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ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
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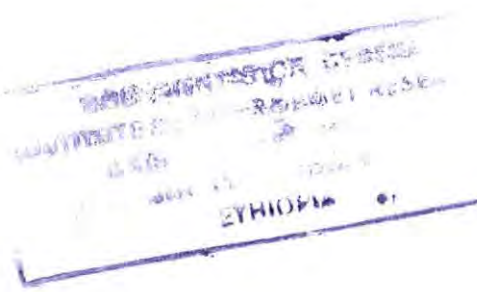
**Problems of Rural Water Supply and the Roles of Community Participation
in Rural Water Supply Schemes Management: The Case of Lemo Woreda,
Hadiya Zone, SNNPRS, Ethiopia.**

A thesis submitted to School of graduate studies of Addis Ababa University in
partial Fulfillment of the requirement for the degree of Master of Arts (MA
degree) in Development Studies, water and Development

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June, 2011

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**ADDIS ABABA UNIVERSITY
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Title

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Community Participation in Rural Water Supply Schemes
Management: The Case of Lemo Woreda, Hadiya Zone,
SNNPRS, Ethiopia.*

By
Tesfaye Demeke

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ACKNOWLEDGEMENT

I would like to thank all those who have contribution to the success of the research work. Before all I would like to thank God for helping me in every aspects of my work. Then, I would like to forward my deepest gratitude to my advisor Dr. Belay Simane, for his critical observations, comments, suggestions and endless support at the various stages of this work. His comments and suggestions were useful in improving the quality of my thesis work.

I also acknowledge the contribution of water users, water management committees, different woreda offices respondents of interview and focus group discantants. I would like to thank all those who played a major role during my studies at Addis Ababa University, College of development studies staffs in supporting materials and different ideas in finalizing my study and the research work. And, I would like to thank French government for financial support and to made opportunity to join this department at the beginning.

In addition, I would like to thank my classmates for ideas, knowledge and experience use shared, and all individual and organization who contribute to the success of my research work directly or indirectly.

At last, not at least, I would like to thank my family especially, my wife Yimagnushale Fikre for being with me in Many aspects of my work. And, Ato Haile Handiso who was one of the enumerators support my work and giving so many important information's.

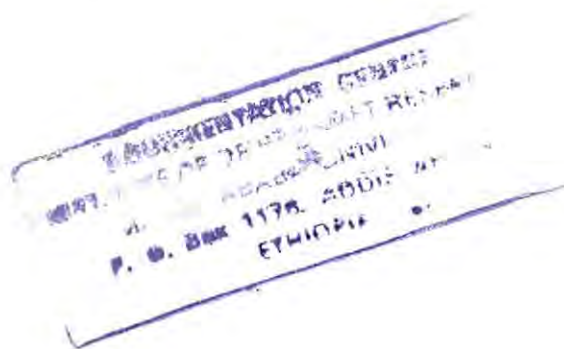


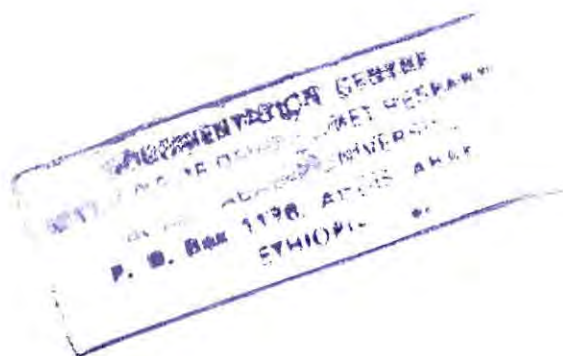
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ACRONYMS

ADF	African Development Fund
ARD	Agricultural and Rural Development Office
BH	Bore Holes
BOFED	Bureau of Finance and Economic Developments
BoWR	Bureau of Water Resource
CM	Community Management
CSA	Central; Statistical Agency
DRA	Demand Responsive Approach
ETB	Ethiopian Birr
FGD's	Focus Group Discussions
Ha	Hectare
HDW	Hand Dug Wells
HHS	House Hold Survey
IWRM	Integrated Water Resources Management
JICA	Japan International Cooperation Agency
KHC	Kele hiwot Church
KII	Key Informant Interviews
Masl	Meter above Sea Level
MDG	Millennium Development Goal
MoWR	Ministry Of Water Resources
NGO	Non-Governmental Organization
ODI	Oversees Development Institute
O&M	Operation and Maintenance
PASDEP	A Plan for Accelerated Development to End Poverty
PS	Protected Springs
RWSS	Rural Water Supply Schemes
SNNPRS	Southern Nations Nationalities and Peoples State
SW	Shallow Wells
UNICEF	United Nation Children Fund
UPS	Unprotected Springs
VLOM	Village Level Operation and Maintenance
WSDP	Water Sector Development Program

Glossary of Some Terms

Got: village in the study area

Kebele: smallest local government's administration unit

Woreda: district level of administrative unit

Zone: government's administrative structure next to region

Idir: locally organized group of people who are helping each other when bad or good happen

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ABSTRACT

One of the major problems in the world today especially, in Africa is the scarcity of water resources. Ethiopia is one of African countries that are endowed with relatively abundant water resources, but access to safe drinking water supplies in rural Ethiopia are among the lowest in sub-Saharan Africa. The same is lacking in most of rural areas of SNNPRS in general and Lemo woreda in particular. The general solution to water demand problems had been more engineering oriented (supply oriented) where the idea is always to increase supply by developing other source of water. The major objective of this research is to see sustainability of rural water supply schemes, and the specific objectives are to see major technical and financial factors that affect rural water supply schemes sustainability and the governance which also contribute to sustainability of rural water supply schemes. In order to obtain the required information that meets the objectives of the study, I had selected 97 households' beneficiaries from five water supply schemes and four kebeles of the woreda. Data obtained from household survey were mainly analyzed quantitatively while data from FGD, KII and physical observation were analyzed qualitatively. The problems observed are: absence of local technicians who are responsible for technical aspects of the schemes; absence of availability of spare parts for community as well as allocated budget for it; the problem of technology selection for rural water supply schemes development; lack of transparency on financial management system; lack of ability and willingness to pay for the services in some of the users beneficiaries; low capacity and skill for operation, maintenance, management and governance of rural water supply by water committees and communities; lack of community participation specifically, in the planning period absence of working manuals, guidelines and lack of incentives for water committees, and lack of awareness for sense of ownership, water management and governance at community level. Therefore, the findings call for the need to give attention in sustaining of the existing water supply schemes by getting the solutions and/or by taking measures to the stated and other related problems.

CHAPTER ONE

1. INTRODUCTION

1.1 Background

Water is one of the basic necessities for human survival and socio economic development. It is used for a number of purposes (i.e. for domestic, agricultural, industrial and other socio-economic activities). Access to safe water and adequate sanitation is a universal need and basic human right. Dessalegn (1999) stated that access to adequate and clean water will greatly contribute to improved health and productivity. On the other hand Kingo (2005) stated that insufficient access to water is not only bad for health, but also contributes to a poor food security and a lagging social development. Women and girls bear heavy burdens in providing water for their families and conflict over water are increasing at local, regional and international levels. The poor are particularly vulnerable to water Scarcity, pollution and flooding.

Despite benefits of access to safe water stated above, many countries in the world currently suffered from shortage of safe drinking water. Many of these people live in rural areas and are the poorest and most vulnerable. In sub-Saharan Africa (SSA), 300 million people have no access to safe water supplies.

The millennium development goal (MDG) for water and sanitation is to reduce by half the proportion of people who do not have sustainable access to safe drinking water and sanitation by 2015. This means that coverage has to be increased dramatically. It is not only coverage that need to be increased but also sustainability of implemented water and sanitation services indefinitely (plan Ethiopia, 2006).

In Ethiopia where the majority of the population (about 85%) live in rural areas, millions of people (about 39.529 million) are facing problems of obtaining adequate potable water supply in 2006 (MOWR, 2006).

Regarding the problem, Dessalegn (1999) stated that in addition to limited provision of water supply, there has been a strong urban bias in water supply programs and the rural areas have suffered more as a result.

The Ethiopian government (subsequently regional government) has adopted its national water resource management policy in 1999. The overall goal of the policy is to enhance and promote efficient, equitable and optimum utilization of water resources for sustainable socio-economic development. It recognizes water as an economic good and encompasses water supply and sanitation (RWSS), irrigation and hydro-power-sub sector. One of these main objectives for the WSS sub-sector is to ensure that every Ethiopian citizen has access to water of acceptable quality to satisfy the basic human needs (MoWR, 2001).

Southern nations, nationalities and peoples region (SNNPR) is located in the southern part of the country with an area of 113,539 square kilo meters and its potential sources are from surface and ground, and the exiting clean water sources. In the region there are mainly ground (hand dug well, springs, shallow wells and borehole).

By realizing the importance of supplying safe drinking water to the community, government at different level, nongovernmental organization (NGO's) and donors invest a lot of capital every year in developing countries including Ethiopia in general and in SNNPRG in particular to tackle the problem through construction of new water supply projects. However, supplying water supply schemes along would not contribute for communities in rural areas to have reduced problems. The issue of functionality, utilization by intended beneficiaries and continuity of water supply schemes to serve for long period are very important issues to be considered.

1.2 Statement of the Problem

Many water construction and management activities are on the way in the country in general and at the woreda in particular. Many governmental and non-governmental organizations are investing very great capital and resources in constructing water supply schemes in rural areas. Since the current government gives more empressees at rural water supply schemes by the rural development program, there is great attention to rural water supply to give adequate water for rural community.

The study area, SNNPRS, the overall water supply coverage is 48% (45% rural and 60% urban) (BOWRD, 2006:2002). In the region there are around 1304 hand dug wells, 1678 swallow wells, 421 deep wells, 2686 spring development with distribution points and 255 springs with network distributions that are constructed by the regional governments and several NGO's in the past years (BOWRD, 2006). On the other hand, it is indicated that a large number of (22-24%) of the schemes in the region are non-functional at any given time (BOWRD, 2006). This implies a negative impact on water supply and sanitation coverage and the attainment (BOWRD, 2006).

Construction quality in rural water supply schemes is in question in the study woreda. There are so many factors that affect the construction quality at the study woreda. These are: most of the constitution materials are local which have no good standard; no integration between the owner of the schemes and the provider; the contractors for scheme development in rural areas are local who have no good experience and capacity.

In addition, spare parts are not provided at the right quality, at the right place and at the right time for the rural community at woreda level. The spare parts are not observed at the woreda or zonal water office, mine and energy departments. But they are at regional water, mine and energy bureau and at different non-governmental stores or in the market.

Therefore, the community gets their spare parts from market or regional office by cash or by support. The absence of the spare parts may be the reason for the non-functionality of the schemes.

Moreover, financial management of the fee or money collected had no transparency and accountability. The chairman of water committee may use for his own purposes, the collected money not saved in bank account which is very crucial for controlling the cheated properly.

Furthermore, community participation in all project phases, including planning, designing, constructing and managing the service, and in the O&M of the service especially, in the management is very crucial for sustainability of rural water supply schemes (RWSS). However, in most of the rural water supply schemes there is no practice of involving community in any aspect except in post implementation of the schemes. That means in providing local construction materials like sand, stone, labor and arranging some practice during the construction. This cannot encourage the rural community to care the schemes in the safety manner. By these activity senses of ownership do not developed within the community at large. For the rural water supply schemes functional/sustainable, the community should have the roles and responsibilities, and sense of ownership.

Most of the developed water supply schemes are non-functional due to different external and internal factors. The low water supply coverage forced the rural community to depend on unsafe and unprotected water sources like rivers, ponds, springs and/or lakes which can easily be polluted. This can cause health related problems of the community in particular and impede the socio-economic development endeavors of the country at large. Therefore, identifying the main problems of rural water supply and the roles of community participation in access to safe and adequate potable water in which the study focused was very important to take measures that enhance the current situation in the specified area.

1.3 Objectives of the Research

The General Objective of the study is to see sustainability of rural water supply schemes

The Specific Objectives are:

- To identify the major technical factors that affect sustainability of rural water supply schemes at Lemo woreda
- To identify the major financial factors that affect sustainability of rural water supply schemes at the woreda
- To see water governance system in the rural water supply schemes at the woreda

1.4 Research Questions

- How is the construction quality of the water supply schemes at lemo woreda?
- Are spare parts provided at appropriate place?
- Is there appropriate tariff at rural water supply at the woreda?
- How is community participation and community management at the woreda?
- Is there sense of ownership in the community?
- How is the governance system of rural water supply schemes in the woreda?

1.5 Significance of the Study

The result of this study will serve as base line information for those who are interested to conduct research study in depth so as to discover the problems and roles of community participation to rural water supply, especially, in the study area. The lesson one draws from this study will contribute to help current efforts by governments and NGO's to find better policy option to

address the problems of sustainability in rural water supply that will bring better service coverage. The finding of the study will also help in filling the gaps by identifying the reason for lack of community participation in rural water supply in the region (woreda) and further enrich the knowledge on the issue, contributing the enhancement of the system. At last, the research attempts treat the problems and come up with certain recommendations.

1.6 Scope and Limitation of the Study

This study specifically focuses on assessing factors affecting rural water supply schemes. The study area is limited to rural areas in lemo woreda of SNNPRG. The study did not include water supply schemes in Hosanna town because of its relatively better water supply coverage and functionality. The study covers 4 kebeles from 35 rural kebeles of the woreda where 5 water supply schemes were selected and data were generated from selected household beneficiaries of the schemes.

Lack of credible data's at regional, zonal and woreda level; lack of transportation and accessibility to go to each kebele; the problem of getting water committees and kebele representatives for discussions and low educational statuses of respondents and the like were some of the main challenges/ limitations for the research work.

Sustainability in water supply schemes is a multi-dimensional and dynamic concept which is the result of interactions of various factors (community technical, financial, etc). Rather, attention has been given to identifying major factors undermining sustainability of RWSS. The result and findings on sustainability problems are the reflections of the study area, which is difficult to replicate directly to other areas of the region. However, it might reflect problems in other areas or woredas with similar characteristics.

1.7 Organization of the study

This study contains five chapters. Following this chapter the second chapter incorporates literature review part. Chapter three comprises methodology part that includes: background of the study area, sampling design, data sources and type, methods of data collection and analysis. Chapter four deals with: background of the sample household respondents, and Factors hindering sustainability of RWS schemes and related issues in the study area. Finally, chapter five incorporates conclusions and recommendations.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Approaches to Rural Water Supply and Sanitation (Rwss)

2.1.1. Supply Oriented Approach

since 1970's, there was a consensus that governments and donors should alleviate poverty in rural areas through providing basic needs such as drinking water, which was largely free at least in capital costs. This approach is now labeled as supply driven (Kleemieer, 1995).

The basic needs/supply driven approach has been adopted for its own elements that were taken to expand water services in the developing nations. The first elements is that donors and governments provide the minimum level of improved water services such s hand pumps, to as many people as possible with available funds. The second one was to build up the capacity of government agencies to appraise, implement and manage schemes. And the third one was providing subsidies to rural water supply (Kleemeier, 1995).

The assumptions behind the basic needs/supply driven (approach towards rural water supply refers to the idea that provision of clean water would contribute to economic growth; government agencies should subsidize water services. But, these assumptions were challenged by the rationales of structural adjustment programmes SAPS) and the approach was found to be not helpful to gain many achievements because of the following three problems.

The first problem was that given the high population growth rates, the strategy of the basic needs approach to water supply would not reduce the number of people without access to safe water supply with reasonable time period. Secondly, the funds needed to achieve universal coverage by 2000 E.C have

proved to be very far from being a reality. Thirdly, in too many cases, schemes were not sustainable (Briscoe and David F, 1998).

Role for project planning, implementation, cost recovery, Operation and maintenance and water supply schemes ownership are poorly defined and less communicated with the beneficiaries. Although communities are usually expected to provide a share of costs (mainly through in kind contributions), it is often unclear how the level of contribution has been determined and/or about the purpose of contributions.

Furthermore, implementing agencies frequently assumes that communities will somehow “manage” their facilities but do not help to build their capacity or commitment to do so (Briscoe J. and David F, 1998:10-11).

2.1.2. Demand Responsive Approach (DRA)

In recent years DRA, has become a widely accepted conceptual tool that has been put into practice by many national governments and NGO's implementing partners; the development and dissemination of DRA has been heavily supported by the World Bank.

The DRA framework is predicted on strong community management and everything that goes with it: internal capacity, decision making powers and the ability to articulate needs.

The key characteristics of DRA can be summarized as: community members make informed choices about: whether to participate in the project, technology and service level option based on willingness to pay (based on the principle that more expensive systems cost more); when and how their services are operated and maintained. Government plays a facilitating role, sets clear national policies and strategies, encourages broad stakeholders consultation and facilities, capacity building and learning an enabling environment is created for the participation of a wide range of providers of goods, services and technical

assistance to communities, including the private sector, and non-government organizations, and adequate flow of information is provided to the community; and procedures are adopted for facilitating collective action decisions within the community. The increasing adoption of DRA as an approach to planning and executing RWS has consequences for efforts at scaling up. As an approach based explicitly on demand, DRA, will by its very definition, exclude those who cannot easily articulate this demand or who are unable to contribute towards and improved service or who simply do not want the service. The execution of these groups under DRA has significant implications for achieving the maximum coverage targets for scaling up especially, because in most instances it is the poorer and less able communities that will be excluded. Demand has clearly become a leading concept in the implementation of RWS, but where it is the most useful concept for scaling up requires further research and investigation.

2.2. Status of Water Supply in Ethiopia

Despite the rich water resources availability of the country, the status of water supply coverage is still low in the country. Accordingly to MOWR (2006) annual report, about 47.3% (35.479 million) of the total population of the country have accessed to safe water supply in the year 2006. Service coverage is considerably higher in urban areas than rural where the coverage is 78.8% (9.589 million) and 41.2% (25.89 million) respectively. From the table below one can understand how the majority of the population especially, the rural communities suffered from the service and depend on the traditional or secondary sources (rivers, streams, ponds and unprotected springs) for domestic purpose.

There was also regional disparity in water supply service coverage within the country. The lowest coverage was 24% and 28% for Harari and Somali respectively, while the highest is 68.2% and 90.3% for Dire Dawa and Addis

Ababa respectively. The remaining seven regions; water supply coverage lies within the range of 40-54% for the year 2006. Furthermore, about 25% of rural water supply schemes have been reported non-functional at the national level at the end of 2006 (MoWR, 2006). However, according to MOFED (2006) about 30% of the schemes were mal-functioning at national level for the same year.

Table: (2.2) water supply coverage and percentage of non-functional schemes in Ethiopia by region in 2006

No	Region	Rural	Urban	Total	% of non-functional water supply schemes
1	Amhara	36.6	80	41.5	23
2	Oromia	40.2	87.6	46.5	25
3	SNNPRS	53.0	64.5	54.0	17
4	Tigray	42.8	50.9	44.3	20
5	Afar	41.1	73.0	44.0	30
6	Somali	21.5	60.0	28.0	30
7	Benishabgul gumz	46.0	66.2	48.0	30
8	Harare	29.0	21.0	24.0	30
9	Gambella	41.4	37.0	40.6	30
10	Dire Dawa	57.0	72.0	68.2	30
11	Addis ababa	-	90.1	90.1	-
	National	41.2	78.8	47.3	25

Source: MoWR (2006)

2.3. Rural Water Supply Schemes Management

At the earth summit in Rio de Janerio in June 1992, world leaders committed themselves to a compressive program to provide sustainable water supply and sanitation services to the hundreds of millions of the world's population who currently lack them. As the summit all states and support agencies have urged to implement activities aiming for universal coverage out lined agenda 21 that is a strategy for sustainable development in 21st century. A guiding principle

in the achievement of services backed by measuring to strengthen local institutions in implementing and sustaining water and sanitation programs (IRC, 1993).

Community management in rural areas is at least, the driving paradigm for the water and sanitation (WATSAN) sector. Community management is all about putting communities in charge of developing systems that respond to their needs. Water for productive uses is high on this list frequently even higher than is treated water for domestic use into account the downside, not taking likely productive use into account can lead to system under design and, in turn, to failure livelihoods approaches, which emphasis the capabilities as well as the needs of people and take in consideration the complex nature of the communities and intra-community relationships, can help optimize the community involvement in system design and implementation. Similarly to community management (with which they are frequently linked), demand responsive approaches are all about matching systems to people with the primary goal of achieving sustainability. Productive users of water have a crucial role to pay in turning water into the cash with which to spare parts and pay for routine maintenances. Clearly, establishing the link between water supply and economic benefits also seems to increase people's willingness to pay for their water in the first place (IRC, 2003).

Some evidence revealed that properly supported communities have both ability and willingness to manage their own water systems. Community management of the rural water supply services is considered as one of the options for achieving sustainability of the water services. Agency resources that are used for provision and maintenance of insufficient services can be diverted to a much more effective facilitating role, bringing greater cost-effectiveness and more wide spread and sustainable benefits.

Less demand for reconstruction or rehabilitation of broken down systems means more satisfying and more productive work on new schemes. Similarly,

studies in Tanzania and Thailand suggested that the water supply systems which provided the most reliable services were those and maintenance of the schemes, but met them in full (Dwarkin, 1989a, 1980b).

2.4. Management and Governance

There is general agreement in the literature that management is an important element in all water development schemes, determining success or failure. Quite frequently in Ethiopia, planners are emphasized the agronomic, engineering or technical aspects of water project and most of the important decision have been made by technical experts, with little regard to issues of management and beneficiary participation. Moreover, where participation has been tried, it has meant peasants to set up users bodies and elect officials, both of which have little say in project management.

Participation of this sort has rarely involved participation decision making or in management. In brief, such practices have proved counterproductive and have contributed to the failure of many water schemes. If water projects, are to be managed efficiently and are to be sustainable it is important to promote beneficiary participation based on new principles (Ramato, 1999).

The principle underlining this option is that the main stakeholders should be actually involved in the management of water supply projects on the one hand, and on the other in the formulation of the rules and responsibilities governing the operation of such projects. There are two elements involved here, management and governance.

Management refers to the day to day operation of project where as governance involves the establishment of working rules and responsibilities the choice of conflict resolution modernisms, the selection and control of technical staff, and mechanisms for accountability of users and officials.

Government bodies may issue uniform rules that deal with problems common to each category of water project but to deal with the specific problems that arises in specific conditions, working rules are necessary. Management is concerned with formulating the working rules common to the entire project itself. The direct stakeholders should be closely involved both in the management and governance of the water projects. Participation in management without participation in governance is meaningless.

Water governance is the set of systems that control decision making with regard to water resource development and management. Hence, water governance is much more about the way in which decisions are made (i.e. how, by whom, and under what conditions decisions are made) than the decisions themselves (moench, et al, 2003). There are different types of governance approaches. But for this particular context, it is taken the definition of (Moench et al, 2003) it refers essentially to the manner in which power and authority are exercised and distributed in society, how citizens can participate in decision making processes.

As such, it relates to the broader social system of governing, as opposed to the narrower perspective of government as the main decision-making political entity. Governance of water is perceived in its broadest sense as comprising all social, political and economic organization and institutions, and their relationships, in so far as these are related to water development and management (Eng. Fiddad, 2007).

Effective water governance requires changes in attitudes and behaviors among individuals, institutions, professionals, decision-makers in short, among all involved. Participation by the public or stakeholders is an important tool in implementing such changes as it facilitates more informed decision making and ease conflict resolution. It can also guarantee that voices of relatively powerless groups such as women and vulnerable people are heard.

Participation offers people the opportunity to meet their responsibilities, as well as the opportunity to claim their rights (Eng. Fidaa Haddad, 2007).

2.5. Management and Operational Skills

Management capacity is essential for two largely different groups of people in the community: first for technical people such as pump minders, care takers operators, network managers, engineers, etc; and second for the managers themselves, the 'committee' who are responsible for overseeing the former while also taking more strategic decisions such as what tariffs to set, or what services, level to adopted.

Typical roles of committee include: representing the community in contacts with government officials, support agencies and the private sectors; coordinating roles with other community institutions and decision-making bodies; ensuring efficient and effective overall management; ensuring equity of water use and distribution; ensuring equity in decision making; financial planning, calculating and organizing contributions; organizing and supervising effective O&M; enforcing rules and regulations; maintaining accurate records, including financials records, minutes of meetings and important data such as member lists; promoting hygiene and effective use of facilities and holding and leading regular meetings (Ton, S and Patric M, 2003 as cited Melkamu. D, 2008).

An important difference between these two groups of people is that of voluntarism and professionalism while management committees are almost invariably voluntary on in the simplest systems should O&M be an unpaid task. In more complex systems it represents a full-time job for one or more people. As this role is increasingly played by community members, finding money for these people represents an important part of cost recovery. (Ton. S and Patric. M, 2003 as cited in Melkamu .D, 2008).

2.6. Integrated Water Resources Management (IWRM)

Man's activities, too, prevent us from making optimum use of water resources that are available. Water use in one location can affect the ability of others to use it in another location hundreds or thousands of kilometers away. Most of the world's international rivers have trans-boundary issues around high withdraw or excessive pollution by upstream riparian sites that in turn reduces the quantity or quality of water available to downstream countries. Though it may be less visible the same problem applies to ground water resources where "Selfish" pumping rates by one aquifer users can dry up the wells of another, or judicious fertilizers use can launch a nitrate time bound to contaminate supplies for the next generation.

These large scale examples of the misuse of water resources generally make headlines and there has been increasing political and scientific attentions given to improve IWRM as a means of conflict attentions. This international "peace making" has deep resonance for the development of water resource at community level, for a key truth about water resource development and management is that in a large majority of cases it is an essential local issue. While much of the literature on resource management concentrates on basin level and trans-boundary issues, the reality is that worldwide most day-to-day conflict over water resources occurs at the level of small rivers or localized aquifers.

At community level, integrated management of local water resource is intuitive water has to be found for domestic purposes, for horticulture and of small scale agriculture. So individual householders recognize the need to conserve and protect available supplies what they may not realize to readily is the responsibility also to avoid degrading the river or ground water so as to protect the resource for downstream communities. That is a matter for both education and regulation.

It remains true that it is the enlightened self-interest of informed water users that provides the best basis for catchment protection, water conservation and demand management. That is why the modern concept of IWRM puts so much emphasis on bottom-up development and management of water, and management at the most appropriate level. Yes, it is essential to have a proper framework in place for management at the river basin level, but this must rest upon a solid foundation of local good practice.

The objective of integrated water resources development and management is to ensure optimal and sustainable use of water resource for economic and social development, while protecting and improving the ecological value of the environment. At the heart of IWRM lie the four so called Dublin principles, first set out in the 1992 Dublin meeting, and then ratified through inclusion in agenda 21 at Rio (Patric moriarty, 2002 as cited in Melkamu, D). The four principles are reproduced in their complete form.

Principle one

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

Since water sustains life effective management of water resources demand a holistic approach, linking social and economic development with protection of natural ecosystems. Effective management links land and water uses across the whole of a catchment's area or ground water aquifer.

Principle number two

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 that decisions are

taken at the lowest appropriate level, with full public consultation and involvement of users in the planning and implementation of water projects.

Principle three

Women play a central role (part) in the provision, management and safe guarding of water.

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

Principle number four

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

Within this principle it is vital to recognize first the basic right of all humans' 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 and equitable use, and of encouraging conservation and protection of water resource (WMO, 1992 as cited Melkamu D, R 2009).



2.7. Factors affecting sustainability of water supply schemes

2.7.1 Community factors

The community factors which are likely to impact sustainability of rural water supply schemes are

- The availability of demand or perceived need for an improved service
- Community participation (men/women, social groups) in all projects phases, including services and the O& M of the services; and
- Management through locally organized & recognized group

2.7.1.1. Demand for an improved service

Demand for an improved service by the communities is a prerequisite for sustainability. It is an expression of their commitment, and a way to make communities responsible for their choices and future tasks. However, demand should be promoted because communities must be made aware of the different technology options available, and of their financial consequences. Demand can be manifested in the form of an initial contribution in cash or in kind to capital cost, or in the form of a written solicitation from organized community group to the competent authority/responsible organizations (Brikke 2000).

As a result, responsible organizations should determine and respond what the community wants, and is able to support and sustain, instead of providing water supply facilities that have not been demanded for. Water supply agencies should ensure the projects that are based on effective demand are given the first priority (Mc Pharson 1994, as cited in Musonda 2004).

Experiences has shown that when development interventions align to the priorities of community, the sense of ownership increases, as does the

likelihood that a community will work to maintain the results, thereby increasing the chance of sustainability (MoWR,2003) as cited Bezabih,2008).

It was also indicated that water supply services which are more demanded responsive and more likely to be sustainable at the community level than services which are less demand responsive (Sara and Kalz, 1997 cited in look wood, 2003). In all cases, it emphasizes the need of community members demand for improved service proper to its implementation if the scheme has to be sustainable.

2.7.1.2. Community participation

Community participation refers to “an active process whereby beneficiaries influence the direction and the execution of the development project rather than merely receiving a share of a project benefit” (Paul 1986 as cited in Mc common et al 1990).In order to increase the changes of the water supply system to meet the needs of users, community participation should begin as early as possible in the project development. In fact, community participation should begin as soon as a community has requested water supply facility.

Therefore, community member should be directly involved in planning the new scheme and deciding how it can run, and by so doing, the prospects of its success so improved (Brikke 1993, as cited in musonda 2004).

In this regard, according to Brikke (2000; 46), participation of communities (men and women) throughout the whole project cycle is essential since it is a way to motivate, make responsible and build the capacities of communities in their new tasks and functions. Therefore, community participation in all project phases, including planning, designing, constructing and managing the

services, and in the operation and maintenance (O&M) of the services is very crucial for sustainability of rural water supply schemes (RWSS).

However, the conventional form of community participation in Ethiopia especially, during rural water supply hand pumps development is restricted to ; access road preparation, local material provision (stone in most cases) , and fencing around water schemes by the time scheme is developed. After a year or so, however, is impossible to see even the fence around the scheme because of lack of continual motivation of community to participate in the scheme management.

Hence, the danger of not involving the community in the planning and implementation of the water supply is, the community ownership of the water supply system is compromised, and consequently community members expect the provider of the water supply system operated and maintain it for them. Bikke (2000) argues that with community participation, much more is likely implementation to be accomplished and services provided cheaply. As a result the larger number of community will be supplied with water and also sustainability of the scheme will not be compromised.

It is fundamental to any successful water supply schemes that the people concerned be involved in as many stages as possible in the entire process. If due to consideration is not paid to social aspects when planning, the risk is high that the water supply system will either not be used or it will be misused. It is essential, therefore, that a high degree of community participation in rural water work is applied. In principle communities should participate in the planning, construction, O&M and evaluation phases of rural water supply projects of a water supply scheme has to be sustainable (IDRC,1981as cited Bezabih 2008).

The highest potential for sustainability is achieved when the community is evolved in all phases of the project starting from planning stage. If the scheme

is to operate satisfactory, people have to recognize the need for the need for improved service, be able to and willing to pay for the maintenance cost and eventually the construction cost, and be willing to manage its maintenance (Arlossoff et al, 1987). Similarly it was indicated that, the success of rural water supply programs depend on the extent to which society is considered during the planning stages.

The findings above are related to De Reget (2005) referring a recent review of World Bank water supply projects by OED that stated the local community involvement in decision making about services in implementing and managing those services is linked to greater beneficiary satisfaction with service; and thus greater willingness to pay significant involvement by local stakeholders correlates with better duplicable and sustainability in outcomes and impacts. A lesser degree of participation e.g., only providing materials and labor is associated with a lower likelihood of sustainability.

2.7.1.3 Women participation

Community participation should also be looked at from the gender perspective, because women have the responsibility of fetching water and yet they are unusually not involved in the decision making process. Accordingly, women have been consistently excluded from any dialogue about the priority of improved water supply systems. It should be borne in mind that women are the prime collectors of water and are also the primary beneficiaries of any improvement and should, therefore, be involved in any attempt to improve their water supply facilities (Churchil 1987, as cited in Musonda 2004).

2.7.1.4 Community management/organization

Community participation could only be sustained when there is a system for organization the community (RSU 1999, as cited in musonda 2006). Community organization therefore, entails that a community has the

institutional capacity to manage the development and operation of the water supply schemes, if it is to be sustainable (MC common et al 1990). Hence responsibility to manage water supply system should not be transferred onto the community structure that does not have the capacity to operate and maintain it (musunda 2004).

Because of aforementioned reason, community management of water system usually relies on the formation of a water committee which is responsible for all management issues related to water supply in community (Harney & Reed 2006:4). That means/water committee is responsible for all activities (management, operational technical and financial) of particular schemes, which cover a large area than a neighborhood and possibly the whole community (Brikkee 2000).

Typical tasks of a water committee include: represent the community in contact with support agencies; coordination with other community institutions and decision making bodies; ensures efficient and effective overall management of system takes up assigned roles and tasks; ensure equity; organize contributions; organize effective O&M; ensure accurate financial management; promote hygiene or effective use of facilities, holds regular committee meetings; ensure good communication of all levels, provide information and feedback; and collects information (Brikke 2000).

The composition of a water committee varies according to its management and operational mandate. Generally, water committee is composed of a chairperson, secretary, treasurer and representatives of the users, with a balance between posts occupied by men and by women. In a case where by the community is directly responsible to technical O and M of the system, the committee also includes the operator and/or care taker (Brikke 2000). According to the same source and researcher experience, the water committee does not have legal status. This makes it vulnerable in situation with material, financial,

contractual or legal problems. At the same it is also difficult to make water committee accountable for their financials embezzlement.

2.7.2 Technical factors

2.7.2.1 Technology selection

According to musonda (2004), technology selection is crucial to sustainability of rural water supply schemes because the type of technology chosen affects O&M. If a community is manage water supply system, the technology used needs to be the type that community care takers can maintain with the outside assistance. Also, technology must suit the existing locally available skills or skills that can be acquired by community members. Technology is considered suitable if it is socially acceptable, economically viable, technology effective, and environmentally sound. Communities should have a say in technology option. The technology option should not too technical and beyond the comprehension of community members.

In this regard, according to Geleta et al (2002:20), socio-economic viability, social acceptability and appropriateness of technology influence the ability and willingness to manage the improved water supply systems. The use of appropriate technologies, which are low cost, easy to maintain, simple to use, and readily available is one response to challenge of sustainability.

Appropriate technologies are integral to the concept of village operation and maintenance (VLOM) which emerged in the water decade (Hayson 2006).The VLOM concept includes the development of hand pumps specifically, designed to be maintained by village care takers, but also extends into the institutional arrangements needed to ensure that skills, and tools and spare parts are available when needed (Arlosoroff et al 1987).

2.7.2.2 Availability of tool kits and technical skills needed for O and M

For VLOM hand pumps, there should be trained care takers those can undertake maintenance when needed. The care takers should be capable of doing preventive maintenance work, replacement of worn out parts, and maintain breakage. Therefore, in order to discharge those responsibilities, the care takers should have necessary trainings from the very beginning of scheme installation. Their performance also should be evaluated in continual bases. At the same times the care takers should be provided with necessary tool kits those required for maintenance purposes. However, if necessary skills and tool kits for community hand pump care takers were not provided, the sustainability of the schemes will be compromised (Arlosoroft et al 1987).

2.7.2.3 The availability, accessibility and costs of spare parts

Hand pump installation is the most widespread solution for supplying water to millions of people in Africa's rural areas. However, at any given movement, average 30 percent of all potentially functional water supply schemes in Africa are not working. In some areas, 50 percent or more are non-functional, partly due to difficulties in obtaining spare parts (WSP 2006).

The problem of spare parts for rural water schemes primarily attributed to lack of formal supply chain mechanism. Hence, lack of spare parts has been a major constraint in sustainability of water supplies and has been a recurring problem. In some cases, it has lead to the complete abandonment of the water supply system (Brikke et al 1995:30).

If sustainability is to be achieved, it should be ensured that after appropriate technology is chosen, spare parts for that type of technology are made readily available (Musopnda 2004).

2.7.2.4 Construction quality of water supply schemes

From experience it is not uncommon for the failure of water supply schemes because of construction quality problems. Common construction quality problems that result in scheme dys-functionality are:

- Improper site selection due to poor and/or lack of feasibility study
- Partial penetration of an aquifer
- Poor casing arrangement
- Poor gravel packing and poor estimating of well yield.

Such kind of well completion problems eventually results in well dry up and as a result the schemes will be abandoned (Harney & Reed 2004).

2.7.3 Financial/Economic factors

2.7.3.1 Financial ability to meet the cost of O&M

Failure to adequately cover costs of improved water supply services in developing countries has been identified as major constraints to achieving the goals of safe water supply for all on a sustainable basis. In recent years, increased community financing through user payment for service has been strongly promoted as a solution (Evans: 1992). In this regard, according to Getachew (2002), even small water supply systems require investment of operation and maintenance. These are often costly and thought to be beyond the financial capacity of community, however, experience shows the communities are willing to shoulder portions of the investment costs and to pay for full O&M provided that they are in need of the service and appropriate community promotion exercise is being carried out.

Although these are undoubted by some areas in some countries where poverty is extreme, the review of global situation reveals that most rural communities can afford to pay for improved water supply services provided that appropriate technology is used. The reason for this argument is that people in rural areas

are already spending large amount of time and energy in water collection (musonda, 2004).

As far as payment for water supply service is concerned, Ethiopian water resources management policy (1999) promote that for rural water supply schemes partial cost recovery principle to be applied i.e. user communities should cover O and M costs. Such kind of payment is proposed to be effected through different tariff structures. The tariff structure that is adopted for rural water supply schemes that provide communicable services like hand pumps and public stand posts is flat rate tariff, in which all beneficiaries are expected to contribute equal amount either in cash or kind in fixed time interval (for instance, on monthly basis).

2.7.3.2 Willingness and ability to pay for services

Providing services which people can afford is a pre-condition for cost recovery (partial cost-recovery in rural water supply case in Ethiopia). Being able to pay for something and being willing to do so, however, do not always go hand in hand. From economists points of view demand is only real (or “effective”) when it is accompanied by wiliness to pay, in cash or kind, for goods or services offered. From this points of view, “willingness to pay” and “demand” essentially mean the same things (Evans 1992).

In order to the communities meet the cost of O and M, community member is willing to pay for the services. Willingness to pay for the service is influenced by number of factors. For example, a community with a river and near-by is prepared to pay much less for a hand pump than a community with similar income who has to walk kilometers to fetch water. This is why a survey should be willingness to pay (Roodk et al 1993; Briscoe & De Ferrani 1998, cited in Musonda 2004).

2.7.3.3 Financial management system

In order to cover O and M costs and other important replacement costs, the collected money from user community should be managed properly and used for the intended purposes.

Necessary training should be given for water committee for prudent financial management. Or else, there should exist transparent working and accountability mechanism in order to avoid mis-utilization and embezzlement of collected money (Davis and Brikke 1995).

2.8. Water supply policy in Ethiopia

2.8.1 Water supply policy

The overall objective of water supply policy of Ethiopia is to enhance the well being and productivity of Ethiopian people through provision of adequate, reliable and clean water supply services and to foster its tangible contribution to the economy by providing water supply service that meet the livestock, industry and other users demand (MoWR, 1999). As a result, a 7(seven) years universal access plan (2006-2012) and a plan for accelerated development to end poverty (PASDEP) (2005/6-2009/10) are underway in Ethiopia to provided adequate water supply facilities to achieve the MDG's related to water supply (MoWR, 2006).

More recently, the government also prepared the five years Growth and Transformation Plan (GTP) which confirms the plan already developed for rural water supply in which after five years the water coverage should reach 100%.It has great challenge in the success of the plan. Therefore, there is need of participation of every one for the success the plan by integration with every stakeholders beginning from the early phase of project planning.

2.8.1.1. Drinking water supply policy

The Water Resources Management policy (1999:22-25) in the section of drinking water supply clearly elaborated detail policies on institutional, financial, technical and engineering issues that should be considered in provision and sustainable management of drinking water supply schemes. Some of the policies include:

- provide subsidies to communities who cannot afford to pay for basic services on capital costs only based on established criteria and phase out subsidy gradually
- Enhance self-financed and total cost recovery programs in urban water supplies and ensure that all water supply undertakings will adequately address costs associated with O&M and be based on “cost recovery” principles.
- Ensure responsibility transparency, fairness and financial accountability in the management of water supply service so as to enhance readiness to pay and participation by the users and communities in the financial management of systems.
- Ensure that tariff structures are site specific determined according to local circumstances; and rural tariff settings are based on the objectives of recovering O and M costs while urban tariff are based on the basis of full cost-recovery;
- Establish “social tariff” or water prices neither low nor high that enables the poor communities to cover costs of O and M;
- Develop standard and criteria for the design quality control, materials and technologies in water supply and for O and M procedures;
- Regulate, guide and manage the import of water supply technologies and materials;
- Ensure that the management of water supply systems schemes to be at the lowest and most efficient level of institutional setup, which provides for the full participation of users to promote effective decision making at the lowest practical level;

- Develop coherent and stream lined institutional frame works at all government levels and stake holders for sustainable and effective collaboration, management of water supply at all levels by creating a legalized forum for the participation of all stake holders and clearly defining the relationships and interactions among them;
- Build technical capacity in terms of water source investigation, design, engineering, water quality control, O and M, construction technology and facilities;
- Promote objective oriented training with special emphasis on community participation, administration finance and O & M;
- Assist in the establishment and strengthening of water users associations and equip water supply organizations with the necessary facilities.

As it is indicated above, drinking water supply policy stipulates the conditions to be considered in provision of water supply systems and to make the service sustainable both in urban and rural areas of the country. The policy clearly indicated, the necessity of institutional supports given to the community (users and water suppliers; management of systems at decentralized levels with full participation of the communities starting from planning; the need of coordination among stakeholders with defined rules and regulations technical issues and financial (cost-recovery principle).

2.9. Conceptual/Theoretical framework

Sustainability is a complex and dynamic concept which is made up many interrelated components. As can be seen from the literature section of this paper, sustainability of rural water supply schemes depend on community, technical, financial factors. Furthermore, each factor comprises of important elements that have to be considered to ensure sustainability of water supply schemes.

Regarding with technical factor, water supply project should consider village level operation and maintained (VLOM) schemes for ease of community management. Also adequately trained and skilled technicians those can undertake minor maintenance of schemes should be created within user communities. Besides, important tool kits that are required to undertake maintenance works should be availed. Furthermore, spare parts supply system should be established in a way that the communities can access and afford them if needed for maintenance. Also, construction quality of schemes during well excavation/drilling and top works construction should be supervised by relevant professionals to avoid construction quality problem.

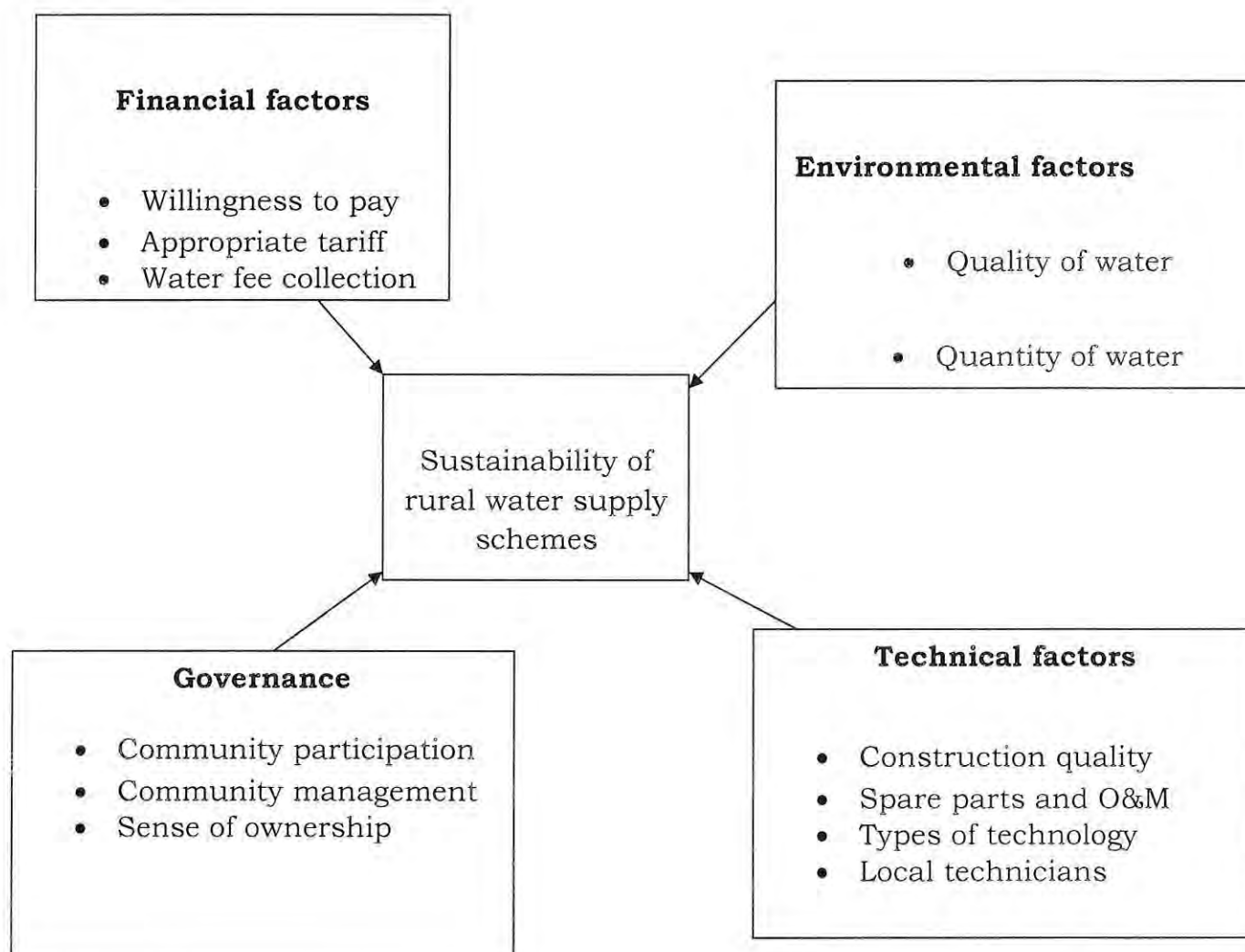
Concerning financial factors, user communities should make regular contribution for O and M of schemes. However, in order to maintain the existence of regular contribution for O and M the amount of contribution should be based on user's ability and willingness to pay taking into account minimum requirement for concerning overall O and M cost of the schemes.

Also, practice of saving users contribution in local financial institutions should be there so that the maintenance of emergency breaks and costs of spare parts can be financed with little down time period of schemes.

Moreover, concerning community factors, there should be a demand for community for improved water supply schemes before development of the schemes. Community participation in general and women participation particular should be ensured starting from planning to financial management stage of the scheme development. Overall management and governance of implemented schemes should be undertaken by locally organized and recognized water committee. Furthermore, staffing of water committee should be gender sensitive to include women as decision making body for water supply schemes and governance. So this study employ the following conceptual /theoretical framework to assess problems to rural water supply schemes by

examining the existence or absence of factors those contribute for water supply schemes functionality (See Fig 2.1) below.

Fig 2.1 conceptual/theoretical framework



Source: Modified from Bezabih .G (2008)

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Overview of the study area

The SNNPRG is one of the nine regional states in Ethiopia. The region has 13 zones and 8 especial woreda, 126 woreda, 3,659 rural kebeles and 156 urban kebeles (BOFED, 2006).

The study area called Lemo woreda is one of the ten woredas and Hossana town administration is in Hadiya zone. The zonal capital is Hossana which is 230 kms south-west of Addis Ababa. The woreda's capital is also Hossana town. The current population of the woreda is 118,578 from which 58,104 male and 60,474 are females with population density 426 (ARD, 2011).

The woreda is further divided into 35 kebeles for administration purpose,. The center of the woreda is situated in Hossan town, which has got its own town administration and government structure. The woreda is bordered with Misha woreda and silte zone at North; Kamabata zone and Soro woreda in south; Anlemo and Shashogo woreda at east, and Gombora woreda at west.

Concerning agro-climatic condition, 9% land mass of the woreda constitutes highland (dega) agro-climatic condition while 91% is classified under mid-land (Woynadega) agro-climatic zone. Average annual temperature is 18°C while the annual rainfall varies within 900mm and 1400mm, and the elevation varies within 1900-2720 masl (ARD, 2011).

Total land area of the woreda is 34,973 Hectar (Ha)

- 1079 Ha grazing land
- 349 Ha can be cultivated land
- 27,441 Ha cultivated land
 - 23,697 Ha is annual
 - 3,444 Ha is perennial
 - 1,559 Ha forest land
- 519 Ha natural
- 240 Ha community owned
- 800 Ha private
- 859 Ha misleaders' land
- 606 Ha institutions and
- 3080 Ha others

Concerning topography, 54.6% is flat, 5.4% hilly and 40% rolling. In the woreda mixed farming is practicing. The woreda is known with production of "enset", wheat and teff. Enset is main source of food, and wheat and teff are the main income source for the local peoples.

Furthermore, in the woreda there are 6 rural towns which are served with electricity services and all are served with water supply services at public level. Most of the kebeles are served with wireless telephone and mobile phone since the woreda is near the center of the zone.

With regard to educational facilities, there are 19 primary first cycle schools (1-4 grade) which serving a total of 20,408 students from which 10,673 male and 9,735 females, and 24 (twenty four) primary second cycle schools (5-8 grade) which benefits a total of 34,519 students from which 17,550 male and 16,969 female students.

There were not high schools observed in the woreda since there are 3 high schools in the zonal town. Six of the schools are served with water nearby.

Finally, concerning health facilities there are a total of 40 (fourty) schemes from which seven are health centers with standard of 25,000 peoples, and the remaining 33 (thirty three) are health posts with standard of 5,000 peoples. There is no hospital in the woreda. The existing heath facilities have a total beneficiary of 132,943 peoples.

3.1.1 Existing water supply conditions of the woreda

There are a total of 108 water supply schemes in the woreda, from which two (2) hand dug wells, (10) ten deep boreholes, 54 shallow wells, 6 springs with distribution networks and 36 on spot spring development. From the total water supply schemes, 76 are functional and 32 are non-functional. Thus implies that 70.4% are functional and the remaining 29.6% are non-functional. The water supply coverage of the woreda is 58.65%. In general, the non-functionality is great problem in the woreda.

3.2. Methodology

3.2.1. Data source and type

The data for the study was from primary and secondary sources. Primary data was collected from 97 sample households (HHS), participant of focus group discussions (FGD) (i.e. three water committees and two women groups), and from key informant interview from water supply agencies (i.e. three zonal experts including head; four woreda water, mine and energy office, experts including head, interview with educational, agricultural and rural development, health office and finance and economic development office one each, etc). In addition, personal observation or visits were made by the researcher. Secondary data was also collected to complement the primary data. The major sources of secondary data was government and non-government (NGO) publications, non-published documents, websites annual reports, books,

researchers done before documents, etc. The collected information includes both the qualitative and quantitative data.

The quantitative was mainly from HH survey while qualitative was from FGD, key informant interviews and personal observation.

3.2.2 Method of data collection

Household survey, focus group discussion, key informant interview and personal observation were techniques to collect primary data which helped to meet the research objectives.

3.2.2.1. Household survey (HHS)

Closed and open ended structured questionnaires were prepared to generate the required information from the sample HHS. The structured questionnaires prepared in English were translated to Amharic which ease the work in the rural area. Then after, structured interviews employed for collecting data from households.

3.2.2.2. Focus group discussion (FGD)

The primary data collected from HHS was enriched by additional information which gathered from FGD. Accordingly, with the help of check lists unstructured questionnaires, discussions, etc.

3.2.2.3 .Key informants interview (KII)

A key informant interview was particularly important in getting information related to the technical and financial aspect of water supply sector.

Therefore, views of water supply agencies (head and experts) were very important as they had better knowledge and experience on problem and

community participation of rural water supply issues. To obtain the views of key informant interviews, checklists were prepared and information was collected.

3.2.3. Sampling design

The target population of the study was all the households living in Lemo woreda from where sample households were drawn. A combination of probability and non-probability sampling techniques were used to select sample rural kebeles and to draw sample households, focus group discussants and key informants. Initially, 4-sample kebeles and 5-water supply schemes were selected purposely (non-probability sampling). The researcher selected four kebles called Kidigisa, Bobicho, Kalisha and Tachgnaw Ambicho purposively based on accessibility, time and other factors.

Of the total water supply schemes existing in the selected sample kebles five sample water supply schemes were selected purposively. These including four shallow hand pumps and one bore hole with four water points. The reason for the selecting of the schemes was for the ease of manageability due to time factors.

And then, 97(ninety seven) households from sample rural kebeles were drawn using simple random sampling techniques which gave all the respondents in the respective kebeles equal chance to become a sampling unit. Hand in hand three water committee groups and two women groups were selected purposively to get strong water governance system.

Finally, to supplement the data obtained from households' survey, relevant government officials (three from woreda water office, three from zonal), and women selected purposively depending on their knowledge and experience. Which ease the identification of the under using problems that affect the

provision of safe and adequate rural water supply and the roles of community participation in the respective kebeles.

3.2.4. Data collection instruments and methods

Different data collection instruments and methods were employed to collect primary data. Since the main source of data for the study was individual households, structured households interview schedule which included close ended and open-ended were employed. Focus group discussion and key informants' interview also employed to generate data from different actors.

The focus group discussion and key informants interview were conducted using structured and semi-structured check list. In addition, personal observation was also a handful instrument to directly observe the existing rural water supply problems in the study area. The researcher used three enumerators to ease the work. The enumerators had enough knowledge and experience in the rural water supply schemes. Water resource engineer, water mechanic, and one community facilitator were participated in the research work. The former two are diploma holders and the later is degree holder who was working in lemo woreda water, mine and energy office during the research work.

3.2.5. Data analysis

There were two level of data analysis. Quantitative data generated from different sources were analyzed using simple descriptive statistical tools like frequency, percentages, cumulative percentages, etc. And qualitative data collected using focus group discussion; key informants interview and personal observation were triangulated, organized and analyzed accordingly.



Furthermore, regarding family size of the respondents, from the total household respondents, 26(26.8%) had a family size below six (6), 56 (57.7%) had a family size between 6-10, and 15(15.5%) had a family size above 10(ten). Family size and consumption is directly proportional and appropriate management and governance is very crucial for those who had great number of family size. The higher family size had contribution for water related diseases transmission.

To see the religion of the respondents, majority of the respondents were protestant (Christian), religion followers. Out of the surveyed households respondents, 85(87.7%) were protestant, 8(8.2%) were Orthodox (Christian), and only 4(4.1%) were Muslim religion followers. Table 4.3 below shows family size and religion of the households' respondents.

Table (4.3) family size and religion of the respondents

Family size			Religion		
Family size	frequency	percent	Religion	frequency	Percent
Below 6	26	26.8	Protestant	85	87.7
6-10	56	57.7	Orthodox	8	8.2
Above 10	15	15.5	Muslim	4	4.1
Total	97	100	Total	97	100

Source: own survey, 2011

Concerning the educational level, out of the surveyed household respondents, 26(26.8%) were respondents who cannot write and read, 6(6.2%) were those who can write and read, 25(25.8%) were respondents who attended grade 1-6th, 33(34%) were respondents who attended high school, and 7(7.2%) were

respondents who attended grades above high school (above grade 12th i.e. certificate and diploma holders). Education plays a significant role for water resources management and governance. Therefore, of those who learned more had good approach in management of water supply schemes since they are more near to new technologies and practices from information gathered.

Concerning their occupational status, 4(4.12. %) were civil servant, 93 (95.88%) were farmers. This implies that majority of the respondents in the study (rural) area are farmers who had doing agricultural activities such as farming, rearing animals, planting trees, planting vegetables and fruits. Their products come to the urban and rural community. Therefore, occupation of rural community can help the occupation of urban community.

Table (4.4) Educational level and occupation status

Educational Status			Occupation status		
Education	frequency	Percent	occupation	frequency	Percent
Cannot write and read	26	26.8	Civil servant	4	4.1
Can read and write	6	6.2	Merchant	-	-
1-6 th	25	25.8	Farmer	93	95.88
7-12 th	33	34	Daily labor	-	-
Above 12 th	7	7.2	-	-	-
Total	97	100	Total	97	100

Source: own survey 2011

Finally, the ethnic groups of the respondents all in all were Hadiya. This implies that in the study area there were only Hadiya ethnic group during the time of survey.

4.2. Existing water supply situation

4.2.1. Water supply sources and consumption

Existing water supply sources situation is very important to understand or know the major problems of rural water supply schemes in the study area. The survey result in the study area shows that majority of the respondents are using protected or developed water supply sources like shallow wells (SW) fitted with hand pumps, bore hole (BH) with distribution networks, and unprotected source like river and dam in some case for their domestic purposes. The result shows that 71 (73.20%) of the respondents use shallow wells fitted with hand pumps, 4(4.12%) of the household respondents use rivers, and 22(22.68%) of the respondents use bore hole with distribution net works of four water points in the selected sample kebeles.

Therefore, the households beneficiaries or communities did not have any other alternative rather than fetching water from distant river. And, they also reported that if the schemes fail, all of the activities will be done by river water since no other options.

In general, except the shortage of water supply schemes, most of the household's respondents of the survey were using developed water sources. And, these made them happy and healthy. This further adds the productivity of the respondents in different activities like agricultural activities.

Table (4.5) main source of drinking water of respondents during the

Time of survey

Water Supplies	frequency	Percent
Shallow wells (SWS)	71	73.20
Borehole with distribution net works	22	22.68
River	4	4.12
Hand dug wells (HDWs)	-	-
Protected spring (PS)	-	-
Unprotected spring (US)	-	-
Total	97	100

Source: survey result 2011

The survey result shows that, 59 (60.82%) of the respondents were using for drinking purpose only, 7 (7.22%) were using for both drinking and cooking, 24 (24.74%) of the respondents were using for cooking, drinking and washing (cleaning), and 7 (7.22%) of the households respondents were using for all purposes except livestock. Most of the respondents were answered that they were using water for livestock and in some case for washing from rivers.

According to focus group discussions made with women's at kalisha kebele, they have reported that, they use their water in effective and efficient manner for alternative activities like drinking, cooking, washing and else during the time of shortage. This findings show that about 60% of the households respondents were using water for drinking purposes only. This implies that they had no alternative source for drinking purposes even if for other purposes they could use other sources including unprotected sources such as rivers for washing, cooking, etc. In the other words, some of the user communities using for all purposes except livestock. This finding shows all of the respondents get water for livestock from rivers or unprotected sources.

4.2.2. Status of water supply schemes

The data from lemo woreda water, mine and energy office 2011 shows that, there are about 108 developed water supply schemes from which 2(two) are hand dug wells (HDWs), 10(ten) are deep bore hole with distribution new works, 54 (fifty four) shallow wells fitted with hand pumps, 6 (six) springs with distribution and 36 (thirty six) are on spot springs development. Out of these water supply schemes 76 (seventy – six) are functional which is 70.37% of the total schemes in the woreda. And, 32 (thirty Two) are non – functional which is 29.63% of the total water supply schemes. This finding, Confirms with Davis and Brikke (1995,) referring WHO that estimated 30-60% of the existing water supply schemes in developing countries like Ethiopia are non- functional or non- operational at any given time.

Moreover, in the selected sample kebeles we had 9 (nine) shallow wells fitted with hand pumps in kidigisa. Out of which are 8 functional and one (1) is non-functional. At Tachgnaw Ambicho kebele there was 2 (two) shallow wells, one functional and the other is non- functional. In addition, Bobicho kebele has four (4) functional shallow wells fitted with hand pumps, and at kalisha kebele there was a bore- hole with four water points which is functional.

Majority of the functional schemes were – even providing services with problems like frequent interruptions due to non- functionality. As a result of failure in water supply schemes, many of the rural communities in the study area were not served properly.

Finally, the data obtained from Hadiya zone water, mine and energy department shows that, the water coverage of the study woreda raised to 58.5% at the end of 2010. This is due to development of some new water supply schemes by governmental and non – governmental organization.

Table (4.6): Existing water supply schemes status and beneficiaries

Woreda	Types of schemes	No of schemes	Status		Beneficiaries	
			F	NF	From functional	From non functional
Lemo	HDW	2	1	1	348	150
	DBH	10	6	4	14,736	16,788
	SW	54	41	13	19,393	7986
	SWD	6	5	1	7875	1500
	OSP	36	23	13	7675	8405
	Total	108	76	32	50,027	34,829

Source: Lemo woreda water, mine and energy office

Table (4.7): Existing water supply schemes status in the selected sample kebeles

No	Kebele	Kebele popn	village	Site name	Constructors by	Year of construction	Status of schemes		Popn. served within 1.5kms from the sources	Total popn served
							F	NF		
1	Tachgna w Ambicho	5137	Benea	Benea	UNICEF	1999	✓	-	360	480
2	Kalisha	1800	Batena	Batena	Food security	2001	✓	-	3865	4180
3	Kidigisa	5394	Hongorame	Kidigisa 2	KHC	2000	✓	-	250	250
4	Kidigisa	5394	Kidigisa	Gabo2	KHC	2000	-	✓	350	400
5	Bobicho	3415	Hakmura	Hakmura	KHC	1992 E.C	✓	-	490	490

Source: Lemo woreda water, mine and energy office

4.2.3. Existing problems in household water supply system

It is clear that there are many types of problems in household water supply system. Most of the households respondents of the survey said that Variety of problems happening within the household water supply system. The survey result shows that 20 (54.05%) of the household respondents who have problem or 20.62% of the total household respondents said that water supply schemes non-functionality is the main problem, 7 (18.92%) of who have problem or 7.22% of the total households respondents said that more beneficiaries using the schemes (pressure or over pumping) is the problem, 4 (10.81%) of respondents who have problem or 4.12% of the total households respondents said that fuel problem for generator is the main problem, 3(8.11%) of the households respondents who have problem or 3.09% of the total households respondents said that long distance to fetch water is the main problem, 1 (2.70%) of the respondents who have problem or 1.03% of the total households respondents said that poor management of water supply schemes is the problem, and 2 (2.54%) of the total household respondents said that problem of diseases while using river is the main household water supply system problem.

In general, in households' water supply system there were so many problems happening. As the findings from the survey, the problems are: water supply schemes non- functionality; more beneficiaries using the schemes (pressure or over pumping); fuel problem for generator; long distance to fetch water: poor management of water supply schemes; and problem of diseases while using unprotected schemes like rivers. Table (4.8): shows that the problems of household water supply system.



Table (4.8) problems of household's water supply systems

Issue	Response	Freq.	percent	Problems in household water supply system		
				problems	Freq.	per cent
Absence or presence of problems in household water supply system	Yes	37	38.14	Water supply schemes non-functionality	20	54.05
				More beneficiaries using the schemes	7	18.92
	No	60	61.86	Fuel problem for generator	4	10.81
				Long distance to fetch water	3	8.11
				Poor management of WSS	1	2.70
				Problem of diseases while using river	2	5.41
	Total	97	100	Total	37	100

Source: household survey result, 2011

According to FGD made with water committee in Tachgnaw Ambicho kebele reported that their schemes are becoming non- functional many times (non-functionality), households, are many and long queue of the water schemes, and awareness and economy or financial problem with some of the households that resulted in water related diseases are the main problems encountered within households water supply system.

Moreover, according to focus group discussion with women in the selected Kebeles said that their water supply schemes problems are the following. These are: not considering community participation especially, women participation from planning phase to implementation phase; Absence of local water

technicians in nearby to the water supply schemes to take care as soon as the water supply schemes fail; there is no check up before failure of the schemes unless the schemes fail; absence of sense of ownership in most of the communities to take care as their own property or asset; and not selecting the right technology for the services such as generator which is consuming much amount of fuel other than electricity which is near by their water supply sources. They were complaining that the community of kalisha kebele suffering from paying of 30 cents/ Jerican which is costly for community at rural areas.

4.2.4. Existing water demand (consumption) status and time of fetching water

Concerning distance to fetch water and time spent, most of the respondents of the survey did not go far distance and much time to take to fetch water. The survey result shows that they did not go more than 3^{kms} which is 1 hrs both round of the walking, and the minimum of 500^m which is not more than 10 minutes.

In the study area, gender inequality was the great challenge in water supply schemes responsibilities and roles. Most of the activities or works within or out of home done were by females and children (i.e. female children's). Females were not attending their lessons properly which had been affecting their results at the end of the academic years. From the surveyed households, 4 (4.12%) responded that only men brings water to their home, 22 (22.68%) responded that only women bring water to their home, 5 (5.16%) responded that both men and women bring water home, 37 (38.14%) responded that both women and children bring water to their home, and 4(4.12%) responded that men, women and children are the one who bring water to their home.

From this we can understand that most of water bringing activity to home is by women and children 37(38.14%).

In other words, water is transported in different manner by human being, donkey, and both human being and donkey. The survey result shows that 27 (27.84%) of the respondents responded that they bring water by human being (labor), 63 (64.95%) responded that they bring water by donkey, and 7 (7.21%) responded that they bring by both human being and don key. The survey result shows that water transporting is commonly done by transporting facility like donkey. They are using human being next to donkey. In some of the households there is both donkey and human being alternatively.

Table (4.9) water fetching task allotment and transportation type

of the water.

Issues	Response	Frequency	Percent	Communicative percent
The responsible body for fetching water to home.	Men	4	4.12	4.12
	Women	22	22.68	26.88
	Children	25	25.77	52.57
	Men and women	5	5.15	57.72
	Women and children	37	38.14	95.88
	Women, men& children	4	4.12	100
	Total	97	100	100
Water is transported by;	Human being	27	27.84	27.84
	Donkey	63	64.95	92.79
	Human being and donkey	7	7.21	100
	Total	97	100	100

Source survey result, 2011

4.3. Existing problems to sustainability of rural water supply Schemes

4.3.1. Technical problems affecting sustainability.

4.3.1.1. Technology selection

Technology selection is one of the very important elements in the sustainability of rural water supply schemes. There are so many types of technologies practicing in different areas in the world in different purposes and for different activities. With regard to rural water supply schemes, in the study area, there were almost similar technologies selected by different organizations including governmental, Non- governmental, community based organizations, and communities depending on different factors such as financial (economic), environmental (geological and geophysical) and etc. In the study area, according to key informants interview made with woreda, zonal, regional water, mine and energy departments emphasized that shallow wells fitted with hand pumps are the most practical technology in the rural area, this is because, the area is not feasible for hand dug wells even in some kebeles shallow wells are not feasible, and financial viability is the great problem to select others technology except shallow wells. In some cases spring developments with net work distribution when there is a fund from different non-organizations. This technology needs much money for construction and distribution which need much investment. The last chance is selecting boreholes with distribution or extension which need huge investment more than the others. These technologies can be done for areas which are not feasible for hand dug wells; shallow wells and spring development since it need much investment which cannot be easy for governmental organization. These are some of the ideas from the key informant interview (KII) indifferent level of water offices.

But these technologies may or may not easily be operatable and manageable by the user communities in the study area. If technologies are not easily operatable within the user communities, the schemes could not be functional for longer time. This is because; their acceptance has great effect on the sustainability of rural water supply schemes.

These technologies were selected by different stakeholders those have responsibility at the time of planning or during construction. The survey result shows that 41(42.27%) of the household respondents responded that, the technology were selected by woreda water, mine and energy office, 46(47.42%) responded that the technology were selected by NGOs, 1(1.03%) were community and government selected the technology, and 9(9.28%) were responded that they do not know who selected the technology in service except using them for their activities. This implies that most of the technologies selection does not include the beneficiaries in the study area which affect the interest of them in using the technology by other selector. Table (4.11) below shows the issues related to technology selection.

With regard to technology acceptance or not, some of the household respondents accepted the technology in-service and some others did not. The survey result shows that for question. "Is the technology option easily operatable and manageable by the beneficiaries?", 51(52.58%) of the respondents said "yes", 43(44.32%) of them said "No", and only 3(3.10%) of the respondents did not know about the technology in service out of the respondents who said "No", 41(95.35%) reported that the main problem is with shallow wells fitted with hand pumps in which the handle is very difficult to more and need to powerful beneficiaries. That means any one could not do without any challenge, 1(2.32%) of the respondents said that there are easily breaking parts within the hand pumps which make the schemes non functional in short time. The remaining 1(2.33%) answered that operation and

maintenance become hard. This is due to non-functionality rate of the schemes in the study area where by difficulty in operation and management.

The suitability of the technology is in question as the key informant interviews. Since they were selecting not due to suitability but due to supplying the community with water .They said that they had financial problem for developing bore holes with net work distribution that made them to select shallow wells with hand pumps that need lesser finance. Shallow wells are not suitable enough, especially shallow wells with extra deep hand pump which need much energy to fetch and not easy to operate. The extra deep pump shallow wells encounter repeat breakages which need operation and maintenance many times. But, for bore holes and spring development with net work distribution both the beneficiaries and the government officials were happy or agree except fuel problem for generator. If there is enough capital the technology should be boreholes with electricity power and spring developments.

Table (4.10) issues of technology selection

Issues	Response	frequency	Percent	Cumulative percent
The technology in service was selected by:	Woreda water office	41	42.27	42.27
	NGOs	46	47.42	89.69
	Community and government	1	1.03	90.72
	I didn't know	9	9.28	100
	Total	97	100	100
The technology in service operatable and manageable or not	Yes	51	52.58	52.58
	No	43	44.32	96.90
	I don't Know	3	3.10	100
	Total	97	100	100
The difficulties (problems) related to the technology.	Hard to move the handle	41	95.35	95.35
	Easily breaking parts	1	2.32	97.67
	O and M become hard	1	2.33	100
	Total	43	100	100

Source: survey result.2011

4.3.1.2 Availability of Spare Parts

Concerning the availability of spare parts at community level in rural water supply schemes whenever needed, almost all reported that there is not easily available and accessible. The survey results shows that, 79(81.44%) of the households respondents get from market on purchase, 8(8.25%) of the household respondents get from donation by regional, zonal and woreda water offices, and the remaining 10(10.31%) responded that they did not know from where they get the spare parts.

Most of the household respondent said that, when the schemes fail as a result of unavailability of spare parts, their water supply schemes were stayed for long period of time without maintenance and others said their water supply schemes providing service with problems.

According to key informant interview made with regional water bureau representative, zonal water head and experts, and woreda water office head and experts, there were no stores for spare parts at community level and at woreda level except at regional level. At regional level, as governmental structures donors supply spare parts and government budget allocation also adjusted at the level. At the woreda level there is no stores for spare parts provision. This is because; at the higher (regional) level office did not give attention for operation and maintenance which are the basic for sustainability of rural water supply schemes. The shortage of budget and not getting position by the higher level organization are the bottle necks of spare parts availability and provision for operation and maintenance. These in turn resulted in the less ownership of the community to take care the water supply schemes at the rural areas.

With regard to spare parts and toolkits availability and affordability, the key informant interview shows that there were not readily available and affordable. But, they get from private owners, government and there is a store at some of the zones at neighboring zones like silte and Wolayita Sodo. Some of the key informant interview answered that in regional level there are stores at capitals of selected zones which did not include Hadiya zone in which the study woreda is found. In somehow availability and affordability in the study area is very difficult which had negative impact on sustainability of rural water supply schemes at the study woreda.

Finally, according to focus group discussions made with water committee emphasized that there were great problem in provision or availability and affordability of the spare parts at the right time, at the right place, and as soon as the schemes get mal functioning.

If there is unavailability and affordability their life stops or they are going to use rivers for different activities which might result in water related diseases. This in turn resulted in non – productivity of the household in the study area. This finding is related with the suggestion of Musonda (2004) who stated that appropriate tools for carrying out repairs should be made available to achieve sustainability. Similarly, according to WSP (2006), at a given moment, averages of 30% of all potentially functional schemes in Africa are not working .In some areas, 50% or more are non-functional due to difficulties in obtaining spare parts. Furthermore, lack of spare parts has been a major constraint in the sustainability of water supplies. In some cases it has led to a complete abandonment of schemes.

4.3.1.3 Availability of local technicians and their technical Skills

Even though the need of local technicians for O & M, there was no community or local technicians at the study sample kebeles. And they did not have opportunity and technical skills within the community which is the great challenge in sustainability of the rural water supply schemes. According to the survey, all of the household respondents responded that they did not know or habit of community technicians activity within themselves. And they recommend that local technicians are very important but they did not have. Local technicians are necessary because nearby technicians can understand every problem within the community and can follow the water supply schemes without challenge. Therefore, the absence of local technicians can affect not only their water supply schemes but also the life of themselves as the respondents said.

According to the respondents, the operation and maintenance activities had been done by woreda water office experts, and heavy or major repairs by zonal and regional bureau experts or technicians.

4.3.1.4 Construction quality of developed water supply schemes

Construction quality plays a great role in water supply schemes functionality or sustainability. If this is not practical i.e. the absence of necessary materials, construction and design problem, in adequate follow up during construction, poor quality of head work, and the like may affect the construction quality of the schemes. During observation made on some of developed water points, there construction qualities were poor. For example, the drainage ditches were

not constructed according to the right standard which should be in relation to the characteristics of the area observed.

It may be a dangerous for people when a facility breaks down and cannot be repaired because of a fault in the design and construction. There was a question “how do you evaluate the construction quality of existing water supply schemes?” for the household respondents in the study woreda. They answered Variety of answers according to their understanding. The evaluation criteria was “not good”, ”good” and “very good” of the water supply schemes construction quality. The survey result revealed that, 67(69.08%) of the household respondents responded that the construction quality is “good” and 26(26.80%) of the household respondents said the construction quality is very good. No one said the construction quality is not good, but this is not the reality from physical observation in the selected kebeles.

Their views were due to the less awareness and lack of understanding upon the design and quality of construction within the user communities. And, the illiteracy of the household respondents in the survey area made them accepting a given constructed schemes without observing the construction quality. Hand in hand 4(4.12%) of the respondents responded that they didn’t know the construction quality itself.

Table (4.11): the evaluation of construction quality of the scheme in respondents opinion.

Issue	Response	Frequency	Percent
The evaluation result of the construction quality of existing water supply schemes	Not- good	-	-
	Good	67	69.08
	Very good	26	26.80
	I didn’t know	4	4.12
	Total	97	100

Source: survey result, 2011

4.3.1.5 Non-functionality and time spent of dis- repair

Functionality is one of the important contributors to sustainability of water supply schemes in rural areas. In other words, non-functionality has negative impact on sustainability of the schemes. The survey result shows that majority of the respondents responded that their water supply schemes are functional now. Only one of the five water schemes is non-functional at the study area. Out of the total households respondents more than 80% were using their water schemes with functionality.

In addition, for question “how frequent does the schemes get failure?”, 23(23.71%) of the respondents responded the schemes fail once in three months, 34(35.05%) responded the schemes fail once in six months, 16(16.49%) responded they fail once in a year, 19(19.59%) responded their schemes get no failure so far, and only 5(5.15%) of the households respondent did not know when the schemes getting failure. These findings imply that the schemes in the study area fail three months to one year.

More time spent after non-functionality or failure has great impact on sustainability of the schemes. This is because; sustainability needs continuity of the services or benefits of the schemes for long time at regular position. The survey result shows that, after failure of the schemes 58(59.79%) of the households respondents said the schemes stay without repair for one week, 10 (10.31%) responded the schemes stay two weeks, 4(4.12%) one month it takes without repair, only 2(2.06%) responded more than one month, 17 (17.53%) said that their schemes stay without failure, and 6(6.19%) of the households respondents responded they did not know how many times to stay after non functionality or failure. The findings shows that majority of the respondents answered that the schemes stay without repair for only one week, and the response of the water supply schemes did not get failure is a high

proportions. Therefore, the water supply schemes beneficiaries could not face problem with repair unless they get heavy problem in the water supply schemes which are difficult for woreda and zonal water experts. Table (4.13) below shows the functionality and frequency of dis repair during the survey time.

Table (4.12), Functionality and time spent after failure

Issues	Response	Frequency	Percent	Cumulative percent
The existing schemes functional or not	Yes	81	83.51	83.51
	No	16	16.49	100
	Total	97	100	100
The existing schemes fail in how many times/frequency.	Once in three months	23	23.71	23.71
	Once in six months	34	35.05	58.76
	Once in a year	16	16.49	75.25
	No failure so far	19	19.59	94.84
	I didn't know	5	5.16	100
	Total	97	100	100
The time spent without maintenance	One week	58	79.45	79.45
	Two weeks	10	13.70	93.15
	One month	3	4.10	97.25
	More than one month	2	2.75	100
	Total	73	100	100

Source: survey result, 2011

4.3.2 Financial/ Economic factors

4.3.2.1 Financial ability and willingness to meet the cost of services

If improved water supply schemes are to be managed properly and make the benefits sustainable, beneficiaries or user communities should cover operation and maintenance cost. In relation to this, the water resources management policy of Ethiopia (1999) clearly indicated that provision of drinking water supplies in urban areas are based on the principle of total cost-recovery programs while rural water supplies are based on the principles of covering costs of O&M and these principles need urban tariff settings to be based on the basis of full cost-recovery and rural tariff settings to be based on the objectives of recovering O and M costs which are considered as mandatory.

The amount of money needed to meet costs of O &M depends on whether the beneficiaries pay or not and their ability to pay regularly. Unless costs of O &M are covered by beneficiaries, the probability of water supply schemes to be sustainable is very low as failure of water supply schemes or break down at any time is one of its features. With regard to this ODI (2004) identified cash flows as a major problem in many rural areas, especially, if the water point breaks at wrong time.

In other words, there were different tariff structures in different areas of the country. But in somehow there is a flat tariff rate at the rural areas in which there exist hand pumps and public stand water points. All beneficiary communities contribute equal amount either in cash or in kind, especially, in cash within fixed time interval, for instance, on monthly basis. This is not practical in some of developed water supply schemes for example, borehole with water points in which the beneficiaries pay for their services every time

when water is drawn in rural areas including the study area. With regard to whether the communities pay fees for the water services, the survey result shows that 93 (95.88%) of the respondents responded they were paying for the service and only 4(4.12%) responded they did not pay with some factors upon their own. Those respondents who did not pay were those who were unable to pay for the service. From this, it can be concluded that communities are aware of why they pay water fees that in turn positively affect sustainability of the schemes as the fees may be used for purchase of spare parts when needed.

The survey result shows that necessity of paying for the services, 93(95.88%) of the households respondents indicated that beneficiaries should pay water fee for the service and only 3(3.09%) indicated that there is no need of payment for the water service due to their economic or financial level in rural areas or in the study area. From the respondents who agree in paying, 88 (93.62%) indicated that the reason for paying is the cost will cover O &M cost, salary of guard, per-diem of water specialist, fuel cost, hired employee costs, etc. And 2(2.13%) of the households respondents out of the agreed in paying indicated that there is need of ownership of the schemes and should be paid for the service, at last 3(3.09%) of them who agreed paying, the reason to pay for the service is when problem faced there is need of the finance (money). From this result we can conclude that or understand there is excellent willingness to pay and the beneficiaries have good knowledge on operation and maintenance .Of those who responded they did not pay, all of them indicated that the reason for not paying the fee was the villagers are poor and they could not afford fee for the services. Hand-in-hand they said that their inability is due to less harvest for their agricultural activities which is one and the only one source of income for all expenditures of their family.

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Regarding the amount of money payment made, the survey result indicated that 16(16.49%) of the household respondents paying 1 ETB / month, 44 (45.36%) of them paying 2 ETB/ month, 6(6.19%) of them were paying 3 ETB/ month, and 5 (5.15%) of the total respondents indicated that they were paying 5 ETB/ month who had great complaining since their neighboring are paying only 2 ETB/month with additional work as care takers. On the other hand, 22(22.69%) of the respondents who were using bore hole with water points indicated that they were paying 0.3 ETB/Jerican which is costly for rural community. This is because; their income is very low which can not cover this cost without help or support.

The reason for paying this cost is the fuel problem in which there was need of much fuel for filling of the reservoir every day. Finally, 4(4.12%) of the surveyed households they did not know how much they pay for the water services.

With regard to the evaluation of existing water fee in the view of the beneficiaries in the study area for question "how do you evaluate the existing water fees?" and for evaluation criteria "Expansive", "Fair", and "Cheap" they indicated that, out of the beneficiaries who were paying 1 ETB/month 8(50%) responded that the fee is "fair" and 8(50%) responded that the fee is "cheap". In relation to this, out of the respondents who said "cheap", 2(25%) were willing to pay 2 ETB/ month, 2(25%) were willing to pay 3ETB/month, 1(12.5%) is willing to pay 4ETB/month, 2(25%) of them were willing to pay 5ETB/month and only 1 (12.5%) was willing to pay 10 ETB/ month. This percentage is out of the respondents who were paying 1 ETB/ month.

The percentage out of the total household respondents would be 2.06%, 2.06%, 1.03%, 2.06% and 1.03% respectively. Out of the respondents who were paying 2 ETB/month, 6(13.64%) said "expensive", 18(40.91%) said the exiting fee is "fair", and 20 (45.45%) said the fee is "cheap". In relation to this, of those who

said 2 ETB/ month is “expensive” all of them were willing to pay 1 ETB/ month, and of those who said “cheap”, 10 (50%) of them were willing to pay 3 ETB/ month, 4(20%) of them are willing to pay 4 ETB/ month, and 6(30%) of them were willing and ability to pay 5ETB/ month. From this finding majority of respondents who were paying 2 ETB/ month said the existing fee is “cheap” and they had ability and willingness to pay 3 ETB to 5 ETB/ month.

In addition, out of the respondents who were paying 3 ETB/ month, 3(50%) of them said the existing fee is “Fair” and 3(50%) of them said “cheap”. From those who said “cheap”, 1(33.3%) is willing and ability to pay 4 ETB/ month, 1 (33.3%) is willing and ability to pay 5ETB/ month, and 1(33.3%) is willing and ability to pay 10 ETB/month.

Moreover, out of the respondents who were paying 5 ETB/ month, 3(60%) said the existing fee is “expensive” and 2(40%) said “Fair”. From those who responded “expensive”, 2(66.7%) were willing and ability to pay 2 ETB/ month and 1 (33.3%) were willing and ability to pay 3 ETB/ month. Hand in hand from the household respondents who were paying 0.30ETB/Jerican, 18(81.82%) said the existing fee is “expensive” and 4(18.81%) said “Fair”. Out of the respondents who said “expensive”, 4 (22.22%) were willing and ability to pay 0.10 ETB/ Jerican, 2 (11.11%) were willing to pay 0.15 ETB/ Jerican, 11 (61.11%) were willing to pay 0.20 ETB/ Jercian and only 1 (5.56%) is willing and ability to pay 1 ETB/ month. In general, from all of the households respondents who were paying 15(16.13%) are ability and willingness to pay 1 ETB/ month, 22(23.60%) 2 ETB/ month, 16(17.20%) of them 3 ETB/month 6(6.45%) of them 4ETB/month, 10 (10.75%) of them 5 ETB/month, 2(2.15%) of them have ability and willingness to pay 10 ETB/month, 5(5.38%) of them 0.10 ETB/Jerican, 11(11.83%)of them 0.20 ETB/ Jerican and 4(4.30%) were willing and ability to pay 0.30 ETB/Jerican. From the above results we could discuss that the water services beneficiaries were paying different amount of

fee in different kebeles depending on the technology type and the period of functionality. That means for bore holes water points, they were paying at the time of water drawn while for shallow wells fitted with hand pumps paying every month at the beginning. In addition, those beneficiaries who faced non-functionality repeatedly were paying much while who did not was paying less.

In addition, the user's communities had different perspectives on the existing fees such as "expensive" ,"fair" and "cheap". This evaluation might be depending on their ability and willingness to pay for water services. Some of the respondents were happy in paying as more, but some did not. And, some of the respondents could not paying do to the capability or ability. In general, most of household's respondents were ability and willingness to pay for their services.

Moreover, the beneficiaries who were in the bore hole sites complaining in paying 0.30 ETB/jerijan which is costly for them. As the FGDs with water committees indicated that this happened due to the higher fuel consumption of the generator since the fuel cost is increasing time to time. For being functional or giving service there is need of fuel for filling the reservoir every day unless the service will stops. Therefore, there should be paying of at least 0.30 ETB/jerican, but it was 0.20ETB/jerican which was not enough to fill the reservoir.

Furthermore, the users' communities had a better willingness to pay for their services since they had understanding of water is life and precious. And, their willingness varies from 1ETB/month to 10ETB/month and from 0.10ETB/Jerican to 0.30 ETB/Jerican as well as ability.

Finally, the beneficiary's community had understanding of water services fee should be paid by everyone. This is because; they think that the fee might used for operation and maintenance cost or recovery cost. And, they understood that there is need of saving money for operation and maintenance at any given time.

Table (4.13): Respondents view on financial issues of their water supply schemes in general manner.

Issues	Response	frequency	Percent	Communicative percent
The amount of fee paying for the water service during the survey	1 ETB/month	16	16.49	16.49
	2 ETB/month	44	45.36	61.85
	3ETB/month	6	6.19	68.04
	5ETB/month	5	5.15	73.19
	0.30ETB/jerican	22	22.69	95.88
	I didn't pay	4	4.12	100
	Total	97	100	100
Evaluation result of existing water fees	Expensive	27	27.84	27.84
	Fair	35	36.08	63.92
	Cheap	32	32.99	96.91
	No fee	3	3.09	100
	Total	97	100	100
Beneficiaries ability and willingness to pay for the water services	1 ETB/ month	15	16.13	16.13
	2ETB/month	22	23.60	39.73
	3ETB/month	16	17.20	56.93
	4 ETB/month	6	6.65	63.58
	5ETB/month	10	10.75	74.33
	10 ETB/month	2	2.15	76.48
	0.10 ETB/jerican	5	5.38	81.86
	0.15 ETB/ Jerican	2	2.15	84.01
	0.20 ETB/jerican	11	11.83	95.84
	0.30 ETB/ Jerican	4	4.26	100
	Total	93	100	100

Source: survey result, 2011

4.3.2.2 Financial management system

According to the survey result, water fees tariff setting have been done in different responsible body, including water committee, community, kebele administration, etc. The survey result shows that 17 (17.53%) of the household respondents responded price setting done by water committee, 3(3.09%) by water committee and water office, 65(67.01%) by community in agreement, 4(4.12%) by kebeles administration, and 8(8.25%) of them responded they did not know who were settled the price of the water fees except paying for the service. This findings shows that majority of them responded the price setting was done by community which is a good approach in rural area that can help the financial management transparent. And awareness creation for those who did not know is very critical to know the hardship and importance of water supply services.

With regard to the responsible body in collecting the settled tariff fee from the user communities, 72 (74.23%) of the respondents responded water committee had been collecting the fees which were the beneficiaries in shallow wells both in functional and non-functional, 22 (22.68%) responded hired employee were collecting the fees, this is for beneficiaries in borehole with water points in which one employee in each water points observed during the survey. And only 3(3.09%) of respondents were who did not know who is collecting the water service fees. From this result we can see that majority of water service fee collection had been done/ doing by water committee who are management body of rural water supply schemes in the study area. This is appropriate if the water committees in the study area were capacitated in skills of financial management system.

Regarding, to the time of collection of the water service fees, 22(22.68%) of the household respondents indicated that they pay every time when water is

drawn, 71 (73.20%) responded they pay every month at the beginning and 4(4.12%) of the respondents responded they did not pay whenever due to many factors.

According to FGD made with water committee of Tachgnaw Ambicho Kebles, there was community based organization that was “Idir” controlling the financial collection system.

It had very hard obligation and rule in water resources management and finance that govern if the user communities not pay at the right time (day). If the user community didn't pay at the right time, the beneficiaries will pay additional 2.50 ETB within a single day, and if they made a problem on water schemes, they will pay 50 ETB. This also will be added day to day unless they pay as soon as they asked. In my understanding this approach is acceptable and necessary for sustainability of the schemes. That means it has positive impact on the sustainability of rural water supply schemes in the study area and else.

In line with the findings above, study by Bhandari et al., (2000) indicated inefficient and less capable institution like water users committee is a prime reason why drinking water supply schemes are not sustainable. Similarly, Komives et al., (2006) also show 80% of problems in communities were an administrative or financial nature and identified the most problems as follows: Lack of appropriate tariff collection; Utilization of WATSAN money for unrelated purposes; Inappropriate and inefficient financial recording; and lack of transparency and trust of the community. Table (4.16): below shows the above analysis in short.

Table (4.14) Issues on financial management system

Issues	Response	frequency	Percent
The price of water services fee setted by:	Water committee	17	17.53
	Water committee with water office	3	3.09
	Community	65	67.01
	Kebele administration	4	4.12
	I didn't know	8	8.25
	Total	97	100
Water tariff fees collected by:	Water committee	72	74.23
	Hired employee	22	22.68
	I didn't know	3	3.09
	Total	97	100
The time of water service fees collection or payment	Every time water is drawn	22	22.68
	Every month	71	73.20
	Once or two times a year	-	-
	I didn't know	4	4.12
	Total	97	100

Source; survey result, 2011

4.3.3 Community Participation and Sense of Ownership

The nature of community participation and types of contributions made by sample households, respondents from planning to construction period of existing water supply schemes in different forms and in different phases of the water supply schemes. Regarding participation of community at any one phases of their water supply projects, the survey result indicated that 84(86.60%) of sample respondents have made participation while the remaining 13(13.40%) had not participated in the water supply projects or schemes. Participation in simple has no meaning unless they participate in all or majority of the phases in which most activities done within the stages. That means there is need of participation from staring to termination, and continuing for future which could help sustainability of the water supply schemes.

This finding confirms with Arlosoroff et al. (1987) strongly argued that the highest potential for sustainability is achieved when the community is involved in all phases of the project starting from the planning stage.

Regarding phases at which the community has made participation, the survey result shows that out of total sample households respondents who made participation, 37(44.05%) of the respondents participated during construction (implementation), 2 (2.38%) of them during post-construction, 42 (50%) were participated both during and post-construction, and only 3(3.57%) were participated in all phases. Surprisingly, no one of the sample households respondents were participated in the planning or during the planning which is the most important phase for sustainability of rural water supply schemes. And. A few numbers of the respondents were participated in all phases of the processes. With regard to this (IDRC,1981) highly recommends the need of participating the community adequately in the planning, construction, O& M and evaluation phases of rural water supply projects if a water supply scheme has to be sustainable.

With regard to the community participation in what forms, out of the respondents who were participated 1(1.19%) were participated by money contribution, 45(53.57%) by labor contribution, 25(29.76%) by money and labor, 5(5.95%) by supply of locally available materials (stone, sand, etc), and 8(9.52%) were participated in all of the forms.

From this we can see that majority of the users' community were participated by labor contribution, and some of them by both labor and money contribution. The post-construction participation of the community is mainly limited to fencing the water supply schemes, and in some extent in greening the surrounding and money contributions which are part of the forms in community participation.

On the other words, with regard to the reasons not to participate, the survey result shows that 3(23.08%) of the respondents who did not participate indicated they didn't participate 3(23.08%) due to not asked by the implementing agency, 2(15.38%) due to lack of awareness, 6(46.15%) due to being other 'Got' in which there is no scheme within their got, 1(7.69%) is due to absence during the implementation, and 1(7.69%) due to age or capacity. This finding shows that absence of participation may affect the sustainability of the schemes since they did not know about the schemes history in which different stages passed if they didn't participate.

According to FGDs made with women at Kalisha kebele, they indicated on the importance of women participation on rural water supply schemes development and management is crucial for water point sustainability. Women know the problems of water supply better than men, fetching water from water points and they are also water vendors. Therefore, women participation can minimize their challenges. And also during discussions women at Bobicho kebele, they also strongly recommended the importance of women participation on rural water supply programs. They said that women participation on rural water supply development and management is very crucial. Because Women are the vulnerable groups by fetching water from water point, their participation can give very good information for stakeholders rather than men.

Regarding the need of community to participate in site selection of the water supply schemes, Davis et al; (1993) stated if improved water supplies are conventionally positioned with the participation of the intended users, it will be more used by communities and will have a better sustainability than water supplies that are not conventionally positioned with participation of communities. In relation to this, respondents were asked about who select the sites for construction or who were decision maker at the time of site selection for construction, the survey result indicated that 4(4.12%) of respondents

revealed that decision for site selection were made by community, 52 (53.61%) were by implementing agency alone, 24(24.74%) were by water specialist (experts) (e.g. from zonal, woreda, etc), 6(6.19%) were by government and 11(11.34%) of the respondents answered that they did not know who decide the site selection. This findings shows that most of the decision making process were done by the implementing agencies alone, and water specialist (experts) from zonal and woreda water office. But, the decision making were not including community who are the owner of the water supply schemes. Absence of communities in site selection would have a negative impact on sustainability of the water supply schemes as decisions were mainly made by implementing agencies alone. Table (4.17) below shows that the overall descriptions on community participation

Table (4.15): Community participation and decision making process

Issues	Response	frequency	Percent
The community participated or not from planning to construction period of existing water supply schemes	Yes	84	86.60
	No	13	13.40
	Total	97	100
The time or phase of participation	During planning	-	-
	During construction	37	44.05
	Post construction	2	2.38
	During and post construction	42	50.00
	In all phases	3	3.57
	Total	84	100
In what form of participation	Informant provision	-	-
	Money contribution	1	1.19
	Labor contribution	45	53.57
	Money and labor contribution	25	29.76
	Supply of locally available materials (rock, sand, etc)	5	5.95
	In all of form	8	9.53
	Total	84	100
The problem behind not to participate	Not asked	3	23.08
	Lack of awareness	2	15.38
	Being other 'got'	6	46.15
	Capacity due to age	1	7.69
	Absence at the time	1	7.69
	Total	13	100
The sites for construction were selected by:	Community	4	4.12
	Implementing agency alone	52	53.61
	Water specialist	24	24.74
	Government	6	6.19
	I didn't know	11	11.34
	Total	97	100

Source: survey result, 2011

4.3.3.1 Communities sense of ownership for developed water supply schemes

Before going to the ideas of sense of ownership of communities, there is need of observing the existing conditions of water supply schemes in the study area. There was a question on the current water supply for the respondents in the selected sample kebeles. The survey result shows that 77(79.38%) of the household respondents were currently using the existing water schemes and the remaining 20 (20.62%) were not currently using the existing water supply schemes. From these findings those who were using have reasons to use the schemes currently. The survey result shows that 10 (12.99%) of the respondents who were using said that they were using because of the water schemes are closer, 38(49.35%) were due to no other alternative to get water, 17(22.08%) due to clothes and no other alternative, 5(6.49%) due to no other alternative, good taste and smell, and 2(2.60%) of the respondents showed that they were using currently due to clothes and good smell.

On the other hand, of those respondents who were not using the schemes currently, the survey result shows that 16(80%) of them were due to improper functionality and the remaining 4(20%) were due to low level of capacity to pay service fee. This finding shows that majority of the respondents or users' communities were not using the water supply schemes due to non-functionality which is the base of sustainability. The findings clearly show that most of the beneficiaries were using their water supply schemes currently. From those majority were using the schemes due to clothes and no other alternatives to get water. So, there is need of arranging additional schemes or alternatives to develop. On other words, of those who were not currently using the schemes were due to the improper functionality or non-functionality.

Therefore, functionality is very crucial for sustainability of rural water supply schemes within which many beneficiaries would be benefited. The table (4.18) below shows the issues on the water supply schemes currently.

Table (4.16) the current situation of water supply schemes using or not by the beneficiaries.

Issues	Response	frequency	Percent
Using or not the developed water points currently	Yes	77	79.38
	No	20	20.62
	Total	97	100
The reason behind to use the existing water supply schemes currently	Cloth to home	10	12.99
	No other alternative to get water	38	49.35
	Cloth and no other alternative	17	22.08
	It has good taste and smell	5	6.49
	No other alternative, good smell and taste	5	6.49
	Clothe and good smell	2	2.60
	Total	77	100
The reason behind not to use the existing water supply schemes currently	Improper functionality	16	80
	Distance	-	-
	Bad taste	-	-
	Low level of capacity to pay service fee	4	20
	Lack of enough labor to fetch water	-	-
	Total	20	100

Source: survey result, 2011

Regarding to communities sense of ownership, the current situation of water supply schemes is very crucial. This is because those users, community who were currently using the schemes had more sense of ownership than those did not. Therefore, using the existing water supply schemes made them think about the schemes during the time of benefit. It is clear that if the communities did not have sense of ownership, the developed water supply schemes will most probably managed poorly, misused and the benefits will not be sustainable.

And most of drinking water supply schemes non functionality is due to lack of ownership on the schemes.

With regard to this, Bahandari et al. (2006) stated most of drinking wss dysfunction is due to lack of ownership on the scheme. Ownership of schemes draws' users' sentiment towards the surveillance of the scheme as a personal property. Users' satisfaction in yields, its location, quality, and regularity are taken as major indicators to measure the level of ownership.

In addition, community participation on rural water supply development is very crucial since they feel sense of ownership, and responsibility will increase if communities participate fully on water point development. And, degree of sense of ownership to certain developed infrastructural services depends on the degree to which the local communities are involved in the whole process, level of satisfaction with the service and others. There were some signs of increasing sense of ownership in the study area. These were the beneficiaries getting the appropriate timing of fetching water (opened twice per day) and providing appropriate service for users. There were greening of the surrounding and fencing properly by the users' communities, protecting and controlling animals and children's from breaking the water supply schemes. In general, these were ideas of understanding the schemes are their own.

In assessing the beneficiaries ownership upon water supply schemes, the survey result shows that 67(69.07%) of the respondents responded the water supply schemes belongs to community, 14(14.43%) of them said the schemes belongs to government, 2(2.06%) of them said community and government, and 14(14.44%) were shown that the water supply schemes belongs to their own or the owners of the schemes are themselves. This shows there is at least the understanding of the schemes belongs to community which is good approach for ownership and sustainability.

The existence of users' communities who understand the water supply schemes are their own shows there is a good progress on ownership of the schemes which in turn result in the sustainability of water supply schemes.

Since sense of ownership has positive impact on sustainability to developed water supply schemes, creating awareness within the users' communities is crucial to reach the best in rural water supply schemes sustainability. Those communities who have sense of ownership will control and protect the water supply schemes as their own property or asset. During the time of survey, the researcher saw some indicators of presence of ownership to the schemes as; most of the schemes were managed somewhat properly except the scheme at Bobicho kebele in which there were no guard or control during fetching but simply opened for long time; almost all of the schemes were well fenced, greened with trees, etc. In the other hand, there were indications of absence of sense of ownership. There were no guard in all of the schemes during the time of survey; no appropriate drainage systems, etc. The following table (4.19) shows that the status of ownership within the communities.

Table (4.17) :Belongness or ownership of developed water supply schemes.

Issues	Response	frequency	Percent
The sense of ownership or whom belongs the water supply schemes	Community	67	69.07
	Government	14	14.43
	Community and government	2	2.06
	Their own (my own)	14	14.44
	NGO's	-	-
	Total	97	100

Source: survey result, 2011

4.3.4 Water Supply management and Governance

4.3.4.1 Water Committees, and Community water supply management and governance

For rural water supply schemes to be functional for long period of time and the benefits from the scheme to continue, those communities who manage the scheme have to have technical, financial, managerial and governance capacities. Water committees are organization of community who are managing and governing water supply schemes in rural areas. The water committees are responsible for mobilizing community for cash and labor contributions, over all financial and technical management and governance of the schemes including carrying out of operation and maintenance, protecting the schemes from children and domestic animals through fencing the schemes, fixing time of fetching, keeping its sanitation, sustaining the benefits of the water supply schemes after project completion and report to the woreda water office if there is any problems beyond their capacities or ability.

Therefore, they should have the capability to organize, manage and govern the schemes properly for sustainability of the schemes for long period of time. In assessing the communities view on the systems of managing water supply schemes by water committees, the survey result shows that 92(94.84%) of the respondents accepted the systems managed and governed by water committees is the best way, only 2(2.06%) were responded that the way is not the best way to manage and govern the water supply schemes, and 3(3.10%) of them indicated they did not know which way is best to organize and manage the schemes. From this result I can understand that, majority of the users' communities accepted the way managing and governing by water committees.

Regarding the selection of water committees members for managing and governing water supply schemes, 67(69.07%) of the households respondent responded the water committees were selected by the user community, 3 (3.10%) of them by community and woreda water office, 6(6.19%) by community and NGOs, 7(7.22%) by woreda water office, 5(5.15%) by kebele administration, and 9(9.28%) of them did not know who were selected the water committees members. Here decision making process of water committees' selection was by the users' communities. This has great importance on sustainability of rural water supply schemes. Since the overall activities of water committee selection made them to think the schemes are their own or sense of ownership developed within the users' communities.

The establishment time of water committees is critical for managing and governing the schemes properly. If the establishment is at the beginning or before any activities done, there will have time to arrange, organize and manage the schemes without any challenge. With regard to this, the survey result shows 2(2.06%) households respondents indicated that the water committees established before schemes construction, 17(17.53%) of them responded during scheme construction, 74(76.29%) of them indicated that the establishment of water committees was after scheme construction, and 4(4.12%) of the respondents said they did not know when the water committees established.

This result shows majority of the respondents indicated the establishment were after the scheme construction which had negative impact on managing and governing the water supply schemes. Being late can result in shortage of time for arranging the activities, and having little idea on the schemes from the beginning or from the schemes pre feasibility, feasibility and other studies upon the water supply schemes. In my understanding, there is need of establishing the water supply schemes before the schemes construction.

In assessing how the water committee selected, the survey result shows that 84(86.60%) of the households respondents indicated that the selection of water committees were by the agreement of the users' communities by majority rule, 2(2.06%) of them indicated by 'Idir', 4(4.12%) by kebele administration, and 7(7.22%) of them responded they did not know how the selection were made. It is clear that there was a habit of deciding their roles and responsibilities upon the management and governance of the water supply schemes in the rural areas especially the study area. This is because; when any bodies making decisions on their water supply schemes, they think the water supply schemes are their own property or asset which could be managed and governed by them. In general, the study area had the habit of deciding on their water supply schemes which in turn result in the sustainability of water supply schemes.

On the other hand, there is need of creating awareness for those respondents who did not know how the water committees were selected. This had importance on sustainability of the schemes.

In the study area, the establishment of water committees were not legally registered by the regional government and by the regional water Bureau including woreda water office in particular. This finding related to Brikke (2000), the water committee does not have legal status. This makes it vulnerable in situation with material, financial, contractual or legal problems. At the same it is also difficult to make water committee accountable for their financials embezzlement.

Absence of legally supported water committees where accountability and transparency were absent in financial management as some of the water committee especially, the chair persons have used the money which is collected from users for their own and other purposes.

Absence of transparency and accountability in financial aspects may result in communities mis-trust on water fees properly which in turn result the shortage of fees/money for operation and maintenance which are the back bone of the sustainability of water supply schemes. With regard to this, 89(91.75%) or majority of the respondents revealed that the water committees had no formal recognition or legally recognized. Only 5(5.15%) of the respondents revealed the water committees had formal recognition.

At community level in all the sample sites, the water supply systems were managed by communities through water committee whose members are mainly 5-9 in which both male and females included. The water committees have job descriptions which are one chair person, one cashier, one secretary, two or four of them are as members. With regard to this, in the field visits or physical observation the members of the water committees were limited to 5-9 in numbers from which 3 to 5 were male and 3 to nil were females. But containing females in the management is not a practical in the study area. This is because, even if containing females in the members of water committees, they were passive in the management and governance of water supply schemes in the study area which has negative impact on sustainability of the rural water supply schemes.

Regarding the frequency of selection of water committees, the survey result shows that 3(3.10%) of them revealed that the selection were made once a year, 1(1.03) were made in three months gap, 1(1.03%) in six months gap, 83(85.56%) were revealed selection will be made when problems faced upon the committees members, 7(7.22%) of them revealed there were no selection unless at the begging of the schemes, and 2(2.06%) of them indicated that they did not know how frequent the water committee selected. Here we can see that majority of the respondents indicated that the frequency of selection were not defined except when problem faced. This has negative impact on water

Table (4.19): way of committee selection, formal recognition, frequency of selection and discharging or not the roles and responsibilities.

Issue	Response	frequency	Percent
Methods of water committee selection	Selection by community	84	86.60
	By Idir	2	2.06
	Kebele administration	4	4.12
	I didn't know	7	7.22
Formal/ legal recognition of water committee	Total	97	100
	Yes	5	5.15
	No	89	91.75
	I didn't know	3	3.10
	Total	97	100
	Once a year	3	3.10
	In three months	1	1.03
The frequency of water committee selection	In six months	1	1.03
	When problem faced and not-functional	83	85.56
	Still no selection	7	7.22
	I didn't know	2	2.06
	Total	97	100
The adequacy of water committee discharging or not discharging their responsibilities	Yes	84	86.60
	No	10	10.30
	I didn't know	3	3.10
	Total	97	100

Source: survey result, 2011

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusions

It is a great challenge in the study woreda in provision of spare parts or problem of supply system. The beneficiaries get their spare parts purchase on market, and there was no spare parts stocking in the study area. Both the regional water bureau and woreda water office failed to allocate budget for spare parts and no formal private part providers exist in the study area as well as in Hadiya zone in which the study woreda found.

Regarding the local technicians there were no existence of local technicians who are responsible to technical management of the schemes in all the visited sites in the study area. This had effect on long period operation and maintenance which need waiting of woreda water offices experts even for minor repairs. So operation and maintenance activities had been done by woreda water office, but there was no a habit of ability and capability of O and M within a community.

Technologies in service were selected by woreda water office and NGOs. But there were no participation of community in selection of technology which had negative impact on sustainability of rural water supply schemes in the study area. And, the selected technology had problem with the handle which was difficult to fetch for less able communities. Hand-in-hand, the construction quality of the selected schemes had no great problems except some problems with drainage ditches and top frame work.

Financial management system of the committee was very low for the majority of the schemes. There were problems such as; no clear accountability and structural linkage between woreda water office and water committees; absence of gender equality on decision making process except being member of water committee in financial management system; no any incentives to the committee; no terms and duration of election and, etc. In addition, there were no well organized financial documentation system; no bank account for the fee collected; no regular auditing and/ or absence of auditing in some of selected schemes and absence of money saved in most of the schemes for operation and maintenance. On other hand, there were participation of community in tariff setting, auditing of the finance and the user communities had been paying fee regularly in month or during the time of drawing/ fetching water according to their using practices.

Moreover, almost all of the user beneficiaries had understanding of paying fee for water services. Therefore, except some of low capable they had willingness to pay for their water services. In addition, most of the beneficiaries think that the existing fee was fair and cheap, and they had ability and willingness to pay more than the existing fees.

User communities had made participation at least one of the periods except the planning period. And, they had participated especially, during construction and post construction. Therefore, their participation in implementation of WSS is not fully addressed from the beginning where the intended beneficiaries were absent during planning including site and schemes type selections which might resulted in low sense of ownership and ignorance by the higher level officials. In addition, communities had made significant contributions through provision of free labor, local construction materials and money contribution especially, during construction and post-construction period. Surprisingly, no one was participated during planning phase in the study area.

With regard to sense of ownership, there were good approaches in thinking the schemes are their own. Majority of beneficiaries think that the water supply schemes belongs to community themselves and their own personally. Therefore, there was sense of ownership starting to develop within the community which is critical for sustainability of WSS in which communities take care properly.

Water committees were encouraged in managing and governing water supply schemes in the study area. They were responsible for overall management of the schemes. However, water committees were not capable of managing water supply schemes as needed. This was because of lack of skills on financial, technical and overall management and governance of their schemes. In addition, absence of well ordered working manuals, guidelines and necessary materials; lack of incentives for water committees; lack of specified duration of water committees selection; lack of specified duration of reporting everything they have done which may be due to work load upon the water committee member and the like.

In addition, even at household level, communities were not responsible for governing and managing the schemes with water committees. This is mainly connected with sense of ownership for the schemes between water committees and community was not totally created, but there were some sense of ownership starting to develop within the community during the time of survey.

Moreover, the water committees were not legally recognized or did not have formal recognition which may add decision making in any aspects of water supply system, and to make good coordination with different stakeholders.

In general, the approaches in water supply in the study area were supply oriented approach in which provision of new water supply schemes or running for coverage without giving attention for sustaining the existing water supply schemes. This was evidenced by none of the implementing agencies had made spare parts available for communities, allocated budget, not including communities representatives during site selection and technology or scheme type selection, not observed local technicians who are responsible for maintenance and the like in the study area.

5.2 Recommendations

As the result shown, there were no local technicians in all the sites who are responsible for O and M. It is clear that village level O and M is basic way that should be considered starting from the beginning or design period. In addition, they need appropriate training for local technicians and availability of spare parts for maintenance. Therefore, the existence of local technicians is very crucial for operation and maintenance of the schemes nearby and the researcher recommend local technicians should be existed for rural water supply in the study area.

Availability of spare parts and toolkits are very crucial for O and M which in turn resulted in sustainability of WSS. Therefore, the researcher also recommends the availability or access of spare parts and toolkits nearby at least woreda level if possible at community level.

Minimizing the problem associated with unavailability of spare parts could be alleviated through assessing mechanism to find revolving funds for spare parts at different levels of water sector.

In addition, site selection and technology or schemes type selection should involve community properly which is crucial for sustainability of the schemes. This is the planning phase of the schemes

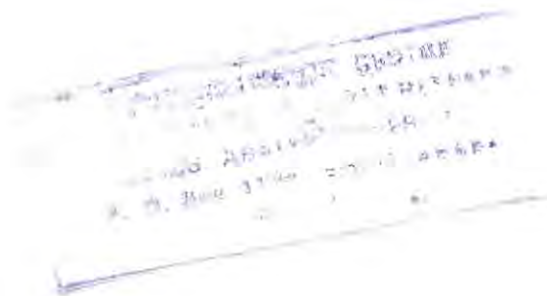
As the result shown, financial management is one of the important factors in sustaining water supply schemes in the study area. As the study, there is a gap in the management of income from sale of water. For addressing the problem, it is recommended that management of the finance aspect should be done on legal basis or formal manner. Developing a transparent and trusted system for collection, management and governance of users' contributions is very important in alleviating the mismanagement and governance of finance. This has positive impact on motivation of the beneficiaries in paying the fees regularly. In addition, in financial management, it was observed that there was no bank account for saving and in some extent absence of auditing. Therefore, the researcher recommends that it is crucial to have bank account and auditing for transparency of financial management system.

The study also shown, managing and governing community water supply schemes by water committees were the best way to organize and manage the overall activities of rural water supply schemes. If water supply schemes are to be managed properly by communities through water committees, providing adequate and practical trainings of technical, financial and overall management and governance of the schemes is critical.

In addition, legalizing or formalizing the water committees, clearly defining their roles and responsibilities, developing working manuals and guidelines, providing incentives in the form of cash during trainings will help enhancing their ongoing capacity, motivation and commitment.

Community participation especially, women participation plays a great role in water supply schemes management and governance. Their participation during water supply schemes development and management can create awareness and sense of ownership upon the users' communities which is crucial for water resources management and governance which in turn resulted in sustainability of the schemes. This is because, creating awareness on water supply schemes management through formal and informal education will help communities to take care of their schemes. But, these activities were not done properly in which there was no participation of users' communities especially, during the planning. Therefore, I recommend that improving community participation especially, women participation in all phases specifically, in planning (i.e. site and scheme type selections) is needed to enhance ownership of the communities upon the water supply schemes.

Finally, there were observed that existence of supply oriented approach in which supply of new schemes is practical in which sustaining the existing WSS is not practical. But, I recommend that demand responsive approach (DRA) in which managing and governing of the existing schemes included for the sustainability of the water supply schemes.



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ANNEXES

Annex-1: list of kebles and population in Lemo woreda

No	Kebeles	Population No.	No	Kebele	Population No
1	Ana-Belesa	4628	21	Lisana sena	7014
2	Bukuna-Chachancho	5806	22	Tachgnaw Ambicho	5137
3	Laygnaw-Gana	6813	23	Kidigisa	5394
4	Shurmo Decho	7987	24	Dubancho	6500
5	Samen Belesa	4381	25	Dijo-Demala	5711
6	Masbera	3981	26	Lisena Kenama	5000
7	Sadama Marduncho	5832	27	Ambicho Gode	6023
8	Shurmo Wixbera	7542	28	Bobicho	3415
9	1 st Omoshora	5568	29	Kalisha	1800
10	Lambuda	4488	30	Tachgnaw kode duna	4254
11	Hayse	3519	31	Laygnaw kode duna	7084
12	Degiba	5358	32	Shachana roma	3126
13	Jawe	7240	33	Dabub Belesa	6990
14	Gora Tume	6682	34	Lisana Kusa	5987
15	Allele	5010	35	2 nd omoshora	5571
16	Belesa Kenama	2000		Total population	183,582
17	Ajo-Tiesa	4454			
18	Ashe-kubaega	4600			
19	Masana Bako	3470			
20	Lareba	5217			

Source: Lemo woreda water, mine and energy office

Annex-2: List of water supply schemes in the sample kebeles by type, status, and year of construction.

No	Kebele	Village	Site name	Scheme type	Technology type	Status during survey	Constructed by	Year of construction
	Bobincho	Hakmura	Hakmura	SW	Afrdev	FN	KHC	1992
		Mehal bobincho	Bach buho	SW	Afrdev	FN	UNICEF	1999
		Mehal bobincho	Bach buho	SW	Afrdev	FN	KHC	1982
		Mehal bobincho	Bach buho	SW	Afrdev	FN	KHC	1992
		Bobincho	Side mincha	Spring	Onspot	abandoned	KHC	1979
	Kidigisa	Hongorame	Shilansha	SW	Afrdev	FN	JICA	1999
		Hongorame	Kidigisa 2	SW	Afrdev	FN	KHC	2000 G.C
		Kidigisa	Gabo 2	SW	Indian II	NF	KHC	2000 G.C
		Hagea	Hagea	SW	Indiabn II	FN	UNICEF	1999
		Hagea	Gabo 3	SW	Indian II	FN	KHC	2000 G.C
		Gabo	Gabo 1	SW	Indian II	FN	KHC	2000 G.C
		Lamsala	Sabare	SW	Afrdev	FN	KHC	2001
		Dunna Got	Duna	SW	Afrdev	FN	KHC	1999
		Lamsala	Lamsala	SW	Afrdev	FN	KHC	1999 G.C
		Hongorame	Gabo	BH	Distribution	FN	Gov. org	1991
	Tachignaw Ambicho	Ashowala	Dube	SW	Indian II	-	UNICEF	1999
		Benea	Benea	SW	Indian II	FN	UNICEF	1999
	Kelisha	Batena	Batena	BH	Distribution network	FN	Food security	1999

Source: Inventory result, 2001 E.C

Annex-3: selected sample kebeles, schemes, their beneficiaries HHS and selected sample HHS.

No	Selected kebeles	Village	Site name	Scheme type	status	Beneficiary HHS	Sample HHS	Beneficiaries HHS %
1	Bobicho	Hakumura	Hakmura	SW	FN	100	21	21.00
2	Tachgnaw Ambicho	Benea	Benea	SW	FN	108	20	18.52
3	Kalisha	Batena	Batena	BH	FN	147	24	16.33
4	Kidigisa	Hongorane	Kidigisa 2	SW	FN	60	16	26.67
5	Kidigisa	Kidigisa	Gabo 2	SW	NF	50	16	32.00

Source: survey result, 2011

Annex-4 list of people contacted (interviewed)

No	Name	Organization	Title/Responsibility
1	Ato Mesfin Moges	Water, mine and energy department (zone)	Head
2	Ato Bereket Wondimu	>>	water supply and schemes management coordinator
3	Ato Abraham Kefalgn	Water mine and energy office (woreda)	Water resource engineer
4	Ato Haile Handiso	>>	community participation promoter
5	Ato Bruk Wolde	>>	Hydrogeologist
6	Ato Abraham Mitiku	>>	Mechanic
7	Ato Temessgen Lamango	>>	Head
8	Ato Moges Woldu	Agricultural and rural development office (woreda)	Information transmission officer
9	Ato Tagesse Lambe	Education office	>>
10	Ato Alemaheu Ermako	Water committee	Chair person
11	Ato Mengistu W/Selassie	Kebele administrator	Manager
12	Ato Wondimu	Kebles water user	-

Source: survey result, 2011

Annex 5: Questionnaire for beneficiary households

Instruction for interview

1. introduce your self
2. inform respondents, the questionnaire is only used for the purpose of development and improving the living standard of the society and tell them that their name and response is not deployed for other purpose
3. circle their answer among alternative choices and describe the option of informants for questionnaires that requires explanation.

Name of interviewer _____

Date of interview _____

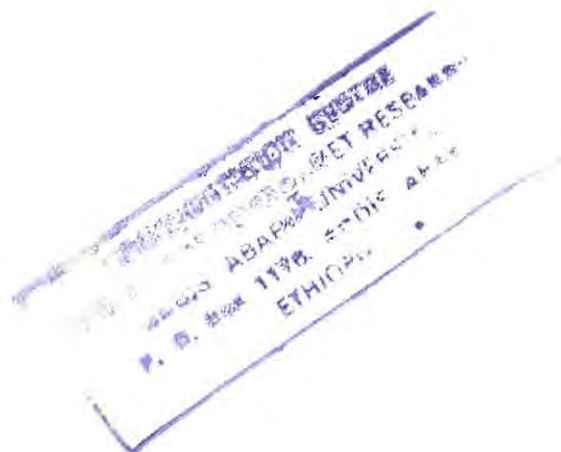
Interview conducted

Woreda _____

Kebele _____ 'Got' _____

Thank in advance

Instruction: the questionnaire has got two parts.



Part 1: Background information

1. name of respondents/household _____
2. date of interview _____
3. household head _____ Age _____ Sex _____
4. marital status:

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

5. Kebele _____ Got _____ Woreda _____

6. Zone _____ Region _____

7. Family size _____

8. Ethnic group:

1. Hadiya
2. Kambata
3. If other specify

9. Religion:

1. Protestant (Christian)

3. Muslims

2. Orthodox (Christian)

4. If other specify _____

10. Educational status:

1. Unable to read and write

4. Grade 7-10th

2. Can only read and write

5. Grade 10-12th

3. Grade 1-6th

6. Above grade 12th

11. Current occupation

1. Civil servant

4. Daily laborer

2. Merchant

5. If other specify _____

3. Farmer

Part Two

A issues related with water sources, water consumption and quality of source (construction).

12. From where you get your water supply:

- 1. River 2. Hand dug wells (HDW) 3. Shallow wells (SW)
- 4. Deep well (DW) 5. Unprotected spring 6. Protected spring
- 7. If other specify _____

13. For what purpose do you use the water from the main source?

- 1. Drinking 4. livestock
- 2. Cooking 5. All purposes
- 3. Washing 6. If other specify _____

14. Which one is your main income to sustain life?

- 1. Agriculture 3. Trading
- 2. Livestock rearing 4. If other specify _____

15. Are the main water supply scheme working now?

- 1. Yes 2. No

15.1 If your response to Q 15 is "No" where do you get you water source?

16. Is there any problem in your household water supply system?

- 1. Yes 2. No

16.1 If your response to Q 16 is "Yes" what are the problem?

- 1. Long guena to fetch water
- 2. High water charge/tariff
- 3. Poor management of water schemes by users
- 4. Not considering community participation in the management
- 5. Non-functionality of water schemes
- 6. If other, specify _____

17. Do you fetch water every day?

- 1. Yes 2. No

17.1 If your response to Q 17 is "Yes", how many times do you go the water source?

- | | |
|--------------|----------------------------|
| 1. Only once | 3. Three times |
| 2. Two times | 4. If other, specify _____ |

18. How many liters do you carry each time when you go to the source?

- | | |
|-------------|-------------|
| 1. Below 10 | 4. 20-40 |
| 2. 11-15 | 5. Above 40 |
| 3. 16-20 | |

19. How long do you go to fetch water? Kms _____ hrs _____

20. Who brings water to your house?

- | | |
|----------|---------------------|
| 1. Men | 3. Children |
| 2. Women | 4. Women & children |

21. How is the water transported?

- | | |
|----------------|----------------------------|
| 1. Human being | 3. Donkey pulled car |
| 2. Donkey | 4. If other specify, _____ |

22. How do you evaluate the existing water supply scheme construction quality?

B. community participation and sense of ownership

23. Have you participated from planning to construction period of existing water supply schemes?

1. Yes 2. No

23.1 If you participate at which phase?

- | | |
|------------------------|---------------------------------|
| 1. During planning | 4. During and post construction |
| 2. Post construction | 5. In all phases |
| 3. During construction | |

23.2 If you participate, in what form?

1. Information provision
2. Money contribution
3. Labor contribution

4. Supply of locally available materials (rock, sand etc) and labor
5. If other, specify _____

23.3 If the response to Q 23 is "No" what is the problem behind?

1. Not asked
2. Everything is done by the implementing agency
3. Lack of awareness
4. If other, specify _____

24 Who select the sites for construction?

- | | |
|------------------------------|---------------------------|
| 1. Community | 3. Both 1 and 2 |
| 2. Implementing agency alone | 4. If other specify _____ |

25 What role do you have in the water supply scheme construction and management?

- | | |
|---------------------------|---------------------------|
| 1. Water committee member | 4. Care takers |
| 2. Pump technician | 5. If other specify _____ |
| 3. Treasurer | |

26 Are you currently using the developed water points

- | | |
|--------|-------|
| 1. Yes | 2. No |
|--------|-------|

26.1 If the response to Q 26 is "No" what are the rational to abandon non-functional them?

1. Distance
2. Improper functionality
3. Bad taste
4. Low level of capacity to pay service fee
5. Lack of enough labor to fetch water
6. If other, specify _____

26.2 If your response to Q 26 is "Yes", what is the reasons?

1. It is closer to home
2. No other alternative to get water
3. It has fair service fee tariff
4. It has good taste and smell

5. If other specify_____

27 To whom do you think the water supply scheme (point) belongs?

1. Community

3. Government

2. NGO's

4. If other, specify_____

C. issues related with water supply management and governance

28 Are water committees the best way to organize the community management of water supplies?

1. Yes

2. No

28.1 If you response to Q 28 "No", who are best in managing water resources?

29 Who select the water committee members?

1. Community

2. NGO's

3. All in collaboration

4. If other, specify_____

30 When did the committee get established?

1. Before scheme construction

2. During scheme construction

3. After scheme construction

31 How the water committee selected?

32 Does it have formal recognition? (Yes/No)

33 How many members exist in the water committee?

Male _____ Female _____ total _____

34 How frequent the committee is selected?

1. Once a year

4. Once selected still no selection

2. In three moth

5. If other, specify_____

3. In six month

35 Is the water committee equipped with necessary materials, manuals and working guidelines?

1. Yes 2. No

45.1 If your response to Q 45 is "No" what do you think are the difficulties?

1. Hard to move the handle
2. Easily breaking parts
3. If other, specify_____

46 Are the community technicians equipped with necessary tools to carryout repairs when needed?

1. Yes 2. No

47 Do you think local technicians have adequate technical skills to carry out all types of repairs/ maintenance?

1. Yes 2. No

48 Are spare parts are available and easily accessible at community level when needed? 1. Yes 2. No

49 From where does the community get spare parts to carry out maintenance?

1. Purchase on market
2. Given by regional zonal woreda water offices
3. Donated by NGO's
4. If other, specify_____

50 Are the existing water supply schemes functional?

1. Yes 2. No

51 How frequent does the scheme get failure?

1. Once in three month 4. No failure so far
2. Once in six month 5. If other, specify _____
3. Once in one year

52 How long does it stay once the schemes fail?

1. One week
2. Two weeks
3. One month
4. More than one month

53 What do you think the main reasons for the water supply scheme failure?

1. Poor quality of scheme construction
2. Poor management of water point
3. Lack of spare parts provision
4. Lack of qualified technicians
5. Lack of finance for operation and maintenance service
6. If other, specify_____

54 Who undertake operation and maintenance activities when the schemes get failure?

1. Woreda water office
2. Water committee
3. Both of them
4. If other, specify_____

55 How do you evaluate overall construction quality of the water supply schemes?

1. Not good
2. Good
3. Very good
4. If other, specify_____

E. ISSUES RELATED WITH FINANCIAL FACTORS

56 Who financed the developed water supply schemes?

1. Community
2. Government
3. NGO's
4. All in collaboration
5. If other, specify_____

57 How much do you pay for water per Jerrican/month?

58 Who set the price of water fees/tariff?

1. water committee
2. government/woreda water office
3. NGO's
4. Water committee with water office
5. All in collaboration

59 How do you evaluate the existing water fees?

- 59.1 If expensive or “cheap” what is the reasonable price you purpose per Jerrican/month?

1. Water committee 3. Elders
2. Hired employee 4. If other, specify_____

61.1 If your response to Q 61 is “yes”, why?

- 61.2 If your response to Q 61 is “No” why?

1. Energy time water is drawn
2. Every month
3. On or two times a year
4. If other, specify_____

1. Poverty
2. Less harvest
3. No land for farming
4. Dis-satisfaction with the services

THANK YOU!

Annex 6: focus group discussions

A. Discussion with water committees

Date of discussion _____

Kebele _____ **village (got)** _____

1. How many people/household are using the schemes?
2. When was the scheme constructed?
3. Who select the water committee members?
4. When did the committee get established (Before scheme construction, during or after scheme cons.)
5. How the water committee selected?
6. Does it have formal recognition? (Yes/no)
7. How many members exist in the committee?

Male _____ Female _____ total _____

8. Is the water committee equipped with necessary materials, manuals and working guidelines?
9. What kind of support provided by the bureau to committee members? (technical, monthly salary, no support, etc)
10. Who designs the water tariff rate?
(Community, water committee alone, implementing agency, woreda water office, if other, _____)
11. Did/are the users pay user fees regularly? If "No" what do you think the reasons and what measures have been taken to alleviate the problem?
12. Who under take O&M? (local technicians, woreda water office, both, no maintenance work so far, if other specify _____)

13. From where did the committee get spare parts and maintenance tool kits? (woreda water office, water resource bureau, purchase from private service providers, if others, specify_____)
14. Does the water committee have a bank account? (Yes/No)
15. How much money is collected and saved for community purpose?
16. How does the committee evaluate community participation in general and women's participation in particular at all phase (pre-implementation, during implementation, post-implementation, post-implementation) of the schemes?
17. From your experience, what major problems are encountered in relation to water supply schemes?
18. What solutions do you recommend in order to alleviate the problems and to sustain the functionality of the schemes?

B. point of discussion with selected women's

Date of discussion _____

Kebele _____ **community** _____

Status of schemes _____

1. Who is responsible to fetch water?

(Men, women, children.....)

2. What burdens do you have rather than fetching water?
3. Do you participate before, during and after construction?
4. How do you compromise your water use behavior for different purpose at dry period time?
5. Does the management of the scheme involves women and treats users fairly?

6. Have you faced the problem with the water scheme non-functionality (yes/no)
7. How do you evaluate the capacity of water committee in understanding their duty?
8. Does the community participation in every aspect of water supply schemes?
9. How do you evaluate the overall performance of the schemes?
10. 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?
11. What do you recommend to alleviate the problem of the scheme and make it functional for long period of time

THANK YOU!

Annex 7: key informant interview

(Regional, zonal, woreda water office)

Date of interview _____

Name of the organization _____

Position/responsibility of the respondents _____

1. What are the major goals or objective of the establishment of your organization in relation to rural water supply?
2. What technologies do you provide mainly? Why?
3. Are spare parts store at regional/zonal/ woreda and community level? (yes/no), if "No" why?
4. Are spare parts and tool kits readily available, affordable at regional/zonal/ woreda and community level (yes/no), if "No" where do you get?
5. What problems is face by your organization office to support the rural water supply service functional for long period of time (sustainability)?
6. What requests are mainly reported to your office from the lower government offices/community in relation to water supply?

7. Are there well trained technicians who can carry out major repairs that are beyond the financial and technical capacity of the community/woreda water office?
8. What is the roles community participation in rural water supply schemes?
9. What are the major problems for rural water supply schemes failure in the region/zone/ in the woreda?
10. What responsible measures have been taken by the regional water bureau/zonal/ woreda department and woreda water office to improve the status of the schemes?
11. What are the major problems associated with the provision and management of the schemes in the region, and at the woreda level?
12. What intervention measures do you recommend to alleviate the problems and to improve the benefits from the constructed schemes?

THANK YOU!

Annex 8: physical observation

1. Name of the kebele _____
2. Local name of the village (got) _____
3. Technology type _____
4. Present status _____
5. Time it has been broken and stayed non-functional _____
6. Water committee functioning/non-functioning
7. Scheme protection (yes/no)
8. Are women the member of water committee?
9. Maintenance and operation
10. Presence of other alternative water source
11. Where they get water for livestock
12. Presence of coordination between community water committee and stakeholders
13. The roles of community participation

DECLARATION

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

Declared by:

Name Tesfaye Demeke
Signature *Tesfaye*
Date June 23 / 2011

Confirmed by Advisor:

Name _____
Signature *Blasius*
Date _____

