by 2015 Africa will end up with 91 million unserved than 2004. Further, if the situation is not improved, 500 million Africans will be likely to be without adequate sanitation by the year 2020, given the current rate of population growth (AMCOW, et al., 2008: vii).

The problem of low level of water coverage is more sever in rural areas than urban. For example, out of the 300 million people who have no access to

safe drinking water in SSA, 80 % live in rural areas (WB, 2004). Besides, poor women have especially difficult time obtaining safe, affordable and adequate water facilities (Khosia, 2003).

According to Dessalegn (1999:14), the great majority of Ethiopians use unsafe and polluted water and as a result are commonly exposed to large variety water-borne diseases. To put it differently, the estimated water service level of Ethiopia in terms of coverage, quantity, quality and reliability is among the lowest in the world (MoWR, 2008:6). Only 22% of the population has access to safe drinking water and 13 % for improved sanitation facilities (UNDP, 2006).Due to the unsustainability of safe and sufficient water supply facilities the estimated service level could be in a much worst situation.

Hence, if we don't act and address the water crises, we will not achieve the Millennium Development Goals in general. This is because, water is significantly inter linked with child mortality, maternal health, primary education, gender, equality, poverty reduction, hunger and environmental sustainability (SIWI, 2008:2).

## 1.2. Statement of the Problem

Water supply is essential for a healthy productive life. It is intrinsically linked to poverty reduction, and measurable improvement in health, social and economic status of the population. Conversely, lack of safe drinking water contributes to the terrible global death toll. Hence, the provision of potable water supply has been a key development goal. Despite its significance, the estimated water supply service level of Ethiopia is among the lowest in the world (UNDP, 2006).

According to world development report, only 22 percent of the total population of the country had access to safe and adequate water supply compared to 30%, 60%, and 77% in Kenya, Uganda and Tanzania respectively (UNDP, 2006). The 2008 WHO/UNICEF report cited in

Teshome (2008:4) also confirmed that the proportion of people who have access to safe drinking water in Ethiopia is only 42% compared to 57%, 70% and 58% for Kenya, Sudan and SSA respectively. Since, most of the population in the country does not have the privilege to improved water supply and sanitation 80 to 90% of the top ten diseases are caused by contaminated water and food (Gebre Emmanuel and Melkamu, 2003).

Further, in the rural areas of Ethiopia water supply coverage is very marginal. Next to Somali (21.5 %) and Harare (29%), Amhara rural areas with 36.6% water supply coverage have great number of nonfunctioning schemes in Ethiopia (MoWR, 2006).

A study conducted by the Amhara Regional Water and Mines Development Bureau in 2005 indicated that water supply service coverage of East Gojjam *zone* and Basso Liben *woreda* was 20.6% and 17.5% respectively. As of the researcher's experience in community development activities in the study area, the last eight years, effort made to improve the rural water supply situation is even more challenging when it comes to the issue of sustainability.

In support to this the 2005 survey findings revealed that, in East Gojjam *zone* 30.54 % of water supply schemes were not sustainable. For Basso Liben *woreda* out of the total 65 rural water supply schemes, the majority 36(55.38%) were not sustainable, only 26 (40%) were found to provide continued service, and the remaining three had been under construction. Therefore, failure in sustainable use of rural water supply facilities has been a critical problem in the study area (BoWMRD, 2005:18).

Besides, factors affecting the continued use of the outcome of rural water supply projects in the background of limited resources are not adequately and systematically studied in the area. As a result, the reasons behind failure to the continued functioning of rural water supply schemes have not been clear. Hence, it seems that there is a lot to be done in the area of

rural water supply sector and problems related to the sustainable use of the benefits.

Moreover, the high number of water supply schemes falling out of use threatens sustainability of the rural water supply and if unchecked, the chance of achieving the Millennium Development Goal to half the portion of people without access to this basic service by 2015 will be seriously lowered (MoWR, 2008:3).

In short, there are three main reasons that initiated the researcher in choosing the problem for investigation. First, having worked in the field of community development activities in the study area, he observed that many water supply schemes were falling into disuse at high rate and wanted to identify factors that lead to this problem. Second, the limited available resource invested in rural water supply goes to waste when projects failed to provide intended benefits. Third, when water supply facilities are not sustainable, the number of people having access to the service reduced. On top of these, review of inventory findings and reports of the study area indicated that factors related to sustainable use of rural water supply schemes has been a problem which requires academic research (BoWMRD, 2005:17).

In view of the above, this study was designed to investigate factors that affect sustainability of rural water supply facilities in Basso Liben *woreda*, Amhara Region.

## 1.3. Objective of the Study

The main objective of the study is to identify factors that affect sustainability of rural water supply schemes in Basso Liben *woreda*.

In its specific form the study attempted to address the following objectives.

- To assess the existing status of water supply in the rural setting of Basso Liben *woreda*.
- To identify the degree of community participation.
- To find out financial factors that affect sustainable utilization of rural water supply facilities.
- To assess technical factors that affect sustainability of rural water supply.
- To identify institutional support system related problems to the continued use of rural water schemes in the study area.
- To recommend the way forward for sustainable water supply in the study area.

## 1.4. Research Questions

The study has attempted to answer the following basic questions.

1. What is the existing status of rural water supply in Basso Liben *woreda*?
2. To what extent do women in particular and the communities in general have been involved in rural water supply project management?
3. What are the major financial related factors that affect the continued use of rural water supply in the study area?
4. Are there technical related problems to the sustainable use of rural water supply schemes in Basso Liben *woreda*?
5. What are the institutional support related problems that influence the continued use of rural water supply facilities?
6. What should be done to ensure sustainable use of rural water supply schemes in the study area?

## 1.5. Significance of the Study

Improving access to safe drinking water supply requires ensuring the continued use of water supply schemes put in place. Failure in sustainable use of these services, on the other hand, hampers development and intensifies poverty.

Given this state of affair, a study on factors related to sustainability of rural water supply is one important area of development research. As sustainable development is unthinkable without sustainable utilization of resources and outcomes, the study could have the following significances.

It may identify factors that affect continued use of rural water supply facilities in the study area. Hence, the lessons drawn from the study may contribute to current efforts by the Government, Non government organizations and other stake holders to find better policy options to address problems related to sustainability of rural water supply programs/projects.

The findings of the study may help in filling the gaps by identifying the factors that affect sustainability of rural water supply in Basso Liben *woreda* and further enrich the knowledge on the issues contributing to proper and continued functioning of rural water schemes.

The results of the study may also serve as baseline information for those who are interested in conducting in-depth research in the study area in relation to sustainability of rural water supply.

## 1.6. Scope and Limitation of the Study

The study specifically focuses on assessing factors that hinder sustainable use of rural water supply facilities in Basso Liben *woreda* of Amhara Region. In other words, the study is delimited to rural areas of a single

*woreda*. Because of its relatively better water supply coverage and functionality the study did not include water supply schemes in Yejube town. Hence, the results and findings on the problem are the reflection of the study area which is difficult to replicate to other areas of the region. However, it may reflect problems in other areas or *woredas* with similar characteristics.

Besides, sustainability of rural water supply is a multidimensional and dynamic concept which is the result of interaction of various factors. Thus, the scope of this study didn't go into the details of these interrelated factors rather it is restricted to major ones. It specifically focused on major factors related to community participation, financial, technical and institutional support system related issues.

## 1.7. Organization of the Study

The study is divided in to six chapters. Chapter one is introduction which contains the background, statement of the problem, objectives, research questions, significance of the study, scope, limitation, and organization of the study. Chapter two provides review of related literatures. Chapter three comprises methodology which includes: area description, research strategy, sampling design, data source and type, methods of data collection and data analysis. Research findings are described and discussed in chapter four. The fifth chapter deals with the conclusion. The way forward to achieve sustainable rural water supply in the study area is presented in chapter six.

# CHAPTER TWO

## 2. LITRATURE REVIEW

The aim of this chapter is to provide theoretical and empirical evidences which help to give a summary of authentic and relevant literature on the problem under investigation. It is divided in to six sections which are structured under ten sub topics. The first section looks at the concept of sustainability of rural water supply facilities in particular. The second section presents the need for rural water supply. The two major approaches to rural water supply are discussed in the third division. Then management approaches to rural water supply are looked at in the fourth section. The fifth section focuses on critical factors that influence sustainability of rural water supply schemes. Finally, policy and status of water supply in Ethiopia are briefly presented.

### 2.1. The Concept: Sustainability of RWS

Sustainability in the context of rural water supply refers to the provision of safe and adequate water supply facilities at a reasonable cost on a long term basis. Specifically, sustainability in rural water supply is the continuance of project benefits after the termination of the project (Asuguide, 2003:51; Mengesha, 2002:14; Zelalem, 2005:14).

In other words, sustainability in rural water supply is achieved when the benefits of the services are continuing indefinitely in reliable manner at a level genuinely acceptable to the community it serves and close to the design parameters; without an unacceptable level of external management, technical or financial support. It gives attention to proper functioning of the system in providing services for a long period of time for intended beneficiaries with some form of support to users (IRC, 2003:2).

In sum, sustainability in rural water supply refers to the capacity of the project to deliver the flow of benefits of the outcomes from the activities with or without the program that stimulated the benefits at the first place. Keeping water supply projects sustainable, on the other hand, requires attention to a range of managerial, financial, technical, environmental, institutional, socio-cultural and political issues.

## 2.2. The Need for Water Supply

Access to safe drinking water supply is essential to health, a basic human right and an integral component, both a means and an outcome of socioeconomic development of a nation. To put it differently, improved water supply is intrinsically linked to poverty reduction, and a measurable improvement in health, social and economic status of the population (AMCO, et al., 2008: Vii; Pickford, 1991:69; WHO, 2004). Without water, Pickford (1991:69) states human dies within few days from dehydration and death tends to be higher and life expectancy lower in areas with poor water supply. So, drinking water is precious commodity (Panchdlari, 1995:42).

There may be a combination of reasons for developing a community water supply that could be divided into two broad categories: improvement in social and economic conditions and health benefits (Davis, et al., 1993; 9).

Regarding social and economic gains, the introduction of improved water supply has welfare benefits, particularly when time and energy spent on water collection is reduced. This could reduce the work load of women, which is often very heavy, as they are usually responsible to these tasks. The review of related literature indicated that these benefits differ considerably between and within households, depending on environmental conditions, the age and position of women in the house hold, and socioeconomic class (Davis et al., 1993:9; IRC, 2003:2).

As of the health benefits, the majority of infectious diseases in developing countries are related to water in some way (Davis et al., 1993:10). Hence, water and sanitation related diseases are responsible for most of the morbidity and mortality in developing countries. The use of more water of improved quality and safe method of excreta disposal, adequate personal hygiene, and food hygiene by all members of the community can lead to significant reduction in these diseases. The measures can also decrease considerably the economic cost of these diseases for individual household and for governments and reduce the human suffering associated with them (IRC, 2003:3; MoWR, 2008:3). In other words, the best way of combating a high incidence of diseases and associated economic losses from cost benefit and cost effectiveness point of view are the provision of safe drinking water, the practice of food hygiene and the sanitary disposal of excreta (Gebre Emanuel,1984:9).

Therefore, the importance of water, sanitation and hygiene for health and development has been reflected in the outcomes of series international policy forms. These have included water-oriented conferences such as in Mar del Plata, Argentina, which launched the Water Supply and Sanitation Decade of 1981-1990, as well as the Millennium Development Goals adopted by the General Assembly of United Nations in 2000 and the outcomes of the Johannesburg World Summit for Sustainable Development in 2002. Moreover, the United Nations General Assembly declared the period from 2005 to 2015 as International decade of action, "Water for Life" (WHO,2004).

## The Dublin principles, 1992

**Fresh water is a finite and vulnerable resource, essential to sustain life, development, and the environment.**

Since water sustains life, effective management of water resources demands a holistic approach linking social and economic development with protection of natural system.

**Water development and management should be based on a participatory approach involving users, planners, and policy makers at all levels.**

The participatory approach involves raising awareness of the importance of water among policy makers and the general public. It means decisions are taken at the lowest appropriate level with a public consultation and involvement of users in the planning and implementation of projects.

## Women play a central part in the provision, management, and safeguarding water.

The pivotal role of women as providers and users of water and guardians of the living environment has seldom been reflected in institutional arrangement for the development and management of water resources. Acceptance and implementation of this principle requires positive policies to address women specific needs and to equip and empower women to participate at all levels in water resource management, including decision-making and implementation, in ways defined by them.

**Water has an economic value in all its computing uses and should be recognized as an economic good.**

With in this principle, it is vital to recognize first the basic right of all human beings to have access to clean water and sanitation at an affordable price. Past failure to recognize the economic value of water has lead to wasteful and environmentally damaging uses of the resource. Managing water as an economic good is an important way of achieving efficient an equitable use, and of encouraging conservation and protection of water resources (DFID cited in Mengesha, 2002:10).

## 2.3. Approaches to Rural Water Supply

There are two approaches to rural water supply: Basic Needs/ Supply Driven Approach and Demand Responsive / Driven Approach.

### 2.3.1. Supply Driven or Basic Needs Approach

Under a basic needs approach to rural water supply governments and / or donors provide a minimum level of improved water service to as many people as possible. This is a traditional or top down approach of service delivery where the needs and preference of the community are centrally decided by government official who have little or no contact with the intended beneficiaries of the project / program. This approach is based on a consensus, since 1970, that governments and donors should alleviate poverty in rural areas through providing basic needs such as safe drinking water, which was largely free at least in capital costs (Kleemer, 1995:1).

The basic needs driven approach had been adopted for its own elements that were taken to extend water level in developing countries. The first element is that donors and governments provide with minimum level of improved water service with available funds. The second one was to build up the capacity of government agencies so as to enable them appraise, implement and manage schemes. And the third one was providing subsides to rural water supply (Kleemer, 1995:5; Alemu, 2006: 32).

The conventional top down approach, however, has missed to mark often for the following reasons. First, the technologies adopted were too complex to be used by the rural people. Second, the amount of money the approach required had been too much. Third, rapid rural population growth made efforts to increase service coverage, by water supplying agencies with out the involvement and participation of communities, even more difficult. Finally, in too many cases, there were problem of keeping existing systems to continue functioning. Consequently, there were doubts both about the prospects of sustaining schemes that have been built and about extending

services to those still unserved, unless a different approach is taken (Briscoe and de Ferranti, 1988: 5).

### 2.3.2. Demand Driven Approach

By the early 1990s, World Bank (WB) had officially adopted the Demand Driven Approach to water supply. This approach was adopted in order to correct short comings of the basic needs or supply driven approach i.e. insufficient coverage, high cost, and poor utilization (Kleemer, 1995:1).

The main philosophy behind this strategy is community self reliance, which ensures ownership, responsible use and sustainability. The approach is geared towards an effective community capability independently and willingly to manage facilities provided to them so as to enhance long term utilization for their good health and wellbeing (Okuni and Rockhold cited in pickford et al., 1996:23).

Accordingly, demand driven strategy refers to a development strategy where the people themselves are expected to take the initiative and the responsibility for improving their water supply situation rather than being passive recipient of the government services. In this approach support is given only to activities which are genuinely required and requested by the beneficiaries. In other words, the beneficiaries should be willing and prepared to takeover responsibility for managing the project and paying for construction, operation and maintenance costs. This implies the consumers are to be controllers of their development process and the program (Saxe'n-Rasendahl in Pickford et al., 1996:32; Kleemer, 1995:1).

Hence, the approach represents a shift from top-down, state centered where the government was setting the targets with little or no involvement of intended beneficiaries. For a genuine demand driven approach to rural water supply systems, first there has to be demand, where demand is not strong a program might try to develop it (MoWR, 2003:148).This is

because, rural water supply can only be sustainable if it is demand driven (WB, 2002:101). Communities must therefore, request for the improvement of the water supply facilities before the water supply facility is constructed (Davis et al., 1993:146).

The expected role of the community in demand driven approach differs considerably between urban and rural areas. In urban areas, private companies and cooperatives are thought to handle management, where as in rural areas community organizations have to assume all management responsibilities. However it is important to note that government officials are to assume the responsibility of motivating and organizing communities (Briscoe and de Ferranti, 1988:15).

**Table 2.1:** Differences between Demand and Supply Driven Approaches

| | Supply-Driven Approach | Demand-Driven Approach |
|---|---|---|
| Objective | Provide clean and potable water to as many people as possible | Provides water supply to which communities are willing and able to pay for it. |
| Service Level | Minimum service level/hand pumps, public taps/ | Service level for which communities are willing to pay |
| Role of government | Appraisal, design, construction, operation and maintenance, and training | Information, advice, regulation training. |
| Financing | Donor/Government pays full capital costs and subsidize operation and maintenance in rural areas | Communities pay full capital, operation and maintenance costs, possible subsides on capital costs in arid or low income areas |
| Community participation | Extension service mobilize participation in water point location, user fee collection etc | Literature vague on this aspect. |

***Source:*** *Kleemer, 1995:6.*

## 2.4. Managing Rural Water Supply

Managing rural community water supply successfully means operating and maintaining a system on a day to day basis so that it continues to work and supply water as planned. In its broadest sense the management of water supply also includes the promotion of hygienic handling and the use of water to improve the health of the people in the community (Davis et al., 1993:141). Several approaches have been under taken since the 1980s International Drinking Water and Sanitation Supply Decade (IDWSSD) in an effort to improve the living conditions of rural communities through access to adequate water supply services (Musonda, 2004:31). Three of these approaches are discussed below: Agency or Central Management, Community Management, and Partnership approach.

### 2.4.1. Agency Management

The first approaches used in managing rural water supply were those that favour highly centralized systems. This is an approach where government agency operates and maintains rural water supply scheme for the community. In other words, a centralized system in rural water supply management is an approach that is dependant and directed by the central government. The community may or may not pay for the service based on government policy. It may not be involved in decision making process about management of the water supply facilities (Davis et al., 1993:1; Musonda, 2004:32). The same have also noted that the centralized approach to rural water supply management proved to be ineffective in developing countries.

The major problems related to agency managed approach to rural water supply include:

- A shortage of spare parts and tools which can result in long break down times and in some cases abandonment of equipment. This

shortage in turn may be due to several factors: at the time of installation the donor might not have included enough spare parts, lack of local suppliers, shortage of foreign exchange etc.

- A shortage of serviceable vehicles makes the support of operation and maintenance very difficult.
- Poor conditions of pay and employment in government services often mean that maintenance crews are unenthusiastic about field work.
- A shortage of skill for both the repair and servicing (Davis et al., 1993:142).

### 2.4.2. Community Management

Community management did not come spontaneously from, nor do they exist in a vacuum. According to Moriatary and Schouten in Musonda (2004:32), community management has a long history of trial and error in the rural water supply sector, especially with failure of the centralized management approach. It is aimed at strengthening the capacities and willingness of the communities to take ownership and responsibility of managing on their water supply systems after the implementing agency left the community. Therefore, in the case of truly community managed water supply, the members of the community actually own, operate and maintain the water supply scheme (Davis et al., 1993:144).

According to IRC (2004:8), the common principles of community management include:

**Participation:** for effective community management to be in place a cross-section of the community must participate in the development process; there must be broad community support for the implementation of community management models. Community participation must continue indefinitely.

**Control**: the community must be in direct or indirect control over the operation and management of its own water supply system, where control is understood to mean the ability to make strategic decisions about the process, from the design phase to long-term O&M.

**Ownership:** although formal legal ownership of physical infrastructure is highly desirable, it may not always be possible in existing legal frameworks. Of equal importance is the perception of ownership by the user community.

**Cost Sharing:** closely linked to the question of ownership, is the need for some element of contribution to the recurrent costs of running and maintaining the system; depending on individual circumstances, contributions need not always be financial in nature.

One way that the community exercises community management approach in managing rural water supply schemes is through establishment of water committee. But water committee for most water supply projects, as summarized by Davis et al. (1993:148), did not function as intended for the following reasons.

- The role of water committee was not made clear.
- Care takers were not supplied with tools, so they couldn't repair pumps; so it undermines the committee's role.
- Committee saw projects as belonging to the government. There was no sense of ownership.
- Committee had no real authority to act with in the community.
- Power in the community was held by a political committee.

### 2.4.3. Partnership Approach

This method of running rural water supply schemes reduces the burden, and share management and operation responsibilities among concerned agencies and the community. It is being advocated for because it has been

realized that although communities can take up a substantial share of responsibility, external support services are still required. This is because the community may play an active role in managing the system, but still does not own it. Major repair jobs and decision on the future of the systems are at the hands of agency that builds it.

This type of management system was practiced in the community of Dulecha, south Ethiopia:

> *The water supply was a borehole and distribution system, managed by the community with the support of the water authority, WSSA. A water committee was formed with the help of WSSA extension agents and based on WSSA guide lines established for community management. A pump operator and a water point attendant were paid from funds collected from sale of water. The water point attendant sold water at the stand point at rate, or tariff, fixed by WSSA. The revenue was handed over to the treasurer of the water committee. The treasurer and chairman were responsible for buying diesel for the pump and for paying for the two employees* (Davis et al., 1993:143).

The partnership approach between government, community and other stakeholders can provide a sustainable management structure where by responsibilities are allocated to those institutions and individuals who are best suited to manage the risk of taking on those tasks (Musonda, 2004:32).

However, this management system faces a problem in maintenance due to capacity problem in government offices. It also faces a problem if partners are Non-government institutions, because they may either get phased out or they may not be interested to respond to operation and management demand (Colin cited in Musonda, 2004:33; Davis et al., 1993:2).

## 2.5. Factors Affecting Sustainability of RWS

According to ODI cited in Bezabih (2008:12), performance on sustainability is often judged by looking at a number and proportion of functioning and non functioning facilities. On the other hand, studies indicated that in

developing countries many water supply and sanitation programs\projects have not been sustainable (Carter et al., 1999:8). Reviews of related literature have also shown that there are many interrelated factors contributing or undermining sustainability of rural water supply projects. For example, according to Zelalem (2005:16) the following are key issues that are of paramount importance to the sustainability of rural water supply projects.

- Community participation and involvement.
- Women's participation and Involvement.
- Community awareness raising and education.
- Demand driven approach in the identification of beneficiaries.
- Cost sharing and cost recovery.
- Water resource and base line survey.
- Management capacity building/ management procedures of watsan committee.
- Water users' management body and structure.
- Repair and maintenance services.
- CBO and conflict management.
- Technology
- Institutional support.

Likewise, Carter et al. (1999:8) identified some causes of non-sustainability of rural water and sanitation projects. These include: communities or intended beneficiaries may never have been convinced of the desirability of new water source in the first place; the financial costs which communities are expected to raise as a contribution to capital or recurrent expenses may be unacceptable, unaffordable or impracticable; communities may never have felt ownership of the new infrastructure, and government may have been over stretched and under resourced, so that repair and maintenance have not been takes place; benefits promised at

the outset of projects have failed to materialize; even when full community participation or management has been planed from the start, community level committee and care takers have lost interest.

Thus, keeping water supply projects operational for long period requires attention to a wide range of inter related factors. And for the sake of logical discussion, issues that affect sustainability of rural water supply projects are organized as factors related to the community, financial factors, technology, institutional support system, environmental factors, social and political factors on the basis of the findings of literature reviewed.

### 2.5.1. Factors Related to Community

**A. Community Participation**

Community participation refers to "an active process, where by beneficiaries influence the direction and execution of development projects rather than receiving a share of projects benefits"(Musonda, 2004:43). It is crucial buttress of sustainable community development (WB, 2003:7). This methodology is used to ensure that the beneficiaries are fully involved in the whole development process, and any dissatisfaction is solved at site (Okuni and Rockhold cited in pickford et al., 1996:5).

The review of related literature indicted that in many countries one of the principal causes of water system failure has been the lack of participation of the community (WB, 2002:101). In other words, villager's involvement in every phase of the local water supply schemes development and contribution to their construction and operation has paramount importance to sustainability. Thus, unless users are involved from the beginning and are conscious of a need for safe water supply there is a danger that the facilities will not be properly used or maintained (Dessalegn, 1999:40). Meaning, donor and top-down projects, generally fail to bring sustainable benefits because they do not lead to stakeholder ownership and commitment. Therefore, the first thing, Briscoe and Ferranti (1988:12) state, is to determine what improvements in water

supply do the villagers want and are willing to pay for, demand responsive or demand driven approach.

With respect to participation, Raxe'n- Rosendahl as cited in Pickford et al. (1996:32-33) has identified the major roles to be played by the community at different stages of the water supply program/project cycle. At the planning stage the community can participate through site identification, providing land for the project, water committee establishment etc. During implementation beneficiaries can provide local materials and labor, supervise and report on the development of works, participate in inspection etc. Raising fund, opening bank account, providing personnel to be trained and take responsibility for use and care of water supply are some of the major roles that the community could play in the operation and maintenance stage.

In short, demand for an improved service, participation in all project phases, sense of ownership, capacity and willingness to pay, decentralized management, financial and administrative capacity of the beneficiaries are some of the community related factors that may have effect on the sustainability of rural water supply projects.

**B. Women Participation**

The development of safe water supply is of particular importance for women. To put it differently, access to safe water supply within easy reach of household means women can save time, labor and effort which can be employed in a more productive activity. Besides, through provision of safe water, women and their children will be protected from many water related diseases (Dessalegn, 1999:40; Khosia, 2003).

Women's involvement in the rural water system is a pre requisite for the achievement of any meaningful goal (Yanore cited in pickford et al., 1996:113). This is because; the participation of women in water supply projects can have several benefits. For example, as prime beneficiaries they can promote the interest and willingness of men to contribute to the

provision of water supplies. Women can also benefit projects in the identification of reliable water sources of acceptable quality. Besides, their opinion and needs have important consequences for the acceptance, use and readiness to maintain new water supplies and for the ultimate health impact of the project. This potential contribution of women emerges logically from their traditional role and participation in water supplies (Wijk-Sijbesma, 1988:1-3).

In other words, many cases of rejection and problems in the functions and use of water supply projects can be explained by insufficient attention to the traditional role and position of women, and that women have had sound reason for non-use of facilities (ibid).

Therefore, Dessalegn (1999:40) argues, women should be involved in the planning, operation and maintenance of rural water supply schemes and should have a say in the choice of technology. In support to this, the WSSA guide line of Ethiopia states that at least two women should be included in all water committees formed to manage water supply schemes.

Despite their crucial importance and efforts made to involve women in water supply project management by agencies, evidence revealed that level of their participation is not encouraging (Mengesha, 2002:54). Review of related literature also indicated that though the degree of women involvement may vary from place to place, it is found to be low across different countries compared to men. For example, in The Netherlands only 15 percent of the Water Management Board is women and women organizations are consciously campaigning to increase their number (IRC, 2003). A few numbers of women among many men, as we experience to date, will inhibit them from playing active role. It is therefore, Dessalegn (1999:41) strongly suggested, important to have all or most water committee involve women.

### 2.5.2. Financial Factors

Water supply project implementation and the continued use of intended benefits require resources of which finance is one. This is simply because, the operation, maintenance and management of water supply projects costs money. Hence, weather it is community managed or agency managed the money for running the supply must come from some where.

In this regard, factors such as community capacity and willingness to share costs, adequacy of collected revenue, appropriate use of money, proper record keeping, suitable tariff, etc have got great importance to wards ensuring sustainability of rural water supply schemes ( Yanore in pickford et al.,1996:112).

In order for the community to meet the costs of operation and maintenance members of the community must be willing to pay for the service. However, willingness to pay for the service is influenced by a number of factors. One of such factors is availability of alternative sources of water in the community (Musonda, 2004:48).

The Issue of cost sharing and cost recovery is crucial in the process of enabling the community to mange their system after completion. It must however be clear that this does not imply total financial responsibility to the community. But it is to indicate some contribution from users is needed to establish commitment, which of course through time should increase to reach the intended level of making the development system sustainable. Failure to adequately cover the cost of improved water supply services in developing countries, on the other hand, has been identified as the major constraint to achieving goal of safe water supply for all on sustainable basis ( Evan, 1992: 41).

Empirical research findings in Ethiopia revealed that users of developed water points were not willing to utilize the service for they believed that

they should not pay for water as it is a gift of nature (Bezabih, 2008: 20; Mengesha, 2002: 49).

Nevertheless, ever since the last decade, it became clear that neither government nor donors continue to afford to pay for the costs of providing water and sanitation supplies and of running them. And there has been a trend of paradigm shift away from free provision to wards user's significant contribution to the cost, particularly to operation and maintenance cost (Evan, 1992: 42).

Revenue management deficiency is also one of the main obstacles to the smooth functioning of decentralized water system. Thus, in addition to fund mobilization smooth financial management methods, like proper book keeping and saving are important elements in sustainable rural water supply (Yanore in Pickford et al., 1996: 12).

Misappropriation of revenue collected from users is another finance related factor that hinders the continued use of services. For example, the findings of a study conducted in Benishangul Gumuz Region, Ethiopia, indicated that the fund collected by beneficiaries had been being misused by some members of the water committee which in turn limited availability of money for operation and maintenance. Consequently, the water point had not been providing service for about eight months (Bezabih, 2008:71).

On the other hand, empirical study conducted in the Upper Regions of Ghana was judged to be financially successful for the following reasons:

- the tariff was affordable,
- most households were willing to pay,
- the benefits of having access to safe water supply were recognized,
- an effective education campaign was conducted to explain the reasons for payment,
- the arrangement for payment ware made convenient, and

- it was able to keep an average of 95% of schemes working and there fore there were an incentive to pay (Davis et al., 1993:159).

### 2.5.3. Technology

Technical issues relating to the design and construction of rural water supply schemes are the most obvious factors that affect sustainability. In other words, poor construction quality and the use of low quality materials may lead to the failure of water supply schemes before the end of its design life. Similarly, design flaws, including shallow wells or boreholes, structural collapse, over estimates of the water source may cause a system to fail from the outset (Zelalem, 2005:14; MoH, 2005:14).

Empirical study conducted in Kenya have also shown that the inappropriate technology used, inadequate tools and equipments, lack of routine or corrective maintenance and poor quality works are some of the technical problems that affect the continued functioning of rural water supply schemes( Mukhwana and Hukka in pickford et al., 1996:99).

Therefore, to promote sustainability, the technology must be selected on the basis of its appropriateness in terms of technical, financial as well as gender and socio-cultural acceptability and so on criteria(Kalbrmaten cited in Alemu,2006:37).

Besides, the appropriate level of quality must be assessed against a number of criteria as: User expectation and acceptance for instance, in the design of houses, sanitation system; costs and benefits, including low investment and maintenance; reliability of supply or delivery system; low capacity to maintain the asset, including access to spare parts and so on (Colin cited in Alemu, 2006: 57).

In general, appropriate technology, availability of adequate spare parts, tools and equipments, construction quality of schemes, and technical skills required to operate and maintain the system are some of the major factors that are related to sustainability of rural water schemes.

### 2.5.4. Institutional Support System

One way of enhancing the sustainability of rural water supply projects is the provision of legal and institutional support. In other words, there is a need for clear policy, strategy and a legal framework that supports sustainability of rural water supply schemes. On the other hand, the lack in the part of the government to setup an enabling environment for the development of a system and management of drinking water supply services through effective community participation is seen as the reason for the failure as far as sustainability is concerned( Bhandari et al. cited in Bezabih,2008:21). Besides, there is a great need to provide technical and managerial support by government or donor agencies to the community so as to ensure continued use of the benefits of developed water supply project or program (Davis, et al., 1993).

On the other hand, institutional weakness is singled out as a reason for difficulties in providing the necessary service for communities in rural water supply system (Roark et al. in Musonda, 2004:40).Therefore, institution are required to make radical reform if they are to meet challenges facing the rural water supply sector and if they are to provide effective service. Organizational framework and quality of staff also influence institutional effectiveness. Coordinating mechanisms are also essential, especially when several government agencies are involved in addition to NGOs Donor Agencies (Ibid)

### 2.5.5. Environmental Factors

Reliability of source and a reliable system of obtaining water from source are important environmental factors up on which continued functioning of water supply depends. The reliability of source is often determined by seasonal changes, land use and pollution. Some springs and wells may fail towards the end of the dry season owing to drop in the water table. This is the time when water is needed most but supplies are least reliable. Besides, pollution of water leads to contamination where the quality of

water could be harmful for healthy consumption (Davis et al., 1993: 26).

There fore, the quantity and continued supply of water from source and its quality for domestic use are important environmental determinants of continued functioning of rural water supply.

### 2.5.6. Social and Political Factors

Development interventions can fail to deliver sustainable benefits due to inadequate attention to the social aspect of target communities, such as gender or women's participation, cultural values and preferences, traditional decision making and governance systems. To introduce new and appropriate technologies, there must be understanding of the indigenous decision making system, gender based division of labor, and cultural preference. For instance, the design of rural water and sanitation systems must take into account the established traditional attitudes to managing human waste and the roles of men and women in collecting and using water (Asuguide, 2003:51). According to UNESCO (2003:110) attitudes, cultural beliefs and taboos with respect to human excreta are among the challenges faced when proposing possible sanitation solutions to communities.

Sustainability can also be much more difficult to be achieved in an unstable political environment. Depending on the nature of the project, change in government polices, civil unrest, war, lack of direction with in executive, a stalled legislative program and falling business confidence, can have an adverse impact on project sustainability or even make projects impossible (Riddle cited in Alemu, 2006:60).

Research study conducted in Kenya has come up with major social and political problems that affect sustainability of rural water and sanitation projects. Some of these problems include: Inter clan or village rivalry, Interference by politicians and other influential people in decision making and inability and/or unwillingness to pay (Mukhwana and Hukka cited in pickford et al., 1996:1000).

## 2.6. Water and Sanitation in Ethiopia

Water is universally acknowledged to be a basic need in sustaining life and recognized as a human right. Besides, Ethiopia is known to be the water tower of Africa, i.e. the country is rich in the availability of water resources. However, the drinking water and sanitation coverage of the nation is very low and minorities of Ethiopians have access to safe drinking water and improved sanitation (MoWR, 2002).

According to the available data 35.4 million or 47.3 percent of the total population of the country have access to water supply at the end of 1998 E.C (2005/2006). Service coverage is higher in urban areas than rural where, as indicated in the same source, the figure for urban and rural is 78.8% and 41.2% respectively (MoWR, 2006). On the other hand, the figures to urban water supply coverage seem contradicting with the EEA (2007: 49) report which shows 80 % coverage for the year 1997 E.C. Nevertheless, from the above figures one can understand how the majority of the population especially in rural communities, suffer from the service and depend on traditional or secondary sources (Bezabih, 2008:25).

Data from MoH (2005: 13) indicated that although there are regional variations, some kind of latrine access ranges between 13 percent in rural areas to 72 percent in the urban in 2003. This gives the national average of 18 percent which is mainly traditional latrine made from locally available materials. However, the MoWR (2006) report showed that the national average sanitation coverage in the year 2004 was 30.63% where the urban and rural coverage represents 77.6% and 21.3% respectively. Compared with MoH (2003) report, the 22.63% coverage increase with in a year seemed a bit exaggerated.

Like the disparity in water supply and sanitation coverage between urban and rural areas, there was also regional variation. For example Somali and Harrari have the lowest coverage of 24% and 28% respectively, while the highest is 68.2% and 90.3% for Dire Dawa and Addis Ababa respectively.

Furthermore, about 25% rural water schemes have been reported as non-functional at national level at the end of 1998 E.C (MoWR, 2006: 33).

To improve the poor status of water and sanitation, the government of Ethiopia has been implementing universal access program (2006- 2012). The targets of the universal access program which sates " water for all citizens of Ethiopia" is to provide safe water 15 liters/person per day with 1.5 km for 98% of the rural population and 20 liters / person per day with in 0.5 km for 100% of the urban population. The program also aims to achieve 100% improved hygiene and sanitation in rural areas (MoWR, 2006; MoH, 2005; Bezabih, 2008).

With regard to addressing the issue of malfunctioning rural water system and to ensure sustainability , the goal during the PASDEP is to reduce the share of malfunctioned rural water systems from 30% in 2005/6 to 10% in 2010 (MoFED , 2006).

## 2.7. Water and Sanitation Policies in Ethiopia

Before 1999, provision of potable water supply and sanitation facilities has been made without any policy framework. However, based on the FDRE constitution Macro-Economic and Social Policies and Development Strategies, the Ministry of Water Resources Development has formulated water resources management policy (1999) in which policy on water and sanitation has been given due emphasis. Besides, Water Sector Strategy (2002) and Water Sector Development Program (WSDP) (2002-2016) have been endorsed to set a basis for sustainable development and management of the country's water resource. The Ministry of Health, similarly, formulated and endorsed the National Sanitation Strategy (2005), which aims at 100% adoption of improved water and sanitation (MoWR; 1999; 2002; 2004; 2008 and MoH; 2005).

The over all objective of WS and sanitation policy is to enhance the well-being and productivity of the Ethiopian people through provision adequate,

reliable and clean water supply and sanitation services and to foster its tangible contribution to the economy by providing water services that meet the livestock industry and other water user's demands (MoWR, 1999:21).

Some of the detailed objectives of water supply and sanitation policy include:

- Provision of sustainable and sufficient water supply services to all.
- Carry out operation and maintenance of water supply and sanitation services in sustainable and sufficient manner.
- Promoting sustainable utilization of water resources through protection of water sources, efficiency in use of water as well as control of wastage.
- Creating sustainable capacity building in terms of the enabling environment, including institution, human resources development, and legislation and regular framework for water supply and sanitation.
- Creating conducive environment for the promotion of appropriate sanitation service (Ibid).

With regard to finance, the policy details stipulate to promote self financing of programs and projects at the local level, provide subsidies to communities who can not afford to pay for basic services, on capital costs only, enhance self financed and total cost recovery programmers in urban water supplies, etc (ibid :23).

As it is indicated in the policy, the development and management of water supply facilities should be at decentralized level with full participation of the community and other stakeholders, a key step to words sustainability.

## 2.8. Description of the Study Area

### A. Amhara National Regional State

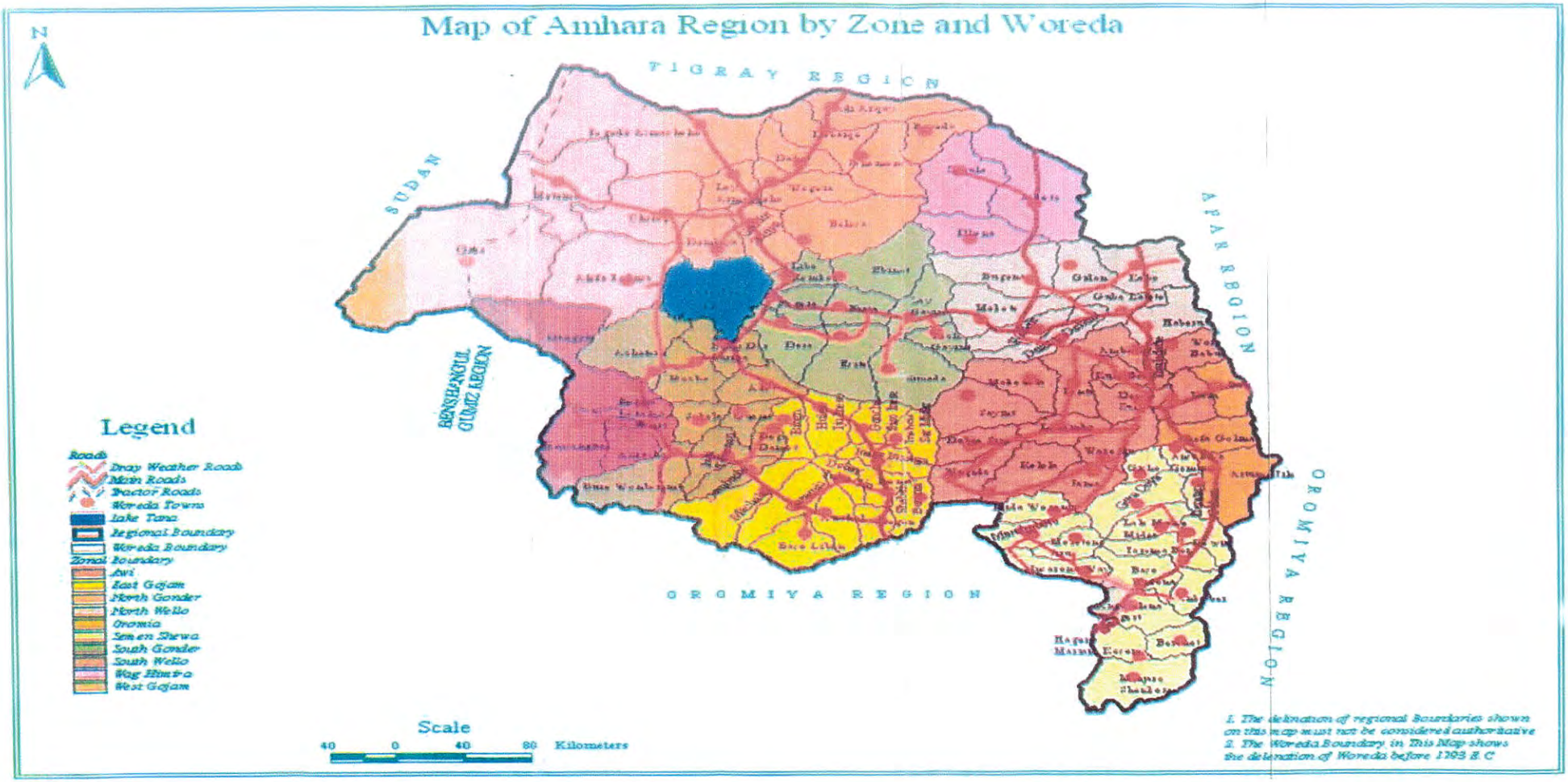
Amhara National Regional State is one of the Federal States of Ethiopia. The region is located in the North-Western part of the country at 9°20' and 14°20' North latitude and 36°20' and 40°20' East longitude. It covers an area of about 157,076.52 kilometer square. As can be seen from figure 2.1, the region shares boundaries with Tigray Region in the North, Afar Region in the East, Oromia Region in the South, Benishangul-Gumuz Region in the Southwest and Sudan in the West (BoFED,2003; BoI, 2007:1).

According to BoI (2007:3), the region is administratively divided in to 10 Zones, 12 city administrations, 140 *woredas* and 3438 *kebeles*. Bahir Dar, the capital city of the regional government, is located at about 565 km far from Addis Ababa, the capital city of the country.

Amhara region encompasses multi-ethnic society, including the Amhara, Awee, Oromo, Wag Hemra and Argoba peoples. The religious composition of the people is also diverse, composed of Orthodox Christian, Muslim, Protestant, Catholic, Traditional Religion and other (BoI, 2008:9).

According to the data obtained from BoFED (2007:24), the demographic situation of Amhara region shows that the total size of the population has reached 19.1 million as of 2005/6. Out of the total regional population 9.58 million (50.1%) are females and 9.54 million (49.9%) are males. The regional population accounts for roughly 27 percent of the total population of the country, while in terms of area the region contributes only 15.4%. Regarding the settlement pattern, the overwhelming majority, i.e. nearly 89.6% of the population, resides in rural areas and mainly are engaged in agriculture.

**Figure 2.1:** Map of Amhara National Regional State




*Source*: BoFED (2007)

Ras Dashen, the highest peak in the country, 4,543 meter above sea level, is found in the northern part of the region. On the other hand, the major part of the region (46.61%) is middle land (*Woyena Dega*, 1,500- 2,300 meters above sea level), 26.71 % is lowland (*Kolla*, less than 1,500 meters above sea level), 24.15% is highland *(Daga*, 2,300- 3,000 meters above sea level), and 2.53% is high peak (*Wurech*, 3,000-4,543 meters above sea level) (BoFED, 2007:4 and BoI, 2008:4).

According to the information collected from the Bureau of Finance and Economic Development (2007:8), the regional annual rain fall ranges from 598.3mm to 1,692mm, while the minimum and maximum average temperature is 12.4°c and 27.8°c. The regional climate is suitable to produce Teff, Maize, Beans and Peas.

Available data on the health coverage of the region shows that about 86.4% of the population has access to health services. In the region, there are 18 hospitals, 155 health centers and 2,075 health posts. Malaria, intestinal parasites, diarrhea and vomiting, gastric, respiratory infection are the main health problems in the region (BoFED, 2007; BOI, 2008:40). This, according to MoWR (2008:8), is mainly related to the poor water and sanitation service access in the area.

Regarding water resource potential, available data indicated that Amhara region is known for its three major river basins, the Abay, Tekezea and Awash. The annual average discharge of these river basins is estimated to be 43billion meter cubic. The data on socio-economic profile also indicated that the region is endowed with 500,000 acres of irrigable land. However, the level of utilization is found to be less than 50 %( BoI, 2008:5; BoWRD, 2008:12-13).

Despite the region is rich in its water resource potential, available data revealed that majority of the population have no access to potable water supply. According to BoI (2008:6), access to drinking water coverage was 45.77%, where the coverage of urban and rural areas was 82% and 41% respectively at the end of 1999 E.C (see table 2.2).

**Table 2.2:** Water Service Coverage in %, Amhara Region

| Area | Year in E.C | | | | |
|---|---|---|---|---|---|
| | 1995 | 1996 | 1997 | 1998 | 1999 |
| Urban | 96 | 96.6 | 78 | 80 | 82 |
| Rural | 23 | 27 | 31 | 35 | 41 |
| Total | 31 | 34 | 36 | 40 | 45 |

***Source:*** *BoI (2008:6)*

The trend of water service coverage in the region described in table 2.2 indicates that urban population has better access to improved water supply than the rural areas. As can be seen from the same table, the urban water coverage exceeds the rural through out the period reported. However, the trend in urban water supply service coverage has declined from 96% in 1995 to 82% in 1999E.C. On the other hand, in rural areas improved water service coverage has shown progress from 23% to 41% during the same period.

Nevertheless, about 55% of the total regional population and 60 % of those who live in rural areas have no access to potable water supply. This shows that unprotected sources are still the major sources of drinking water for the majority of the population in the region (BoWRD, 2006; BoI, 2008, 5_6).

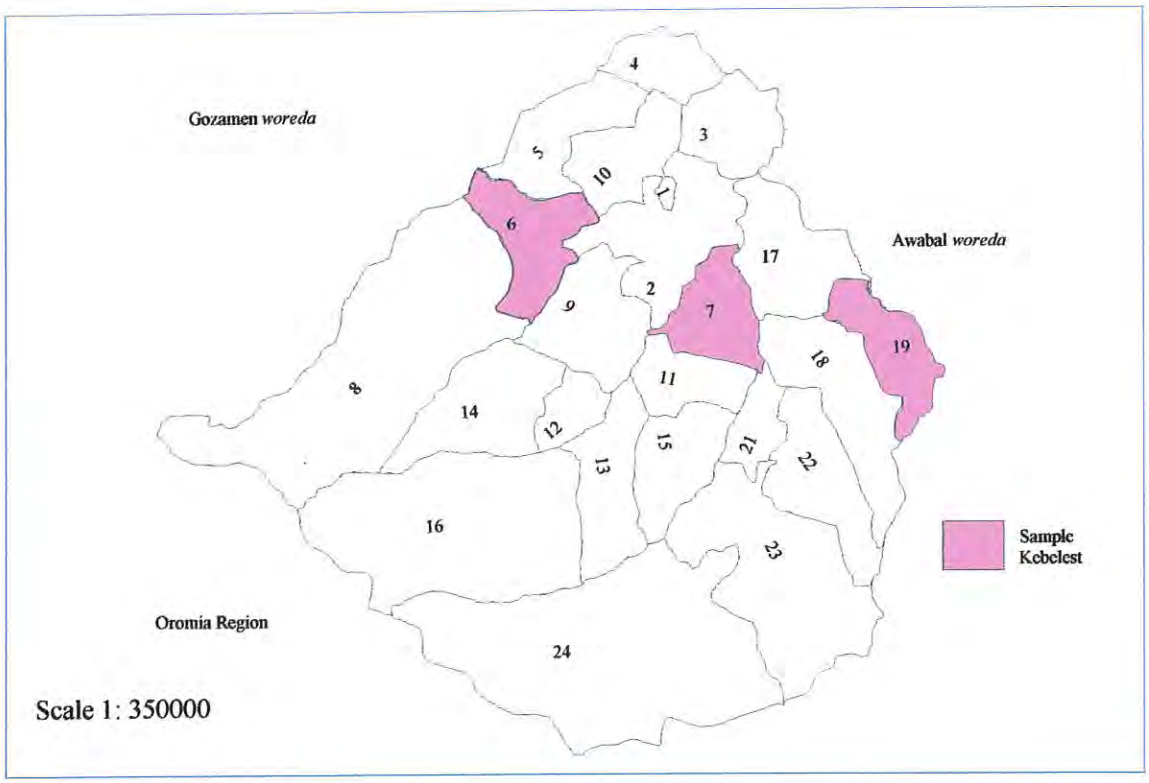
The situation is further worsening because of sustainability problem of the facilities established in rural areas of the region. Thus, in order to ameliorate these constraints, due attention needs to be given to both expansion and improvement of the continued use of the facilities put in place (BoWRD, 2006:3; MoWR, 2006).

**B. Basso Liben Woreda**

Basso Liben *woreda* administration is one of the eighteen w*oredas* of East Gojjam *zone*, Amhara Region. It covers a total area of 1311.33 kilometer square. It shares boundaries with Gozamen *woreda* in the North and West, Awabal *woreda* in the East, and Oromia Region in the Southwest. Yejube is the centre of the *woreda* that is located 27 km and 307 km far from Debre Markos and Addis Ababa respectively (BoFED, 2007:7).

Available data indicated that Basso Liben *woreda* is administratively divided in to 22 rural and 2 urban *kebeles*, the lowest administrative political structure next to *woreda* administration, (see fig. 2.2 and table 2.3). Of the two urban *kebeles* Kork is recognized as emerging town by *Zonal* Labor and Urban Development Department since 2000E.C (WPFO, 2008:19).

**Figure2.2:** Map of Basso Liben *Woreda*




*Source: Modified from BoFED (2007)*

According to the data obtained from the *Woreda* Plan and Finance Office, forty six percent of the area is characterized by *Kolla* climate while fifty four percent is *Woyena Dega* with an elevation that ranges from 800 to 2720 meters above sea level. The mean annual temperature and rainfall ranges from 22.5 °C to 25 °C and 900mm to 1200mm respectively (WFPO, 2008:1).

As the information collected from BoFED (2007:18) shows, the population of the *woreda* is estimated to be 159,295 in 2005/6. Out of the total population 79,687 (50.2%) are females and 79,608 (49.8%) are males. Regarding settlement pattern, 152,610(95.80%) of the total population resides in rural areas, while only 6,685

(4.1%) people are urban dwellers. The *woreda* is almost exclusively inhabited by Amhara people. The number of people from other nations and nationalities is very small.

**Table 2.3:** Kebeles in Basso Liben *Woreda*

| No | Kebele | Distance from Woreda Capital in Kms | Kebele Center |
|---|---|---|---|
| 1 | Yejube Town | = | Yejube |
| 2 | Lemecham | 1.5 | Asegmech |
| 3 | Yegelaw | 10 | Dengab |
| 4 | Mecheg | 9 | Yeberna |
| 5 | Aratu Amba | 9 | Gebbu |
| 6 | DendoYechebara | 15 | Gedam |
| 7 | Yedug | 20 | Yedug |
| 8 | Denguam | 10 | Koncher |
| 9 | Dogem | 12 | Addis Amba |
| 10 | Yelelem | 3 | Sefera |
| 11 | Enetemen | 13 | Kahenat semaye |
| 12 | Gondelmit | 15 | Gedam |
| 13 | Yelamgeje | 16 | Yelamgeje |
| 14 | Anjem | 18 | Koncher |
| 15 | Chede Mariam | 25 | Kurratel |
| 16 | Zenboal Yechora | 26 | Yechora |
| 17 | Dendegeb | 8 | Addis Amba |
| 18 | Kork | 15 | Kork |
| 19 | Yenscha | 22 | Yenscha |
| 20 | Talak Ameba | 23 | Maksegnet |
| 21 | Gobetmma | 24 | Chencheser |
| 22 | Dejat | 25 | Lay Dejat |
| 23 | Bete Negus | 27 | Bete Negus |
| 24 | Kommeazema | 30 | Chendeferro |

***Source:*** *Basso Liben Woreda Administration, 2009*

According to the data collected from *Woreda* Health Office, the basic health service coverage of the study area has reached 88.9% at the end of 2000E.C. There were one health station, 22 health posts and 5 private clinics providing health service in the *woreda* during the report period. This shows that, one health center is serving about 76,482 and a health post for about 5000 people. As to health professionals, available data revealed that 6 Nurses, 3 Sanitarians, 6 Birth Attendants, 3 Pharmacy Technicians, 3 Laboratory Technicians, 2 Junior Nurses and 43 Health Extension Agents were assigned to work in the aforementioned health institutions.

Hence, one Nurse was serving about 25,494 people and health professional to people ratio was found to be 1:6373. Malaria, Bronchitis, Intestinal parasites and Gastritis were the five top diseases in the *woreda* (BLWHO, 2008).

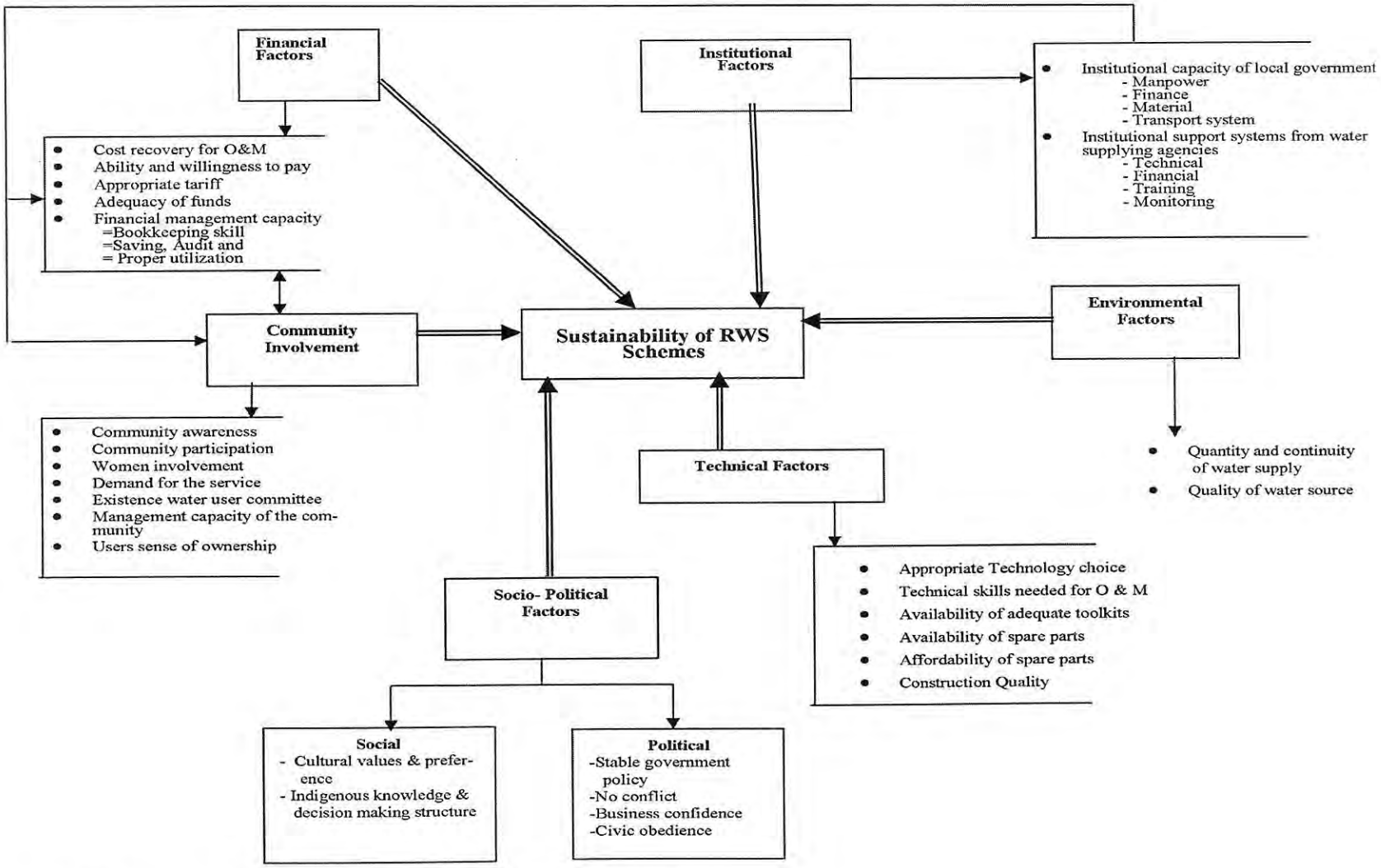
The data obtained from the WWRDO revealed that at the end of 2000 E.C there were about 143 water supply schemes. Out of these water supply systems 76 were HDWs, 36 protected springs, 20 shallow wells and only 2 were deep wells. The data obtained from the desk review also showed that 4 of the developed water supply facilities were located in Yejube, the *woreda* center, while 139 schemes were sited in the 20 rural kebeles. The same source indicated that there was no any developed water supply facility in Den Guam and Aratu Amba *kebeles* until the period reported (see fig. 2.2). Out of the total rural water supply schemes more than thirty five percent were found to be nonfunctional during the period under consideration (WWRDO, 2008).

Regarding service coverage, access to safe water supply in Basso Liben *woreda* is estimated to be 68.5% in the urban and 34.5 % in the rural areas. Compared with the national, regional and *zonal* service level, potable water supply coverage in the study area is found to be marginal. This shows that majority of the population in the *woreda* have no access to improved water supply which could in turn threaten the health condition of people (WWRDO, 2008).

## 2.9. Conceptual Framework

The main objective of the study is to find out factors that affect sustainability of rural water supply schemes in Basso Liben *Woreda.* As the literature reviewed indicated the major problems, though expressed in different terminology, can be categorized as community involvement, financial, technology, environmental, legal and institutional, and social and political related. Therefore, the researcher has tried to adopt conceptual frame work for the main analytical exercise of the study based on the literatures reviewed.

**Figure 2.3:** Conceptual Framework




*Source: Adopted from Musonda (2004); MoWR (2003); Bezabih( 2008) and IRC(2004)*

# CHAPTER THREE

## 3. METHODOLOGY

### 3.1. Research Strategy

The study attempts to explore and portray an accurate profile of the factors that affect the continued use of rural water supply facilities in Basso Liben *woreda,* Amhara Region. In due course, the focus is on the make up of the samples and the state of affairs in the population at just one point in time. Therefore, it is a descriptive cross sectional survey research methodology.

### 3.2. Sampling Design and Procedure

The study employed a descriptive cross sectional survey research design where different data at a point in time is collected. So as to obtain the necessary data, both probability and non probability sampling designs were employed in selecting sample kebeles and water supply schemes (villages).

**A. Selection of Sample Kebeles**

Basso Liben *woreda* has 22 rural *kebeles*. Except in the two, according to WWRDO Annual Report (2008), there has been water and sanitation intervention in the rest of the *kebeles*. Hence, taking 20 rural *kebeles* of the *woreda* as a sampling frame, a multistage sampling procedure was employed. First, on the basis of their climatic condition, all *kebeles* of the *woreda* were grouped (stratified) as *Woyena Dega* and *Kolla kebeles* to ensure homogeneity. This is because, except agro ecology, all rural *kebeles* in the *woreda* are similar in cultural setting, socio economy and are inhabited by the same ethnic group, Amhara. So, 6 rural *kebeles* were recognized as *Kolla* areas which are mostly located in the Abay Gorge, while 14 *kebeles* were grouped in the *Woyena Dega* part. Then, two *kebeles* (Yedug and Dendo) from the *Woyena Dega* were selected randomly. On the

other hand, as most of the *Kolla kebeles* are remote and inaccessible the researcher selected Yenscha *kebele* purposively based on its relative proximity to the *woreda* capital, Yejube. Accordingly, Yedug and Dendo from the *Woyena Dega* and Yenscha from *Kolla kebeles* were taken as representative sample *kebeles (see Fig.3.2)*.

**B. Selection of Water Schemes**

According to Basso Liben WWRDO, the total number of rural water supply schemes at the end of 2000E.C in the *woreda* was 139. Out of the total projects 23 small scale water supply facilities, 14 protected HDWs and 9 developed springs were located in the sample *kebeles* (9 in Yedug, 6 in Dendo and 8 in Yenscha).

Accordingly, a total of 6 villages (water schemes) were selected using simple random and purposive sampling techniques from the projects sited in the sample *kebeles*. The reason for selecting 6(26%) of the schemes was for the sake of manageability due to time and cost factors. Purposive or available sampling techniques were only employed in selecting non functional water scheme from Yedug *kebele* where there was only one during the time of survey. In Dendo and Yenscha *kebeles* there were more than one functional and nonfunctional schemes and simple random sampling technique (Lottery method) were employed in selecting sample water supply schemes. Similarly, as there was 8 functional water points in Yedug *kebele*, the sampling technique used in selecting a village was simple random.

Accordingly, Watlem(nonfunctional) and Den(functional) from Dendo *kebele,* Gebrea Mench(functional) and Graram(nonfunctional) from Yenscha *kebele* and Tejebar(functional) and Mench(nonfunctional) from Yedug *kebele* were selected as sample water points/*Gotes*/villages for data collection. The reason for selecting both functional and nonfunctional schemes was to look into the reason why some schemes are providing continued service while others are not which could help in identifying major factors that affect continued functioning of rural water supplies.

Water points, that were constructed before 1993 E.C were excluded from selecting sample schemes to reduce the effect of sustainability problem as a result of age/longer period of service provision. Like wise, water points that were constructed in the year 2000 E.C were not also included in selecting samples for some are not yet officially handed over to the community and communities in some other schemes had no enough experience in utilizing and managing the system and it is felt that a large amount of information couldn't be available in this villages. Therefore, water supply schemes that were established between 1993 and 1999 E.C were taken in selecting sample schemes [*Gotes*].

One village means one protected water supply site and according to the data collected through the household survey, the total number of household beneficiaries of sample water supply facilities were found to be 505. Then, as can be seen from table 3.1, from each village by systematic random sampling 13 to 20 (20%) households were selected. Hence, the study took a total of 101 households as sample for data collection.

**Table 3.1:** Sample *kebeles*, Gotes and Households

| Kebele | *Gote*/Village/ Water point | Number of Beneficiaries | Number of HHs | Sample HHs | Scheme Status |
|---|---|---|---|---|---|
| Yedug | Tejebar | 516 | 88 | 18 | Functional |
| | Mench | 528 | 96 | 19 | Nonfunctional |
| Dendo | Watlem | 561 | 102 | 20 | Nonfunctional |
| | Den School | 377 | 65 | 13 | Functional |
| Yenscha | Gebrea Mench | 412 | 69 | 14 | Functional |
| | Graram | 484 | 85 | 17 | Nonfunctional |
| Total | | 2878 | 505 | 101 | |

***Source:*** *WWRDO and Household Survey, 2009*

## 3.3. Data Source and Type

The major strategy of the study is quantitative complemented by qualitative approach. Thus, both quantitative and qualitative data were collected to counterbalance the limitation of the one by the other. The quantitative data mainly was obtained from Household Survey. Qualitative data was

generated through Focus Group Discussion, Key Informant Interview and Personal Observation to supplement, complement, validate and triangulate data obtained from sample households.

On the other hand, the data input for this study was both primary and secondary source. The major sources of secondary data were from government and non government publications, annual and inventory reports, previous studies, and books.

The primary data was collected from sample households, participants of Focus Group Discussion and Key Informant Interviews that had been made with water facility supplying government and non government agencies. In addition, Personal Observation was another source of primary data.

## 3.4. Methods of Data Collection

Data on factors that hinder the sustainable functioning of rural water supply facilities were gathered through employing multiple methods of data collection. Thus, Household Survey, Focus Group Discussion, Key Informant Interview and Personal Observation were employed to collect primary data.

**A. House Hold Survey**

Primary data concerning all relevant variables such as problems related to rural water supply facilities, community participation, and role of water committee, utilization of facilities, financial, technical, and institutional issues were collected through structured questionnaires.

As most of the sample population in the study area is illiterate, structured interviews were found to be the most appropriate to obtain the required data. It also provides an opportunity to investigate new things and reduces the probability of non response, although the method demands time. Thus, closed and open ended questionnaires were prepared in English and translated into Amharic to collect the required information from

households. Before the actual data collection, the structured questionnaires were tested in all sample villages with two interviewees. Based on the results of the pilot test which were made with 12 structured questionnaires in sample villages, items were modified (refer annex 4).

Six enumerators were recruited based on educational background (primary school teachers), knowledge of Amharic language, familiarity with the culture of the community and previous experience in data collection. Accordingly, three teachers, two directors and one unit leader were recruited from schools in each sample *kebele* and trained by the researcher to familiarize them with the items. Then, trained enumerators conducted structured interviews in their respective *kebeles*. The researcher closely followed up the actual process of data collection.

**B. Key Informant Interview/KII/**

A key informant interview is particularity important in generating information related to institutional, technological, and efforts made so far to improve problems related to sustainability of rural water supply facilities. Hence, views of water supply agencies (experts and heads) were important as they have better knowledge of the case in point. An interview guide was prepared and information was gathered through unstructured interview (refer annex 5). In due course, the office head and an expert working in Basso Liben *woreda* Water Resource Development Office, 2 from NGOs that have been supporting in rural water supply and the other two from East Gojjam zone Water Resource Development Department were interviewed.

**C. Focus Group Discussion/FGD/**

The primary data collected from sample households were enriched by additional information obtained through focus group discussion. At the beginning, it was planned to conduct three focus group discussions in each village where women, water committee members, *kebele* administration representatives and elder people are participated. However,

the researcher during the actual data collection found that two FGDs in each water point were enough to generate the required information given the time and financial resource available for the task.

On average 8 - 10 people have participated in the focus group discussions conducted in each village. First, discussions were made with the women group alone who were expected to have better knowledge and concern about problems related with sustainability of rural water supply. Next, a group in which water committee (2-3), k*ebele* administration (2), elder people (2) and women (2) represented were formed and discussions were made on different issues related to problems to the continued use of water facilities with the help of check list (refer annex 6). The principal researcher facilitated discussions made in each village with an assistant in taking pictures and audio records, up on consent from participants (see picture below):

**Figure 3.1:** FGD at Mench *Gote*, Yedug *kebele*

***Source:** Field Observation, February, 2009*

**D. Personal Observation**

The researcher observed 23 developed water supply schemes (9 springs and 14 HDWs) located in sample *kebeles* using observation check list(refer annex 7). This helps to find out the actual status of functionality, operation, maintenance and the technology. The primary data collected through observation complemented the information obtained through household survey, key informant interview and focus group discussion.

## 3.5. Methods of Data Analysis

Both quantitative and qualitative methods of data analysis were used. The Primary data collected from household survey through structured questionnaires were first checked for accuracy and data entries coded. Then, the data were entered, edited and analyzed using Statistical Package for Social Science (SPSS) version 15.0 software. Descriptive statistics such as percentage, ratio, frequency, mean and standard deviation were used to analyze the data quantitatively. On the other hand, data gathered through key informant interviews, focus group discussion and personal observation were organized according to themes and analyzed qualitatively to strengthen data obtained from household survey. On top of these, method of triangulation was used to analyze data collected from different sources.

# CHAPTER FOUR

## 4. RESULTS AND DISCUSSION

In this chapter, the results of the research are presented and discussed.

### 4.1. Socio-economic Characteristics of the Respondents

#### 4.1.1. Distribution by Sex and Age

Distribution of respondents by sex and age is presented in table 4.1 below. Out of the total 101 surveyed households, the majority 85(84.2 %) are males, while females constitute only 15.8%.

With regard to age composition of household respondents, 12(11.9%) recline in the age category less than 30 years. The majority 44(43.6%) of the respondents fall between the age of 31 to 40 years, while 30(30.7%) lie between the age category of 41 to 50 years and only 14(13.9%) of the respondents were greater than 50 years old. The mean age of household respondents was 40.55 with standard deviation $\pm$ 8.93 years. As table 4.1 shows about 75(74.3%) of household respondents fall in the age category of between 31 to 50 years which are mainly considered as economically active population.

**Table 4.1:** Distribution of Respondents by Sex and Age

| Sex of Households | | |
|---|---|---|
| Category | Frequency | Percent |
| Male | 85 | 84.2 |
| Female | 16 | 15.8 |
| Total | 101 | 100.0 |
| Age of Households | | |
| Years | Frequency | Percent |
| <20 | = | = |
| 20 - 30 | 12 | 11.9 |
| 31-40 | 44 | 43.6 |
| 41-50 | 31 | 30.7 |
| >50 | 14 | 13.9 |
| Total | 101 | 100.0 |
| Mean ± S.D | 40.55 ± 8.93 | |

***Source:*** *Household Survey, 2009*

### 4.1.2. Ethnicity and Religion

According to the survey result, all of the household respondents are Amhara people who are speakers of Amharic language. All of them are followers of Orthodox Christian religion. This indicates that the people living in the study area are homogenous with respect to ethnicity and religion.

### 4.1.3. Marital Status and Family Size

Distribution of respondents by marital status and family size is described in table 4.2. As can be seen from the table, 88(87.1%) respondents were married, 4(3.0%) divorced, 8(7.9%) widowed and only 1(1.0%) separated. The researcher has also learned during his stay in the study area that majority of male headed households were married while female headed families were found to be divorced, widowed or separated.

With regard to household family size, those respondents with family members less than 4 comprised about 29(28.7%), from 4 to 6 constituted 40(39.6%), from 7 to 9 represented 29(28.7%), and only 3(3.0%)of household respondents embraced family size greater than 9 (table4.2). This shows that the majority 71(70.3%) of household survey respondents have family members greater than four. As can be seen from table 4.2, the mean family size was found to be 5.88 per household and it ranges from 2 to 12 persons per family.

**Table4.2:** Respondents Marital Status and Family Size

| Marital Status | | | | | |
|---|---|---|---|---|---|
| Category | Married | Divorced | Widowed | separated | Total |
| Frequency | 88 | 4 | 8 | 1 | 101 |
| Percent | 87.1 | 4.0 | 7.9 | 1.0 | 100.0 |
| Family Size | | | | | |
| Category | <4 | 4-6 | 7-9 | >9 | Total |
| Frequency | 29 | 40 | 29 | 3 | 101 |
| Percent | 28.7 | 39.6 | 28.7 | 3.0 | 100.0 |
| Mean ± S.D | 5.88 ± 2.88 | | Range | 2 to 12 | |

***Source:*** *Household Survey, 2009*

### 4.1.4. Education Level of the Respondents

Education is an instrument for socio- economic development of a nation. This is because, literate citizen can better participate in an effort that is aimed at progress and makes better use of the benefits of growth. Knowledge and technology transfer are also easier in a community that constitutes educated people. Besides, educated individuals demand for better services and contribute towards improvement of their living condition. Accordingly, a study on problems related to sustainability of rural water supply needs to look at educational status of the target community.

As shown in table 4.3, out the surveyed households 53(52.5%) were found to be illiterate and those who can only read and/or write were 40(39.6%). Only 6(5.9%) and 2(2.0%) of the respondents were having primary school/1-8/ and secondary school/9-12/ education respectively.

On the basis of the findings, we can conclude that literacy level in the rural setting of Basso Liben *woreda* is very low. This in turn could be one reason for problems of rural water supply schemes sustainability. This is because; the FGD participants indicated that the low level of awareness is the factor for absence/weak community sense of ownership to the developed water supply facilities.

**Table4.3:** Households Respondents Education

| Category | Frequency | Percent |
|---|---|---|
| Illiterate | 53 | 52.5 |
| Only read or/and write | 40 | 39.6 |
| Primary school /1_8/ | 6 | 5.9 |
| Secondary school (9-12) | 2 | 2.0 |
| >12 grade | = | = |
| Total | 101 | 100.0 |

***Source**: Household Survey, 2009*

### 4.1.5. Occupation and Monthly Income

Sample households were asked about their main source of income, the amount they earn monthly and the results are presented in table 4.4. Almost all 99(98.0%) of the respondents reported that farming is their main source of income (see the table). Out of the remaining households one was a daily laborer and the other a government employee. From this it can be concluded that agriculture is the major source of income in the study area.

Similarly, table 4.4 shows that, the monthly income of 21(20.8%) household respondents was less than ETB 500. Household respondents with monthly income from 501 to 1000 ETB and 1001 to 1500 ETB comprised 24(23.8%) and 34(33.7%) respectively. According to the survey result, monthly income of the majority 58(57.5%) of the respondents lie between 501 and 1500 ETB and the mean monthly income was ETB 1301.74 with SD± 798.03. On the other hand, the range between the minimum and maximum monthly household income was found to be ETB 3,950 which indicates the existence of income difference among households in the study area. The researcher has also observed that Basso Liben *woreda* is suitable for agricultural activity and farmers were enjoying a relatively good yearly cereal harvest during the survey.

**Table4.4:** Household Occupation and Monthly Income

| Monthly Income in ETB | | | Source of Income | | |
|---|---|---|---|---|---|
| Category | Frequency | Percent | Category | Frequency | Percent |
| < 500 | 21 | 20.8 | Farming | 99 | 98.0 |
| 501 - 1000 | 24 | 23.8 | Employee | 1 | 1.0 |
| 1001 - 1500 | 34 | 33.7 | Daily labor | = | = |
| 1501- 2000 | 17 | 16.8 | Peaty trade | 1 | 1.0 |
| > 2001 | 5 | 5.0 | other | = | = |
| Total | 101 | 100.0 | Total | 101 | 100.0 |
| Mean ± S.D | 1301.74 ± 798.03 | | Income range | 3,950 | |

***Source:*** *Household Survey, 2009*

### 4.1.6. Demand for Social Services

Household survey respondents were also asked about what social services they need to be provided primarily and secondly. As table4.5 shows, 62(61.4%) and 15(14.8%) respondents have indicated that they desired water supply and education services to be provided first respectively. Equal

number 9 (8.9%) of the respondents replied that they preferred health and electricity services primarily. Only 4(4.0%) and 2(1.9%) respondents reported that road and telephone services as their first priority respectively.

Similarly, concerning social services that were needed to be provided secondly, 32(31.8%) and 23(22.8%) household respondents indicated that health and education services were their second priority respectively. As can be seen from the table, 16(15.8%), 13(12.9%), 12(11.9%) and 5(4.9%) of the respondents have replied that they needed electricity, water supply, road and telephone to be provided secondly respectively.

Surprisingly, no household respondent showed interest in sanitation facility supply. This may be because of low level of awareness of household respondents about the health related impacts of poor sanitary condition in the study area.

**Table4.5:** Respondents Need for Social Services

| | First Prioritized | | Second Prioritized | |
|---|---|---|---|---|
| Social Services | Frequency | Percent | Frequency | Percent |
| Education | 15 | 14.8 | 23 | 22.8 |
| Health | 9 | 8.9 | 32 | 31.8 |
| Water supply | 62 | 61.4 | 13 | 12.9 |
| Telephone | 2 | 1.9 | 5 | 4.9 |
| Road | 4 | 4.0 | 12 | 11.9 |
| Electricity | 9 | 8.9 | 16 | 15.8 |
| Toilet/Sanitation | = | = | = | = |
| Total | 101 | 100.0 | 101 | 100.0 |

***Source:*** *Household Survey, 2009*

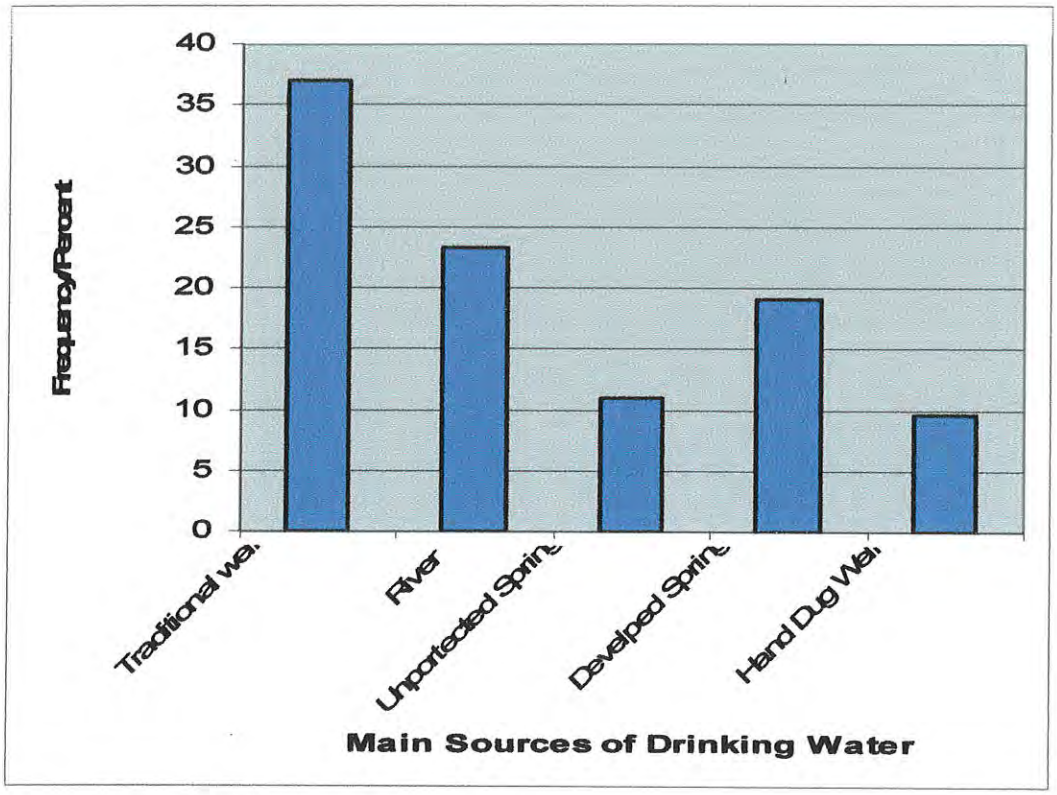
## 4.2. Existing Water Supply Condition

As indicated in the review of related literature, provision of drinking water supply is the access to safe, enough quantity and quality of drinking water to the people with in a reasonable distance. Accordingly, data on water source, its location, the amount of time required for water collection and household water utilization characteristics was collected to look into the status of water supply. Thus, this sub topic presents the findings of the study in three sections. First, the results of the study on existing sources of water for domestic purpose are described. Then, time required for the household water collection and distance from the source is offered. Finally, findings on household water utilization characteristics is presented and discussed.

### 4.2.1. Sources of Water Supply

There are several sources of water including river, unprotected and/or developed springs, traditional and/or protected wells etc, which can be used for different purposes. On the other hand, water is not only necessary for drinking and cooking but also for personal hygiene and livestock rearing (WB, 2002: 101). In view of that, sample households were asked whether they were using the same or different sources of water supply for domestic purpose.

**Chart 4.1:** Main Sources of Drinking Water for the Community




***Source:*** *Household Survey, 2009*

According to the survey result, 73(72.3%) respondents were using water for domestic purpose from different sources, while 28(27.7%) respondents were using the same source. As can be seen from chart 4.1, the study found that out of the 73 households who were using different sources, 27(37%) and 17(23.3%) respondents were using traditional well and river as their main supply of water during *"Bega"* season respectively. Correspondingly, 29(39.7%), 22(30.1%) and 12(16.5%) households were using traditional well, unprotected spring and roof catchments as the major source of water in the *Kirmet* season in that order.

The results of the survey also showed that, only 14(19.1%) and 7(9.6%) respondents had access to water supply from developed springs and hand dug wells as the main sources during *Bega* season respectively. During the *Kirmet* season, as the findings of the household survey showed, only 10(13.7%) respondents were using protected schemes as their main source of water supply.

More to the point, the researcher observed that inhabitants, in Mench (Yedug *kebele),* Den and Watlem *Gots (*Dendo *kebele*), were using unprotected private traditional wells as their main source of water for domestic purpose during the time of survey. The data collected through personal observation also indicated that people in the study area were collecting water from river and unprotected springs for domestic purpose (see Fig. 4. 1).

**Figure 4.1:** Unprotected Water Sources, Abay Gote, Yenscha Kebele

***Source:*** ***Field observation, February, 2009***

Frequent breakdown of the protected water source and an extended longer period of time it took for maintenance (Mench, Watlem and Graram water supply schemes) were reported as the major reasons that forced villagers to use unprotected traditional sources. Regarding the reason for using unprotected source a women FGD participant in Mench Gote, Yedug *kebele* argues:

*It has been about three years since the water supply scheme failed to provide service. We were very happy when the developed water supply scheme was functioning. For me, it seemed as if I were dreaming, we found and lost it in short moment. Consequently, we reverted back to alternative traditional water source that is why I am using from my own unprotected well as staying a day is difficult with out water.*

***Source:*** *FGD, February, 2009.*

Following frequent breakage of water supply schemes, too many people at the water point, water taste and distance were reported as additional reasons for not using protected sources by household respondents and participants of FGD. The interview held with Ato Mekuriaw (WWRDO head), W/o Muluken (Expert working in the WWRDO) and Ato Endanger (Project Coordinator for UNICEF water supply projects in Basso Liben *woreda*) also supports the household survey and FGD findings. Based on the results it can be concluded that traditional sources are the main sources of drinking water in the rural setting of Basso Liben *woreda*.

### 4.2.2. Time/Distance and Water Collection

Water supply has welfare benefits, particularly when time and energy on water collection reduced (Davis et al., 1993:9; IRC, 2003:2). Hence, a good source of water is one that can be collected with relatively short time and located with in a reasonable distance (WB, 2002:98). In view of that, household respondents were asked to tell the distance between the water source and their home and the total time required to go to the source and back home. The findings are described in table 4.6.

**Table4.6:** Distance and Time for Collecting Water

| Distance | | | Time | | |
|---|---|---|---|---|---|
| Category | Frequency | Percent | Category | Frequency | Percent |
| <100m | 27 | 26.7 | <15minuts | 24 | 23.8 |
| 101 - 500m | 46 | 45.5 | 16- 30minutes | 55 | 54.5 |
| 501 - 1km | 14 | 13.9 | 31- 45minuts | 17 | 16.8 |
| 1001 - 1500m | 2 | 2.0 | 46 minutes-1 hr | 4 | 4.0 |
| 1501 - 2000m | 8 | 7.9 | >1hr | 1 | 1.0 |
| > 2000m | 4 | 4.0 | Total | 101 | 100.0 |
| Total | 101 | 100.0 | Mean ± SD | 24.63 ± 12.92 | |

***Source:*** *Household Survey, 2009*

As shown in table 4.6, the large percentage (72.2%) of the respondents replied, their main drinking water source was located with in 500 meters distance from their home. Of these, 27(26.7%) households reported that the main drinking water source was placed in less than 100 meters distance. The remaining 14(13.9%), 2(2%) and 8(7.9%) households confirmed that their home is 501meter to 1000m, 1001 to 1500 meter and 1501 to 2000meters far from the main drinking water source in that order.

The survey result also revealed that, the total time taken to collect water in 69(68.3%) households was less than 30 minutes. The mean time required by households to go from home to the main water source and from the water source back home including waiting time at the water point was 24.63 minutes with standard deviation ± 12.92. The finding is far from the results of Mengesha (2002: 31) where the mean time required for water collection in rural areas of North Gonder was found to be 16 minute. It is also beyond the limit of the recommended time by WHO (1995), which is in 15 minutes of walking distance.

### 4.2.3. Characteristics of Water Utilization

Households' means of water transportation, the amount daily collected and consumed in the study area is presented and discussed under this sub topic.

**Table4.7:** Water Collection Task in the Family

| Who Mainly Fetch Water in the Family? | | | Age of Children, years | | |
|---|---|---|---|---|---|
| Category | Frequency | Percent | Category | Frequency | Percent |
| Husband | = | = | < 4 | = | = |
| Women | 72 | 71.3 | 4 - 9 | = | = |
| Children | 4 | 4.0 | 10 - 14 | 19 | 70.4 |
| Women and Children | 25 | 24.8 | > 14 | 8 | 29.6 |
| Total | 101 | 100.0 | Total | 27 | 100.0 |

**Source:** Household survey, 2009

As shown in the table above, the large percentage of the respondents (71.3%) confirmed that women were responsible for water collection in the family. In contrast, 25(24.8%) households reported that water collection was mainly the duty of both women and children and only 4 respondents put children as major water collectors at home. In addition, the results of the survey showed that in the family, the husband was not involved in water collection activity. The finding is more or less similar with the study results of Davis, et al. (1993:68) who revealed that on average women in Wollo, Ethiopia, undertook 90 percent of all water collection trips, children 8 percent and men only 2 percent. It also supports the assessment results of WHO that indicated, children and mothers, who are the common water attendants; spend much time on water collection in the rural settings of Ethiopia. This is believed to affect spare times required for other household affairs that may impact the health of the family as a whole (WHO, 1995:7).

A considerable number 9(70.45) of households also indicated that the age of children that collect water in the family were between 10 to 14 years. What is more attention-grabbing is that all respondents confirmed that water was transported by human labor using clay pot and/or plastic Jar.

Based on the findings it is safe to say that water collection is mainly the responsibility of women and children in the rural setting of Basso Liben *woreda* which in turn is a sign of the heavy work saddle of women at home. This may be because of the deep-rooted gender differences and associated values towards men and women roles in the family which requires attitudinal change through continuous sensitization and education of both sexes.

**Figure 4.2: Women Collecting Water in Gebarro Gote, Yenscha Kebele**

***Source:** Field observation, February, 2009*

In table 4.8, it is depicted that 58 (57.4%) of the respondents have been collecting water more than three times, 29 (28.8%) three times and 13(12.9%) two times daily. The average amount of water collected in single round tripe was found to be 23.42 liters.

As can be seen from the table below, 69 (68.3%) households were utilizing less than or equal to 75 liters of water per day. The daily water consumption of 31 (30.7%) respondents was found to be more than 76 liters per day per household. The study also revealed that the mean household water consumption and the amount of water per capita were 63.66 and 10.71 liters per day respectively. The finding of the study is more or less similar with the research conducted by Mengesha (2002:47) in North Gonder *Zone* where the amount of water per capita consumption was found to be 8 liters.

In contrast, the amount of water per capita consumption in the sample kebeles, about 10.71 liters and less used by the majority, was significantly different from WHO guide line and MoWR universal access program target values set at least 20 and 15 liters per capita per day in that order (Webster J, et al.,1999: 416; MoWR, 2008:2).

Based on the results it can be concluded that, people in the rural areas of Basso Liben *woreda* do not get sufficient quantities of water for a healthy life.

**Table4.8:** Water Collection Frequency and Consumption

| Water collection frequency per day | | | Daily HH water consumption per liter | | |
|---|---|---|---|---|---|
| Category | Frequency | Percent | Category | Frequency | Percent |
| once | 1 | 1.0 | 26- 50 | 29 | 28.7 |
| Twice | 13 | 12.9 | 51-75 | 40 | 39.6 |
| Three time | 29 | 28.7 | 76 -100 | 27 | 26.7 |
| > three | 58 | 57.4 | >100 | 4 | 4.0 |
| Total | 101 | 100.0 | Total | 101 | 100.0 |
| Per capita consumption | | 10.71 | Mean ± SD | 63.66 ±21.88 | |

***Source**: Household Survey, 2009*

## 4.3. Status of Rural Water Supply Schemes

On the basis of the data collected from WWRDO and field observation made by the researcher during the time of survey, the Physical status of rural water supply schemes in sample kebeles have been identified as functional (F) and nonfunctional (NF). The results are presented in table 4.9.

**Table4.9:** Status of WSSs in Sample *Kebeles*

| *Kebele* | Village/*Gote* | Type of Scheme | No of Beneficiaries | Year of Establishment | Status |
|---|---|---|---|---|---|
| Yedug | Tejebar | SPD | 516 | 1994 | F |
| | Anjem Denjem | SPD | 1250 | 1993 | F |
| | Mench | SPD | 528 | 1995 | NF |
| | Gedam No 1 | HDW | 400 | 1998 | F |
| | Gedam No 2 | HDW | 420 | 1998 | F |
| | Gedam No 3 | HDW | 200 | 1999 | F |
| | Ketato | HDW | 400 | 1999 | F |
| | Wend Ames | HDW | 384 | 2000 | F |
| | Yedug School | HDW | 370 | 2000 | F |
| Dendo | Watlem | SPD | 561 | 1995 | NF |
| | Tenkotch | HDW | 605 | 1993 | NF |
| | Den School | SPD | 377 | 1997 | F |
| | Seffera | HDW | 400 | 1998 | NF |
| | Gurem | SPD | 350 | 2000 | F |
| | Health post | SPD | 135 | 2000 | F |
| Yenscha | Gebarro | HDW | 225 | 1996 | NF |
| | Assero | HDW | 310 | 1997 | NF |
| | Gebrea Mench | HDW | 412 | 1996 | F |
| | Nabera | HDW | 225 | 1995 | NF |
| | Graram | SPD | 484 | 1994 | NF |
| | Abay | HDW | 400 | 1999 | F |
| | Sefere | HDW | 350 | 1999 | NF |
| | Chewa Mench | SPD | 350 | 1999 | F |

***SPD:*** *Developed Spring;* ***HDW****: Hand Dug Well;* ***F:*** *Functional;* ***NF****: Nonfunctional*

***Source:*** *Basso Liben WWRDO and Field Observation, February, 2009*

According to the data obtained from WWRDO, the number of developed water supply schemes in the study area at the end of 2000 E.C was about 139. The data also indicated that out of the total projects 74, 36, and 29 sources were protected springs, HDWs and Shallow Wells respectively. Additional information collected through personal observation also

confirmed that 23 developed water points, 9 springs and 16 HDWs were located in the sample *kebeles*, i.e., Yedug, Dendo and Yenscha during the survey (February, 2009). This shows that ground water is the major source of water for utilization in the rural areas of Basso Liben *woreda*. As presented above, the ground water was developed using different methods and supplied to the communities from caped springs, hand dug wells and shallow wells.

Available data on the status of water supply schemes in the study area indicated that out of the total facilities 50 (25 protected springs, 14 HDWs and 11 Shallow Wells) or 35.9% water supply schemes were not functioning during the report period, end of 2000E.C. The KII held at WWRDO further indicated that majority of the functional schemes were even providing service with frequent interruption.

The data collected through personal observation also shows that 9 (3 protected springs, and 6HDWs) or 39.1% of the water supply schemes in the sample *kebeles* were not providing services properly during the time of survey (see table 4.9). Likewise, a considerable number 45 (44.6%) of the household survey respondents confirmed that their water supply schemes were not functioning properly due to major breakdown during the time of survey and 41(40.6%)households reported that their water supply facilities were functioning, but with frequent disruptions. This shows that the great majority 86(85.2%) of the respondents indicated that their water supply systems are not properly functioning during the survey.

In sum, even though non-functionality of water supply facilities has shown a decreasing trend since 2005, where the percentage of nonfunctional facilities was about 55% (BoWRD, 2005:18) the study revealed that more than 35% of the schemes in the study area were in the state of breakdown, and many more were providing service with frequent interruptions.

**Table 4.10:** Characteristics of WSSs Non-functionality

| Issue | Respondents | | |
|---|---|---|---|
| | Response | Frequency | Percent |
| Level of scheme Non-functionality since construction. | Faced interruption | 88 | 87.1 |
| | Have never faced | 13 | 12.9 |
| | Total | 101 | 100.0 |
| Frequency of schemes failed to provide service. | Daily | = | = |
| | Weekly | = | = |
| | Monthly | = | = |
| | Sometimes | 40 | 45.5 |
| | Once broken, but, never maintained | 48 | 54.5 |
| | Total | 88 | 100.0 |

***Source:*** *Household Survey, 2009*

The household survey result also showed that the majority 88(87.1%) of the respondents have experienced nonfunctioning problem since the scheme get underway, while only 13 (12.9%) respondents replied as they have not faced interruption since the time of construction. This implies that the rural community in the study area did not get proper and regular water supply service.

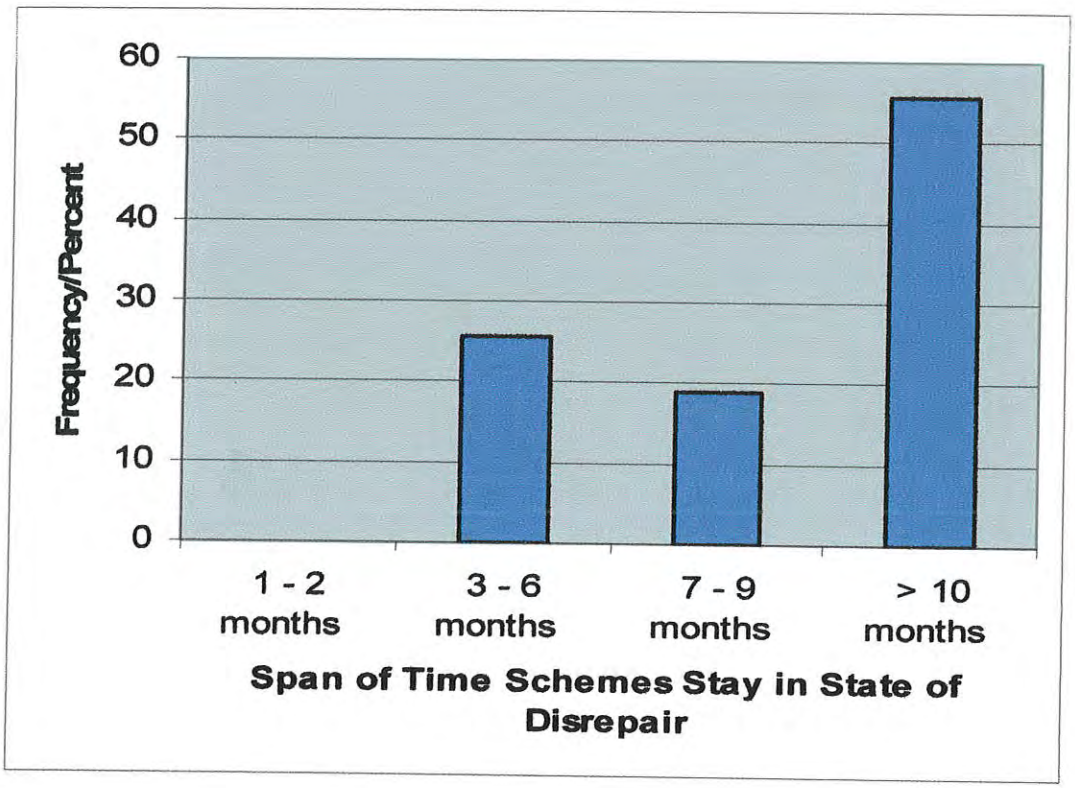
As can be seen from table 4.10, out of the total (88) households who have faced non-functionality problem, the majority 48 (54.5%) of the respondents reported that the scheme have never been maintained once it went to faulty. Similarly, participants of focus group discussions in Mench, Watlem and Graram villages explained that their water supply schemes were not providing service since the first moment they faced non-functionality.

Household survey respondents, who have ever faced water supply scheme non-functionality, were also asked about the average time span in which schemes stay in state of disrepair. As chart 4.2 shows, 56 (55.4%) respondents reported more than ten months, 26 (25.7%) 3 to 6 months, 19 (18.8%) 7 to 9 months and no household replied less than or equal to 2 months. Hence, all 88(100%) respondents reported that their water supply schemes have stayed in state of disrepair for long period (more than 2

months). The data collected from key informants further indicated that one of the major reasons why rural water supply schemes stay in state of disrepair for an extended period of time was the weak capacity of WWRDO to closely follow up scheme status and to take timely actions accordingly.

Based on the findings of the study, it can be concluded that ensuring sustainability of rural water supply schemes is a major challenge in Basso Liben *woreda* which in turn threatens efforts made to access potable water supply to all.

**Chart 4.2:** Span of Time in which WSSs Stay in State of Disrepair




**Source:** *Household Survey, 2009*

## 4.4. Factors Affecting Sustainability of RWSS

### 4.4.1. Community Related Factors

#### A. Community Demand for Improved Water Supply

As indicated in the review of related literature rural water supply can only be sustainable if it is demand driven. Communities must, therefore, request for the improvement of the water supply facility before it is constructed. Conversely, unless communities show interest and essentially demand for safe water supply service, there is a danger that the schemes will not be properly used and maintained.

In view of the above principle of demand driven approach respondents were asked to tell if they had demand for improved water supply service prior to construction in their respective villages.

As table4.11 shows, the study found that the great majority 98(97.0%) of household respondents confirmed that they didn't have demand for improved water supply prior to the construction of the schemes. This may be due to the existence of alternative traditional sources in the villages and low level of awareness about the health impacts of drinking unsafe water among the community which may in turn contribute to their reluctance in taking care of the improved facilities after construction. The finding opposed to the study results of Bezabih (2008:51) that reported more than 95% of households in Menge *woreda* (Benishangul Gumuz Region) had demand for protected water supply service prior to construction.

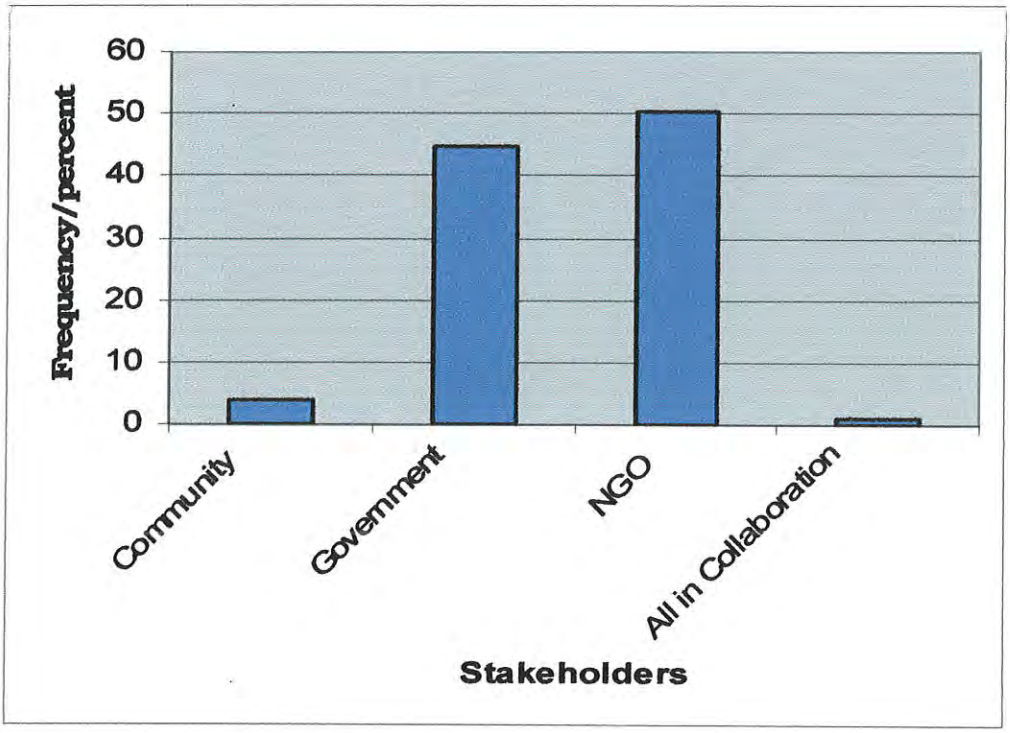
**Table 4.11:** Community Demand for Improved WS Service

| Issue | Frequency | Percent |
|---|---|---|
| Having the demand prior construction | 3 | 3.0 |
| No demand prior construction of WSS | 98 | 97.0 |
| Total | 101 | 100.0 |

***Source:*** *Household Survey, 2009*

Similarly, in response to the item "who took the initiative to provide the existing water supply?" 51 (50.5%) and 45 (44.6%) households reported NGO and Government respectively. Hence, the study indicated that it was the external water supplying agencies (Government and NGOs) who mainly initiated the development of water supply schemes in the study area which may be a factor for failure of the system to continue to provide service once it is established (see chart4.3). This is because sustainability is higher when demand for safe water supply is expressed directly by the community (Kantz and Sara, 1997:5).

**Chart 4.3:** Nature of Stakeholders Initiative in WSD




***Source:*** *Household Survey, 2009*

The Data collected from participants of FGD also confirmed that the communities didn't have demand for improved water service at the beginning and the initiative for scheme development was not from the community. An elderly at Watlem *Gote* of Dendo *kebele*, for example, described the way how the project was started as:

*It was before six years that two individuals from the government came to our village and told us that the water, we were used to drink, was not clean. And then, they developed the spring and finally handed over to us during the inauguration ceremony. As to my knowledge, no one in the village was willing to put stone and cement on the spring head prior to that moment.*

***Source:*** *FGD, February, 2009*

From the above discussion, it can be concluded that the communities in the rural areas of Basso Liben *woreda* were not taking the initiative and the responsibility for improving their water supply situation rather they were passive recipients of external agency services i.e., the approach was not demand responsive which could be one factor that affected sustainability of the facilities. The result supports the findings of WB (2002:101) that reported one of the principal causes of system failure in many countries had been the lack of demand and initiative of the community in improving their water supply services.

**B. Community Participation**

In many countries one of the major causes of water system failure has been the lack of participation of the community (WB, 2002:101). In other words, users' involvement in every phase of the local water supply development and contribution to their construction and operation has paramount importance to sustainability. Thus, Dessalegn (1999:40) strongly argues, unless users are involved from the beginning and are conscious of a need for safe water supply there is a danger that the facilities will not be properly used or maintained.

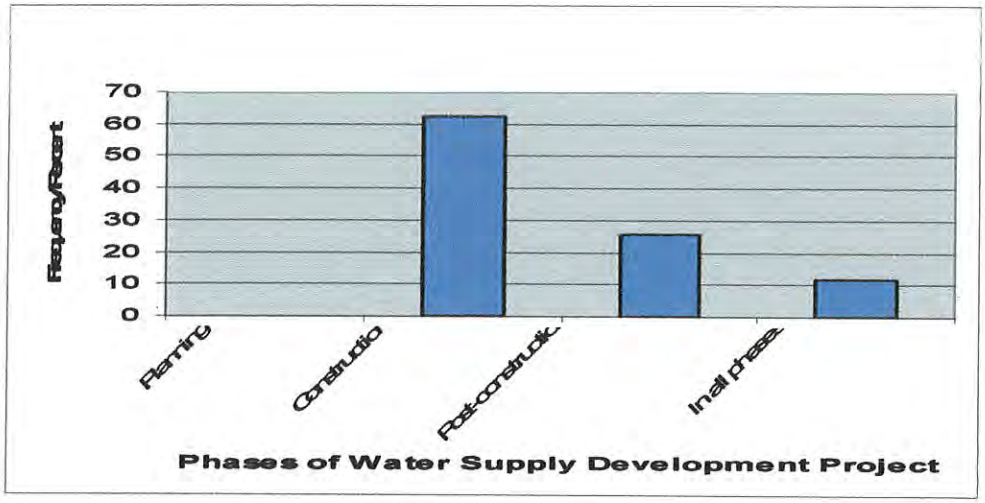
In view of the above, the levels of community participation in water supply development were assessed and the results are presented in table 4.11. With regard to participation of the community at any stage of the water supply development, the findings of the study revealed that the great percentage (92.1%) of the households had participated in one way or another. Similarly, except Den *Gote* water supply scheme users in Dendo *kebele*, all participants of the FGDs unanimously confirmed that they had

been involved in the development of their water supply scheme. This is because, Ato Mekuriaw (Head, WWRDO) explained, implementing agencies had been trying hard to involve users in the development of water supply as per the policy guideline, though the achievement wasn't significantly encouraging.

As far as community participation is concerned the main issue to be considered is the phase at which users are involved or participated. Review of related literature indicated that community participation should began as early as possible in the project development and community members should be involved in planning the new scheme, decide how it can be run and by so doing the prospects of success are improved. Hence, the water supplying agency should ensure that the community is involved from the start of the project to the evaluation stage.

As shown in chart 4.4, 58(62.4%) respondents participated during construction, 24(25.8%) after construction (post construction) and 11(11.8%) in all phases. This implies that majority 82(88.2%) households didn't participate satisfactorily during the planning stage, which is the most important phase that gives an opportunity for communities to make informed decision about the water supply (like site, type of technology, and contribution). Similarly, participants of FGD and KII also confirmed that users were not fully involved during the planning stage. This could be seen as the failure of water supplying agencies to involve beneficiaries in designing water supply projects which could in turn influence the level of acceptance and sense of ownership of the facilities put in place.

**Chart 4.4:** Levels of Community Participation in the WSD Project Phases




***Source:*** *Household Survey, 2009*

Regarding the type/s of contribution made, the survey result revealed that among participated household respondents 31(33.3%) contributed free labor, 7(7.5%) local materials, 53(58.1%) both free labor and local materials and no respondent made financial contribution. Participants of FGD also reported that except at Den *Gote* (Dendo *kebele*) users contributed unskilled labor and local materials i.e. stone, wood and sand during construction, but all capital costs were covered by implementing agencies.

In assessing who was/were participated in the family during water supply development, 57(61.3%) households reported that the husband only, 29(31.9%) adult males and only 7(7.5%) indicated the participation of both adult males and females. This shows that the involvement of women in water supply development in the study area was very limited.

Further, as can be seen from the table, 66(65.3%) of the respondents indicated that the site for water point construction was selected by implementing agencies (Government and NGOs), 33(32.7%) by both community and implementing agencies in collaboration and 2 by the community. The data collected from KII held at ZWRDD and WWRDO also confirmed that the decision on site for water supply development was made by technicians from government or non government organization, with only background information collected from the local communities. Yet,

participants of FGD were complaining on technicians for not involving and accepting community suggestions as to where the water point was to be located in the village. Specifically, participants of the FGD at Mench and Graram water supply schemes complained with anger that repudiation to accept the ideas of the community and failure to fully involve users in site selection decision was a principal reason for system failure.

**Table 4.12:** Level of Community Participation

| Issue | Responses | Frequency | Percent |
|---|---|---|---|
| Nature of households' participation. | Participants | 93 | 92.1 |
| | Non participants | 8 | 7.9 |
| | Total | 101 | 100.0 |
| Type of contribution | labor | 31 | 33.3 |
| | money | = | = |
| | Local Material | 7 | 7.5 |
| | 1,2 and 3 | 1 | 1.1 |
| | 1 and 3 | 54 | 58.1 |
| | Total | 93 | 100.0 |
| Family member participated in water supply development. | Husband only | 57 | 61.3 |
| | Adult males | 29 | 31.2 |
| | Adult males & Females | 7 | 7.5 |
| | Total | 93 | 100.0 |
| Involvement in site selection decision. | Community | 2 | 2.0 |
| | NGO | 55 | 54.5 |
| | Government | 11 | 10.9 |
| | 1 and 2 | 16 | 15.8 |
| | All in collaboration | 4 | 4.0 |
| | 1 and 3 | 13 | 12.9 |
| | Total | 101 | 100.0 |

***Source:*** *Household Survey, 2009*

**C. Women Participation**

The review of related literature indicated that the participation of women in water supply projects can have several benefits. As prime beneficiaries they can promote the interest and willingness of men to contribute to the provision of water supplies. Women can also benefit projects in the identification of reliable water sources of acceptable quality. In addition, women opinion and needs have important consequences for the acceptance, use and readiness to maintain new water supplies and for the ultimate sustainable use of the scheme.

Accordingly, the level of women participation in the development of water supply was assessed and the results are presented and discussed below.

As table 4.12 shows, only 7(7.5%) respondents reported that adult females have participated in the development of water supply. Surprisingly, all participants of FGD confirmed that women were not even consulted about the project and it was only men who were involved in the process. Although two of the water committee members were made women, the selection was done by male with out the knowledge and participation of women in the community. Similarly, participation of women in the committee was nominal. A woman at Tejebar *Gote*, Yedug *kebele* states the level women involvement in water supply development and management during FGD as:

> *Our level of participation in the development of water supply was limited to food preparation to the local artisan during construction. We were not publicly informed, consulted or involved during the development process and later in the management of the scheme. Besides, our representatives in the water management committee were elected by men with out our knowledge and participation. Elected women were not given the opportunity and had made no significant contribution. Yet, we are part of the community who suffered a lot from the problem related to water supply.*
>
> **Source:** *FGD, February, 2009*

The information collected from KII also indicated that water supplying

agencies had made concerted effort to ensure participation of women in the water supply project management, though the achievement was not cheering.

In sum, despite their crucial importance and efforts made to involve women in water supply scheme development and management by the agencies, the results of the study revealed that level of women participation in rural water supply in the study area is very low. The finding supports the study results of IRC (2003) which stated though the degree of women involvement may vary from place to place, it is found to be low across different countries compared to men. For example, in The Netherlands only 15 percent of the Water Management Board is women and women organizations are consciously campaigning to increase their number.

**D. Community Management**

Managing rural community water supply successfully means operating and maintaining a system on a day to day basis so that it continues to work and supply water as planned. Therefore, water supply schemes will be more sustainable if they are managed by users themselves than by external agencies. On the other hand, water supplying agencies need to strengthen the capacities and willingness of the communities to take ownership and responsibility of managing their water supply systems. One way that the communities exercise the management of rural water supply schemes is through establishment of water committee.

In assessing the approach followed in rural water supply management in the study area, all sample households unanimously reported that water supply systems were managed by the communities through elected water management committees whose members were mainly 7 of which about two were women. The water management committee includes one chairperson, one secretary, one cashier, two local technicians and two members.

The data collected from KII also indicated that implementing agencies

establish water committee during project implementation and handover water supply scheme officially to them after construction. Particularly, KII held at ZWRDD and WWRDO indicated that post construction management of schemes was made the sole responsibility communities. Similarly, all participants of FGD confirmed that water committee was established during the water supply development process and mobilize users to contribute labor and local materials during construction (except Den *Gote* in Dendo *kebele*).

The data obtained from NGO KII respondents indicated that the water management committee signs memorandum of understanding on behalf of the communities which was expected to serve as contract agreement between the implementing agency and users. According to the signed agreement collected during the time of survey at Mench *Gote,* Yedug *kebele,* the water committees were mainly responsible for:

- mobilizing the community for labor and local material contribution during construction,
- ensuring safety and security of the scheme i.e. fencing,
- employing guard and keeping the system clean,
- protecting the scheme from flooding by diversion ditch,
- over all financial and technical management of the scheme,
- submitting monthly report about scheme status to WWRDO, and
- request support for problems that are beyond the community capacity.

However, the Memorandum of Understanding wasn't signed in all water supply schemes. It is found to be the experience of some NGOs working in water supply development in the study area.

According to the information collected from *woreda* and zonal Water Resource Development Office key informants, water committees had no

legal recognition at regional or lower levels which could be the major reason for lack of transparency and accountability.

Further, ahead of their establishment, the capacity of water committees in carrying out their duties, responsibilities and proper management of schemes for sustainable utilization of the benefits of the projects were assessed. As the survey result indicated the majority 77(76.2%) of the respondents replied that the management committees are not capable and as a result they were not adequately performing their duties and responsibilities. 24(23.8%) households reported that water committees are capable of managing water schemes.

The data collected from FGD held at Mench, Watlem, Graram and Den *Gotes* also confirmed that the water management committee was not responsible in carrying out their responsibilities especially in the post construction period. Besides, conflict among members of the committee, misuse of collected fee, lack of transparency, accountability and commitment were reported as problems related with local water management board that affects sustainability of the system. Most of the committee members during the FGD also accepted that they did not work as harder as management of rural water supply demands because of lack of adequate training and follow up from implementing agencies, lack of power to enforce rules as the committee had no real authority to act with in the community, and lack of sense of ownership.

The finding supports the study results of Davis et al. (1993:148), who reported that water committee for most water supply projects in developing countries did not function as intended for various reasons. Hence, before forming the water committee, it is imperative to be clear about what the committee should do and develop strategies that would enhance capacity building in knowledge, skills and problem resolution method at community level (Yanore in Pickford et al., 1996:112).

## E. Communities' Sense of Ownership

The developed water supply facility will most probably be managed poorly, misused, and rarely repaired by the community, if the beneficiaries do not feel sense of ownership. In other words, if end users don't feel sense of possession, developed water supply scheme will not be sustainable. On the other hand, the degree of sense of ownership depends on the level of involvement of the community in the development process. Hence, any community development activity including rural water supply needs to ensure participation of beneficiaries so as to build there sense of owner ship which in turn is crucial for sustainable utilization of the benefits.

In assessing the sense of ownership of the community to the developed water supply schemes, 44(43.6%) household survey respondents reported that they feel sense of possession while more than half 57(56.4%) of them do not. The data collected from KII also indicated that one of the problems related to sustainability of rural water supply is the absence of sense of possession by beneficiaries who did not handle schemes properly and refused to contribute finance to cover costs of operation and maintenance. Similarly, majority of the participants of FGD confessed that the non-functionality problem is in one way or another related to absence of sense of ownership due to low level of awareness, failure of the scheme to provide adequate and continuous service that satisfy demand of beneficiaries, existence of alternative sources particularity traditional wells for some members of the community and party due to lack of full participation in all stages of the project cycle.

A women FGD participant at Mench *Gote* of Yedug *kebele* sensitively states the problem of lack of sense of ownership as the cause for non-functionality of water supply schemes as:

*It was our dilemma to use properly and take care of the developed scheme that allowed for the breakdown of the facility. Besides, no one of us was ready and willing to advice and punish children who had been playing on and breaking parts. Even we were expecting every thing from the Red Cross as we thought that the scheme belongs to it. Above all we made no valuable effort so far to get the facility maintained the last three years. It becomes clear for me by now that the Red Cross had invested about 50,000 birr and supported us in protecting our spring then because of mainly our low level of awareness we didn't use it properly. As a result we are back to use drinking water from traditional sources computing with our domestic animals. So, for me, we shouldn't externalize the problem as the absence of sense of ownership was the major difficulty that threatens continued use of our developed spring.*

**Source:** *FGD, February, 2009*

The data collected during personal observation also showed that, 19 schemes have weak or no fences. Only 4 of the 23 observed schemes have guard and all have no appropriate drainage/diversion ditch to protect from flooding during the rainy season. Out of all (23) visited schemes only Tejebar and Anjem Denjem in Yedug *kebele*, Den in Dendo *kebele* and Chewa Mench in Yenscha *kebele* have locks and appropriate timing of fetching water. To put it differently, the researcher has observed that majority (19) of the visited schemes were pumped by users and mostly by children any time through out the day. These are indicators of weak or absence of sense of ownership to the developed schemes. The finding is different from the study results of Sharma, et al. (2005:368) who reported that communities in rural and semi-urban areas of Zambia have demonstrated high levels of sense of ownership commitment to sustain water supply schemes.

Thus, based on the above findings it can be concluded that rural communities in the study area have weak or no sense of ownership to the developed water supply facilities that could be one factor affecting sustainability of rural water supply schemes.

### 4.4.2. Financial Factors

Water supply project implementation and the continued use of intended benefits require financial resource. This is simply because, the establishment, operation, maintenance and management of water supply schemes costs money. Hence, weather it is community managed or agency managed the money for running the supply must come from some where and needs to be utilized and managed properly (Davis et al., 1993:157). Accordingly, the nature of community financial contribution to costs recovery, ability and willingness to pay, adequacy of funds, proper management and utilization of collected fee are some of the major financial issues that were assessed as factors that affect sustainability of rural water supply in the study area. Hence, in this section, the results of the study on financial factors that affect sustainability of rural water supply are presented and discussed.

**A. Community Financial Contribution**

The Issue of cost sharing and cost recovery is crucial in the development of sustainable water supply. Hence, the nature of communities' financial contribution to the development of water supply in the study area was assessed. In this regard, the results of the study indicated that capital costs were fully covered by water supplying agencies. Meaning, all respondents of household survey unanimously reported that they did not contribute money for the construction of the water supply scheme.

Further, sample households were asked to tell by whom the capital costs of their WS project were covered. The majority 82(81.2%) of the respondents replied that water supply projects were financed by NGO and 19(18.8%) by government. The data collected from FGD, KII and document review also confirmed that capital costs (costs of construction industrial materials and skilled labor) were covered by implementing agencies. Yet, community failure to cover or share the cost of improved water supply in developing countries has been identified as the major constraint to achieving goal of safe water supply for all on sustainable basis (Evan, 1992:41).

The Water Resource Management Policy of Ethiopia (1999:23) clearly stipulates that the provision of drinking water supplies in urban areas are based on the principle of total cost recovery while in rural areas water supplies are based on covering costs of operation and maintenance. There fore, beneficiaries are expected to pay for water supply services, particularly to cover operation and maintenance costs.

In assessing whether communities pay fees for the water service they use or not, the results of the survey found that less than half 50(49.5%) of the sample respondents were paying, while 51(50.5%) respondents reported that they were not paying during the time of survey. Besides,as the statistical test shows, there is association or dependence between system sustainability and service charge payment at $p < 0.01$(table4.13). The data collected from FGD also confirmed that although a system of payment for the water service had been established in all the sample schemes, except beneficiaries of Tejebar and Gebrea Mench water schemes, users of Mench, Watlem, Den, and Graram water points were not paying for the service during the time of survey.

The finding is far from the study results of Bezabih (2008:66) that revealed 97.4% of households in Menge Woreda of Benishangul Gumuz region were paying for the water supply service they use. On the other hand, the result supports the research findings of Haysom (2006:22) that indicates water supply fee collection is weak in the majority of the rural villages of Tanzania which primarily correlates to non-functionality.

Amazingly, the major hitch, as reported by Ato Mekuriaw, Head WWRDO, was the problem of budget/finance at *woreda* level to provide support for operation and maintenance costs at community level. This shows that the money required for operation and maintenance had not been collected in most water supply schemes in the study area and the WWRDO had very limited financial capacity to provide support which could in turn affect sustainability of the schemes. Nevertheless, ever since the last decade, it becomes clear that neither government nor donors continue to afford to

pay for the costs of providing water supplies and of running them. And there has been a trend of paradigm shift away from free provision to wards user's significant contribution to the cost, particularly to operation and maintenance cost (Evan, 1992: 42).

Based on the findings, it can be concluded that community's failure to pay for water supply service and limited government budgetary allocation/support to operation and maintenance costs were financial factors that hinder continued use of the benefits of water supply facilities in the study area.

**Table 4.13:** Nature of Community's' Financial Contribution

| Item | Responses | Scheme Status | | | | Total | |
|---|---|---|---|---|---|---|---|
| | | Functional | | Non Functional | | | |
| | | Frequency | % | Frequency | % | Frequency | % |
| Do you pay service fee? | Yes | 40 | 39.6 | 10 | 9.9 | 50 | 49.5 |
| | No | 11 | 10.9 | 40 | 39.6 | 51 | 50.5 |
| Total | | 51 | 50.5 | 50 | 49.5 | 101 | 100.0 |

**Note: Chi-square = 34.48; p<0.01**

***Source:*** *Household Survey, 2009*

### B. Adequacy of Funds

As indicated in the preceding section, the Ethiopian Water Resource Management Policy (1999:23) clearly states rural water supply service tariff setting to be based on the objective of recovering operation and maintenance costs as compulsory. Thus, the amount of money needed for operation and maintenance must be contributed by the user community which follows a decentralized approach of resource mobilization and management. The Amhara National Regional State proclamation No.82/2003 also states, the communities that use the sources are determining and fixing water service tariff rates.

As table 4.13 shows, all 69(100%) household respondents reported that the water service fee rates were set by the community mainly through the water management committee. In other words, sample households replied that the involvement of implementing agencies, Government and NGOs, in water service fee rates setting decision was limited to facilitation. In support to this, W/o Muluken, who had been working in WWRDO for about ten years, explained that the major community mobilization activities including water management committee formation, community participation during construction, and service fee rate setting were done by the community under the facilitation and/or leadership of WWRDO. Similarly, the data collected from FGDs also confirmed that people from WWRDO and/or NGO were facilitating the process of fee rate setting in each water supply scheme; yet final decisions were made by the community. The amount of the fee and mode of payment were not standardized as it was done depending on the capacity and interest of each community.

Regarding the amount of payment, majority 35 (70.0%) of sample households who have made payments during the survey reported that the fee lies between ETB 1.51 and 2.00 per month per household, while 15(30%) respondents were paying less than ETB 1.50 per month/household. The study also found that the amount of payment was not fair or it was too low to recover operation and maintenance costs (see table 4.14).

Further, majority 47(68.1%) of the respondents reported that, collected fees were used to cover only the salary of the scheme guard. However, during the time of personal observation the researcher widely read that most of the scheme guards have resigned mainly because of pending payments of salaries.

Amazingly, even from among those less than half 50(49.5%) of the respondents who have made payment during the time of survey 19(38.0%) households assured that they were not paying user fee regularly. This shows that majority of the households in the study area were not paying

for the water supply service and those who were paying have not been doing it regularly. Data collected from FGD discussants also indicated that, except Tejebar and Gebrea Mench water points that were in a relatively better sate of functioning, the amount of water supply service fee paid by users were not adequate to cover costs of operation and maintenance.

Hence, it can be concluded that inadequacy of funds collected from the community to cover operation and maintenance costs was one of the financial factors that affect sustainable use of water supply facilities in the rural setting of Basso Liben *woreda.*

**Table4.14:** Issues Related to Adequacy of Funds

| Issue | Responses | Frequency | Percent |
|---|---|---|---|
| Water service fee rate setting. | By Community | 69 | 100.0 |
| | By Government | = | = |
| | By NGO | = | = |
| | Community & Government | = | = |
| | All in collaboration | = | = |
| | Total | 69 | 100.0 |
| Amount of money paid per month by households. | < 0.50 cents | 14 | 28.0 |
| | 0.51 - 1.00birr | 1 | 2.0 |
| | 1.51- 2.00 birr | 35 | 70.0 |
| | >2.00 birr | = | = |
| | Total | 50 | 100.0 |

***Source:*** *Household Survey, 2009*

### C. Ability and Willingness to Pay

In order for the communities to meet costs of operation and maintenance, members must be willing and able to pay for the service. This is why a survey is recommended to be done before a project is started to determine the community's capacity and willingness to pay.

As the results of the study showed, 20(19.8%) and 50(49.5%) respondents reported that they are willing to pay ETB 0.51 to 1.00 and ETB1.01 to 2.00 per month per household respectively. A considerable number 26 (25.7%) of respondents also indicated that they are willing to pay more than ETB 2 per month per household.

Thus, the survey result revealed that households are willing and able to pay more than what they were paying. Similarly, the data collected from FGD discussants confirmed that users of water supply schemes are willing and capable of paying for the service, although majority of them were not actually paying during the survey. This was because, as indicated by the FGDs discussants, villagers were not satisfied with the service as schemes were not functional for a relatively a long period of time (Mench and Watlem water points were not providing service for about three years), the water committees were not collecting the money regularly and lack of transparency and accountability in fund management.

From the above finding, it can be concluded that majority of the households were able and willing to pay for the service. Therefore, the study found that willingness to pay is not a major problem related to sustainability of rural water supply in the study area.

The result supports the findings of the study conducted in Malawi where communities were willing to make significant payment for water supply service even when the distance is not reduced. This is because there is an inherent attraction in many settings for modern services similar to those available in towns and cities (Briscoe and de Ferranti, 1998:12). It also goes along with the study results of Bamberger (2000:118) that indicated that the willingness to pay a better quality reliable water supply is much higher than previously perceived.

**D. Community Management of Funds**

As indicated in the review of related literature, revenue management

deficiency is one of the main obstacles to the smooth functioning of decentralized water system. Thus, in addition to fund mobilization, smooth financial management methods like proper book keeping and saving are important elements in sustainable rural water supply. Proper management of funds, on the other hand, depends on the capacity of water committee to raise, bank and make use of the money as it should be.

According to Article31/3 of the Urban and Rural Water Supply and Sewerage Service Regulation No. 82/2003, the water committees are obliged to keep financial records and bodies designed through *Woreda* Administration Council and *Woreda* Water Resource Development Office shall audit the records. In view of the above, community fund management capacity in the study area were assessed and the results are presented as follows.

As table 4.14 shows, all respondents reported that water supply fund was managed by the community through established water management committees. In assessing the capacity of beneficiaries in managing the money, majority 36(72%) of the sample households replied that water committees lack the competence to properly handle the finance collected from the community, while only 14(28%) respondents replied that committees have the required capacity.

The data collected from FGD also confirmed that except at Tejebar water point where participants have clearly shown trust and confidence on the competence of the committee, who were able to properly manage users fee and proved to ensure continued functioning of the facility, inability to raise adequate users ' fee, misuse of the collected fund, and lack of proper book keeping and saving were some of the fund management related problems that were indicated by Mench, Watlem, Gebrea Mench, Graram and Den water supply schemes discussants.

With regard to fund misappropriation Ato Menuyelet Asserse, a participant of FGD held at Mench *Gote* of Yedug *kebele* summarizes the discussion on the issues as:

> *---as per our consensus, the first two years, we were used to pay sufficient amount of grain on a regular basis hopping to build up a fund to cover the maintenance and replacement costs of the scheme installed. Collection, keeping and authority of fund utilization were done by the village water management committee. Latter on, we found out that some of the committee members were misappropriating our money and since then no one has been ready to pay for the service. Consequently, the scheme had not been working properly for the last three years which could have been maintained with spare part change that costs for not more than ETB 200.*
>
> ***Source:*** *FGD, February, 2009*

Regarding fund keeping, the study found that no banking system had been put into effect and the money was kept in the water committees' home. Besides, all respondents of household survey and FGDs unanimously confirmed that cash receipt invoices had never been given for the payments made. In addition, the water committees' book keeping skills were found to be near to the ground. These could be some of the reasons that allowed corruption and misappropriation of funds which in turn affected users' interest to contribute money to cover operation and maintenance costs in the study area.

The result supports the findings of studies that indicated misappropriation of revenue collected from users is a major finance related factor that hinders the continued use of water supply services (Bezabih, 2008:71; Davis et al., 1993:160; Yanore in Pickford et al., 1996: 12).

On the basis of these findings, it can be concluded that revenue management paucity by communities is a major threat to sustainability of rural water supply in the rural areas of Basso Liben *woreda.*

**Table4.15:** Communities Fund Management Capacity

| Issue | Responses | Frequency | Percent |
|---|---|---|---|
| Collected fee management responsibility. | Community | 50 | 100.0 |
| | Government | = | = |
| | NGO | = | = |
| | Community & Government | = | = |
| | All in collaboration | = | = |
| | Total | 50 | 100.0 |
| The capacity of water committees to manage the finance. | Capable | 14 | 28.0 |
| | Don't have the capacity | 36 | 72.0 |
| | Total | 50 | 100.0 |

***Source**: Household Survey, 2009*

### 4.4.3. Technological Factors

As indicated in the literature, technical aspects related to technology choice, availability of spare parts, operation and maintenance skill, design and construction quality are the most obvious factors that affect sustainability of rural water supply schemes. Accordingly, the results of the research on these issues are presented and discussed in this sub section.

### A. Technology Choice

Technology choice is crucial to the sustainability of rural water supply as the type of technology chosen affects operation and maintenance. To put differently, if the community is to manage a water system, the technology used needs to be the type that users are interested in and can maintain with little out side support (Davis et al., 1993:155). A technology is considered suitable if it is socially acceptable, economically affordable and environmentally sound.

Thus, user communities should have a say in technology choice and technology choice should not be considered too technical and beyond the comprehension of the community members. Accordingly, the nature of water supply technology choice was assessed and the results are presented below.

**Table4.16:** Nature of RWS Technology Choice

| Issue | Responses | Frequency | Percent |
|---|---|---|---|
| Community involvement in the choice of the technology. | Consulted | = | = |
| | Not consulted | 101 | 100.0 |
| | Total | 101 | 100.0 |
| Nature of the technology to be operated and used by the community. | Simple | 35 | 34.7 |
| | Not Simple | 66 | 65.3 |
| | Total | 101 | 100.0 |

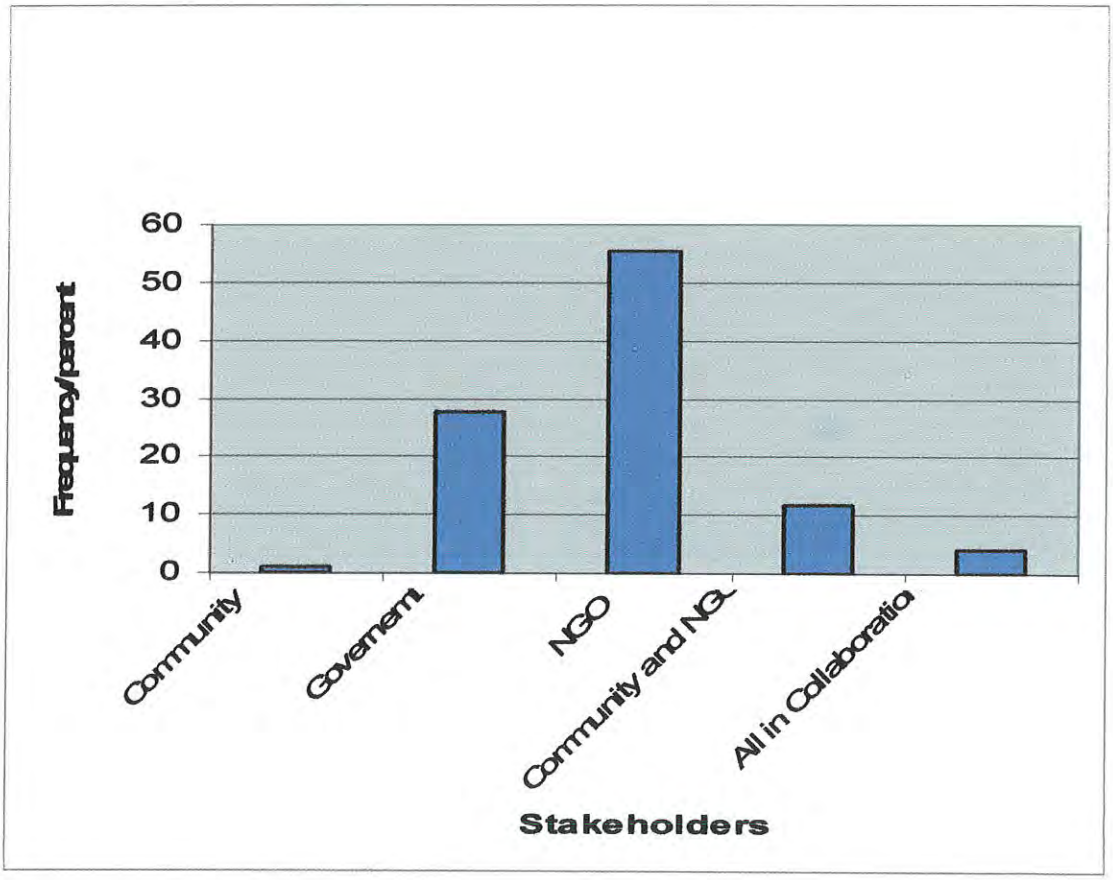
***Source:*** *Household Survey, 2009*

As can be seen from the table above, all respondents of the household survey unanimously reported that community members didn't have a say in the choice of the technology they are using. This is because as the data collected from KII revealed, the type of technology to be installed was predetermined by implementing agencies.

Similarly, majority 84(83.1%) households, as shown in chart 4.5 below, confirmed that existing technologies were selected by water supplying agencies (government and nongovernmental organizations). The result contradicts with the recommendation that indicates communities should always be consulted for a technology to be appropriate (Mc Pherson in Musonda, 2004:122).

Based on the finding, it can be concluded that beneficiaries of rural water supply in the study area did not have a say in the choice of the technology which is a menace for sustainability of the facilities.

**Chart 4.5:** Nature of Stakeholders Involvement in WS Technology Choice




***Source:*** *Household survey, 2009*

### B. Operation and Maintenance Problems

Sustainability cannot be fully realized if the communities are not able to operate and maintain their own water supply facilities. This is because, operating and maintaining water supply schemes on the day to day basis ensures that it continues to work for a long time. Hence, effective operation and maintenance of schemes by the community is a vital element that contributes for the continued utilization of the benefits of rural water supply project as non-functionality is the feature of any developed water supply scheme. Then again, carrying out effective operation and maintenance requires availability of skilled technicians at community level.

In view of the above, the capacity of the community to operate and maintain their water supply facilities were assessed. As table 4.17 shows, the large percentage (69.3%) of the respondents reported that they do not

have the ability to handle and maintain water supply facilities due to absence of trained technicians at community level, while 31(30.7%) households replied that they have trained local technicians. Amazingly, the study indicated that there was no any female technician in the sample villages.

The study further inquired whether local technicians have been actually maintaining technical failures (see table 4.17). As the findings of the household survey showed, all respondents unanimously reported that local technicians did not repair any breakdown of water supply scheme.

Similarly, KII respondents from water supplying agencies said that although they have trained two local technicians from each community they were supporting, the achievements so far are not encouraging as trained technicians did not shoulder their responsibility and communities have persisted seeking external technical support even for minor technical failures. This is because, as the information collected from FGDs indicated, the training given did not adequately prepared and enabled local technicians to carry out effective operation and maintenance.

Consequently, a considerable number of water supply facilities in the study area are not providing service as intended (for the details refer section 4.3). The finding does not go along with Davis et al. (1993:150) who states, training of community members in operation and maintenance skills should help to promote continued functioning of water supply schemes.

Based on the finding, it can be concluded that majority of the communities in Basso Liben *woreda* do not have the ability to operate and maintain their water supply schemes properly because of absence of trained local technicians, which is a major factor that constrain sustainability of facilities.

**Table4.17:** Community Involvement in O & M

| Issue | Responses | Frequency | Percent |
|---|---|---|---|
| Existence of local technicians. | Exist | 31 | 30.7 |
| | absent | 70 | 69.3 |
| | Total | 101 | 100.0 |
| Actual maintenance work done by local technicians. | yes | 13 | 41.9 |
| | No | 18 | 58.1 |
| | Total | 31 | 100.0 |
| Sex of local technicians. | Male | 31 | 100.0 |
| | Female | = | = |
| | Total | 31 | 100.0 |

***Source:*** *Household Survey, 2009*

### C. Availability of Tools and Spare Parts

Availability of spare parts and tools for maintenance are very crucial for the sustainability of water supply schemes. In assessing whether the local technicians were equipped with necessary toolkits to carryout repairs or not, all respondents of the household survey, who reported the existence of local technicians in their village, replied that technicians were ill-equipped (see table 4.17). Similarly, KII respondents at WWRDO said that local technicians were not provided with necessary tools required to carry out repairs by implementing agencies and it was difficult to the community to find tools needed to repair water supply scheme failures in the *woreda.*

The researcher also noticed, during field observation, leaking pipe lines and broken facets in Mench and Watlem springs that could have been mended by local technicians if they were equipped with the necessary hand tools (see figure 4.3 below).

**Figure4.3:** Problem of Spare Parts and Tools, Mench Gote, Yedug Kebele

***Source:*** *Field observation, February, 2009*

This shows that local technicians were not accompanied with the necessary tools to carry out operation and maintenance in the study area. Based on the discussion above, one can draw a conclusion that absence of toolkits was one factor, that constraint local technician from operating and maintaining their water supply facilities which in turn lead to non-functionality of schemes for a longer period of time. The result indicated that the suggestion made by Musonda (2004:139) who states "appropriate tools for carrying out repairs should be made available to achieve sustainability" needs to be considered.

Availability of spare parts at community level is another important constituent that contributes to sustainability of rural water supply schemes. Accordingly, the research inquired whether spare parts were readily available at community level or not and the result is presented in table 4. 17.

As the findings of the survey shows, the great majority 100 (99%) of respondents reported that the communities do not have any access to spare parts, while only one household reacted to the item positively. Similarly, respondents of KII and FGD mainly from nonfunctional schemes said that lack of spare parts at *woreda* and community level was the major problem that constrains the possibility to carryout day to day maintenance of the water supply schemes.

This situation is made worse by the fact that implementing agencies only participate in the construction phase of the project and do not make provision of spare parts following the transfer of ownership to the communities and there were no private suppliers at the *woreda* level.

With regard to affordability, 27(26.7%) respondents reported that the communities are unable to meet the costs of spare parts because they are expensive, while the majority 73(72.3%) of the sample households replied as they do not know the price. KII respondents also expressed that communities are only able to meet the costs of less expensive spare parts such as valves, rubber, and faucets, while spare parts such as pipes and rods are beyond the financial capacities of the communities.

Based on these findings it can be concluded that, unavailability of spare parts at community level is major threat to rural water supply schemes sustainability in the study area because they are not readily obtainable either at *woreda* or community level. The finding supports the inventory results of BoWMRD (2005:18) that indicated, almost all schemes in East Gojjam *zone* rural areas, Amhara Region do not have spare parts at hand and there are no local suppliers of spare parts even in the big urban areas of the *zone*. However, it contradicts with the study results of Musonda (2004:127) who found that availability of spare parts is not a major problem to sustainability of rural water supply sector in Zambia.

**Table 4.18**: Community Access to Tools and Spare Parts

| Issue | Responses | Frequency | Percent |
|---|---|---|---|
| Tool kits available for local technicians. | equipped | = | = |
| | Unequipped | 31 | 100.0 |
| | Total | 31 | 100.0 |
| Availability of spare parts at community level when needed. | Available | 1 | 1.0 |
| | unavailable | 100 | 99.0 |
| | Total | 101 | 100.0 |
| Affordability of spare parts community level. | Affordable | 1 | 1.0 |
| | Expensive | 27 | 26.7 |
| | I don't know | 73 | 72.3 |
| | Total | 101 | 100.0 |

***Source:*** *Household Survey, 2009*

**D. Construction quality**

As described in the literature review part, technical issues related to design and construction quality are the most obvious factors that affect sustainability of rural water supply schemes. In other words, poor construction quality and the use of low quality materials may lead to the failure of water supply schemes before the end of its design life. Similarly, design flaws, including shallow wells or boreholes, structural collapse, over estimates of the water source may cause a system to fail from the outset. For that reason, technical issue related to construction quality was assessed by taking the responses of sample households. The evaluation criteria introduced for them were poor (not good), good (satisfactory) and very good.

As can be seen from table 4.19, the large proportion 63(62.2%) and 27(26.7%) of the household survey respondents reported that the construction quality of water supply schemes were not good and good respectively, while only 10(9.9%)respondents evaluated their water supply

facilities construction quality as very good. Participants of FGD from nonfunctional schemes (Mench, Watlem and Graram *Gotes*) also reported that they were not happy with the workmanship of local artisans and the construction quality of their water points was poor. Similarly, KII respondents said that they were not satisfied with water supply schemes construction quality because of poor workmanship of the local contractors who after given short term (about 8 days) training by WWRDO technicians were allowed to handle the task.

Besides, the data collected through field observation by the researcher showed that out of the 23 water points visited, 10 HDWs and 5 developed springs were faulty or leaking, diversion ditch to shield from flooding during the rainy season and manholes for all observed facilities were not properly constructed.

Hence, based on the findings it can be concluded that poor construction quality is one of the problems that hinder sustainability of rural water supply in the rural areas of Basso Liben *woreda.* The finding supports the study results of Kantz and Sara (1997:6) which revealed that even when a demand responsive approach was used, poor construction quality lowered the chances that the water supply system would be sustained.

**Figure4.4:** Nonfunctional HDW in Assero *Gote* of Yenscha *Kebele,* Poor Construction quality.

***Source:*** *Field observation, February, 2009*

**Table4.19:** Households Evaluation of WSSs Construction Quality

| Issue | Responses | Frequency | Percent |
|---|---|---|---|
| Construction quality of the water supply scheme. | Not good | 63 | 62.4 |
| | Good | 27 | 26.7 |
| | Very Good | 10 | 9.9 |
| | Other | 1 | 1.0 |
| | Total | 101 | 100.0 |

***Source;*** *Household Survey, 2009*

### 4.4.4. Institutional Support System Problems

There is a great need to provide technical and managerial support by government or donor agencies to the community so as to ensure continued use of the benefits of developed WS project or program. For this reason, the institutional set-up or organizational arrangements are considered to be a central factor in sustaining water supply facilities (Davis, et al., 1993). In order to provide the necessary support to the rural community, therefore, it is essential to build adequate capacity at all levels, but in particular at local government level. This would ensure that support systems are in place for service delivery and maintenance (Musonda, 2004: 41).

In view of the above, WWRDO (the leading office) capacity and the nature of institutional support provided to the community in the study area were assessed and the results are presented below.

**A. WWRDO Office Capacity**

**i. The WWRDO Human Resource**

It is obvious that, man power is the most important resource that coordinates all other resources towards the attainment of organizational objectives. In contrast, absence of the required personnel will threaten the realization of planned goals. Accordingly, water supply project management and sustainable utilization of benefits by the community calls for assigning people of the required number, qualification and experience at different

levels most importantly at WWRDO which is responsible for ensuring that the community has access to potable water supply and schemes are providing continued service as intended.

The results of the assessment revealed that, according to the existing organizational structure, 35 employees are required at WWRDO to discharge the roles and responsibilities properly. Out of the total number of the required personnel, majority 31 (88.6%) are line stuff i.e., 5 Mechanical, 5 Civil, 5 Electro-Mechanical Engineers, 4 Geologists, Economists, etc who are direct implementers of organizational objectives, while only four of the posts are left for the support service i.e., driver, janitor, guard and secretary typist.

However, the study found that at WWRDO there are only 6(17.14%) employees: one office head, 3 technical school 10+3 graduate mechanical technicians, one water quality control technician and one secretary typist. This shows that most of the posts at the office that need qualified professionals were found to be vacant and some (4) were filled by people with out the required qualification. Similarly, Ato Mekuriaw (WWRDO head) sympathetically replied that one of the major problems his office has faced was lack of the required personnel due to budget constraint, access in the labor market and lack of interest on the part of professionals to work in rural areas.

From this finding one can conclude that weak human resource capacity of the WWRDO to provide support to the community in the development and management of water supply is one institutional factor that affects sustainability of RWS schemes in the study area.

**ii. Material and Financial Resource Capacity**

In addition to human resource, material and financial resources are also critically important to discharge roles and responsibilities of a certain organization properly. Hence, as the WWRDO is responsible for leading and coordinating of the overall development and management of the water

supplies at woreda level, the required budget needs to be allocated and the office should be able to access to reasonable materials. However, according to the data obtained from WPFO, despite the trend has shown progress since 1998E.C, the amount of budget allocated for the water sector is found to be limited.

As can be seen from the table below in 1998 and 1999 E.C capital budget were not allocated at all for the water sector at woreda level. Even the inadequate recurrent budget was mostly earmarked to cover compulsory salary expenses. As a result, the share of the water sector from the total *woreda* annual government budget was less than 3%, even though the trend is positively increasing. Ato Mekuriaw, WWRDO head, explained that water supply was not given attention that deserves in the past which was the great challenge faced in providing support to the community in potable water supply and in operating and maintaining developed schemes.

The researcher has also observed during the time of survey that the office was not equipped with the minimum required materials like chairs, tables, type writer or computer. Transport facilities which are critically important to closely follow up scheme status and to take appropriate corrective measures timely, were also found to be weak. What is more surprising, the information collected from KII at Woreda Water Resource Development Office indicated that toolkits to carry out major maintenance were not available in sufficient quantity and some were worn-out.

**Table4.20:** Allocated Budget to the WWRDO, 1998-2001

| Year (E.C.) | Allocated Budget in ETB | | | | |
|---|---|---|---|---|---|
| | Capital | Recurrent | | Total | Share In % |
| | | Salary | other | | |
| 1998 | Not allocated | 51136.27 | Not allocated | 51136.27 | 0.01 |
| 1999 | Not allocated | 60485.00 | 1000.00 | 61485.00 | 0.52 |
| 2000 | 250,000.00 | 79213.00 | 15652.00 | 344865.00 | 2.15 |
| 2001 | 364,459.00 | 83873.00 | 19234.00 | 467569.00 | 2.33 |

***Source:*** *Basso Liben Woreda Plan and Finance Office, 2009*

In sum, the research found that Basso Liben *Woreda* Water Resource Development Office has limited institutional capacity which is manifested in terms of the inadequate number and under qualification of personnel, financial, material and the transport system available for the office. This shows us that the water sector was not given priority in the *woreda* for water supply programs costs were expected to be covered by NGOs and /or bilateral agencies.

As a result, the office was unable to provide the necessary support to the community in operation and maintenance of the water supply schemes put in place which in turn threatens the continued functioning facilities in the study area.

The finding supports Roark et al as cited in Musonda (2004:40) that states institutional weakness is singled out as a reason for difficulties in providing the necessary service for communities in rural water supply system. Therefore, institutions require radical reform if they are to meet challenges facing the rural water supply sector, if they are to provide effective service.

**B. Nature of Institutional Support System**

It has been realized that although communities can take up a substantial share of responsibility, external support services are still required. This is because the community may play an active role in managing the system, but still does not own it. Major repair jobs and decisions on the future of the systems could also be beyond community capacity. Therefore, in addition to covering costs of construction, implementing agencies particularly the government should continue to provide support to the community, if they are expected to manage effectively and ensure sustainability of the system. However, the type of backing given needs to be identified cautiously and known by all concerned in order to promote sense of ownership and responsibility by the community and to trim down persistent dependency on external support.

Such supports may include providing adequate training on system administration, financial management, operation and maintenance techniques and procedures, carrying out operation and maintenance on major breakdowns which are beyond the technical and financial capacity of beneficiaries, ensuring availability and affordability of spare parts, and closely follow up water committees and equip them with the necessary toolkits. Besides, regular water supply system inventory and water quality control needs to be carried out by the external agency (government) so as to ensure proper and sustainable functioning of schemes.

As results of the study showed, all 101(100%) respondents of the household survey unanimously reported that the external support service given to the community from both government and nongovernmental organizations to effectively manage their water systems were inadequate. Similarly, FGD discussants with consensus expressed their complaint with regard to the question of support given to them on part of implementing agencies after once the schemes were handed over to the communities.

Majority of the participants of FGD particularity who represented *kebele* administration and water committee at Mench, Watlem and Graram *Gotes* (non-functional water schemes) explained emotionally that their frequent request for support of scheme maintenance which were beyond their technical and financial capacity were not reacted timely and positively on the part of WWRDO as a result their facilities were not providing service for an extended period of time. Almost all participants of FGD were complaining that the implementing agencies didn't adequately prepare water committees to properly manage and sustain water supply facilities. Further, the water committee members criticized that the duration, content and method of training given to them were not satisfactory in acquainting them with the necessary knowledge and skill needed to mange community water supply properly. That is why the theoretical training given to local technicians did not enable them to handle even minor operation and maintenance activities in the village.

Besides, participants of FGD were also complaining on implementing agencies for their absence in ensuring availability and affordability of spare parts, dearth of close follow-up and monitoring which are crucial for sustainability of water supply schemes.

Key informant interviewees from government officials also acknowledged that the institutional support service given to communities in managing rural water supplies is far below what should have been mainly because of resource limitation which include human, financial, material and transport system. Except a report from one NGO that has given refresher training and reviewed performance, all KII respondents supported the views of household survey and FGD respondents that implementing agencies are almost absent once they handed over schemes to communities.

The data collected through personal observation also evidenced the weak or in adequate support given from external agencies to the rural communities in managing their water supply in a sustainable way. For example, Mench and Watlem developed springs have technical problems which are beyond community capacity and the responsible agency mainly WWRDO have took no considerable measure for the last three years during which the systems stayed non-functional.

Based on the above findings it can be concluded that the institutional support service given to communities with regard to water supply in the rural setting of Basso Liben *woreda* was inadequate, which is a major factor that influenced the continued functioning of schemes as most of the rural communities lacks basic skills and training to manage their schemes properly. The finding is similar with the study results of Musonda (2004:122) who reported that in Zambia the institutional support to rural water supply is not adequate which will continue to impact negatively on sustainability of schemes.

## 4.5. Measures to be taken to Ensure RWS Schemes Sustainability

Respondents of the household survey, FGD and KII were all asked to suggest possible solutions to ensure sustainability of rural water supply schemes in the study area. Based on the data collected, the major findings of the study on the case in point are summarized bellow.

- Ensuring community demand for the service beforehand,
- Involving user community including women in all project management cycle,
- Building the capacity of water management committee,
- Integrating scheme management with local Community Based Organizations,
- Employing scheme guard, particularity women FGD participants recommend female guard,
- Users contribution of money to share construction, O&M costs,
- Ensuring proper book keeping,
- Regular financial utilization and audit report,
- Community involvement in selecting the technology to be installed,
- Selecting appropriate design, competent contractor, professional supervision to ensure construction quality,
- Assigning trained water technicians at *kebele* level,
- Ensuring availability of spare parts at *woreda* and community level,
- Keeping schemes fenced and clean at all times,
- Allocating the required budget to WWRDO ,
- Providing regular support from implementing agencies to problems that are beyond the capacity of the community were outlined by majority of the respondents as possible solution to promote sustainability of rural water supply facilities in the study area.

# CHAPTER FIVE

## 5. CONCLUSION

### A. Existing Water Supply Status

The study found that the mean time (24.63minuts) required to collect water in the study area is beyond the standards set by WHO, 15 minutes. The amount of water per capita consumption, about 10.71 liters, is also less than the WHO guide line and MoWR universal access program target values set at least 20 liters and 15 liters per capita per day in that order.

Besides, the findings of the research study revealed that traditional sources are the main source of drinking water and developed water supply schemes are either not providing service at all or are providing the service with frequent interruption which clearly shows that sustaining the proper functioning of water supply facilities is a major problem in the rural setting of Basso Liben *woreda*.

### B. Community Related Factors

The supply driven approach followed in rural water supply, lack of community participation during the planning stage, low level of women involvement, limited water committee capacity and weak or no sense of ownership are found to be community related factors that threatens the sustainability of rural water supply facilities.

Specifically, conflict among members of the committee, misuse of collected fee, and lack of transparency, accountability and commitment are the major indicators to problems related with local water management board that affect sustainability of the system. Besides, lack of adequate training and follow up from implementing agencies, lack of power to enforce rules, lack of incentives, and absence of working manuals are identified as major problems that constrained the water committees from managing their schemes properly.

**C. Financial Factors**

The study found that capital costs for rural water supply are fully covered by water supplying (external) agencies which is a major constraint in achieving the goal of safe water supply for all on sustainable basis. In the study area, it is encouraging to note that communities are able and willing to pay for the water supply service. However, inadequacy of funds (inability to raise adequate fee), misuse of the collected fund, lack of proper book keeping, and saving by water management committee are identified as the major financial related threats to sustainability of rural water supply.

**D. Technology Factors**

Failure to consult beneficiaries in technology choice, lack of community skill to operate and maintain the schemes properly because of absence of trained local technicians, unavailability of tools and spare parts either at woreda or community level and poor construction quality are found to be the major technological threats to sustainability of water supply in Basso Liben *woreda*.

**F. Institutional Support Related Problems**

The study found that the limited capacity of the WWRDO to provide support to the community in the development and management of water supply and lack or absence of post construction external support are major institutional threats to the continued functioning of rural water supply in Basso Liben *woreda*.

# CHAPTER SIX

## 6. THE WAY FORWARD

Water is the most fundamental building block of life. However, most of the rural population in the study area is not fortunate to be living in a place where potable water is literally at their fingertips. Efforts made so far towards accessing communities with clean drinking water are threatened by system failures to provide service as intended. The findings of study indicated clearly that despite a lot of work has been done in an attempt to ensure sustainability of rural water supply much more needs to be done to deal with in built weakness that have been identified. There is a danger that if these weaknesses are not addressed, what have been achieved so far in rural water supply may be lost.

Hence, this chapter deals with the way forward on how to deal with the identified problems that affect sustainability of rural water supply in the study area. The chapter is divided in to four sections. Recommendations to address weakness related to community participation are presented in the first section. The second part deals with possible solutions to financial factors. The third section of the chapter presents suggestions to deal with technical problems. Finally, ways of strengthening institutional support system to the community so as to ensure sustainability of rural water supply are described.

### 6.1. Community Related Factors

Three recommendations are made under this section: adopting demand responsive approach, strengthening community participation and building community capacity to manage water supply schemes properly.

### 7.1.1. Adopting Demand-responsive Approach

As the review of related literature indicated clearly, employing a demand-responsive approach at the community level significantly increases the likelihood of water system sustainability. However, failure to replace the supply driven approach by demand based service provision is found to be a threat for sustainability of rural water supply in the study area. Thus, implementing agencies should make sure from the out set that communities have demand for the service and are wiling to contribute for the development, operation and maintenance of the system. In other words, water supplying agencies should start their project from needs assessment and the decision for system development should be based on the results of situations analysis; need and willingness to contribute.

### 6.1.2. Strengthening Community Participation

Users of water supply facilities should be involved and aware of the need for water supply from the beginning, if the facilities are to be properly used and maintained. On the other hand, in order to improve community participation, the foundation needs to be done by implementing agencies during community ingress. This could include:

First, the situations analysis should be done with the communities to ensure that they are involved from the start. In addition to identifying needs of the community, the assessment should take into account the determination of the community to contribute resources to the operation and maintenance of WSSs. Second, implementing agencies should ensure that communities are clear about their roles and responsibilities in the development and management of RWS from the very beginning. Then, the beneficiaries and supporting agencies need to inter into formal agreement that made either party accountable. Third, water supplying agencies should ensure that community leadership is involved in an early stage of entry. RWS agencies should also make sure that women are actively involved in all phases of the project management.

### 6.1.3. Building Community Capacity to Manage WSS

Water supply schemes will be more sustainable if they are managed by users themselves, if community management approach is adopted. However, water supplying agencies should strengthen community capacity to take ownership and responsibility of managing their water supply systems. Therefore, for rural water supply facilities to be managed properly by the community; legalizing the water committees, clearly defining their roles and responsibilities and providing them with adequate and practical training on financial and overall management of schemes are critically important. Water supplying agencies should also develop working manuals, provide incentives for committee members like refresher trainings, experience sharing visits with in *woreda* or at *zonal* level and jointly reviewing performance of the water committees will help in enhancing their on going capacity, motivation and commitment.

Besides, integrating water management with existing community own organization/s will help in empowering the water management committee in areas were this institutions are strong and well accepted, a very good example in the study area is *Idir*.

## 6.2. Financial Factors

Two recommendations are made under this section: establishing effective user fee collection system and developing trusted and transparent system of funds management.

### 6.2.1. Establishing Effective User Fee Collection System

If the communities themselves do not share their system's costs, it is unlikely that anyone else (water supplying agencies) will be able to do so on an adequate and long-term basis. Hence, communities should be moving towards an eventual goal of covering of the costs from their own resources.

This study also found that the communities can contribute more in cash or usually in kind, than what they are actually doing today. However, poor collection of user fee is one of the major threats of rural water supply in Basso Liben *woreda*. Most communities are either not collecting user fee or the user fee collected is inadequate such that in cases of breakdown communities can not buy even the cheapest spare parts. Water supplying agencies should therefore, ensure that effective user fee collection system is put in place for every water supply facility that is constructed, if sustainability is to be achieved.

Several approaches should be looked at to establish an effective user fee collection system. One option is integrating the time and place of payment with government rural land tax collection up on consensus and agreement. Two, the type of payment could be in kind made just after harvesting crops. Three, working with community own institutions like *Idir* in collecting users' fee is another option that could facilitate effective fund generation. It is also critically important that communities are made aware of the importance of contributing users' fee. This should be done through out the life span of the water supply scheme.

### 6.2.2. Developing Trusted and Transparent System of Funds Management

In addition to effective user fee collection system, modalities for managing funds should be critically explored. One, keeping of the funds in the houses of water committee in the study area should at all costs be avoided because the chance of such funds being misused is high. It is, therefore, recommended that where it is possible, bank accounts are opened. The WWRDO should facilitate ways for the communities to get the service from the Amhara Credit and Saving Institute branch at Yejube. According to Article31/3 of the Regulation of Urban and Rural Water Supply and Sewerage Service Regulation No. 82/2003, the water committees are obliged to keep financial records. Besides, bodies designed through Woreda

Administration Council and Woreda Water Resource Development Office shall audit the records. However, lack of proper book keeping by the water committee, follow-up and audit from government are critical problems in the study area that needs attention by all concerned. Therefore, the *woreda* Water Resource Development Office should make sure that financial recordings are made as per the regulation; and the financial performance of committees should be periodically evaluated and reported to ensure accountability, i.e. developing transparent and trusted system.

## 6.3. Technological Factors

Four recommendations are made under technical factors: choosing appropriate technology, building local technicians' capacity in operation and maintenance, minimizing problems related with availability of spare parts and improving construction quality.

### 6.3.1. Choosing Appropriate Technology

If the communities are to manage their water system, the technology should be simple, cheap and easily maintainable by them. Therefore, the government should consider manufacturing technologies locally, so that villagers could be able to obtain affordable technologies that address their real needs. Besides, water supplying agencies should consult and involve beneficiaries in technology choice decisions.

### 6.3.2. Building Local Technicians' Capacity in O&M

Carrying out effective operation and maintenance requires availability of skilled technicians at community level. Hence, to lessen community dependence on external assistance for operation and maintenance tasks, water supplying agencies should provide adequate and practical training on technical issue. Besides, some form of incentives should be arranged to local technicians, like priority in water collection for the technicians at times when the scheme is too busy with longer queues, exemption from

users' fee payment, refresher trainings, certificate and minimum payments for the time spent in maintaining the system to enhance their commitment. In addition, equipping local technicians with the necessary toolkits will considerably contribute in improving the poor maintenance system in rural areas of Basso Liben *woreda*.

In the long run, the government should see ways of assigning at least one technician at kebele level like Health and Agriculture extension agents as the number of schemes becomes unmanageable.

### 6.3.3. Minimizing Problems Related with Unavailability of Spare Parts

Unavailability of spare parts at community, district (woreda) or Zonal level is a major threat to rural water supply sustainability in the study area. Therefore, minimizing this problem is one of the technical issues that call for serious consideration by water supplying agencies, if rural water supply schemes are to be sustainable. The researcher recommends three options of accessing spare parts to alleviate the problem.

First, implementing agencies should include in their project plan to provide communities with enough spare parts at the time of installation particularly easily brittle parts, like valves, facets, and elbows. This could give some time for communities to fully get prepared themselves for longer responsibility.

Secondly, assessing mechanisms of establishing revolving funds for spare parts purchase at *woreda* level is another way of solving the problem. This is because, if such funds are made available to purchase spare parts, the community utilizes user fees collected to procure spare parts whenever their schemes face breakage which in turn helps them to generate adequate funds.

Thirdly, promoting the private sector and/ or establishing some form of cooperatives at either w*oreda* or *zonal* level that can provide spare parts to the community at reasonable price will help in alleviating the problem. In this regard, the government should encourage the private sector with some form of incentives like arranging credit facilities and tax exemption.

### 6.3.4. Improving Construction Quality

Poor construction quality is a threat for sustainable rural water supply in the study area. Hence, approaches to improve construction quality should be seriously explored by water supplying agencies. In this sense, selecting appropriate designs, employing competent contractors, and assigning qualified supervisors will help in minimizing the problem. Communities should also participate in contractor selection, when appropriate, and have greater control over supervising works and authorizing payment when works are completed (even if construction is done directly by government or non government agencies).

## 6.4. Strengthening Institutional Support System

Two recommendations are made under this section: strengthening the capacity of the leading office at *woreda* level and supporting rural communities in managing water supply schemes.

### 6.4.1. Strengthening the Capacity of WWRDO

The capacity of the WWRDO should be strengthened so as to provide the necessary support to the community in managing their water supply in a sustainable way. To achieve this, stakeholders who are involved in rural water supply should be consulted on how to reinforce institutional capacity of the leading office. Nevertheless, the government should not only depend on resources from NGOs in building the capacity of the water sector at *woreda* level but should provide resource for this task. This could be reflected by assigning personnel as per the organizational structure,

equipping the office with materials, arranging some form of transport system at least a pick up vehicle and motor cycles and allocating adequate budget.

### 6.4.2. Supporting Communities in Managing their WS

For communities to utilize and mange their water supply schemes properly on sustainable basis, there is a need to have strong back up support at district (*woreda)* level. This should include regular technical, material and financial support to problems that are beyond community capacity.

## 6.5. Further Research

To augment the findings of this study, additional research should be conducted with a large sample size that covers most kebeles of the woreda. Lessons that would be drawn from such a study would help in promoting sustainability of rural water supply in the woreda.

The following specific areas are recommended for further research.

- Further research should be undertaken to find out environmental, socio-cultural and political factors that affect sustainability of rural water supply in the study area.
- Assessment of the current policy and legal framework is required in order to find out effective ways of dealing with the problems that have been identified in this study.
- Further research should be undertaken to identity effective ways of strengthening institutional capacity of the woreda water resource development office and water committees to enable them effectively manage and ensured proper and sustainable utilization of water supply schemes in the woreda.

## References


Alemu Azemeraw (2006). *An Assessment of Community Management of Rural Water Supply schemes: the Case of Eight Peasant Associations North Gonder Zone.* M.A Thesis Addis *Ababa* University.

ANRS Council (2003). *Proclamation to provide for the Recognition of ANRS Urban and Rural Water Supply and Sewerage Service. Regulation No.82/2003:* Zekere Hege 8th Year No 6. Bahir Dar

AMCO, AfDB, WB and WSP (2008). **Can Africa Afford to Miss the Sanitation MDG?** A Review of the Sanitation and Hygiene Status in 32 Countries.

Asuguide R(2003). **Australian Agency International Development**. Aid Program.

Bamberger, M(2000).**Integrating Quantitative and Qualitative Research**; Directions in Development Studies. Washington, D.C: The World Bank

Bezabih Germew ( 2008). *Assessment of problems to Sustainability of Rural Supply Schemes.* The Cases of Menge Woreda. M.A Thesis Addis Ababa University.

BLWHO(2008).Basso Liben Woreda Health Office Annual Statistical Beltline. Yejube, 2000E.C.

BoFED (2003).**Development Indicators of Amhara Region**. BoFED, Bahir Dar.

_____(2007). *Annual Statistical Bulletin of Amhara Region.* BoFED, Bahir Dar.

BoH (2005). *Annual Regional Health Bureau Report for the year 1997E.C.* Bahir Dar.

BoI (2008).*Monthly Statistical Bulletin,october_November,2008.BoI,* Bahir Dar

_____ (2007). *Annual statistical Book.* Amharic Version, BoI, Bahir Dar.

BoWMRD (2005). *Inventory of Water Supply Schemes and Data Base Management* Lot 2, East Gojjam, Vol. 1, Summary Report.

BoWRD (2006). **WUHA**: Amhara National Regional State Water Resources Development Annual Bulletin. Vol-1 No 5, Bahir Dar.

Briscoe, J and de Ferranti, D (1988).**Water for Rural Communities: Helping People Helps them selves**. Washington D.C: The World Bank.

Carter C., Tyrell S., Howsam P, (1999). *Impact and Sustainability of Rural Water Supplies and Sanitation Program in Developing Countries:* Institute of Water and Environment, Cornfield University, at Silosoe, Beford. http://www.reliefweb.it (Retrieved in November, 2008)

Dagnaw Tadesse, Assefa Desta, Abera Geyid, Woldemariam Germa, Solomon Feseha, and Olvir Schmoll (2007). **Rapid Assessment of Drinking Water Quality in the Federal Republic of Ethiopia**. Addis Ababa: WHO, MoH, UNICEF and EHNR.

Davis J., Garry G. and Wood, M. (1993). **Developing and Managing Community Water Supply.**UK: Oxfam Publications.

Dessalegn Rahmato (1999). *Water Resource Development in Ethiopia, Issues of Sustainability and participation.* Forum for Social Science Studies, A.A

EEA (2007).**Economic Focus**: Bulletin of the Ethiopian Economic Association (EEA). Vol.10 No 2, Addis Ababa

Evans, P. (1992). **Paying the Piper**: An Overview of Community Financing of Water and Sanitation Occasional Paper Series No 8. The Hague: IRC.

Gebre Emmanuel, T and Melkamu M (2003). *Sanitation and Hygiene Issue Paper.* MoWR, Ethiopia.

Gebre Emmanuel, T (1984).**Human Waste Disposal, Ethiopia:** A practical Approach to Environmental Health. AA: United Printers Pvt.ltd.Co.

Haysom, A (2006). *A Study of the Factors Affecting Sustainability of Rural Water Supply in Tanzania.* Available from http:// www. wateraid. org. (accessed on 3rdDecember, 2009).

IRC (2004). *Scaling up Community Management of Rural Water Supply.* Thematic Overview Paper: International Water and Sanitation Centre. Available from http://www.irc.nl(Accessed on 24th January,2009).

_____ (2003). **Tapping in to Sustainability**: *Issues and Trends in Gender Mainstreaming Water and Sanitation.* A Background document for the Gender and Water Session. Third Water Forum, Kyoto, Japan

Katz, T & Sara, J (1997). **Making Rural Water Supply Sustainable:** Recommendation from a Global Study. UNDP- World Bank Water and Sanitation Program. http://www.*its.caltech.edu/*(Accessed on 15thJanuary,2009).

Khosia, P (2003). **Taping in to Sustainability: Issues and Treads in Gender Mainstreaming in water and sanitation**. A Back Ground Document for the Gender and Water Session 3rd Water Forum, IRC, Japan.

Kingo, J.M (2005).*The Millennium Development Goal on Poverty and the Links with Water Supply, Sanitation, Hygiene and HIV/AIDS*: a Case Study from IRC, Delft, and The Netherlands.

Kleemeier, L (1995). ***From Supply Driven to Demand Driven Provision of Rural Drinking Water.*** A Tanzanian Case Study of the Arguments for Transition. CDR working Paper.

Mengesha Admassu (2002).*Factors Related to Sustainability of Rural water and Sanitation projects in North Gonder.* MA. Thesis, A.A.U.

MoFED (2006).Ethiopia: Building on Progress; A plan for Accelerated and Sustained Development to End Poverty (PASDEP)(2005/6-2009/10).Volume I: Main Text, Addis Ababa, Ethiopia.

MoH (2005). **Federal Democratic Republic of Ethiopia Ministry of Health, National Hygiene and Sanitation Strategy**, Addis Ababa.

MoWR (2008). ***Your Health is in Your Hands.*** World Water Day of the Ethiopian Millennium, Special Issue Addis Ababa.

_____ (2006). *Water Sector Development Annual Report.* Amharic Version.

_____(2004). *Rural Water and Sanitation Program Regional Implementation Guideline for Regional Scale,* A.A, Ethiopia.

_____ (2003). *National Water Supply and Sanitation Framework.* Addis Ababa.

_____(2002). *Water sector Development program (2002- 2016)* Main Report. A.A: MoWR.

_____ (1999). *Ethiopian Water Resource Management Policy.* Addis Ababa: Berhanena Selam Printing Enterprise.

Musonda K(2004). *Issues Regarding Rural Water Supply in Zambia.*http://www.etd.unisa.ac.za (Accessed on 8th October, 2008).

Panchdlari, A.C (1995). **Water Supply and Sanitary Installations**. London: New Age International limited.

Pickford, J(1991). **The Worth of Water**: Technical Briefs on Health, Water and Sanitation. London: Intermediate Technology Publishers.

Pickford.J, Barker,P, Junson,C, Parr,J, Saywell, D, and Skinner,B(1996). **Sustainability of Water and Sanitation System**. Intermediate Technology Publication Selected Papers of the 21st WEDC Conferencc, Kampala

Sharma, S.K, Numwa, N.G and Amy, G (2005). Evaluation of Hand Pump Water Supply in Selected Rural and Semi-Urban Areas of Zambia. 31st WEDC International Conference, Kampala, Uganda,http://www.irc.nl/(Retrieved on 12thFebruary2009).

SIWI (2008). **Stockholm Water Front**: A Forum for Global Water Issues. Stockholm: SIWI.

Teshome, A (2008). *Performance and Future Prospects of Water Supply and Sanitation in Ethiopia*: http//www.aglimmerofhope.org (Retrieved on 21thMarch, 2009)

UNDP (2006). **Human Development Report:** Beyond Scarcity, Power, Poverty and the Global Water Crisis. UNDP

UNESCO (2003). **Water for People Water for life**. The UN World Water Report UNESCO Publishing.

WB (2004). **World Development Report**: Making Services Work for the Poor People. A Co publication of the World Bank and Oxford University Press.

_____(2003).**Community Driven Development in Africa:** A Vision of Poverty Reduction through Empowerment. The World Bank Group, Africa Region.

_____(2002).**Water supply and Sanitation Handbook**: World Bank Technical Paper Number 12, Volume1. Washington, D.C: the World Bank.

Webster J, Dejachew G, Bereket G, Mehari N, Tesfaye G(1999). Sustainability of rural water and sanitation projects. 25th WEDC Conference on Integrated Development for Water Supply and Sanitation. Addis Ababa, Ethiopia

WHO (2004). **Guide Line for Drinking Water Quality**. Third Edition Vol.1. Geneva: WHO.

WHO(1995).**Catalogue of WHO Indicators for Health Monitoring**. Geneva: WHO.

Wijk-Sijbesma C (1988). **What Price Water?** User Participation in Paying for Community-Based Water Supply with Particular Emphasis on Piped Systems. The Hague: IRC.

WFPO (2008). *Basso Liben Woreda Annual Statistics Bulletin, 2000 E.C.* Yejube.

WWRDO (2008). *Basso Liben Woreda Office of Water Resources Development 2000 E.C. Annual Report*, Yejube.

Zelalem Getachew (2005). *Determinants of Sustainable Rural Water Supply System in Ethiopia.* A Case of Two Rural Water Supply Systems, Amuye Serra and Habru Seffu Schemes , MA. Thesis, A.A.U.

# Annexes

## Annex 1. Water Coverage in Ethiopia, 2006

| No | Region | Percent (%) | | | Remark |
|---|---|---|---|---|---|
| | | Rural | Urban | Total | |
| 1 | Amhara | 36.6 | 80 | 41.5 | |
| 2 | Oromia | 40.2 | 87.6 | 46.5 | |
| 3 | SNNP | 53.0 | 64.5 | 54.0 | |
| 4 | Tigray | 42.8 | 50.9 | 44.3 | |
| 5 | Afar | 41.1 | 73.0 | 44.0 | |
| 6 | Somali | 21.5 | 60.0 | 28.0 | |
| 7 | Benishangul Gumuz | 46.0 | 66.2 | 48.0 | |
| 8 | Harrari | 29.0 | 21.0 | 24.0 | |
| 9 | Gambela | 41.4 | 37.0 | 40.6 | |
| 10 | Dredawa Administration | 57.0 | 72.0 | 68.2 | |
| 11 | A. Ababa Administration | - | 90.1 | 90.1 | |
| Total | | 41.2 | 78.8 | 47.3 | |

Source: MoWR (2006)

## Annex 2. Sanitation Coverage in Ethiopia, 2004

| No | Region | Percent (%) | | | Remark |
|---|---|---|---|---|---|
| | | Rural | Urban | Total | |
| 1 | Amhara | 5.52 | 66.76 | 12.44 | |
| 2 | Oromia | 16.94 | 81.84 | 24.93 | |
| 3 | SNNP | 54.59 | 85.23 | 57.27 | |
| 4 | Tigray | 6.15 | 67.55 | 18.95 | |
| 5 | Afar | 3.95 | 44.60 | 21.16 | |
| 6 | Somali | 1.94 | 78.16 | 26.04 | |
| 7 | Benishangul Gumuz | 26.35 | 82.72 | 33.91 | |
| 8 | Harrari | 6.34 | 88.61 | 55.98 | |
| 9 | Gambela | 21.35 | 76.63 | 28.33 | |
| 10 | Dredawa Administration | 7.17 | 93.22 | 68.11 | |
| 11 | A. Ababa Administration | 17.79 | 92.09 | 91.25 | |
| | Total | 21.34 | 77.68 | 30.63 | |

Annex 3. List of People Contacted (Interviewed)

| No | Name | Organization | Post |
|---|---|---|---|
| 1 | Ato Mekuriaw Zewdu | Basso Liben *Woreda* WRDO | Head |
| 2 | W/o Muluken Yeferu | Basso Liben *Woreda* WRDO | Expert |
| 3 | Ato Endager Getinet | UNCIF/ORDA | Program Coordinator |
| 4 | Ato Agerie Dersso | Ethiopian Red Cross Society, East Gojjam Branch Office | Operations Unit Coordinator |
| 5 | Ato Adiss Ayele | East Gojjam *Zone* WRD Department | Head |
| 6 | Ato Tasefaye Belay | East Gojjam *Zone* WRD Department | Expert |

## Annex 4: Questionnaire for Household Survey

**ADDIS ABABA UNIVERSITY**
**SCHOOL OF GRADUATE STUDIES**
**COLLEGE OF DEVELOPMENT STUDIES**

### General Objective and Confidentiality

The purpose of the study is to generate relevant information on factors that affect sustainability of rural water supply scheme in Basso Liben Woreda. The research is conducted for M.A Degree in Development Studies at the College of Development Studies of Addis Ababa University. It is expected that policy makers and other responsible bodies will make use of the findings of this study as a background information for improving the life condition of the rural community with regard to sustainable water supply. The study is conducted only for the academic purpose and be sure that the information you provide will only be used for this research only. Your full support and willingness to respond to quesions is very essential for the success of the study. Therefore you are kindly requested to answer all questions and give reliable and complete information on the issues.

### Directions for Interviewer:

1. Introduce your self
2. Inform the respondents clearly the purpose of the questionnaire and win their consent
3. Use pen
4. Circle all that apply
5. Describe the answers of respondents for questionnaires that require explanation in the space provided.

## Identifications

1. Name of interviewer_____
2. Date of interview_____
3. Name of Kebele_____
4. Village/'Got' _____
5. Questionnaire identification number_____

## Part 1.1: Background Information

BI01. Sex? 1. Male 2. Female

BI02. Age (in complete years)? _____

BI03. What is your current marital status?

1. Single 2. Married 3. Divorced 4. Widowed 5.Separated

BI04. Household (family) size?

1. Below 4 2. 4 – 6 3. 7 – 9 4. Above 9

BI05. Ethnic group?

1. Tigrie 2. Amhara 3. Oromo 4. Others, specify _____

BI06. Religion? 1. Muslim 2. Orthodox Christian

3. Protestant 4. Catholic 5. Others, specify _____

BI07. Education Level?

1. Unable to read and write (illiterate) 4. Some high school (9-12)
2. Only read or/and write 5. 12 Grade completed
3. Some Primary school (1-8 Grade) 6. Above 12

BI08. What is you major occupation?

1. Farming 2. Government employee 3. Daily labor
4. Business/Peaty trade 5. Others, specify

BI09. How much is your household income per month? (estimate)

_____

BI10. Which two social services you need most provided with? (Health, Education, Water, Road, Electricity, Telephone, etc)

1st_____ 2nd_____

## Part 1.2: Existing Water Supply Situation

***Issues related with water source, consumption, quantity and current status.***

W01. Are you using the same source of water supply for domestic purpose?

1. Yes 2. No

W02. If your response to W01is "No" what are your two major sources of water for domestic purpose during dry (Bega) and wet (Kiremt) season?

| No. | Water source | In 'Bega' | | In 'Kiremt' | |
|---|---|---|---|---|---|
| | | 1st | 2nd | 1st | 2nd |
| 1 | River | | | | |
| 2 | Unprotected/Traditional Well | | | | |
| 3 | Protected Hand Dug Well | | | | |
| 4 | Unprotected Spring | | | | |
| 5 | Protected Spring | | | | |
| 6 | Roof Catchments | | | | |
| 7 | If others, specify | | | | |

W03. Which one is your main/major source of water for drinking now?

1. River 3. Protected Hand Pump 4. Protected spring
2. Traditional well 5. Unprotected spring 6. If others, specify _____

W04. How far is the water source from the house? (_____ in Kms or ms). (To go there and come back home)

W05. How much time do you spend walking to and from the main water source? (_____ Hours or _____ minutes).

W06. Which one is your secondary source of water for drinking at this time?

1. River 3. Protected Well 5. Protected spring
2. Traditional Well 4.Unprotected Spring 6. Have no secondary source 7. Other,_____

W07. How far do you/water collectors in your home/have to walk to collect water from your secondary source? ( _____ Kms or ms )

W08. How much time on average do you (they) spend walking to and from the secondary water source? (_____ Hrs and _____ Minutes).

W09. Do you still go to the secondary source of water for drinking purpose?

1. Yes 2. No

W10. If your response to W09 is "Yes", why you do so?

_____

_____

W11. Who collects water in your home mostly? 1. The husband

3. Children 2. The wife 4. Both the husband and children

5. Both the wife and children 6. If others, specify _____

W12. If children, how old are they? 1. 4- 9 years 2. 10-14 years

3. above 14 years

W13. How do you transport water from the source to home?

1. Human labor 3. Animal pulled cart

2. Donkey 4. Other specify _____

W14. What container do you use to fetch water mainly? _____

W15. How many times a day is water collected?

1. Once 3. Three times

2. Twice 4. More than three times

W16. How much water is collected each time? _____liters (estimated)

1. Less than 5 3. 11-15

2. 6-10 4. 16-20 5. Greater than 20

W17. How many liters of water are used by the family per day for domestic purpose? _____liters

W18. Are you the beneficiary of water supply project? 1. Yes 2. No

W19. If your response to W18 is "Yes", is the water scheme working now?

1. Yes 2. No

W20. If your response to W19 is "No", from where do you get water now?

_____

W21. If your response to W19 is "No" when was it non-functional?

_____

W22. Why do you think is the scheme non-functional?

_____

W23. If your response to W19 is "Yes", was there a time that the scheme non function since it was put in place? 1. Yes 2. No

W24. If your response to W23 is "Yes", how frequently do break down occur since the time of construction?

1. Daily 2. Weekly 3. Monthly
4. Sometimes 5. Once broken, it has never been maintained

W25. Have you ever faced the non-functional problem with your water supply scheme since the last one year? 1. Yes 2. No

W26. If your response to W25 is "Yes", how many times the water supply scheme get non-functional? _____times.

W27. What do you think about the problems to no functionality?

_____

_____

W28. When is most of the time non-functionality of water supply schemes occur? 1. Summer 2. Winter 3. Both

W29. On average for how long do breakdown last (estimated)?

1. For one to two months
2. For three to sex months
3. For seven to nine month
4. For ten months to one year
5. For more than one year
6. If other, specify _____.

W30. In which season do you face shortage of water? 1. June___Sept.
2. Oct_____Jan 3. Feb.____May 4. all year round 5. No shortage

W31. How do you evaluate current status of the scheme in providing service?

1. With out having the problem, it is functioning properly
2. With having the problem, the scheme is providing service
3. Because of major problem/breakdown, it is not functional
4. With out having the problem/breakdown, it does not provide service because of some reasons.
5. If others, specify _____

## Part 1.3: Community Related Factors

CF01. Who provided the water supply scheme?

1. Community 3. NGO 5. All in collaboration
2. Government 4. 1 and 2 6. 1 and 3

CF02. Who initiated to provide the water supply to the community?

1. Community 3. NGO 5. All in collaboration
2. Government 4. 1 and 2 6. If others, specify _____

CF03. Did you have a demand for the water supply before construction of the present scheme? 1. Yes 2. No

CF04. Have you been involved in the provision of the water supply scheme?

1. Yes 2. No

CF05. If your response to CF04 is "Yes", at which stage of the development/construction process you have participated?

1. Planning 2. Construction 3. Post-construction
4. 1 and 3 5. 1, 2 and 3 6. In all phases

CF06. What was your contribution in provision of the water supply?

1. Labor 2. Money 3.Local material/stone, sand, wood/
4. Labor and local material 5. If others, specify _____

CF07. If your response to CF04 is "No", why do you think the reason for not participating?

1. Not asked 3. Every thing is done by the implementing agency
2. Lack of awareness 4. Used to live elsewhere 5. Other----------

CF08. Who have participated in the development of water supply scheme in your family? 1. Husband only 2. Adult males
3. Adult females 4. Adult males & Females 5. Children

CF 09. Who selected the site of the new water supply scheme?

1. Community 2. NGO 5. All in collaboration
3. Government 4. 1 and 2 6. If other, specify _____

CF10. Is the management system put in place for the developed water supply scheme? 1. Yes 2. No

CF11. If your response to CF10 is "Yes", who manages the scheme?

1. Community/water committee alone 2. Government alone 3. NGO
4. Both 1 and 2 5. If other, specify _____

CF12. Is the management body adequately performed its duties and responsibilities? 1. Yes 2. No

CF13. If your response to CF12 is "No", what do you think the reason?

_____

_____

CF14. Do you have sense of owner ship to the developed scheme?

1. Yes 2. No

CF15. What do you think should be done by the community to improve the problems related with continued use of the water supply schemes_____

_____

**Part 1.4: Financial Related Issues**

FF01.Did you contribute money for capital assets during the construction of water point? 1. Yes 2.No

FF02. If no, who financed the developed water points?

1. Community 3. NGO 5. All in collaboration
2. Government 4. 1 and 2 6. If other, specify _____

FF03. Do you pay for the developed water supply service?

1. Yes 2. No

FF04. If your response FF02 is "Yes", how much money you pay per month on average or per container you uses to fetch water?

Birr/month _____ or Birr/container you use to fetch water _____.

FF05. Do you think the payment is fair? 1. Yes 2. No

FF06. How much money is you willing and able to pay for the service per month or per container you are using to fetch water?

Birr/month _____ or Birr/container you use to fetch water _____.

FF07. Do you pay for the water supply service regularly?

1. Yes 2. No

FF08. If "No", why don't you pay regularly? 1. I have no income

2. I am afraid that it will be embezzled

3. No one is responsible for collection 4. If other specify_____

FF09. How is the payment made for the developed water supply service?

1. All the households pay the same amount per month
2. Flat rate where varieties of payment are made for water per household based on the amount of water used
3. If other, specify _____

FF10. Who set the price of the water fees?

1. Community 3. NGO 5. All in collaboration
2. Government 4. 1 and 2 6. If other, specify _____

FF11.How do you evaluate the level the users` fee tariff?

1. It is Low 2. It is high 3. It is fair 5. If other specify_____

FF12. What do you suggest to the level of service fee?

1. Should be increased 2.Should be reduced 3. Should be free of charge 4. Remain as it was 5. If other, specify_____

FF13. What costs of the water supply scheme are covered by fees collected? (from users )

1. Only costs of minor repairs
2. Costs of major repairs only
3. Salary of guard only
4. Costs of technicians only
5. Costs of spare parts only
6. All costs of the scheme
7. None of these costs
8. If other, specify _____

FF14. Who manage the water fees collected from the users?

1. Community 3. NGO 5. All in collaboration
2. Government 4.1 and 2 6. If other, specify _____

FF15. Have you ever received receipts for paying service fee? 1. Yes 2. No

FF16. Do you think the scheme managers have the capacity to manage the finance? 1. Yes 2. No

FF17. What do you recommend to improve financial related problems to sustainability of rural water supply?_____

_____

**Part 1.5: Regarding Technical Factors**

TF01. Have you been informed of the advantages, costs and disadvantages of the potential technologies to be installed? 1. Yes 2. No

TF02. Who selected the type of the existing technology (scheme type)?

1. Beneficiaries 3. NGO 5. All in collaboration
2. Government 4. 1 and 2 6. If other, specify _____

TF03. How do you evaluate the construction quality of the water supply scheme? 1.Not good 2.Good 3. Very good

4. If other, specify _____.

TF04. Is the technology (the scheme) simple operate and use to by the users? 1. Yes 2. No

TF05. Is/Are there local technician/s for operation and maintenance work?

1. Yes 2. No

TF06. If your response to TF04 is "Yes", do they have been maintaining technical failures? 1. Yes 2. No

TF07. Are any of them females? 1. Yes 2. No

TF08. Is/are he/she/they equipped with adequate tools to carry out repairs when needed? 1. Yes 2. No

TF09. Does/Do he/she/they have technical skill/s to handle major repairs? 1. Yes 2. No

TF10.If your response to TF08 is "No", who carriers out repair and maintenance when needed? _____.

TF11. Are spare parts easily available at community level when needed?

1 Yes 2. No

TF12. Where does the community get spare parts to carry out operation and maintenance?

1. Purchase on market
2. Given by Regional/zonal/woreda water desk (Government agency)
3. Donated by NGOs 4. If other, specify _____.

TF13. Are spare parts affordable at community/beneficiaries level when needed? 1. Yes 2. No

TF14. Which major technical problems do the community encountered to make the water supply scheme properly function and sustain the benefits from the supply?

1. Lack of adequate spare parts and tools 5. All of the above
2. Inappropriate technology 6. If other, specify _____

3. Inappropriate designs/poor construction quality

4. Lack of technical skill to carry out operation and maintenance

TF15. Do you think the water supply source now you are using has quality Problem? 1. Yes 2. No

TF16. Do you think the water supply is adequate to the beneficiaries?

1. Yes 2. No

TF17. What do you recommend to alleviate the problems that the water supply is experiencing and to make the scheme proper functional for long period of time?

_____

_____

## Part 1.6: Regarding Institutional Support

ISO1. Do the community receives adequate external support service from government to effectively manage water supply scheme?

1. Yes 2. No

ISO2. What supports did the community get from the government Organizations in relation to managing the water supply schemes to make properly functional and sustainable?_____

_____

CF03. What supports did the community get from the NGO's in relation to Managing the water supply schemes to make properly functional and sustainable?

_____

_____

CF04. Did the supports given to the community from government and non-governmental organizations have some from of continuity?

1. Yes 2. No

CF05. What types of supports are needed by the community to ensure sustainability of water supply schemes?

_____

**Thank you again!!!**

## Annex 5: Checklists for Interviewing for Key Informant Interview

### Part2.1: Checklists for Interviewing Government Officials

Date of interview _____.

Name of the organization represented _____.

Position of the respondent _____.

1. What are the major goals or objectives of the establishment of your organization in relation to rural water supply?
2. When, where and by whom are water supply projects have been decided?
3. Project site were decided: where, when, how and by whom?
4. Did the government agency adequately prepare the community to manage and sustain their water supply schemes? (Yes/No), if 'No', what are the reasons?
5. How do you evaluate community involvement in general and women participation in particular in the water supply project management cycle?
6. What the policy stipulates about costs of water supply, cost recovery of O and M as well as recurrent expenses?
7. What technologies do you provide mainly? Why?
8. Are spare parts and toolkits readily available, affordable at regional/zonal woreda and community level? (Yes/No), if 'No', where do you get it?
9. Are there spare part store at regional/zonal/woreda and community level? If "No". Why?
10. Are there competent private sectors who provide spare parts and able to do water supply construction in the region?
11. What types of institutional supports are given to the lower governments/community in sustaining the functionality of the schemes? And how frequent are the supports?
12. How do you see the coordination of your organization/office with the lower governments and stake holders to support the service?

13. What requests are mainly reported to your office from the lower government offices/community in relation to water supply?
14. Are there well trained technicians who can carry out major repairs that are beyond the financial and technical capacity of the community/woreda water desks?
15. What problems are faced by your organization/office to support the rural water supply service functional for long period of time (sustainable)?
16. What factors could contribute for the continued use of rural water supply schemes?
17. How do you evaluate the status of the schemes implemented by your office and others?
18. What are the major problems related to sustainability of rural water supply schemes in the zone/in the woreda?
19. What responsive measures have been taken by the regional water bureau, zonal water office and woreda water desk to improve the status of the schemes?
20. What are your recommendations for the better projects management and continued use of the benefits?

**Thank You!!!**

## Part2.2: Checklist for Interviewing NGOs Officials

Date of interview _____.

Name of the organization represented _____.

Position of the respondent _____.

1. When did your organization established?
2. What are the major goals or objectives of the establishment of your organization in relation to rural water supply?
3. In which Woredas and kebeles have you intervened?
4. How many water supply schemes have been implemented by your organization since intervention time and how many people/households have benefited from the served as a result?

5. When, where and by whom are water supply projects have been decided?
6. Project site were decided: where, when, how and by whom?
7. How do you evaluate community involvement in general and women participation in particular in the water supply project management cycle?
8. What the policy stipulates about costs of the water supply, cost recovery of O and M as well as recurrent expenses?
9. What technologies you mainly use and why?
10. Are spare parts and toolkits readily available, affordable at woreda and community level? (Yes/No); if "No", where do you get it?
11. What request are mainly reported to your office from the lower government offices and community in relation to water supply?
12. What supports/contribution did you get from the government and local communities in relation to provision of water supplies?
13. What trainings and supports do/did you give to the community to manage the schemes properly by themselves and carryout repairs when needed to make schemes functional and sustainable? How frequent are the supports?
14. How do you evaluate the status of the schemes?
15. What are the major/main problems related to sustainability of rural water supply schemes in the in the woreda?
16. What solutions do you recommend to alleviate the problems of water supply schemes sustainability?

**Thank You!!!**

**Annex 6: Checklist for Focus Group Discussion**

**Part 3.1:** Points of Discussion with Water Committee

Date of discussion _____.

Kebele _____

Village/'Got' _____.

1. When was the scheme constructed?
2. How and by whom were the scheme established?
3. What were your involvement and contribution?
4. How many people/household are using the scheme?
5. How was the committee established? Who decided the members of committee? How many of you are women?
6. Does it have formal recognition?
7. Do you have job descriptions? (yes/No),if `yes' are you well aware of it?
8. Are there activities that you do regularly? (Yes/No), if 'Yes' could you mention the major once?
9. How does the committee evaluate community participation in general and women's participation in particular at all phases (pre implementation, during implementation and post construction) of the scheme?
10. Did/are the users pay user fee regularly? (Yes/No), if 'No' why do you think the reasons and what measures have been taken to alleviate the problem?
11. How money is collected and saved for community purpose?
12. Are there care takers who are supported with the necessary tools so that they can carry out repairs when scheme break down/face problem?
13. What supports (technical, financial and others) have been given to the community/committee from the external (government and non-government organizations) to sustain the water supply service?

14. Did the government (regional, zonal and water desk) adequately prepare the community/committee to manage and sustain the water supply? (Yes/No), if 'No' why do you think the reasons?
15. From your experience, what major problems are encountered in relations to water supply scheme?
16. What solutions do you recommend in order to alleviate the problems and to sustain the functionality of the scheme?

**Thank You!!!**

**Part 3.2: Points of Discussion with Selected Women**

Date of discussion _____.

Kebele _____ "Got" _____.

1. Have you participated or consulted in the water supply projects? If yes, what were your contributions, and if not, why women were not participated?
2. Who is responsible to fetch water for domestic purpose mainly?
3. Where do you get water during dry and wet season?
4. Does the management of the scheme involves women and treats users fairly?
5. How do you evaluate the advantages of having the new scheme verses the traditional sources?
6. Have you faced the problem with the water supply scheme non-functional? (Yes/No), If "Yes", what do you think the major reasons and where do you get water at that time?
7. How do you evaluate the overall performance of the scheme?
8. From your experience, what major problems are encountered in relation to water supply schemes to make them properly functional and to sustain the benefits gained from the water supply?
9. What do you recommend to alleviate the problem of the scheme and make it functional for long period of time?

**Thank You!!**

## Annex 7: Physical observation checklist

Part 4.1: Information about Springs

**Identifications:**

Name of Kebele_____.

Name of village/Got _____

Total households in the village _____

Observer Name _____.

Date of Observation _____.

1. Date of construction _____
2. How frequently do breakdown occur_____ an average of every (day, month, year)
3. For how long do breakdown last _____ (days. months. years)
4. Yield of the spring_____liter per second
5. Location of spring: under foot of hill on plain ground____ comfortable/access_____
6. Any unprotected source near the village that may be used during the rainy season when it is more productive: Yes____ No_____
7. Spring service components: No. off faucets _____, Animal trough _____ Cloth washing basin_____ and body washing basin_____.
8. Spring construction components: Protection box_____, collection box and distribution point _____
9. Total households using the water source_____
10. Is the spring functioning at the time of visit? Yes_____ No_____
11. Is there guard at the time of visit? Yes_____ No_____

**Specific Diagnostic Information**

1. Is the spring source protected by masonry or concrete wall or box? Yes____ No_____
2. Is the masonry or concrete box faulty or leaking? — Yes___ No____
3. Does the spring box have an inspection manhole with cover? Yes____ No_____
4. Do silts or worms and other animals discharged with the water? Yes____ No_____

5. Is there a screened sanitary over flow pipe? Yes_____ No_____
6. Is there a screened vent pipe? Yes_____ No_____
7. Is the spring fenced? Yes_____ No_____
8. Is the spring protected from flooding during the raining season? Yes_____ No_____
9. Does the spring have a diversion ditch? Yes_____ No_____
10. Are there any latrine(s) uphill of the Spring Yes_____ No_____

Total score_____

## Part 4.2: Observation Checklist for Protected Hand Dug Well

**Identifications:**

Name of Kebele_____

Name of village/Got_____ _____

Total households in the village _____

Observer name _____.

Date of Observation_____.

1. Date of construction _____.
2. How frequently do breakdown occur_____ an average of every (day, month, year)
3. For how long do breakdown last _____ (days. months. years)
4. Yield of the well _____.
5. Location of well: under foot of hill on plain ground____ comfortable/access____.
6. Any unprotected source near by the village that may be used during the rainy season when it is more productive: Yes____ No____.
7. Hand dug wells service components: storage tank faucet _____, Animal trough _____ and Cloth washing____ and body washing _____.
8. Total households using the water source_____.
9. Is the well functioning at the time of visit? Yes_____ No_____.
10. Is there guard at the time of visit? Yes_____ No_____

**Specific Diagnostic Information**

1. Is the well source protected by masonry or concrete wall? Yes__ No__
2. Is the masonry or concrete slab faulty or leaking? -— Yes___ No____
3. Does the well have an inspection manhole with cover? Yes____ No_____
4. Do silts or worms and other animals discharged with the water? Yes____ No____
5. Is the well has hand pump? Yes_____ No_____
6. Is there a screened vent pipe? Yes_____ No_____
7. Is the well fenced? Yes_____ No_____
8. Is the well protected from flooding during the raining season? Yes___ No___
9. Does the well have a diversion ditch? Yes_____ No_____
10. Are there any latrine(s) uphill of the well? Yes_____ No_____

## DECLARATION

I, the undersigned, declared that the thesis is my original work and has not been presented for a degree in any other university and that all sources of materials used for the thesis have been duly acknowledged.

| ***Declared by*** | ***Confirmed By*** |
| --- | --- |
| Aklilu Getinet | Mulugeta Feseha |
| ***Candidate*** | ***Advisor*** |