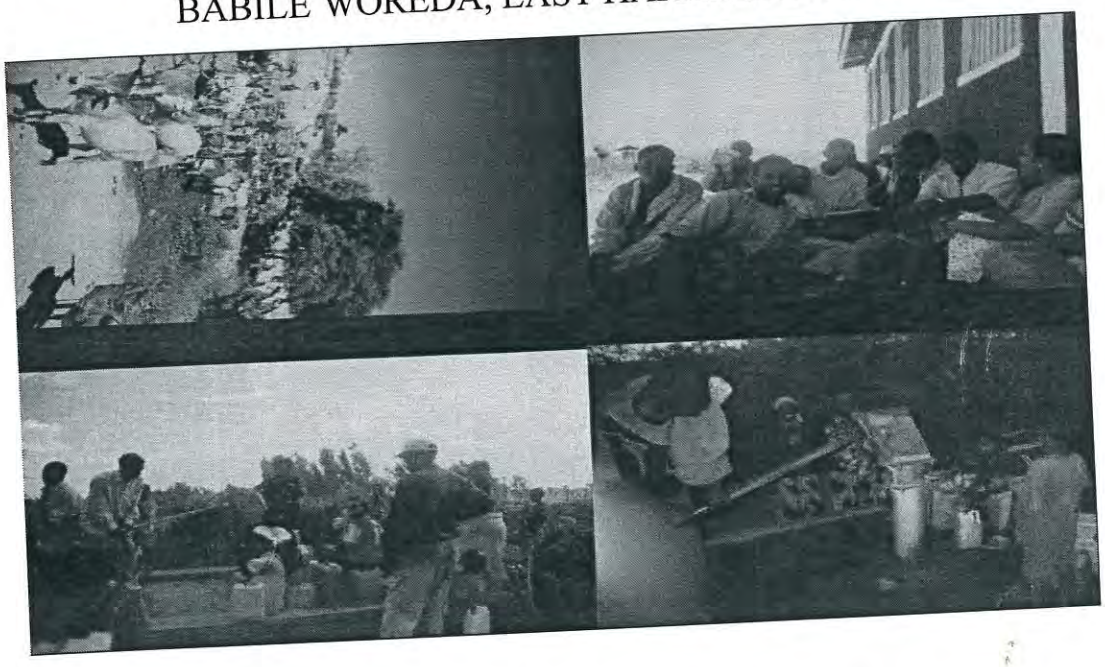
ADDIS ABABA UNIVERSITY SCHOOL OF GRADUATE STUDIES
COLLEGE OF DEVELOPMENT STUDIES

THE IMPACTS OF RURAL WATER SUPPLY AND MANAGEMENT SYSTEM ON LIVELIHOOD OF USER COMMUNITIES: A CASE OF BABILE WOREDA, EAST HARARGE ZONE.



A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIRMENT OF THE DEGREE MASTERS OF ART IN COLLEGE OF DEVELOPMENT STUDIES

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Title

The Impacts of Rural Water Supply and Management System on Livelihood of User Communities: A case of Babile Woreda, East Hararge Zone

BY

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Acronyms

AAU	Addis Ababa University
BoFED	Bureau of Finance and Economic Development
CDS	College of Development Studies
CISP	International committee for the Development of People
DA	Development Agent
DFID	Department for International Development
ECA	Economic Commission for Africa
IDR	Institute of Development Research
IRC	International water supply and sanitation
m.a.s.l	meters above sea level
MfM	Menschen for Menschen
MoWR	Ministry of water Resources
MoFED	Ministry of Finance and Economic Development
NGOs	Non-governmental Organizations
OWRB	Oromia Water Resources Bureau
PAs	Peasant Associations
PASDEP	Plan for Accelerated Sustainable Development to Eradicate Poverty
RWSS	Rural water supplies and Sanitation
UN	United Nations
UNECA	United Nation Economic Commission for Africa
UNDP	United Nation Development program
UNICEF	United Nations Children and Education Fund
VLOP	Villages level operation and maintenance
WATSAN	Water Supply and Sanitation
WB	World Bank
WSS	Water Supply and Sanitation
WHO	World Health Organization

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Abstract

Knowledge of the impacts of rural water supply and management on the livelihood of the user community can help in improving the future impacts of rural water supply. Thus, the objective of this paper is to assess the impacts of rural water supply and management systems on the livelihood of the user community in Babile Woreda, East Hararge Zone.

The data sources for the study were both primary and secondary. For secondary data collection document review was used as a tool to collect valuable information. Focus group discussion, household surveys, observation method and key-informants interview were used for primary data collection. Three stage sampling method was used for primary data collection. For the selection of kebele administration stratified sampling method was used based on agro-climatic zone. Two kebele administrations were selected from kola and one from Woina dega agro-climatic zone. Purposive sampling method was used for villages/communities selection and simple random sampling method was employed for households' selection. House hold survey was conducted in three selected kebele administrations and 90 heads of house hold were randomly drawn from the total 900 water supply user heads of house hold. Three focus group discussions were held with water committee members, elders, health extension workers, development agents and kebele administration officials and four observations were conducted at different water points. For data analysis a combination of quantitative and qualitative methods was employed.The method used for data analysis was simple description: like percentage, average and tabulation.

The study revealed that weak institutional capacity, poor water supply scheme and financial management and there was weak linkage between water committees and Woreda Water Office were identified as short comings of the study area. The household survey also showed that, the livelihood of the user communities in the study areas have been improved after they have started to use improved water supply. The improvements in livelihood were manifested through improvement in health and time saving in all the surveyed communities. Whereas 35.6 % of the respondents said, the improved water supply has improved the income of households in terms of opening possibilities for small scale production and livestock watering but about 64.4% of the respondents said no improvement in income after they started to use improved water supply. The implication of reduction in time spent on water collection could mean more time for income generating activities, food production, childcare and health. The study also revealed that the linkage between impacts of water supply and management on the livelihood of the user communities. The better the management of rural water supply indicated that the better was the improvement in benefits of improved water supply. The evidence in the study area indicates that poorly managed water supply scheme has adversely affected the livelihood of the user community, especially in those study areas where water supply schemes interruption was with high frequency. The policy implication of the study is strengthening of the institutional capacity at local level in order to improve the rural water supply scheme management and impacts of rural water supply on the livelihood of the user community.

CHAPTER I

1. INTRODUCTION

1.1. BACKGROUND TO THE PROBLEM

Water supply plays the most important role in both social and economic development. Improved public health, better living standards and economic development are intimately related to the availability and access to adequate potable water supply and sanitation. It has been widely argued that safe and adequate supplies of water together with proper sanitation are basic needs and essential components of primary health care (Hofkes, 1986).

In many parts of the developing world, people lack enough water to stay healthy. Many people have to travel long distances to collect water and often, the water that is available is not safe to drink. If people do not have enough water for their daily needs, they face hardship and serious illnesses. When a community has a water supply that is accessible and safe, everyone health is improved. If Women are freed from daily labor of fetching and treating water, the well-being of the whole family can be improved. When improved water supply is available, women and girls have more time to be part of community life and to go school. (Hesperian Foundation, 2005).

From the existing potential of water resources on the surface of the earth, less than 1% is fresh water which is used for drinking, washing, transporting, heating, cooling and

industrial and many other purposes. It is most vulnerable and can easily be threatened if not properly administered and managed (Burqitu, 2002).

With the issues and problems of drinking water supplies and sanitation services, several international and national conferences and workshops have been held in many parts of the world. Among them, an International Water Conference organized by the United Nations in March 1978, in Latin America, has historical and paramount importance for it passed a resolution to involve the target community users in the activities of development at all levels. This conference emphasized the need to involve the community in drinking water supply projects throughout the whole phases of project planning, construction, operation, maintenance, management, monitoring and evaluation (African Regional meeting, Country paper, 1978).

The 1978 conference also summoned the subsequent African Regional Water Conference. The Economic Commission for Africa (ECA) prepared the conference the same year and adopted the resolution of the International Water Conference of Argentina, at Mar Del Plata, that advised all developing countries, including Ethiopia, to involve the target communities, in the planning, construction, operation and maintenance as well as monitoring and evaluation of water supply schemes. It has also resolved the formation and strengthening of community participation and management of the schemes by users themselves as owners of the system. By so doing, it inculcated the sense of ownership in the minds of communities as strategic approach for sustainable drinking water supply and sanitation services. Since 1978, community management of water supply and sanitation systems has increasingly been seen as

fundamental part of national programs for sustainable development. Experiences in many developing countries during and since the International Drinking Water Supply and Sanitation decade(1980-1990) revealed that even the best managed water agencies cannot successfully implement, operate and maintain a network of widely dispersed water systems without the full involvement and commitment of the local community (ibid).

Provision of water supply is more useful in reducing the hardships of women and in bringing about the wellbeing of communities in areas of health, education and economic fields. It will also liberate women from time consuming, long travels to collect water. Closer sources of potable would mean that, particularly girls would be free to attend school. The" saved'' time could also be used for such beneficial and income-raising projects as poultry production, pottery making and production of food crops (ECA, 1999).

Until recently, the impacts and roles of domestic water supply and sanitation not received as much attention as they deserved. It was usually considered water supply and sanitation as largely a "public health" benefit. Now a broad range of non-health benefits have started to be recognized and targeted in an increasing number of studies and report. In the recent draft white paper on water service in South Africa, economic activities are explicitly recognized. "Municipalities do not and should not only provide water service necessary for basic health and hygiene. It is important that municipalities' undertake health education, facilitate the provision of higher level of

service for domestic used and provide service which supports the economic development and well being of communities (Teshome, 2006).

According to Teshome (2006), water supply coverage in Ethiopia is one of the lowest in the world, which is 39.4 % in 2004. 63.6% of water supply came from unprotected source of water as compared to 35.4 % water supply source that came from protected well/spring, public and private tap. This low coverage of water supply service enforced Ethiopia to have a good decentralization strategy where all government structures are decentralized and staffed from the federal to regional, woreda and community levels. The decentralized structures provide an opportunity for quick decision making at all levels and having interventions at different levels. It also provides an opportunity to develop tailor-made programs and strong participation of the community.

Thus, the central question of the study is whether improvements in water supply service was leading to bring impacts on the livelihood of user communities and the extents to which the management system of rural water supply affects the livelihood of the rural community in the study area.

1.2. STATEMENT OF THE PROBLEM

Huge amount of resources in terms of human power, material supplies and financial expenditures have been invested by the government, bilateral and multilateral agencies at local and regional levels for the construction and provision of improved rural water supply services in developing countries. It is unfortunate that the efforts, objectives and

goals could not fulfill and be sustained as planned. Lack of achievement of objectives in water supply and sanitation services have adverse impacts on the livelihood of the user community. Whereas properly managed improved water supply and sanitation service has positive impacts on the productive capacity, health and welfare of the society. (WHO, 1990a as cited in Burqitu, 2002).

For instance, in developing countries, not only are investment levels low, but even meeting recurrent costs for operation and maintenance have proven to be a major problem. Unacceptably high level of investment continues to be wasted as many systems fail to non-functional almost as quickly as they are built. Some evidences suggest that 30-40% of the water supply schemes in developing countries may be broken down at any time (ibid).

In Tanzania, 12% more children were found to attend school when safe water available within 15 minutes rather than one hour from their home. Therefore, the provision of water supply and sanitation near to home or school enable us to enhance the impacts of water supply on the livelihood. When water supply improvements are coupled with opportunity to create income trough microenterprise, time released from water collection is converted into income earned. This brings several benefits:-reduce drudgery, higher household income and consequently greater women's empowerment through changing gender relations within the household. An improvement of water supply to the extent that women spend one hour per day on collecting water would result in an improvement of the annual income with upper boundaries of between

Rs 750 and Rs 5520.Alternatively, each woman might gain between 45 and 152 eight hour days annually for domestic, social and development activities (Teshome 2006).

The unavailability and inaccessibility of potable water service greatly contributes to poor health and low productivity. The Central Statistics Authority Report of 2004 explains lack of safe water as the major causes of water borne diseases and death in most developing countries including Ethiopia. Apart from causing poor health and death, Meseret (2006), indicates the negative consequences of unavailability of safe water on society as "lack of safe water supply has other chain of negative consequences such as the work load on women and children in fetching water mostly from very distant areas''.

Water is a valuable natural resource fundamental for life and it is believed that it facilitates the overall socio-economic development of a nation. Women spend much of their time in fetching water even from long distances. So provision of adequate and clean water helps to free up the labour of women and children who are used to collect water to other production activity (MoFED, 2002).

The management system of rural water supply can enhance or reduce the targeted impacts of rural water supply on the livelihood of the user community. For instance, the Oromia Rural Water Supply Schemes inventory data of 2003 indicates, of the existing 7202 schemes in the region, about 35% were non-functional. Similarly, in Babile woreda, of the existing 103 water supply schemes, 38% were non-functional in the same year. This indicates that higher percentage of non-functional schemes in Babile woreda implies the reduction of the targeted impacts of improved water supply

on the livelihood of the user community as a result of poor management systems of water supply schemes. In addition to this, there are very few empirical studies on impacts of rural water supply and management systems on the livelihood the rural community at Regional level and no study has systematically addressed the issue in study area.

1.3. OBJECIVES OF THE STUDY

1.3.1 GENERAL OBJECTIVE

The main objective of the study is to assess the impacts of rural water supply and management systems on the livelihood of the user communities in Babile woreda.

1.3.2. SPECIFIC OBJECTIVES

In relation to this, the study will have the following specific objectives:-

1. To explore the existing water supply schemes in the study area.
2. To assess the technical, social and institutional factors that hinder the impacts of rural water supply in the study area.
3. To assess the impacts of rural water supply and management systems on the livelihood of the user communities on the livelihood of the user communities in the study area.

1.4. RESEARCH QUESTIONS

In order to address the above issues, the study attempted to answer the following three research questions:

1. What are the types and status of rural water supply schemes in the study area?

2. What are the technical, social and institutional factors that hinder the impacts of rural water supply on the livelihood of the user community in the study area?
3. What are the impacts of rural water supply and management systems on the livelihood of the user communities in the study area?

1.5. SIGNIFICANCE OF THE STUDY

The study is believed to be important since it is expected to identify the impacts of rural water supply and management system on the livelihood of the user communities in the study area.Thus, it is hoped that the findings of this study will help:

i) To provide specific data for further studies and revision with a view to making the rural water supply scheme and it's management system more effective and efficient.

ii) To provide specific data on impact of water supply on the livelihood of the user communities in the study area.

Moreover, this study would initiate and back up others to carry out extensive studies in impacts of rural water supply and management systems on the livelihood related issues.

1.6. SCOPE AND LIMITATIONS OF THE STUDY

The study investigated the impacts of rural water supply and management systems on the livelihood of the user community in Babile woreda.

The reasons for selecting Babile woreda as a study area were due to:-

1. The fact that water supply is a privileged field for the study and the intensity of the problem and the specific situation in the area has driven the attention of the researcher to select the study area.

   Accessibility was also another factor for the selection of the study area.

2. Babile woreda is one of the RiPPLE (Research Inspired Policy Practice Learning) action research areas and RiPPLE has sponsored the researcher's to study at the College of Development Studies (CDS) as part of capacity building for the program beneficiary Regions. Accordingly, the program pursues the students to conduct their thesis on one of the RiPPLE action research woreda and I am also one of the sponsored students from Oromia Region.
3. Moreover, no study has systematically undertaken that address the impacts of rural water supply and management systems on the livelihood of the user community issue.

The study was also not without limitation. The limitations of the study include: lack of compiled base line data at Woreda Water Office and the impacts of rural water supply and management system on the livelihood of the user communities require in depth investigation but this thesis may not be exhaustive. In addition to this, the study was not included measurement of the amount of water carrying time "saved' as well as the effects of these savings on both earlier and new activities. Therefore, further research for better understanding will have great importance.

1.7. DEFINITIONS OF TERMS

Terms that carried a unique meaning for the purpose of this study are defined as follows

Sustainability: In context of drinking water supply schemes, sustainability refers to the ability to maintain efforts and derived benefits both at community and agency level even after the assistance (managerial, financial and technical) is withdrawn (WECD, 1987).

Livelihood comprises the capabilities, assets and activities required for a means of living (Chamber and Conway, 1992).The dictionary meaning of livelihood is the money people need to pay for food, a place to live, clothing (Cambridge university press, 2003).This definition emphasizes only the income that an individual gets and pays for different necessities.

Impact: The changes produced. It is an expression of the results actually produced usually at the level of broader, long range objectives. Impact measures the final results (Issayas and Tadesse, 1988:5).

Efficiency: efficiency refers to the productivity of a project.

Effectiveness: It is refers to the extent to which a project is meeting its objectives.

WATSAN committee: The community level institutions in the water sector are WATSAN committees which are volunteers elected by community members to serve a given community members.

Community management: community management of water supply and sanitation start from project identification and goes deep in to contribution in cash and kind and monitoring during implementation and managing the scheme.

Better health: it has been widely established and accepted that more and better quality water, and improved hygiene, reduces disease. Healthy people are able to work and live more productive lives.

Time savings: time and effort spent collecting water can be reduced by improved water supplies. Especially for women and children who shoulder the burden of water collection.

Expenditure savings: improved water supplies lead to reduced expenditure on drugs to treat illness.

Well-being: better water supplies reduce pressure on people, especially women. As well as time saved, there is less stress, anxiety, and improved safety when water supplies are available close to home.

Empowerment: ensuring that the powerless are given a voice and increasing their capacity to participate in community decision-making can help empower marginalized women, the poor and other groups.

Community capacity: well designed, planned and implemented water projects can strengthen and extend the capacity of local organizations in areas like decision-making, financial management, and ability to carry out operation and maintenance.

Productivity and income: more opportunities for home-based activities lead to improved employment, productivity and incomes. Non-water based livelihood activities are possible because of time savings, better health, and opportunities to invest expenditure savings.

Operation: It deals with the actual running of a service (**e.g.** Provision of fuel, starting or handling of pumps, control of water collection points, general mechanical).

Maintenance: It deals with the activities that keep the system in proper working condition, including management, cost recovery, repairs and preventive maintenance.

CHAPTER II

2. REVIEW OF RELATED LITERATURE

2.1. CONCEPTS AND DEFNITIONS

2.1.1. RURAL WATER SUPPLY

According to WHO (1982),the term rural water supply covers all the measures taken to satisfy the demand for water in predominantly rural regions. Rural regions of this kind may be typified by:-

- Nomadic ways of life
- Peasant ways of life
- Peri-urban ways of life

Rural water supply embraces the supply of drinking and household water to the rural population plus supply of the water required for the purposes such as garden watering. However, this constitutes an environmental problem in its own right, the supply of water for livestock watering because it is virtually impossible in practice to draw any clear distinction between drinking water for humans and drinking water for live stock.

Ethiopia uses population size to classify population and areas as rural or urban. For water supply purposes, a community with a population less than 10, 000 is identified as rural. Rural water schemes are also defined as points improved by the joint efforts of users and government or NGOs. Rural water supply and sanitation schemes share some common characteristics. They require low capital costs, mostly use locally available materials,

largely based on similar design relied on the approach and technology understandable to the people who are using it, local labor, controlled and maintained by villagers, are flexible to be used or adapted to fit to changing circumstances. The expected outputs of these water schemes are improvements in health, income, institutional strengthening and technological know-how, as well as environmental resilience (Mengesha, 2002:12).

2.1.2. RURAL WATER SUPPLY SCHEMES MANAGEMENT

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. On 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 into consideration the complex nature of 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 uses of water have a crucial role to play in turning water into the cash with which to buy spare parts and pay for routine maintenance. 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 the 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 inefficient 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 where communities not only contributed to the operation and maintenance of the schemes, but met them in full (Dwarkin, 1989a, 1980b).

Sustainability of rural water supply refers to the provision of safe and adequate services at reasonable cost and on long-term basis. Specifically, it is the continuation of project benefits after the commission of the project. Involving the end-users in all aspects of the decisions believed to have empowering effects on users, so that they could be able to manage developed water points by themselves. Problems at the planning and appraisal stages create loop holes for the emergence of problems that can be a threat to sustaining services. Giving proper attention to software aspects of the project at planning stage therefore helps to develop a sense of community ownership to enhance users' involvement in project management and consequently contributes to sustainability of benefits. Developing sense of ownership will enhance the impacts of rural water supply on the livelihood of the user community (Ausguide, 2002:3, cited by Mengesha, 2002:14).

Building the capacity of grass-root actors that have stakes in water source and water point management, both during project implementation and even after projects are handed over to the user communities, is a viable way of alleviating managerial and technical capacity constraints in rural water supply context, it refers to providing various trainings to elected water supply and sanitation committees, local caretakers and community at large so as to enhance their capacities that can be applied in managing improved water supplies. In addition, it also refers to providing various technical assistance/backup services, equipping water supply and sanitation committees and village technicians with essential practices and experiences, and providing maintenance equipments that can be used in managing improved water points (Getachew, 2002).

3.1.3.THE IMPACTS OF IMPROVED WATER SUPPLY

Domestic water supplies can be productive and productivity can contribute to peoples' livelihoods, particularly those of women and the poor, thus increasing the impact on livelihood. Until recently, the multiple benefits of domestic water supplies had not received as much attention as they deserved. The traditional view of domestic water as largely a 'public health' benefit persisted even beyond the 1980s when international agencies continued to focus on 'clean drinking water and adequate sanitation' as a key right and development goal (IRC,2003).

Rural water supply and sanitation have the potential to act as a catalyst for change in the socio-economic and health aspects of the target communities. Several impacts are anticipated from the developed improved water supplies.

One of the social conditions that could primarily be improved by the provision of water supplies is a reduction in the effort and time required to collect water. Improving physical access to a physically dangerous source can be a major benefit in itself. The locations of some water points are risky and dangerous to women and children. Carrying the heavy load of water, either on the head or back, from far distant locations or sources causes various health hazards. They suffer headaches and exhaustions due to heavy weight of carrying water. For low-income women, the working day is excessively long. In many African countries, including Ethiopia, the collection and carrying of water and fuel wood over considerable distances can result in women having only few hours sleep a night in the dry season (Alemu, 2006).

The lack of access to water supply has impacts not only on the quality of life of the poor, but also productivity and health. According to a survey carried out in 2001 by the Salvadoran think tank, the rural poor in particular spend a significant share of their productive time collecting water. Families without house hold access to water spent 4.9% of their productive time for fetching water. For the structural poor the values were much higher with 13.6% and 7.1% respectively (El Salvador-Wikipedia, the free encyclopedia, Feb, 2008).

The livelihood of the people is also greatly influenced by the accessibility of water and sanitation which is necessary in the improvement of their economic well being. Water is critically needed for drinking and other domestic purposes in the livelihood of people. A person has to drink certain quantity of water per day to remain hydrated and

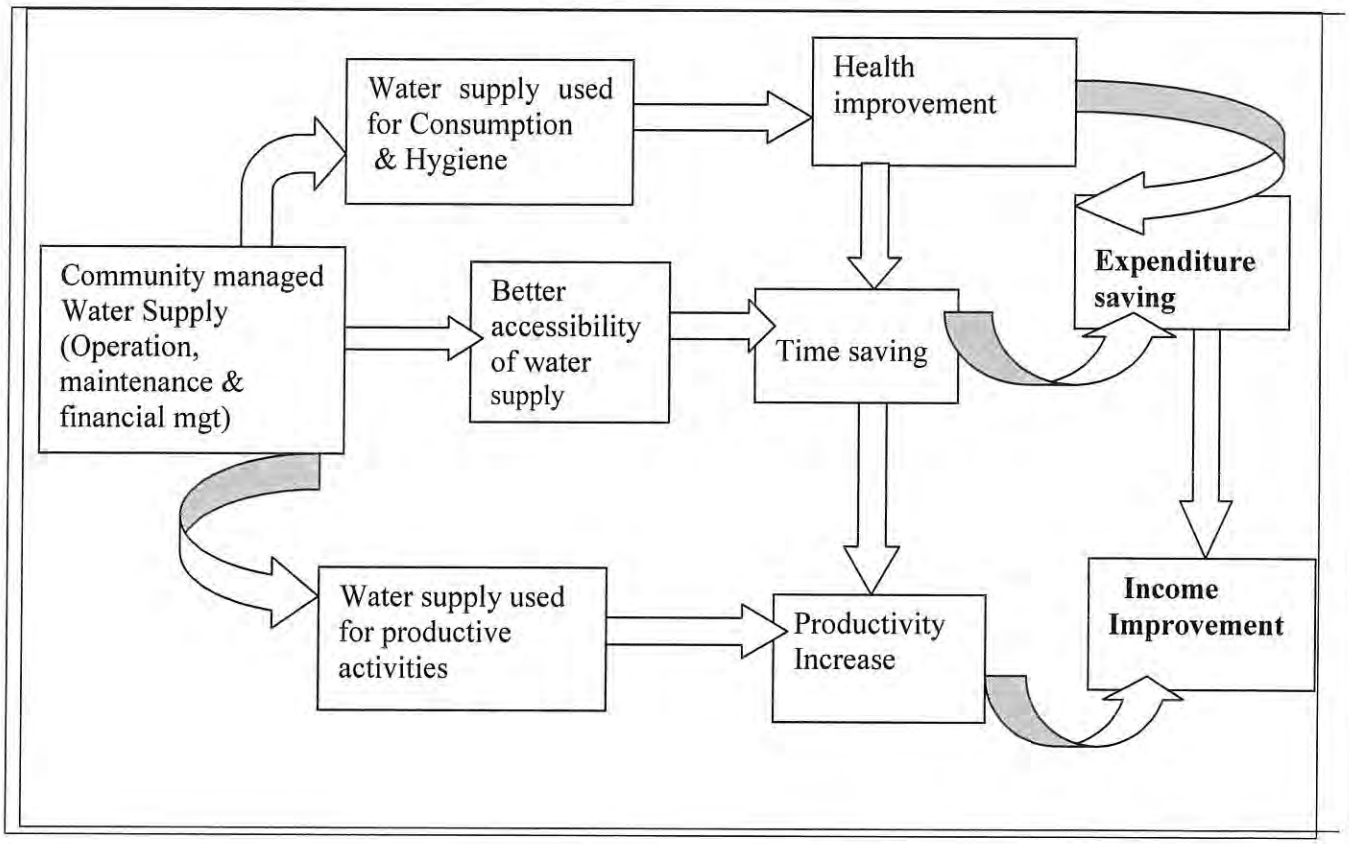
healthy. Along with this water is essential for cooking, promoting personal hygiene. The people's livelihood can be improved through provision of safe water supply and appropriate sanitation which can minimize the large amount of time and energy spent in fetching water. The time and energy saved through provision of improved water supply and sanitation can use in many economically productive activities (DFID, 2001:25, cited by Tefera, 2007).

Improved water supply is important for maintaining the health of individuals. Having access to safe water for drinking and food preparation highly influence the health of people. By having washed the cloths, hands and other parts of the body one can keep him/her healthier. Without adequate and wholesome water supply, health cannot maintain. Access to sanitation is the critical determinant of preventing drinking water from being contaminated. Good health is both an end and a means of sustainable livelihood. For poor people good health is an essential asset in the pursuit of their livelihood, their home and work environment often threatens their health. Improving environmental health is a sustainable and cost effective means of improving people's health and therefore basic to the creation of sustainable livelihood and the elimination of Poverty (ibid).

It has been widely established and accepted that more and better quality water reduces water-borne disease. Healthy people are able to work and live more productive lives. Improved water supplies can also reduce time and effort spent to collect water especially for women and children who shoulder the burden of water collection.

Improved water supplies also lead to reduced expenditure on the generally expensive water provided by water vendors, and less money is spent on drugs to treat illness. Moreover, well designed, planned and implemented water projects can strengthen and extend the capacity of local organizations in areas like decision-making, financial management, and ability to carry out operation and maintenance. Non-water based livelihood activities are possible because of time savings, better health, and opportunities to invest expenditure savings. Improved incomes lead to improved status: for example, of women when their economic contribution to the household is visibly improved (IRC, 2003).

Fig1: Conceptual framework



Adopted from IRC, 2003

As shown in fig.1 above, IRC (2003) came up with this conceptual framework to study the impacts of rural water supply on the livelihood of the user community. In this frame work, well managed and adequate water supply will be resulted in health improvement and time saving. Improvement in health of family members and time saving will be resulted in expenditure saving and income improvement. The implication is that properly managed rural water supply has positive impacts on the livelihood of the user community.

2.2. EMPRICAL REVIEW OF LITERATURE

2.2.1. RURAL WATER SUPPLY SCHEME MANAGEMENT

At the earth summit in Rio de Janeiro in June 1992, world leaders committed themselves to a comprehensive program to provide sustainable water supply and sanitation services to the hundreds of millions of the world's population who currently lack them. At the summit, all states and support agencies have urged to implement activities aiming for universal coverage outlined Agenda 21 that is a strategy for sustainable development in the 21st century. A guiding principle in the achievement of Agenda 21 is "community management of services, backed by measures to strengthen local institutions in implementing and sustaining water and sanitation programs (IRC, 1993).

Functional community participation management needs functional and effective village community organization that involves all sections of the community. The essential feature of community management is the participation of the community and community groups throughout the life of the project. A water committee is a voluntary

group of five to seven people, who have at least four women representatives from groups that are active in the area. This composition ensures that all active groups, all points of view and all local political interests/groups are represented. The water committee should by all means be a non-political group precisely because all views are represented and all decisions must be made in open meetings of all members. To perform the functions equitably, water committees need to be representative of the community social structure with members selected democratically after considering their competency, deduction and motivation (Kurup, 2003).

Many developing countries have examples of women being chosen as treasures of water committees, collectors of contributions, depositors of collected fees in the committees' bank account, and book keepers. It has been found that in general women are better, more reliable keepers of money than men. Once they are given an important task in the water committee, they tend to feel more responsible towards the community. Also, they will not as easy squander as men do. Sometimes women are reluctant to take up the role of treasurer, as they feel that they lack the skills. Projects could contribute considerably in enhancing women's skills in management tasks, particularly as managers of finance, by training women in bookkeeping and financial accounting. In Niger, monitoring of financial performance soon revealed that in villages where the village chief had appointed a male treasurer, considerable misuse of funds occurred. Such misuse did not occur in the villages with a female treasure. The women had no other financial interest and less social pressure to give loans to others (IRC, 1994:51).

Achieving full and effective community participation in development activities is a difficult job and much depends on the way members of the community are approached by field staff, extension workers and technical consultants. The experience of development workers bounds with stories of projects that did not succeed because the intended beneficiaries failed to change behavior or attitude that were critical to the project's success. This type of problem is well known in the water supply and sanitation sector. While there are many reasons why costly facilities may fail in to disrepair, one critical factor no doubt has been the failure to mobilize the will of the people and willingness to pay. The latter has proven to be more important in predicting success than the ability to pay. Many communities who are able to pay have not in fact been able to raise the cash, while some poorer communities who are less able to pay have successfully financed their systems. The primary incentive that makes communities willing to pay seems to be guaranteed access to an adequate supply of water. Communities that do not have easy access to water are generally willing to pay for improved water supply, regardless of their ability to pay. Communities also tend to be willing to pay for an increase in quantity and convenience, but not for an improvement in quality (UNDP-World Bank, 1993).

2.2.2. THE EXPERIENCE OF ETHIOPIA IN RURAL WATER SUPPLY SCHEME MANAGEMENT.

Management of rural water supply systems have been the responsibility of different authorities since 1950.Following the international drinking water supply and sanitation decade, the Ethiopian Water Supply and Sewerage Authority prepared community participation guidelines and community management of rural water supply system in

1981.Since 1984 Water Supply and Sewerage Authority has started to take the responsibility of water supply schemes and had begun transfer of ownership. Since rural communities in Ethiopia are relatively large and scattered, the schemes serving these communities are also many in number and require close follow up efficiently to manage their smooth running (Ayele, 1986).

In Africa, particularly in Sub-Saharan Africa, there is a decreasing rate in the execution of new water supply and irrigation projects. The problem was further compounded by the failure of existing schemes because of lack of proper operation and maintenance. Consequently, communities were falling in the low-income bracket, particularly those dwelling in peripheral or urban fringe areas and rural segment of the population, have to stay without proper services facilities of drinking water and sanitation and often revert to unhygienic and polluted sources. In Ethiopia and Ghana, steps were being taken to be ensuring community management and ownership of rural water supply projects as the option to bring about sustainability of systems. The community was charged with the responsibility for planning, operation and maintenance of their water supply systems. Both countries had taken steps for community to participate in planning, in the choice of technology, and in identifying members to operate maintenance facilities that are installed.

Adequate representation of women will be part of the committee's constitution so that their special concerns are caring of fully addressed and their interests are safeguarded.

The question of awareness creation, hygiene, education, training requirements, co-ordination of water supply and sanitation were among the issues that will be promoted towards enhancement of the community participation in Ghana and Ethiopia. Encouragement of community participation on basis of demand-driven approach was in course in the area of small scale schemes development in these two countries with women as equal partners (ECA, 1999:45).

Since the mid 1980s, policy and practice in rural water and sanitation projects have been gradually reoriented. For intensely practical reasons, today's emphasis is on promoting and supporting community involvement in the planning and management of the projects. Why has this happened? Experience has demonstrated that involving users in decision making, goal-setting, design and management increases the chances that water and sanitation facilities will be financed, used fully and looked after properly. The end goal is not maximize the participation of users, but to optimize participation in order to achieve sustainability through human development. When stakeholders are intimately involved in all aspects of a project, there is less risk of inappropriate design, significant under use and long periods of disrepair. User involvement in decision making and particularly women's involvement is therefore increasingly recognized as a means to developing sustainable programs in water supply sanitation. With their intimate knowledge of the community water situation, they can best determine where to place water points. As they suffer most when facilities break down, they have a vested interest in ensuring good maintenance (WB, 1993 technical paper number 207).

Proper organization of a community and incorporation of an adequate training component will provide impetus towards successful realization of water projects. Further, women as a group most affected by lack of water, work with great zeal to have a reliable supply. The Dodota water supply scheme in which local women's Association in Dodota district of Ethiopia is a sustainable project of the early 1980s which can be cited as a successful scheme initiated, planned, executed, implemented and managed by women. Mio Gasera is also another typical community-based and sustainable water supply scheme in Ethiopia. These projects relieved a total of 17,000 women from the drudgery of Fetching water from a long distance. Numerous such success cases could be cited in various African countries to demonstrate the benefits of sustainable water supply schemes constructed and managed by the beneficiary (ibid).

The evaluation under taken by NTAG,(2006), indicates that Dalocha water supply scheme consists of a spring and 6 Bore holes,7 reservoirs with a capacity ranging from 50 m3 to 300m3,70 km of pipe line and 32 water points. The Dalocha woreda is in the southern region. The Dalocha water supply scheme was constructed in 1994 with the assistance of Action Aid Ethiopia and the full participation of the community. The water scheme is fully managed by the community. The community now gets a continuous water supply in the whole day from water points. Sustainability has been maintained, as shown by a cost recovery system, under which beneficiaries have agreed to pay service delivery fees to keep the water supply system working. The community is the sole caretaker of the whole system, without whose total commitment, the water system would not have been sustainable.

2.2.3. RURAL WATER SUPPLY SCHEME MANAGEMENT SYSTEM IN OROMIA

There are three rural water supply management options, which are currently operational.

- Water committee
- Water Board
- Indigenous water source management

A. **Water committees** are community members who are democratically elected by beneficiary community to run the regular activity of water supply schemes. The services years of water committee are two years. The number of water committee members is seven for motorized schemes and five for shallow wells fitted with hand pumps. To enhance the gender participation in water supply scheme management, the guidelines depict at least two of the water committees are female. The water committee member consists of chairman, secretary, treasurer, storekeeper, care takers (2) and counselors. In general, there are about 7200 water supply schemes managed by water committees in the region. The water committee is headed by chairman who reports to the Woreda Water Office and to the local community.

The information obtained from Oromia Water Resources Bureau shows that the challenges faced by many of water committees in the region is failure to meet at least cost of operation, maintenance and repairs. The causes for failurity of operation and maintenance cost were due to mismanagement finance obtained from water fee collection.

B. **Water Board: -** is established by motivation of two or more water committees who have got access to potable water from the same sources. The general assembly of water committee members is those democratically elected by beneficiary community. There are 28 rural water supply Boards and each Water Supply Boards consists of 7 to 40 water committees. The major constraints of Water Boards in the region are multi village rural water supply system incurs high cost of operation and maintenance cost especially those schemes constructed by governmental organization. Whereas, management of those water supply schemes constructed by NGOs are successful. For instance, Robe Meliyu, Gonde Iteya and Dodota which were constructed by NGOs.

C. **The Indigenous Water Source Management:-**The Borena people have their own long traditions of developing and managing water supply sources. Those long traditions include how and when to utilize water sources. Accordingly the right of water usage depends on its scarcity and labour and material contribution. Surface water such as river, or that found in natural depression or pool after the rain storm is regarded as gift of God for all use. Water that has been contained by pond or ella (traditional well) developed by human lobour is subject to greater regulation. The Borena's ella administered by abba hirega (father of the ella) who have the responsibility to oversee the operation and maintenance of ella. Everybody comes for watering livestock have to participate in disilit the ella (Rural Water Supply Scheme Management guide lines, 2002).

2.2.4. TECHNICAL FACTORS

The technical factors to be considered in this literature reviews are: Technology, operation and maintenances. Operation and maintenance activities are the most important activities to be under taken if sustainable and adequate potable water supply service is required. It is the cornerstone of system management without which reliable service cannot be ensured. Problems with the operation and maintenance of water supply and sanitation have long financial status and are a good progress towards full cost recovery. It is not uncommon to find that attention is mainly or exclusively focused on the construction of new water supply systems. Frequently no provision is made for operation and maintenance of the existing supplies. In fact maintenance is one of the most neglected aspects of rural water supply projects and the numbers of in operative systems remain discouragingly high. International and bilateral agencies often offer funds for new construction but are not so readily prepared to finance maintenance costs, considering this to be the responsibility of the recipient country (Ayele, 1986).

The operation and maintenance requirement should be a major consideration when selecting or developing appropriate water supply technologies and organizations for rural areas. If the technology chosen is relatively complex involving for example motorized pumps and treatment plants operation and maintenance in rural areas is likely to be a major problem. Although no system is maintenance free careful provision has to be made even for the simplest systems (protected dug wells, Hand pump systems and springs) by using simple technologies of low maintenance requirements. Once a water supply scheme is provided, it is important to ensure that the community

continuous to rely up on it. Thus it is essential that the system is kept continuously operating. If it breaks down, and remains in operative for long periods of time due to poor maintenance, people will return to their traditional water source. The opportunities for improving the attitude towards safe water supply will be lost, probably for years (ibid).

One of the major problems in rural water supply in Ethiopia is the question of sustainability due to inappropriate choice of technology like the installation of Bore Holes with electrical pumps which often becomes in operational since the beneficiaries neither have the technical know-how nor the financial capability to make repairs on the systems. From this stand point, the preference is to go for simpler and more sustainable technologies like spring development and hand-dug wells fitted with hand pumps. These technologies offer beneficiary participation both during implementation and operation stages and consequently enhance sustainability of systems (Mengesha, 2002: 40).

In undertaking water development projects, the first step is that all water sources should be assessed, so that the most suitable and acceptable source can be selected. Different sources of water require different degrees of treatment which have marked bearing on the cost of installation. The choices of source and technology used to determine the sustainability of water supply systems. The case study of Ethiopia points out that in remote rural areas borehole equipped with motorized pumps have resulted in failure as these did not afford simplified operation and finance opportunities. In another

situation, the case study of Ethiopia makes reference to two successful spring-based gravity water supply systems (Dodota and Gonde Itaya) which did not require treatment. In one of these systems, women were owners of the system and in both cases community participation was very high (ECA, 1999:28).

In rural of Africa, integrated water management is undertaken depending on the water source, technical knowhow, and financial availability and affordability. The sources of water may be from rivers, springs or groundwater. The general practice in remote rural areas has been the application of labour-intensive technology in the development of water resources. For better success to be achieved there is a fundamental need to build up technology capacity within the countries in Africa to solve problems and to a void undue dependence on imported technology and raw materials. In the area of development of hand pumps, the examples of Zambia, Malawi, Ethiopia and Ghana among others can be cited. Most of the hand pumps are manufactured locally, they are easy to operate and maintain and are produced at a considerably low-cost than imported hand pumps (ECA, 1999:39).

Some reports from Ethiopia as well as other developing countries showed that insufficient and in appropriate technology accounts for the failure of some water supply schemes and insufficient water facilities, poor physical structures, low reliability of the services and facility designs, the distance and time needed to collect water and low awareness about their uses. These factors affect the continued functioning and utilization of water supply schemes. Although several water supply projects have been

constructed in Gonder area, the majority of them are reported to be non-functional at present affecting a significant proportion of users. This high proportion of non-functional schemes resulted in inadequate drinking water Supply which adversely affects personal hygiene, clean food preparation and housing sanitation, which in turn, bring about the transmission of water-borne diseases (Mengesha, 2002).

2.2.5. RURAL WATER SUPPLY AND LIVELIHOOD

An evaluation seminar held in 1992 as a follow-up to the first UN international Decade for Clean Drinking Water (1981-1990) found that half of the incidents of infant and child mortality in Central African Republic were due to water-related diseases. WHO estimates that in 2005, 1.6 million children under age 5 died from the consequences of unsafe water and inadequate hygiene. In order to reduce the mortality rate of the child we have to provide clean water with adequate sanitation facility. It protects children from water-related disease and enables them to get enough nutrition (Teshome, 2006).

Improved water supplies lead to both direct and indirect opportunities for improved productivity. More water, of better quality and provided more reliably, can provide the water needed for productive activities like irrigation of a backyard or community vegetable garden or for micro-enterprises like hair salons or tea shops. These direct benefits are what most of the experiences identified in this top seek to capture. But indirect gains may be even more important in that they can apply to both water-based and non-water-based activities. Saved time and money can be invested in activities that bring positive returns to capital or labour (IRC, 2003).

An intriguing and important study in Gujarat, India (James et al., 1992), showed how significant improvements in incomes were achieved when an improved water supply that saved women's time was combined with promotion of handicraft-based rural enterprises. These enterprises did not significantly depend upon making productive use of domestic water but the better supply enhanced productivity through time savings. This project illustrates the utility benefit of water but the important message is that just providing the utility was on its own less effective than doings in conjunction with a program that supported the women in making use of the time saved. It demonstrates a livelihood based approach which realized that time and timely access to other key assets is a prerequisite to making money. In order to maximize the benefits of the improved water supply it was necessary to address constraints associated with these other assets.

Many women in rural areas are caught up in the routine of fetching water from distances of 3 to 6 kilometers. A disproportionate part of the day is spent in obtaining water for the family. Regardless of the amount of water needed, there is the health implication and the depletion of the Woman's energy for other activities which in some areas is reduced by 50%. The role of women as the group who are custodians and guardians for food and water requirements for the household should be taken in to account by planner and designers of water schemes (ECA, 1999).

Warner (1974) gave an example of the complexity of the influence of diseases in an African setting. An African house wife gets up in the morning and soon begins to fetch

water. She walks through the thicketed Savannah to the water source. This is the habitat of tsetse flies and she is exposed to reaches the water source in a valley bottom and has waited her turn. This is the habitat of disease-bearing mosquitoes and of a different tsetse fly more efficiently transmitting Bilharzias if it is sluggish or may contain guinea worm larvae if it is a mere muddy hole. She collects the water, which today bears a dilute load of human excreta and may contain typhoid bacilli or hepatitis virus. She returns, past the tsetse flies, to her home. As a result of her trip she has been unable to day any digging for the past hour and fewer crops are grown. She prepares the family's main meal. The scarcity of water discourages the washing of hands before the meals and makes washing up after the last meal. Some decayed food may be left on the utensils. Some un boiled water is drunk by her thirsty family, who pick up the germs from it. Two days later father falls sick. The cattle are not tended properly and the cotton is not planted-latter in the year there is no money for school fees since not only was the harvest small but also part of the available cash had been spent on medicines. A little had also been expended on getting the children spent by the government on medical facilities used in treating the water borne diseases or insecticides to kill mosquitoes breeding in and around the water holes and on providing chlorinated water for a nearby town. Because of the difficulty of controlling all of the relevant health-related, as well as social and economic variables' in such a setting, conclusion concerns causes and effect relationships often are colored by the strong likelihood that some un suspected or un measured factor was responsible for the observed result.

> Nelson Mandela said '' When I return , as I often do, to the rural village and area of my childhood and youth, the poverty of the people and devastation of the natural environment strike me painfully and in that impoverishment of the natural environment, it is the absence of access to clean water that strikes most starkly. Among the many things I learnt as a president, was the centrality of water supply in the social, political and economic affairs of the country, the content and the World'' (World Submit on Sustainable Development,2002).

Locating improved water supplies within reasonable distances to households saves time and possibly increases production time. Some studies find that, improving accessibility by constructing boreholes in villages in Nigeria reduced daily water fetching times from 360 minutes to 45 minutes. Through rain water harvesting, women in Sri Lanka saved 2 hours (opportunity costs) daily by a reduction in the number of trips to dug wells and springs from 8 to 3 per day. As a result, rainwater consumption increased in dry and wet seasons between 50 to 70%. Such substantial amount of time saved could improve women's welfare through time and energy availability for productive time in developing countries.Studies show that time saved by women is channeled into house work (for example, cooking and hygiene), rest, social and personal activities. Others allocated time saved to having quality time with the family whilst a few invested this time into agricultural and cottage income generating activities. Mozambican women, allocate time saved between housework such as grinding grain, rest and leisure with very little allocated to agricultural production.

2.2.6. NGOs INVOLVEMENT IN PROVISION OF WATER SUPPLY

In any development project or program, clearly defined indicators are essential for accurately and realistically measuring results toward goals and objectives. Within the context of participatory management, the process employed to realize these results is also key' capacity building is one of the main requirements for achieving progress.

The maintenance of water and sanitation systems how frequently water and toilet facilities breakdown and how they are repaired is determined by a variety of factors: technical, motivational, community capacity to operate and maintain the systems, cost and availability of spare parts, private sector or NGO involvement and government support system. Because the cost of setting up centralized operation and maintenance for hundreds of scattered water systems is prohibitive, increasing emphasis is being placed on standardized technology and creating management systems that include communities, the private sector, NGO and local municipal involvement and government support systems. In most countries, governments retain the responsibility for training of mechanics and care takers to correct major breakdowns. The training may be contracted to the private sector or NGOs. Several external, multi and bilateral agencies and NGOs are operating in Ethiopia. It is noted that in some of the countries the number of NGOs operating in the water sectors is so numerous and their activities are not coordinated. There are NGOs that plan implement and handover water schemes to communities which in a few years become in operational. The activities of some NGOs are not even known to the responsible government water offices. Such chaotic situations should be corrected through joint arrangements between the government responsible offices and NGOs. So that partnership may attain the desired objectives (UNECA, 1999).

CHAPTER III

3. SAMPLING AND METHODOLOGY

3.1. SAMPLING METHODS

3.1.1. DATA SOURCES AND COLLECTION INSTRUMENTS

A combination of both primary and secondary data sources were used for the study. In any type of study, it is advisable to assess the availability of secondary data before embarking upon the collection of primary data. Secondary data related to impacts of rural water supply and management systems on the livelihoods of the user communities were collected from various reports and publication, different publications of ministries and regional government, thesis paper, online and electronic data bases and reports of various organizations.The methods employed for primary data collection were household surveys, key informant interviews (formal and informal), observation method and focus group discussion.

A. **Household survey** was conducted to collect data on the impacts of rural water supply and management problems on the livelihood of user community with sampled people in the selected rural kebele Administrations. A multi stage sampling technique was used for data collection as follows:

   First stage: Selection of Kebele Administrations

The Kebele administrations were selected based on representativeness, accessibility and availability of improved water supply scheme. Stratified sampling method was used for the selection of Kebele administrations.

Babile Woreda has two agro-climatic conditions (Kolla 90% and Woinadega 10%). Ebada Gemechu kebele administration was selected from Woina-dega agro-climate zone (1500-2000ma.s.l) while Tula and Abdibuch kebele administrations were selected from Kolla agro-climatic zone (900-1500m a.s.l) in order to have representative sample.

Second stage: Selection of villages or communities

Communities for the study were selected from three kebele administrations based on availability of improved water supplies, the representativeness of their water supplies to the kebele and accessibility. In villages/community selection, purposive sampling method was used.

Third stage: Selection of households

The households' selection within a given village was carried out at the start of the first survey by using random sampling method. Three interviewers with prior experiences on data collection conducted the interviews. One day training was given to the interviewers by the author on the various procedures to be followed in the selection of respondents and on how to conduct the interview. Upon arriving in a village, the enumerators first presented their support letters from Water Bureau to kebeble administration officials. The enumerators were careful to point out that their presence was unrelated to the immediate solution for the existing water supply related problems but that the cooperation of the people on the investigation would help policy makers to have a better understanding of the existing water supply scheme related problems in the selected kebele administrations in Babile Woreda. The names of every ten household's heads were taken randomly for

interviewing. At first, the enumerators were instructed to pick the names by themselves with the aid of a list of the random numbers from Kebele records.

Prior to commencement of actual data collection, pre-testing was carried out at selected six households to check whether the questionnaire for household surveying was workable or not at the existing context. Adjustments to questionnaires were accordingly made as per the feedback from the field so as to make the instruments more appropriate. Supervisions were undertaken by the candidate student. Interviews were often made at a time when the respondents had rest, mainly after 3:00 pm in the afternoon. As the target was to have approximately 90 households or respondents, at least 30 household heads in each kebele/community were selected and interviewed. In the absence of the head of the household, spouses were interviewed.

B. Focus group discussions (FGDs) were conducted particularly with water users' committee members, elders, healthy extension workers and DAs to gather group opinions.

C. **Observation:** Observation can be used as a supportive or supplementary technique to collect data that may complement or set in perspective data obtained by other means (Robson, 1995). It was employed to observe and record the status of water supply schemes and managerial capacity of water committee at water points. The observation method has enabled the researchers to have knowledge about improved water supply scheme management and benefits of improved water supply from the beneficiary perspective. Photographs were part of the assessment instruments to pick up the status of different water supply schemes.

D. Key informants interviews were carried out to collect background information on institutional set up, operation and maintenance, impacts of improved water supply and

strength of water committee in scheme management. The interviews were held with selected individuals who were believed to have good knowledge about the subject matter. The key informant interviews were held with the Head of Woreda Water Office, Zonal Water Office, and Menschen for Menschen representative of Babile Woreda.

E. Informal discussions were also held with different categories of people at Woreda level (experts at Water office, Health extension worker, MfM representative and elders).

3.1.2. SAMPLING SIZE

From the total of 21 rural kebele administrations in the Babile Woreda, three kebeles were selected by using stratified sampling techniques. For household survey, simple random sampling was employed. Interviews were held with heads of the households having access to improved water supply. The total numbers of households in the three selected kebeles administrations were 1,856. Accordingly, from the total of 1,856 households, 900 household heads having accessing domestic water from different water sources were taken as total sample. Thus, 10% of 900 household heads accessing domestic water supply or 90 household heads were drawn from Ebada Gemechu,Tula and Abdibuch kebele administrations for the study. Three focus group discussions were held with water committee members, elders, health extension workers, development agents and kebele administration officials and four observations were under taken at different water points.

Table 1.Summary of household survey and qualitative sample size

Woreda	Kebele community	Household survey			Qualitative tools and number of individual/group Interviewed				
		No. of Total HH s	No. of user HH Heads	Sampled user HH Heads	FGD	Elderly	DA	NGO	Health extension
Babile	Ebada-Gemechu-Adasha	600	300	30(25M & 5 F HH)	1	1	1	MFM	1
	Tula-Ebiro	716	300	30 (23 M and 7 F HH)	1	2	1	-	1
	Abdibuchi-Galeyi	540	300	30 (28 M & 2 F HH)	1	2	-	-	1

Source: Field survey data, 2008

The household survey was carried out between Jan-Feb, 2008.As shown in table 2 below the types of technology vary from community to community based on water supply source. The selected communities in Tula and Abdibuchi kebele administrations are the users of water supply from shallow wells fitted with hand pumps. Whereas, the selected communities for the study in Ebada Gemechu were the users of protected spring with distribution. Spring with distribution give service for 300 households where as shallow wells fitted with hand pump give service for 100 households. Monthly Water tariff is also varying from community to community. The monthly based water fee per household is 2 Birr, 1Birr and 3Birr for Tula-Ebiro, Ebada-Gemechu-Adasha and Abdibuchi communities respectively.

Table 2.Types of water supply schemes and technologies in use

Community	Types of Technology	Number of schemes	Number of user HHs	Monthly payment/ HH	Constructed by
Tula-Ebiro	Shallow wells fitted with hand pumps	3	300	2Birr	Government
Ebada-Gemechu-Adasha	protected spring with distribution	1	300	1Birr	Mf M
Abdibuchi-Galeyi	Shallow wells fitted with hand pumps	3	300	3Birr	Mf M

Source: Field survey data, 2008

3.1.3. DATA ANALYSIS METHOD

Analyzing the data is a crucial part of the study. After data collection the information was organized, analyzed and interpreted. For data analysis, combinations of quantitative and qualitative methods were used. The data collected through household survey, FGD and physical observation were analyzed by using qualitative method in a way to better complement and describe variables in the existing conditions of impacts of rural water supply and management on the livelihood of the user community. A method used for quantitative data analysis was descriptive statistics: like percentage, average and tabulation. The SPSS version 10 soft ware program was also used for data analysis.

CHAPTER IV

4. THE STUDY AREA

4.1. LOCATION AND ADMINISTRATIVE SETTING

The Regional State of Oromia shares boundary with all other Regional States of the country except Tigray. It is the single largest state that accounts for over one third of the total population of the country. The region has a total area of 363,136 km^2 and on the basis of 1994 Central Statistics Authority's census the total population of Oromia as July of 2006 were projected to be 26.55million of which 23.03 mil (86.7%) were rural population and 3.52 million (13.3%) were urban population. Currently Oromia regional state is divided into 17 administrative zones and two special zones (Adama and Jimma towns) and 259 rural and 36 urban woredas.

Babile Woreda is one of the 18 Woredas in East Hararge Zone, Oromia Regional state. It lies between $8^0$9' and $9^0$23'N latitude and $42^0$09' and $42^0$55'E longitude to the south east of Harar town. It is bordered by Gursum Woreda to the north and northeast, Harari Regional state to the north and northwest, Fedis woreda to the west and Somali Regional State to the south, south west and southeast directions. It has a total area of 3,169.06 km^2 accounting for about 14.01% of the total area of East Hararge zone, its capital is Babile town which is located at a distance of 35km from Harar town to the south east direction. Babile Woreda has one urban and 21 rural Kebele Administrations.

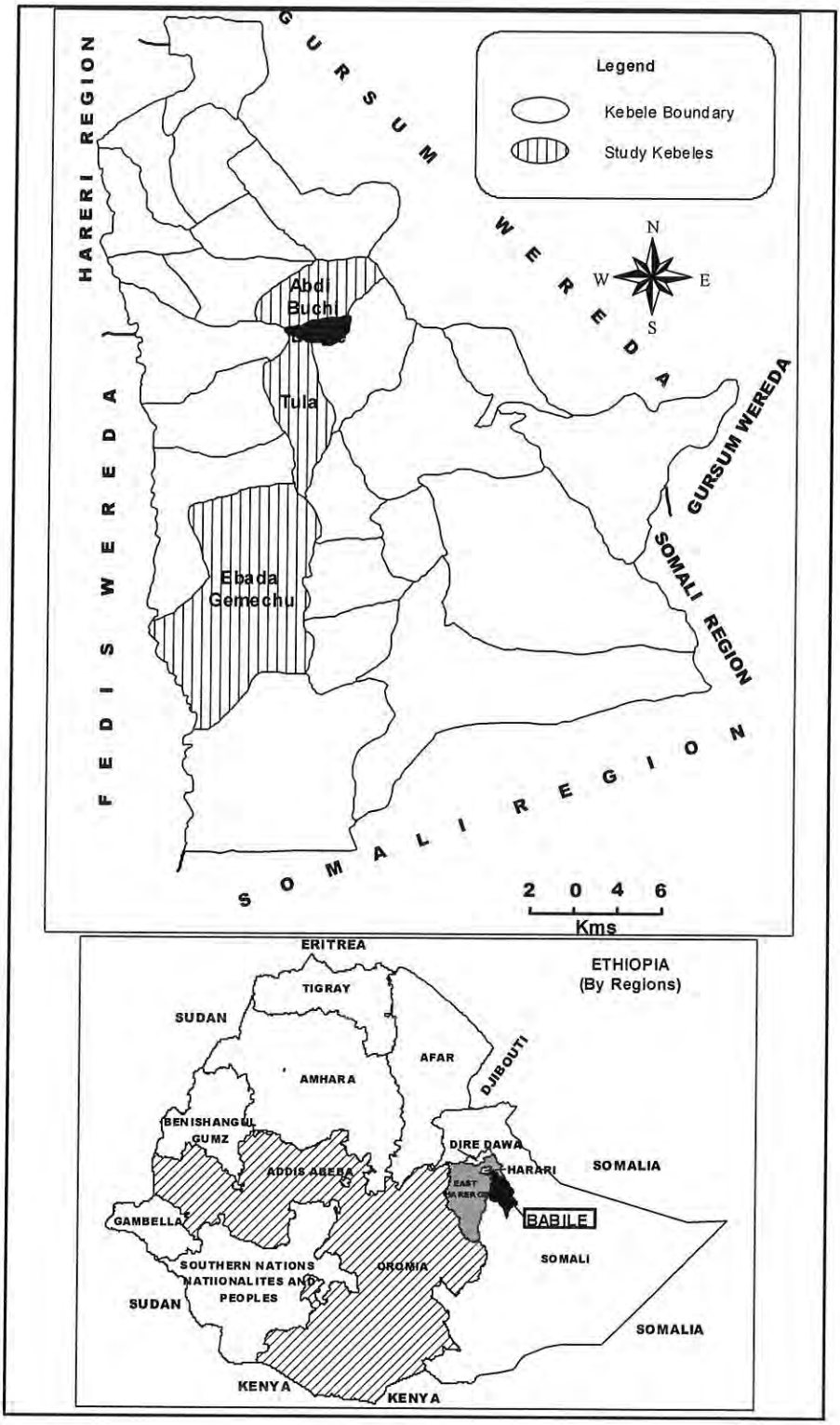


Figure 2. Location Map of Babile Woreda

Geographically, Babile Woreda is predominantly characterized by plains mainly Mulu Bota Adada Bota from north to south direction along the rural gravel road from Babile to Fike town (in Somali Regional state). There are also isolated hills in these plains such as kora (1518ma.s.l.)Kurfadenbe and plateaus as well as mountains such as Mt.Ambelber (1780m.a.s.l). and Mt.Sarbadin to the north and north eastern parts of the woreda. Attitudinally, the district stretches between 950 and 2000m.a.s.l.)The lowest place lies in the floor of Daketa valley (950-1600m.a.s.l.).About 94.4%, 4.6% and 1% of the total area of the district are characterized by plains and isolated hills, dissected plateaus and mountains, and rift valleys including gorges respectively.

4.2. CLIMATE

Babile woreda is classified into Woina-dega and Kola agro-climatic zones, covering about 10% and 90% of the total area of the woreda respectively. Woina-dega agro-climatic zone (1500-2000m.a.s.l) is characterized by average annual rainfall and temperature ranging between 600 and 2000mm and 15^0c and 20^0c while Kolla agro-climatic zones (900-1500m.a.s.l) is explained by average annual rainfall and temperature varying between 410 and 820mm and 20^0c and 25^0c.

4.3. POPULATION

According to the 1994 population and housing census, the projected population at present is 74,779(urban 17,173, rural 57,606). The crude population density of Babile Woreda is 23.66 persons /km2 in 2006/07. The population size of Babile woreda was projected using annual growth rates of 2.23 % for rural & 4.11 % for urban areas based on 1994 Population & housing census (refer to table3 below). The average house hold sizes for

rural & urban areas of Bable woreda are 4.7 & 4.0 respectively, with 4.2 for both areas (1994 population & Housing census results).

Table 3. Population Distribution by sex

Year	Area	Sex		
		Male	Female	Total
2006/07	Rural	29,133	28,473	57,606
	Urban	8,752	8,421	17,173
	Total	37,885	36,894	74,779
	%	50.66	49.34	100

Source: Ormia Bureau of Finance and Economic Development, 2006

4.4. SOCIO-ECONOMIC CHARACTERSICS

Agriculture is the dominant economic activity and the base of lively hood of the majority of the residents of the study area. The agricultural activities in study area are characterized by mixed farming system which involves crop production and livestock rearing is the main livelihood activity. The cereal crops produced in the woreda are sorghum and maize. In addition to cereals crops pulses and oil seed such as Haricot bean, ground nut are produced. Chat is the permanent cash crops in the Babile woreda. Regarding fruits and vegetables, sweet potato, tomato, pepper, papaya and mango are the major ones that are produced in the woreda. The agricultural sector is characterized mostly by production of subsistence or household consumption and not geared to market condition. In addition to various impediments such as high population pressure and land fragmentation, ecological and environmental imbalance resulting in to drought and poor infrastructure development have hampered the development of the sector in the woreda. Agriculture is the main stay and the major income source of the residents of the district. Next to agriculture, trade is the secondary source of income.

The major type of trade activities undertaken is marketing of agricultural products, which are practiced informally. Private petty trading and small shops mostly undertake the other main trading activities. The development of mining sector is highly indispensable for the development of other economic sectors and the society as a whole. This sector need huge capital, highly skilled manpower and well developed infrastructure. According to the preliminary study in Eastern Hararghe Zone in 1993, the availability of (Field spar 5000-10000 ton) Granite, Marble, Red Clay, Dolomite, Mineral water & sand were known in the woreda. So Granite, Marble, Feldspar, Dolomite & Sand were started being used, while Babile Mineral Water was used for bottled water from long time. Babile Mineral Water has created job opportunity for many people.

In the study kebeles all the respondents 'were in the economic productive age group. The economic productive age group is between 15-64 years. That means data was gathered from the productive age group and indeed people of this age group are those expected to care take after the developed water supply schemes. The level of education of the rural people would give an idea as to their potential for implementing income generating and other activities or achieving certain objectives such as operation and maintenance, financial management and local institution capacity. The study shows that about 66.7% of the respondents were illiterate and 33.3% the respondent households can read and write having basic education in the study community. It is found that the literacy rate in the study area was very low. This implies that higher illiteracy rate can be the causes for poor managements of rural water supply schemes and minimize the expected impacts on the livelihood of the user community in the

study area. Some studies show that education is one of the major socio-economic factors that influence a person's behavior and attitude.

In general, higher the level of education of the water supply users, more knowledgeable and will be taking care of operation of the water schemes and the positive impacts of water supply on livelihood will be improved.

Table 4: Mean Annual income of Household in Birr

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Total income	90	330	7140	2274	1568.922
Valid N (listwise)	90				

Source: Field Survey Data, 2008

The house hold income is another important criterion to decide the level of house hold affordability of water fees. As shown in table 4 above, it is clearly indicated that there is income gap between the maximum and minimum income of households. The estimated mean annual income is 2,274 Birr per household.

CHAPTER V

5. RURAL WATER SUPPLY

The provision of water supply is an important aspect that improves the well being of the people. Access to water supply refers to the provision of sustainable water supply to fulfill the basic needs of the people. It is usually measured in terms of the percentage of people who have access to the minimum requirement of water quantity and quality. Improved drinking water technologies are those more likely to provide safe drinking water than those characterized as unimproved (Teshome, 2006)

5.1. WATER SUPPLY DEVELOPMENT IN ETHIOPIA

The development of water supply increases the welfare of the society by improving the workload of women and children. This would also contribute to the improvement in the productivity of the society. In Ethiopia provision of improved water supply services in an organized manner was started in the 1950s when the Water Resources Department was established. Since 1950s, organization responsible for water sector was different at different period of time (METAFERA cons.Eng. in associate with BIKE Engineering, 1999).

Since the liberation from the Italian occupation (1941), and most significantly since 1974, considerable progress has been made in the development of improved water supplies infrastructure for urban and rural areas. After the establishment of the Ethiopian Water

supply and Sewerage Authority in 1981, the progress in the provision of safe water both for urban and rural populations has been achieved. In this respect the work for 134 urban centers with an estimated population of 2.3 million had already been completed. Similar progress was made in developing rural water supply points, such as spring and river diversion.

In the period between 1975 and 1982 a total of 1,018 deep wells were drilled and hand dugs and 31 springs were developed. The government of Ethiopia adopted and signed the UN Assembly's declaration on the International Drinking Water Supplies and Sanitation Decade and Joined the Decade program in 1985. During the Decade, drinking water supply and sewerage sector investments have been significantly increased with the related governmental bodies. The implementation of the Decade plan started in 1886 in Ethiopia. During the Decade, the target was to serve a total population of 11.3 million people. In the plan, 7.3 million rural residents were expected to be supplied with water while sanitation facilities were to be provided to about 3 million people. Between 1985 and 1991 a total of 4.58 million people, of which 3.7 million are urban residents, have been served with safe water (Zewude, 1994).

Looking at the trends of water supply coverage will helps us to understand the performance of water supply coverage during the last decades. Here we will see the change of the water supply coverage during 1990 to 2004.This trends can be seen the change of water supply coverage over the years and also in terms of the number of peoples served and unnerved for water supply.

In 1990 the water supply coverage was 19 percent at the national level. After five years the national water coverage increased to 23 percent. It increased only by 21 percent between 1990-1995.In 2000 the water supply coverage reached 30.8 percent (34 percent increase).The performance is 13 percent higher than the earlier five years.

In 2004, the water supply coverage reached to 39.4. In this year, the water supply increased by 28 percent (Teshome, 2006).

5.2. REGIONAL WISE SOURCES OF WATER SUPPLY

Since 1991 the government delineated the country in to nine regional governments and two special administrations. These regions are Tigray, Afar, Amhara, Oromia, Somalia, Benshangul-Gumuz, Southern Nation Nationalities Regional State (SNNRP), Gambella and Harrari. The two special administrations are Addis Ababa and Dire Dawa.

As you can see in the table below, the three region: Beneshangul Gumuze (72.62 percent),Amhara (71.73 percent) and Oromia (67.60 percent),Water supply is from unprotected source.But share of the types of unprotected water source is different in each region based on the availability of river and ground water. For instance in Beneshangel Gumuze which is the western part of the country with more number of rivers, the share of river as a source of water take 52.42 % of unsafe water in the region. In other side, in Amhare regional state which do not have the same number of river like other western part of the country, the source of unsafe water supply dominated by unprotected well/spring. It takes 44.32 % of the unprotected source of water in the region.The Harari Region and two special administrations (Addis Ababa and Dire Dawa) has low source of unprotected water supply for their people as

compared to the rest of the region in the country. In Harari the unprotected water supply is 26.59 %. In Addis Ababa and Dire Dewa, the unprotected water source takes 0.93 % and 9.23 % respectively in 2004. Harari region and the two special administrations are more urbanized or much closer to the urban area as results the people in this region are not using more unsafe water source for drinking water supply. You can see in Addis Ababa the share of river and lake is only 18 percent of the unsafe source of water supply which is the lowest as compared to any other parts of the country (Teshome, 2006).

Table 5: Regional wise distribution of source of water supply

Region	River, lake	Unprotected well/spring	Unprotected source of water	Protected well/spring	Public tap	Own tap	Safe source of water
Tigray	23.68	22.25	45.93	19.23	29.49	5.27	53.99
Afar	35.70	15.72	51.42	4.17	36.83	7.57	48.57
Amhara	27.41	44.32	71.73	12.89	12.45	2.68	28.02
Oromia	29.20	38.40	67.60	11.45	17.699	2.86	32.00
Somale	31.87	29.14	60.01	6.72	29.62	2.64	38.98
Benshangul Gumuz	52.41	20.21	72.62	17.85	8.36	1.02	27.23
SNNRS	30.99	34.49	64.48	15.37	16.92	1.98	34.27
Harari	4.91	21.68	26.59	30.51	34.60	8.17	73.28
Addis Ababa	0.18	0.75	00.93	1.30	58.29	39.37	98.96
Dire Dawa	0.31	8.92	9.23	9.37	70.06	11.33	80.76

Source: Ministry of Water Resources, 2004.

5.3. WATER SUPPLY DEVELOPMENT IN OROMIA

Since 1993 the Regional State took the responsibility of developing rural and urban water supply. Between 1993-1995 Water Supply and Irrigation was a department under the Bureau of Natural Resources and Environmental Protection. Again in 1995, Water

supply was restructured as Bureau of Water, Mines and Energy Development. Since 2003, Oromia Water Resources Bureau was organized and became fully responsible for water supply development and management. During these periods, achievements were registered in provision of water supply. Concerning water supply development the evidence indicates that attention was given for urban water supply development. This can be evidenced by looking at the access to potable water supply at the end of 2003, 17.7% rural and 72.8% urban and the overall access to water supply in the region was 23.5%.

Due to the efforts made by governmental and non-governmental organizations, the number of people with access to potable water supply increased from 23.5% to 36.2%, while for urban and rural it increased from 76.3% to 83.9% and from 30.1 % to 42.8% respectively at the end of 2005. Although the number of people with access to potable water supply increased from 4.5 million to 11.2 million in the region, given the rapid population growth of the region, the challenge was not simple to fulfill the demand for potable water supply (OWRB, five years strategic planning, 2006).

Major constraints in water sector development

1. Management problems: Management problems are typically explained by in efficient organizational structure, under staffing, under equipping, lack of organizational units at the lowest possible levels like Woredas and Zones, low and irregular salaries, lack of staff motivation and in ability to retain trained and experienced staff.

2. Lack of linkages: Various stakeholders are involved in the water sector activities. The major ones being the Ministry of Water Resources, the regional Water Bureau, NGOs, the community and the private sector.

   However, there is no structural and coordinated linkage among them, even between the two key institutions, **i.e.** Ministry of water Resources and Regional Water Bureau.

   Lack of coordination among the institutions involved in water and water related activities could lead to in ability to achieve the goal of the sector.

3. Weakness in operation and maintenance of water supply schemes

   Generally speaking, there are considerable draw backs in managing, operating and maintenance of the existing water sector facilities, especially in rural areas. It is identified that several water supply and sanitation services are not functional in many regions. Operation and maintenance units are underfunded compared to construction units, lack adequate equipment, training and transport facilities to properly perform their activities (MoWR, 2002).

5.4. RURAL WATER SUPPLY DEVELOPMENT IN BABILE WOREDA.

Following the decentralization policy of the country, Oromia Water Resources Bureau had stretched its structure up to Woreda level in 2004. The Woreda water office was established with responsibility for provision of rural water supply. The problem of rural water supply was very serious in Babile Woreda before 2000. Since 2000, as a results of efforts made by both governmental and non-governmental organizations, water supply coverage increases from 19% in 2000 to 48% in 2007.

The 2007 rural water supply scheme inventory data of Babile woreda indicates that there are two motorized deep wells, fifty five shallow wells; eighty two hands dug wells, two springs on spot and two springs with distribution. These water supply schemes are benefited 41, 300 people living in rural areas of Babile woreda. This indicates that 48% of the populations have access to potable water supply. The study also indicates from the total of 143 improved water supply schemes, 58 water supply schemes were non-functional. The survey data shows that there are about 15 shallow wells fitted with hand pumps and one caped spring with distribution in the study kebele administrations. From the total of sixteen water supply schemes in the study kebeles, seven water supply schemes were non-functional. The non-functional schemes account about 44% of the existing water supply schemes in the study area. The information obtained from Babile Woreda Water Office confirms that the non-functionality of water supply schemes were mainly due to lack of spare parts, poor financial management by water supply and sanitation committee and lack of logistic at local level. The study also revealed that the types of technology determine the number of beneficiaries. The spring with distribution in Ebada Gemechu-Adasha give service for 300 households but shallow wells fitted with hand pumps give service for 100 households.

In addition to this, spring in Ebada Gemechu-Adasha is used for live stock watering and small scale production activity. The rural water supply schemes in the study areas have the following short comings:- in Abdibuchi-Galeyi two of the three water schemes have no fences and exposed to damage.

As the information obtained from kebele official all the three schemes selected for study have hired guards whose salary is paid from the monthly collected water fees. The three water supply schemes in Tula-Ebiro have fences and hired guards. The water supply scheme in Ebad-Adasha has masonry fence and hired guard. From field observation I can say that there is high population pressure on water points in all the study communities and the water points are functioning the whole day.

CHAPTER VI

6. RURAL WATER SUPPLY SCHEME MANAGEMENT

Management of rural water supply systems have been the responsibility of different authorities since 1950.Following the international drinking water supply and sanitation decade, the Ethiopian Water Supply and Sewerage Authority prepared community participation guidelines and community management of rural water supply system in 1981.Since 1984 Water Supply and Sewerage Authority has started to take the responsibility of water supply schemes and had begun transfer of ownership. Since rural communities in Ethiopia are relatively large and scattered, the schemes serving these communities are also many in number and require close follow up efficiently to manage their smooth running (Ayele, 1986).

After 1993, responsibility of rural water supply scheme management was transferred to the regional government. Again in 2002 full responsibility of rural water supply scheme management system was transferred to Woreda water office with mandate to capacitate community at grass root level. Thus, this study was focused on factors that can affect the management of rural water supply and its impacts on the livelihood of the user community. The major factors that can affect the management of rural water supplies systems are: - institutional capacity, technical and social factors. When these factors are adversely affecting the rural water supply scheme management system, it will reduce the impacts on the livelihood of the user communities.

6.1. INSTITUTIONAL CAPACITY

6.1.1. WOREDA LEVEL

Institutional capacity and support is one way of enhancing the functionality of rural water supply schemes in the provision of inspiration support to their management bodies. Problems that are beyond the community level need to be addressed by supporting agencies like local government staffs. Studies indicate that lack of assistance to the grass root level (community) management body is one of the important reasons for the failures of improved water supply schemes in the study area. In this case, the capacity of the technical staff at Woreda Water Office level is also very important. The more the staffs are capable, trained and professionalized; the better would be their effect on the water sector.

The findings of the study shows that, there is weak institutional capacity at Woreda level which is manifested through shortage of manpower, logistic and budget to undertake water supply development activities at Woreda level. The study also shows that, there is loose communication between Zonal and Woreda Water office.

The evidence from Zonal Water Office revealed that the Woreda Water Desk was established in 2002 which was responsible for Rural Development and Agricultural Office and restructured again in 2004 and named as Woreda Water Office which was directly responsible for Woreda Administration. In general the weak institutional capacity at woreda level has direct implication on the rural water supply schemes management system by local institution. Therefore, it can be concluded that Babile

Woreda Water Office has weak institutional capacity to undertake operation and maintenance and in providing technical assistance to water committees. The data from East Hararge Zonal Water office also indicates that the required man power for Babile Water Office in the past five years was 14. But the existing man powers were 2 in 2003 and 2004, 3 in 2005 and 2006 and 5 in 2007. This implies that, there was shortage of required man powers in the past five years. This shows that Babile Woreda Water Office has a critical shortage of skilled manpower.

The shortage of man power has direct implication for poor functioning of the institutions at local level. There were lack of skilled man powers to undertake study and design, monitoring and evaluation, operation and maintenance of water supply schemes. Concerning logistic, Babile Water Office has only one motorcycle to undertake all the water supply related development activities.

6.1.2. WATER SUPPLY AND SANITATION COMMITTEES

The community level institutions in the study area are water supply and sanitation committees, which are made up of volunteers elected by community members to serve a given community. The existing water supply and sanitation committees in the study area were mainly organized by Woreda Water Office whether the water schemes were constructed by government or non-governmental organizations.

The FGD panelists pointed out that the existing water committees have no capacity to manage water supply schemes properly and care takers at community level have no maintenance tool for repairing and maintaining for break down water supply schemes.

The trend developed as a culture by water committee was to inform the Woreda Water Office whenever the water supply schemes breakdown. According to the FGD panelists, the frequency of scheme breakdown (hand pump) on average ranges between 4-6 times per year for shallow wells fitted with hand pumps in the study kebeles. Lack of monitoring and follows up by technicians from Woreda Water Office after handover the water supply schemes to the local community was identified as a major problem. On the other hands, monitoring means the provision of information and use of that information to enable assessing the progress of implementation and make timely decisions to ensure that progress is maintained according to schedules.

Monitoring is thus a part of the management information system. Lack of monitoring implies that the local communities will be incapacitated to undertake operation and maintenance of interrupted water supply schemes. As indicated in Babile Woreda Water Office inventory data, as many as two-fifths of the water supply schemes constructed in the past by governmental and non-governmental organizations need urgent repair, maintenance and replacement of hand pumps. This implies that institutional capacity building is a crucial issue and a strategic element for sustainability of water supply schemes. Thus, it requires intensive monitoring to assess the existing level of water committees before implementing any of the capacity enhancement activities.

The study also shows that participation of women in water committee' is very low in all of the study communities (women to male ratio is 1:5).

This shows that the participation of women in water committee members was only 20% even though women are the primary fetchers and users of water. Therefore, the low participation of women in water committees has impacts on both the water supply scheme and financial management. Most decisions that affect communities are taken by men. Well-planned water supply and sanitation schemes could serve in breaking this gender bias, allowing women to exercise authority within a community and empowering them to make decisions affecting the community. In general, the study shows that most of the rural water supply schemes in the study areas are not well managed due to lack of managerial and technical capacity and transparency in the handling of finances by water committee members.

6.1.3. NON-GOVERNMENTAL ORGANIZATIONS

NGOs have a major role to play in improving access to water and sanitation services by assisting the poor to express their demands, advocating on their behalf and monitoring the responses of the government and the private sector (DFID, 2001). Many schemes constructed by NGOs were observed in two of the three study kebele administrations (EbadaGemechu and Abdibuchi).The data obtained from Babile Woreda Water Office revealed that NGOs have significant contribution in the provision of rural water supply in Babile Woreda in general and in the study communities/kebeles in particular.

Menschen for Menschen (MfM) and International Committee for the development of the people (CISP) have played a decisive role in the provision of drinking water supply in the past ten years in the woreda in general.

According to the information obtained from Babile Woreda Water Office, NGOs were focused on construction of new water supply systems. Frequently, no continuous support was made for operation and maintenance of the constructed water supplies schemes after they were hand over to the communities especially for those water supply schemes constructed by CISP. Another problem observed was lack of monitoring and follow up by Woreda Water Office after the handover of the constructed water supply schemes by NGOs.

6.2. TECHNICAL FACTORS

In this study, the technical factors were taken as the critical problems that could affect the impacts of rural water supply schemes. Next to institutional capacity, the technical factors play a decisive role in sustainability of water supply scheme. Technological option; operation and maintenance were considered as major elements of technical factors. The main reason of technical assessment was to know the extent and causes of breakdown of the villages' water supplies schemes and to look for remedial measures. The causes for non-functionality could be due to in appropriate technology selection and operation and maintenance.

6.2.1. TECHNOLOGICA FACTORS

In order to bring sustainable water supply, appropriate technology selection is very important. The choice of technology type should consider the existing socio-economic and environmental conditions of specific area. Technology type, operation and maintenance, capacity and acceptance of rural people and spare parts accessibility

issues are of importance for sustainability of the given service. Experience from African continent shows that in areas where technologies were adopted without consideration of the above features will face problems. What appeared to be lacking was the ability of both governments and user communities to maintain them. Even where communities did attempt to take care of their pumps, this largely involved carrying out repairs after a failure, preventive maintenance was hardly ever undertaken (Skinner in Harold et al,2003, cited by Alemu,2006).

Table 6 below shows that a large percentage of the respondents, **i.e**. 86.7% participated in community consultation before the construction of the water supply schemes, 74.4% of the respondents participated in technology selection and 53.3% of the respondents participated in the election of water committee members. Again more than half of the respondents (52.2%) agreed that the water committee has ability to manage the water schemes if they can get technical and financial assistance from the local government. In general, the data in table 6 below indicates that community involvement in water supply project started from project identification and finally takes over the management and operation of the water schemes. Despite the fact that communities participated in all stages of the projects, still the communities are not well under stood the proper management of water points. The implication is that there was no monitoring and follows up by local government after the schemes were handed to the communities.

Table 6: Community participation in Technology selection

Community Participation in provision of water supply	Frequency	%	Cumulative %
(a). Have you participated on community consultation?			
Yes	78	86.7	86.7
No	12	13.3	100
(b). Have you participated in selection of technology in service?			
Yes	67	74.4	74.4
No	23	25.6	100
(c). Have you been informed about the benefits of technology?			
Yes	61	67.8	67.8
No	29	32.2	100
(d). Did you participate in water committee election?			
Yes	48	53.3	53.3
No	42	46.7	100
(e). Can WATSAN committee willing and able to manage?			
Yes	47	52.2	52.2
No	43	47.8	100

Source: Field Survey Data, 2008

6.2.2. OPERATION AND MAINTENANCE

The number of water supply systems in Babile Woreda has been constructed. But operation and maintenance of these systems was unfortunately lagging behind and is now to be recognized as a major bottle neck for scheme functionality. Operation and maintenance activities are the most important activities to be executed if sustainable water supply service is required. It is the cornerstone of system management without which reliable service cannot be ensured. Problems with the operation and maintenance of water supply and sanitation have long been recognized as key constraints to the sustainability of these services.

As it is mentioned above, water supply scheme maintenance could be a function of the ownership attitudes held by the villagers. A variety of other factors such as levels of education may also affect the types of cooperation given by a village for the operation and maintenance of the schemes. Knowledge of these factors is necessary for the optimum choice of systems design and materials selection. This knowledge is also useful in deciding whether to train a local operator for the scheme or to bring another from outside the village. Another useful line of investigation is the operational performance and maintenance history of water supply schemes. Operation and maintenance has the potential to make the difference between systems that are successful, independent and self sustaining and those that fail. The budget allocated for operation and maintenance in the past five years was very low for Babile Worked Water Office (refer to table 7 below).

The allocated budget was 1000 - 2500 birr between (2003-2007).The budgets allocated in the past five years was insignificant compared to maintenance the large numbers of water supply schemes in Babile Woreda. For example to replace one hand pump it costs 6000 Birr (current price of hand pump). Lack of sufficient budget allocation implies that operation and maintenance was ignored by local government in the past five years. According to the information obtained from Babile Woreda Water Office, the budget allocated for operation and maintenance was not enough to maintain large number of non-functional schemes per year.

Table 7: Allocated Budget of Babile Water Office (2003-2007)

No.	Budget year	Allocated budget	Remarks
1	2003	1,000	
2	2004	2,500	
3	2005	3,000	
4	2006	2,000	
5	2007	3,000	

Source: Babile Woreda Water office

6.3. SOCIAL FACTORS

Attitudes and opinions play a bigger role in determining the eventual outcome of rural water Supplies. The attitudes of the villagers with respect to ownership of both the water source and the technical delivery system have greatly affected the degree of local responsibility shown to the care and maintenance of the scheme. The social problems in the study area are summarized below:

- Lack of women participation in operation and maintenance of water supply schemes in the study area .
- Inadequate systems and procedures for management of revenue collected from water fee and lack of strong leadership in management of rural water supply schemes in the study area.
- Absence of consistent and equitable participation of community especially women in all aspects of water supply scheme management.
- Also all user households pay the same amount of monthly water fee, there is no equity in water supply usage. Water fee payment is not depending on the amount of water used for domestic purpose and other activities by households.
- In the study area, there was loss of farmland at source and water point areas, For example in Ebada-Gemechu the owner of the land at source area had lost about one hectare of irrigable land.

6.4. FINANCIAL MANAGEMENT

Many developing countries have considered water supply and social service their as a priority. This has meant adopting a policy of supplying water for free that is almost free of charge. External support in water supply has concentrated on constructing new schemes, which is an attractive option in many respects but one, which is meant that the operation level of existing schemes has deteriorated. Management of financial resources is a key factor in the successful operation of water schemes. There is also a need to adapt a more comprehensive and adequate accounting system. Cost accounting for operation and maintenance are absolutely essential for providing accurate and meaningful cost estimates and expenditure data. Water supply, whether large or small, requires funds for its management, operation and maintenance. It is impossible for a water utility to render satisfactory service and meet the requirement of future expansion without adequate funds. No matter how poor the community may be, some fee can and should be collected from the consumers. It has been said that the day when people start to receive water free of charge from a water system marks the beginning of the downfall of the systems (Ayele, 1986).

As shown in the table 8 below, 50% of the respondents agreed that the existing water fee is fair with, 92.2% of the respondents have knowledge why monthly based fee was collected **i.e**. to cover operation and maintenance cost. The existing water fee varies from community to community depending on type of technology in use and reflects the interest of the organization that has constructed the water supply schemes. In general, the information obtained from Babile water office revealed that the payments made by

user communities in the large majority of cases are not adequate to cover even the operation and maintenance costs.

Water fee Payment is collected by water committees in Ebada-Adasha and Abdibuchi-Galeyi and water fee is collected by the hired guards in Tula-Ebiro. Water fee payments in all surveying have no receipts provided to those who make payments. As far as the information obtained from the Woreda Water Office Water Committees haven't made adequate effort to collect the amounts agreed up on by the community as payment to be saved to cover operation and maintenance costs.

Although the collected contribution is supposed to be deposited at Woreda Finance and Economic Office, the survey revealed cases where cash is still held by the treasurers of committees. The survey also shows that, no book keeping and accounting systems in the study areas by the water committees. The water committees also lack transparency in money expenditure, **i.e.** the user communities do not know for what purpose the money spent. There is no regular reporting system for Woreda Water Office and receipt for water fee collection. Another worrisome finding was that rural households in the study areas are paying very little water fee for improved water services and as a result, the finances of many water committees are in poor status. Basically, the rural water supply schemes are not designed for communities to recover at least operation and maintenance costs. The operation and maintenance cost recovery objective was simply to collect sufficient revenues from users on an ongoing basis to pay operation and maintenance costs.

Table 8: Water fee collection practice

Water fee collection	Frequency	Percent	Cumulative %
(a). How do you evaluate the existing water fee?			
Expensive	10	11.1	11.1
Fair	45	50	61.1
Cheap	34	37.8	98.9
No need of fee	1	1.1	100
(b). Is there additional payment for O&M?			
Yes	9	10	10
No	81	90	100
(c). Who collect water fee?			
Water committee	58	64.4	64.4
Guard	32	35.6	100
(d). Why beneficiaries pay?			
For construction of new schemes	6	6.7	6.7
To cover operation and maintenance cost	83	92.2	98.9
Others	1	1.1	100

Source: Field Survey Data, 2008

As far as the evaluation of water supply scheme management by the respondents is concerned, the results is shown that about 31.1% and 48.9% of the respondents respectively, said that the financial management of the water schemes by water committees is poor and very poor in all study community. The survey result also evident that 8.9%,16.7% and 26.7% of the respondents said the schemes maintenance practices are, okay, poor and very poor respectively(refer to table 9 below) . From the above results, we can say that the water supply scheme maintenance practices and the financial managements are poor and needs capacity building at grass root level by giving training for care takers and water committees on scheme and financial management.

Table 9: Evaluation of water supply scheme management

Evaluation of WS schemes and financial management	Frequency	Percent	Cumulative %
(a). How do you evaluate scheme maintenance?			
Very good	3	3.3	3.3
Good	40	44.4	47.8
Okay	8	8.9	56.7
Poor	15	16.7	73.3
Very poor	24	26.7	100
(b). How do you evaluate financial management?			
Very good	2	2.2	2.2
Good	10	11.1	13.3
Okay	6	6.7	20
Poor	28	31.1	51.1
Very poor	44	48.9	100

Source: Field Survey Data, 2008

Moreover, house hold data in Abdibuch and Tula-Ebiro community confirmed that in areas where there was poor scheme management and frequent break down of water supply schemes, the previous beneficiaries were back to the traditional water sources and their livelihood was affected by water borne diseases and incurred additional costs for medical treatment and spent their productive time for fetching water from long distances. This implies the relationship between water supply scheme management and impacts of water supply on the livelihood of the user communities.

CHAPTER VII

7. THE IMPACTS OF WATER SUPPLY ON LIVELI HOODS

As water is the basic need of human beings, use of improved water supply bring about improvements in the livelihood of the user communities. The most important benefits obtained from improved water supplies are both social and economic. Economically improved water supply is not only important for domestic use and in put in to small scale production and livestock watering but the provision of better domestic water supplies will both release much labour previously consumed in carrying water from traditional sources. The provision of better rural domestic water supply is also a necessity for the achievement of a better quality of rural life both in health and inconvenience. Improved water supply changes the welfare of the society by improving health of the family members, saving time spent on fetching water from far distances.

The study attempted to assess the degree to which households faced problems due to their reliance on unprotected water. The findings show that 84.4% of the respondent households were faced water-borne diseases and 57.8% of the respondents said that there was burdens on women and children to fetch water from long distances (refer to table 10 below).similarly, 43.3% of the respondents said more time was spent in fetching water. These imply that due to the use of unprotected water supply for domestic use, most of the households were adversely affected by water-borne diseases and faced different challenges.

Table 10: Distribution of problems households faced because of reliance on unprotected water

Problems households faced because of reliance unprotected Water	Frequency	Percent	Cumulative %
(a).Was the un protected water a drudgery for women and children?			
Yes	52	57.8	57.8
No	38	42.2	100
(b).Did you spent more time for fetching water?			
Yes	39	43.3	43.3
No	51	56.7	100
(c). Did you ever face water borne diseases?			
Yes	76	84.4	84.4
No	14	15.6	100

Source: Field Data Survey, 2008

One informant, named Ahimed Mohammed (60) from Ebiro village in Tula kebele administration said that "prior to the development of the water project, the water sources for domestic and livestock was traditional ponds and river in our village''. These water sources were not only in accessible but also not clean. We assumed as ignorant people by both governmental and non-governmental organizations. But we knew that people were using improved water supply in the neighboring kebele administration. During dry season, ponds get dry out and women and children were travelling a long distance (up to 5km) to fetch water for domestic use.

Many people were also suffering from water borne disease and women and children were forced to spend most of their time for fetching water from long distance and men are spending most of their times in searching water for livestock.' After we started to use improved water supply, our children became happier and healthier''.

Another informant from Tula village stated the following: After I started to use improved water supply, I saved money which was spent for health treatment related to water-borne diseases. After I and my family started to use improved water supply, we became healthier.

An informant named AbdiAbdella,(65),from Tula village in Tula kebele administration said that we were using water for drinking and cooking from ponds The water was always turbid and unclean. The family members were attacked by diarrhea disease. We did not know the exact causes of diarrhea at that time. But the health professionals were told us the causes of diarrhea was polluted water. We were spending a lot of money for medical treatment of family members. In general we were suffering from the lack of potable water supply for a long time. We had no right to use water supplies from another kebele, because we didn't make any contribution during the construction of water supply schemes. But after the construction of water supply schemes in our village the health of my family members have been improved and the expenditure for medical treatment is also reduced. Many people in our village use the single water point today and no travelling a long distance to fetch water. But we are suffering more when the scheme interrupted/break down because we adapted clean water supply from the developed water point.

7.1. Time saving

One of the most important benefits accrued from improved water supplies, and certainly the easiest to measure is saving in time and energy spent for collecting water. The distances utilized in the analysis of the impacts of time are the normal walking routes reported by the heads of house hold in the household survey.

The variables measured for the impacts of time included the one-way walking distances for each individual house to its usual source of water. The average time spent for fetching water from traditional source was about 48.7minutes and the average time spend for fetching water from improved water supply source is 34.51minutes (refer to table 11 below).This implies that there is a significant reduction in time spent for fetching water after the provision of improved water supply. Access to potable water supply within 1.5 km for rural people and access potable water supply within 0.5 km for urban people is the standard set by Ethiopian government (PASDEP document, 2005/06).

The reduction in time revealed that the impacts of using improved water supply is resulted in time saving and energy spent for collecting water, since the current water source is closer than the previous water source. Energy and time saved from using improved water supplies have solved the burden on women and children of rural community in the study area, as they are the principal collectors of water. The implication is that reduction of time spent on water collection could mean more time for income generating activities, food production, childcare, nutrition and health. Improving water supply conditions to cut down the time women spend for collecting water could hence unlock the productive potential of women's time and energy. The reported distance of the respondents' water sources from their home were more or less moderate. Generally, the common reported distances in all three kebele range between 500m to 3kms.

Table 11: Average time (in minutes) of previous and current water source

Time taken	N	Minimum	Maximum	Mean	Std. Deviation
Un improved source	90	5	150	48.68	30.89
Improved source	90	5	120	34.51	24.58
Valid N (like wise)	90				

Source: Field Survey Data, 2008

Time estimates were also not reliable since most of the respondents were illiterate. What is needed is detailed time-budget studies of water carriers, which in most households are women and children. Such studies should include measurement of the amount of water carrying time "saved' as well as the effects of these savings on both earlier and new activities.

7.2. ECONOMIC AND SOCIAL IMPACTS OF RURAL WATER SUPPLY

7.2.1. THE USE PATERN OF IMPROVED WATER SUPPLY

Domestic water use patterns are generally similar in all the study villages regardless of the type of the water sources and the distances covered to reach the sources. Water is used for drinking, cooking and washing among others. All respondent households are using the improved water supply for drinking and cooking, 83.3% for washing clothes, 48.9% for livestock watering and 35.6% of the respondent's from Ebada-Adasha community were using water supply for small scale production activities in addition to domestic use (refer to table 12).But 70% of the respondents agreed that the existing water supply not enough for domestic and other activities. The economic and social impacts of rural water supply depend on the type of technology, type of water sources and management capacity of water committee.

Table 12: Distribution of respondent's by usage pattern of improved water supply

For what purpose are you using the improved water supply?	Frequency	Percent	Cumulative %
(a). Do you use Water supply for drinking cooking?			
Yes	90	100	100
No			
(b). Do you use Water Supply for washing clothes?			
Yes	75	83.3	83.3
No	15	16.7	100
(c). Do you use water supply for Live stock watering?			
Yes	44	48.9	48.9
No	46	51.1	100
(d). Do you use water for small scale production?			
Yes	32	35.6	35.6
No	58	64.4	64.4

Source: Field Survey Data, 2008

7.2.2. The impacts of rural water supply on the livelihood of the user community

Lack of access to water supply has impacts not only on the quality of life, but also on productivity and health. The study shows that improved water supply has brought improvement in health, saving time and energy spent in fetching water from far distance and improvement in income of user people. This indicates that provision of improved water supply can play a decisive role in social and economic development. When it comes to the impacts of water supply on the livelihood of the user community, about 81.1% of the households asserted that there are some changes in the livelihoods following provision of water supply interventions, most particularly in terms of household health improvement and saving times. Similarly, 94.4% of the respondents' asserted that the health of family members have been significantly improved after they started to use improved water supply (refer to table 13 below). This implies that public health and water supply are undeniably linked together.

Improvements in family members' health are essential and better health is a pre-requisite for economic growth. Ill-health limits the ability to earn higher incomes. Reduction in poverty is possible only when steps are taken for better health of the people. About 64.4 % of the respondents said that there have been no changes in income of household due to the use of improved water supply and 35.6% of the respondent households from Ebada Gemechu-Adasha communities said that there have been some improvements in income due to the use of water supply for small scale production activities and live stocks watering.

Table 13: Distribution of respondents on the impacts of water supply on livelihood

Water supply and livelihood	Frequency	Percent	Cumulative %
(a)Has water supply bring any changes to your livelihood?			
Yes	73	81.1	81.1
No	17	18.9	100
(b). Has water supply improved your income?			
Yes	32	35.6	35.6
No	58	64.4	100
(c). Has water supply improved health of your family?			
Yes	85	94.4	94.4
No	5	5.6	100
(d). Do you get water with less effort?			
Yes	79	87.8	87.8
No	11	12.2	100

Source: Field Survey Data, 2008

The FGD panelists from Ebada Gemechu-Adasha community equated 'water with life'. They stated that we have better access to water supply and we are using it for small scale production activities to generate income. The study also revealed that access to potable water supply provides better hygiene and sanitation for members of water

supply user communities. It confirmed that accessing to potable water supply at their village enable the whole community to experience better hygiene and sanitation. The head of Babile Woreda health office confirmed that water borne diseases decreased significantly in the woreda since the establishment of potable water services. According to the Woreda Health Office Statistics (2006), water borne diseases ranked to the fifth place in the study area.

> An informant named Rashid (50), living in Adasha village stated that after we started to use improved water supply the health of family members and livestock have been improved. Similarly, a development Agent worker in Ebada Gemechu kebele confirmed "the accessibility of water supply, most particularly for small scale production and the attainment of income increments have been achieved. Healthy extension worker in Tula kebele underlined the significance of improved water supply in family health improvement and time saving. She also added the prevalence of water-borne diseases in villages where no improved water supplies found. To tackle the prevalence of water - borne diseases, the health extension workers have distributed water purifier tablets (agar) freely for the treatment of unimproved water supply. The water purifier (Agar) costs 5 ETB per house hold/month. Whereas the monthly water fee for improved water supply in the same kebele is 2 ETB per house hold /month. When the people without improved water supply want to use improved water supply from neighboring village in the same kebele administration, they are charged 0.25 ETB per Jerrican.
>
> The short term solution to protect the people who are using unimproved water supply source is continuous distribution of water purifier tablets freely. Those villages adapted water purifier tablet (agar) are facing serious health problems when the distribution of the tablet has interrupted even for one week. She also tried to point out that the reasons for health problems occurred when the tablet was interrupted is the loss of resistance due to adaptation of water purifier.

Another informant named Solomon G/Tsadik from Menschen for Menschen (MfM) asserted that many people were attacked by lion while searching water supply in (Darera Arba) one of the kebele administrations in Babile woreda before the construction of water supply schemes. After provision of improved water supply, the user communities started to get safe and adequate water at reasonable time. He added that the improved water supplies have brought the following significant changes in Babile woreda in general:-

- It has created moral satisfaction to the user community and improved the child care of mothers.
- Relieved the drudgery of women and empowered them economically by having water at home for watering livestock and generating income from selling the livestock.
- Increased the participation of women in political and social activities in some kebeles.

According to information obtained from Menschen for Menschen representative and development agent worker in Ebada Gemechu- Adasa, the improved water supply is used for drinking, washing, livestock watering and production of Chat, Onion, tomato, coffee and sweet potatoes. The use of water supply for small-scale production has direct relations with improvement in income of the user community. The user households having access to small scale production (gardening) have earned on average 3000-5000 birr per year. There is also small scale Agro-forestry assisted by Menschen for Menschen which has created job opportunity for 35 employees. The total salary of 35 employees for 10months is estimated to 157,500 Birr. 500,000 different species of trees are supplied to the local community from the agro-forestry project for a forestation program in Babile Woreda.

The price of one piece of tree is estimated to be 0.20cents. The total price of 500,000 trees X 0.20 cents is equal to 100,000 Birr. In general, the improved water supply in the study area (Ebada-Adasha) has not been only used for domestic purpose but also used for income generation of the local community. This contribution of water supply has positive impacts on the income of the local community in terms of livelihood. The survey data also revealed that improved water supply in the study area has been resulted in both economic and social impacts on the livelihood of the user communities (refer to figure 3 and figure 4)

Figure 3: The small scale production at Adasha water supply

Figure 4: Live stock watering at Adasha water supply

In general, improved water supplies in the study area have both positive and negative impacts on the user communities. The information obtained from Ebada Gemechu-Adasha area confirmed that there was loss of farm land at source and water point areas. For instance in Adasha water supply area one household had lost about one hectare of irrigable land. This land was taken for Agro-forestry projects by MfM. Another impact observed is land degradation around the water points due to the use of animals for transportation of water and live stock watering (refer to figure 5 below). Conflicts were also reported in Ebada Gemechu-Adasha community to be very rampant during the dry seasons of the year. These conflicts, according to respondents were mainly due to different competing water use interests. Commonly cited conflicts were among those who wanted to use water for their livestock at water point while others did not support this idea. Some wanted to water their gardens when others were against this idea due to equal monthly payment of water fee per household. Conflicts reported were among individual

small scale production holders competing to get limited water for watering their gardens during dry months of the year.

Discussions made with elders revealed that conflict resolution is transparent and resolved by informal institution Idir (Afosha).In Tula-Ebiro community conflicts were reported to be very common between user community and people from other villages. Tula-Ebiro community did not allow residents from other villages to use their water schemes. This was because of high population pressure and people from other villagers were not willing to contribute when there is scheme breakdown. This implies that the development of water supply schemes is directly or indirectly affected the livelihood of the user community as well as the neighboring people.

Figure 5: Land degradation around Adashsa water supply scheme

CHAPTER VIII

8. CONCLUSION AND RECOMMENDATION

8.1. CONCLUSIONS

The need for improved water supply is widely recognized as an essential component of social and economic development. Safe water is essential to the protection of community health by limiting the transmission of water-borne diseases. At the same time it contributes greatly to the enhancement of human dignity and economic opportunity by freeing people, mainly women and children, from the drudgery of water carrying and providing time for them to engage in other activities.

The study shows that there is improvement in livelihood due to provision of water supply does not necessary imply increase in income of user households even though health improvement and time saving is a precondition for improvement in livelihood of the user community. The findings of the study showed that weak institutional capacity at woreda level was the major problem. Weak institutional capacity was due to shortage of skilled manpower, lack of logistics and lack of sufficient budget for monitoring and follow up and operation and maintenance. Most rural water supply schemes in the study areas were not properly managed by the local community due to lack of managerial and technical skills, a general lack of transparency in handling of finances by water committees and lack of regulatory and control mechanisms at the woreda level and absence of gender sensitivity (women: male in water committee is 1:5) were identified as major problems.

The higher percentage of mal-functionality of the schemes shows that there was poor operation and maintenance as a result of weak institutional capacity at local level.

Most of the water supply schemes in the study area were constructed by NGOs, who were mainly focused on construction of new water supply systems. No provision was made for operation and maintenance of the constructed water supplies schemes. This indicates that maintenance of the schemes was the most neglected aspect of rural water supply schemes. The higher percentage of non-functional schemes obviously has reduced the targeted impacts of rural water supply on the livelihood of the user community as a result poor water supply scheme management by local community.

The household survey data also revealed that the livelihood of the user community in the study areas have been improved after they started to use improved water supply. The improvements in livelihood are manifested in terms of improvement in health and time saving in surveyed communities. The findings of the study also revealed that the average time spent for fetching water from traditional source was about 48.7minutes & the average time spend for fetching water from improved water supply source is 34.51minutes.This implies that there a significant reduction in time spent for fetching water after the provision of improved water supply. In addition to this, the improved water supply in Ebada Gemechu-Adasha has improved the income of the user community in terms of opening possibilities for small scale production and livestock watering. The use of water supply for small scale production activity has increased the income of the user community in the study area. The data obtained from MfM representative and DA worker in Ebada-Gemechu-Adasha showed that the incomes of

about user households increased between 3000-5000 birr after they started to use water supply for small scale production. The evidence obtained from the study area also revealed that poorly managed water supply scheme has reduced the benefits obtained from improved water supply by the user communities, especially in areas where there was interruption and frequent breakdown of the schemes. When we are comparing water supply scheme management, it is relatively better at Ebada-Adasha than Abdibuch-Galeyi and Tula-Ebiro. This implies that the impact of better managed water supply at Ebada- Adasha outweighs the impacts of water supplies in the two study communities.

Moreover, the information obtained from study area confirmed that in areas where there was interruption and frequent break down of water supply schemes, the previous beneficiaries were back to the traditional water sources and sometimes their livelihoods have been affected by water borne diseases and incurred additional costs for medical treatment and spent their productive time for fetching water from long distances. This implies that there is a strong relationship between water supply scheme management and impacts of water supply on the livelihood of the user communities.

8.2. RECOMMENDATIONS

A. In order to strengthen the managerial and technical capacity at Woreda level attention should be given to capacity building in terms of manpower, logistics and budget. Capacity building at Woreda Water Office level will create conducive environment for rural water supply management by local institution (water committee).

B. Both governmental and non-governmental organizations focus on construction of new water schemes and at present the operation and maintenance of rural water supply are in the lowest performance margin due to various reasons among which technical and financial short comings are the major one in the study communities. So in order to keep a water supply system sustainable, there should be preventive and regular maintenance program by local institutions.

C. To solve the financial management problems, strong water committee establishment is the primary solution. Monitoring and follow up of water committee activities by development agent (DA) and technicians from Woreda Water Office can tackle the existing financial management problem. The second option is contract out the water points to the private sector (microenterprises).

D. Water with all its multiple uses plays a pivotal role in the sustenance of beneficiaries' livelihoods, especially the poor. In order to maximize the impacts of rural water supply on the livelihood of the user community, there should be strong water committees and increasing the number of women in water committee members.

E. Increasing the community role in managing water supply leads to better impacts, at least operation and maintenance cost recovery and increased efficiency.

Therefore, the study recommends that water service providers should be able to provide appropriate, efficient and sustainable services and understand and appreciate the livelihood needs and priorities of the communities they serve.

F. Technology option can enhance, promote or hinder impacts of water supply. In Ebada Gemechu-Adasha community, for instance, protected spring with distribution has been used for both domestic and small scale production and livestock watering. Despite technological ability to promote multiple uses of water, it was also observed that technology and system design can hinder multiple uses of water. For example in Abdibuchi-Galeyi and Tula-Ebiro community, shallow wells without washing slabs and cattle troughs were observed. Shallow wells, by nature of their design prohibited people to wash cloths on spot and watering of livestock. Therefore, there should be appropriate technology selection based on socio-economic situation to manage water supply easily and to maximize the impacts of water supply on the livelihood of the user communities.

G. Land degradation was observed in all sources and water points in the study area. Therefore, to protect land degradation, there should be conservation of the environment in schemes catchments area for sustainability of the sources.

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Annex 1: The existing rural water supply schemes by source types in the study area

No.	Kebele	Specific Village	Year of Cons	Status and types of technology								Benef. HHs
				Deep Wells		Shallow Wells		Spring with distribution		Hand Dug Wells		
				F	NF	F	NF	F	NF	F	NF	
1	Tula	Hassen	2000	-	-	1	-	-	-			110
2	"	Taha	1986	-	-	-	1	-	-			-
3	"	Ibiro-1	1985	-	-	-	1	-	-			-
4	"	Ibiro-2	1988	-	-	-	1	-	-			-
5	"	Ibiro-3	1986	-	-	-	1	-	-			-
6	"	Tulaa	1998	-	-	1	-	-	-	-	-	90
7	"	Shiyo	1995	-	-	1	-	-	-	-		100
8	AbdiBuchi	Galeyi	1998			-	1	-	-	-	-	-
9	''	Maru-1	1998	-	-	1	-	-	-	-	-	100
10	''	Maru-2	1986	-	-	1	-	-	-	-	-	-
11	''	Dhan-dharo-1	1986	-		1	-	-	-	-	-	100
12	''	Dhan-dharo-2	1995	-	-	1	-	-	-	-	-	100
13	''	Dhandharo-3	1986	-	-	-	1	-	-	-	-	-
14	''	Babo-1	1998	-	-	-	1	-	-	-	-	-
15	''	Babo-2	1998	-	-	1	-	-	-	-	-	100
16	Ebada- Gemechu	Adasha	2000	-	-	-	-	1	-	-	-	300

Source: Rural water supply Inventory data, 2003 NF-Non-functional F-Functional

Annex:2 Manpower at Babile Woreda Water Office

No	Required Manpower by qualification	Required quantity	Existing man power					Remarks
			2003	2004	2005	2006	2007	
1	Head of water office (BA)	1	1	1	1	1	1	10^{th} grade
2	Water Resource Engineer(BSC)	1	-	-	-	-	-	-
3	Sanitary Engineering(BSC)	1	-	-	-	-	-	-
4	Geologist (BSC)	1	-	-	1	1	-	BSC
5	Planning expert(BA)	1	-	-	-	-	-	-
6	Community expert IV(BA)	1	-	-	-	-	-	-
7	Community expert II	1	-	-	-	-	1	12^{th} grade
8	Mechanic III	1	-	-	-	-	1	10+3
9	Plumber I	1	1	1	1	1	1	8^{th} grade
10	Assistant plumber	1	-	-	-	-	-	-
11	Electrician V	1	-	-	-	-	-	-
12	Water quality technician II	1	-	-	-	-	1	10+3
13	Assistant Auditor	1	-	-	-	-	-	-
14	Secretary Typist	1	-	-	-	-	-	-
	Total man power	14	2	2	3	3	5	-

Source: East Hararge Zonal Water office (2003-2007).

Annex3: House hold survey questionnaires

I. Questionnaires prepared for households survey in Babile Woreda,E/Hararge Zone, Oromia Regional state.

The objective of the study was to assess the impacts of rural water supply and management on the livelihood of the user communities.

Part I. Back ground of house hold

1	House hold Code	
2	Date of interview	
3	Name of enumerator	
4	Name of supervisor	
5	Worked	Babile
6	Kebele Administration	
7	Village (Goti)	
8	Name of house hold head	
9	Sex	1.Male 2.Female
10	Age	
11	Religion	1. Orthodox (Christians) 2. Muslim 3. Catholic (Christian) 4. Protestant (Christian) 5. others_____
12	Ethnic background	1. Oromo 2. Amhara 3. Afar 4. Isaa 5. Somali 6. Harari 7.Others_____
13	Marital status	1. Single 2.Married 3.Divorced 4. Separated 5.died
14	Education background	1. Illiterate 2. Read and write
15	Family size	1.Male_____ 2.Female_____Total_____
16	Occupation	1. Farmer 2. Artesian 3. Trader 4. Others _____
17	Main source of livelihood	1. farming 2. Cattle raising 3. Trade 4. Crafts
18	Approximate monthly/yearly incon in ETB	1.crop selling____2.Cattle selling_____ 3.Trade_____4.Craft_____

Part II. Improved Water supply related issues

1. Where from did your members get water before the construction of improved source?

   1. river 2. Pond 3. Spring 4. Roof catchment 5.Well

2. How long it took you to bring water from the un improved water source?

   _____hrs_____minutes

3	Who came up with the idea of developing improved water supply?	Yes	No
3.1	resident appeal to respective bodies		
3. 2	Kebele Administration		
3.3	Woreda administration		
3.4	Woreda water office		
3.5	NGOs intervened by their initiative		
3.6	If others specify		

Code*: 1. yes 2. No

4	What were the problems that forced you to demand the current improved water supply?	Yes	No
4.1	More time were spent to fetch water		
4.2	Problems related to water borne diseases		
4.3	Drudgery for women and children to fetch water		
4.4	Lack of water source during dry season		
4.5	If others specify		

Code*: 1. yes 2. No

5	Who was constructed the water supply scheme in thi village?	yes	No
5.1	Regional government		
5.2	Private sector		
5.3	NGOs and government		
5.4	Local community and NGOs		
5.6	Government and local community		

Code*: - 1. Yes 2. No

6. When was the improved water source constructed?_____

7. Do you think that the present water supply is enough for you and your family?

1. Yes 2.No

8. In Q.7 above if the answer is No, what do you think are the potential reasons for the shortage?

1. Reduction of the potential of the water due to aridity.
2. The number of house hold using a single water points are higher
3. If others specify_____

9	For what purpose are you using the improved water supply?	yes	No
9.1	Drinking and cooking		
9.2	Washing clothes		
9.3	Live stock/animal watering		
9.4	Irrigation/Vegetable production		
9.5	If others specify		

Code*: 1.yes 2.No

10	What are the impacts of improved water supply	Yes	No
10.1	House hold income has improved		
10.2	Health of the family has improved		
10.3	Productivity of livestock has improved		
10.4	If other specify		

Code*: 1. Yes 2. No

11	Do you obtain drinking water from your present source with les effort than the former source?	Yes	No
11.1	Present source is closer		
11.2	Present source has more water		
11.3	Present source is permanent		
11.4	Less time need to get water		
11.5	If others specify		

Code*: 1. Yes 2. No

12. How do you evaluate your expenditure for water after you started to use the improved water supply?

1. Increased 2. Reduced 3. No change 4.If others specify_____

13. In Q.12 above if the answer is increased, what are the reasons? _____

_____

15. In Q.13 above if the answer is reduced, what are the reasons? _____

16	What benefits have you gained from the improved water supply?	Yes	No
16.1	Health of family members has improved		
16.2	Relieved drudgery for women and children		
16.3	More time is available for productive activities		
16.4	More social and domestic activities		

Code*: 1.yes 2. No

18. How far is the improved source from your home?_____ km_____

19. How long it takes for a single trip to fetch water? _____hrs_____minutes

Part III. Water tariff management

1. How much do you pay for water per Jerrycan/month? _____

2. How do you evaluate the existing water fees? 1. Expensive 2. Fair 3.Cheap 4. No fee

3. In Q.2 above if the answer is expensive, what is the reasonable price you propose per Jerrycan?_____

4. Do you pay additional fee for operation and maintenance? 1. Yes 2. No

5. In Q.4 above if the answer is yes, how much do you pay per month? _____

6. Who collects water fees/tariff?

1. Water committee 2. Hired employee 3.Elder

4. If others specify_____

7. Do you think beneficiaries should pay water fee? 1. Yes 2. No

8. In Q.7 above if the answer is yes, why? Because

1. It could enable them to build new water scheme
2. It will cover operation and maintenance cost
3. If others specify_____

9. In Q.7 above if the answer is no, why? Because

1. Water is considered as a gift of nature it should be hence be provided for free
2. The villagers are poor and they cannot afford
3. The use of traditional source of water has no problem

10. When do you pay water fee?

1. Every time water is drawn 2. Every month 3. Once or two times a year

11. If you are unable to pay the water fees, what are the reasons for failing to do so?

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

Part IV. Technology selection

1. Have you been participated in community consultations that were conducted before and during the construction of water schemes?

1. Yes 2. No

2	Which type of technology did you select with the help of such consultations?	Yes	No
2.1	Hand pump		
2.2	Spring with distribution		
2.3	Spring on spot		
2.4	Motorized schemes		
	If others specify		

Code*:1. Yes 2. No

3. Is the technology in-service is the one that you were selected?

1. Yes 2. No

4	Who were selected the technology in service?	Yes	No
4.1	Woreda Water Office		
4.2	NGOs		
4.3	Water committee		
4.4	Elders		
4.5	If others specify		

Code*:1. Yes 2. No

5. Have you informed about the benefit and cost of the technology to be selected?

1. Yes 2. No

6. Have you participated in election of WATSAN committee members?

1. Yes 2. No

7. Do you think a water committee will be willing and able to operate the improved scheme?

1. Yes 2. No

8. In Q.7 above if the answer is yes, how?_____

9. In Q.7 above if the answer is no, how? _____

10. Have women participated in the process of developing water scheme?

1. Yes 2.No

11	In what ways they have participated?	Yes	No
11.1	Supplying local building materials		
11.2	Providing food and drinks to laborers		
11.3	Labor contribution		
11.4	Ideas		
11.5	If others specify		

Code* 1. Yes 2. No

12. Have women been members of WATSAN committee?

1. Yes 2. No

13. Is there community based organizations in your village?

1. Yes 2. No

14. In Q.13 above if the answer is yes, what are the names of the CBOs?

1. Edir 2. Ekub 3. Senbete 4. Religious organizations

15. Are you the member of CBOs? 1. Yes 2. No

16. In Q.15 above if answer is yes, to which CBOs, are you member ship?

1. Edir 2. Ekub 3. Senbete 4. If others specify_____

17	What are the roles of CBOs in provisions of water supply?	yes	No
17.1	Contribution of money for O&M		
17.2	Supplying local building Material		
17.3	Providing foods for laborers		
17.4	Managing conflicts between users of water point		

Code*:1. Yes 2. No

18. Are there any problems with the management of the improved water source?

1. Yes 2. No

19. If the answer yes, what do you think is the

1. The first most serious problem_____

2. The second most serious problem_____

3. The third most problems_____

20. What do you think should be done to deal with these problems?_____

21	How do you rate the works of water committee?	V.Good	Good	Okay	poor	V.poor
21.1	Maintenance of schemes					
21.2	Financial management					

Code*: 1.V.Good 2. Good 3.Okay 4. Poor 5. V.poor

22. Is there any activity to sustain service of water supply scheme?

1. Yes 2. No

23	what are the specific tasks you are performing to sustain the benefits of improved schemes?	yes	No
23.1	Protect and up keep		
23.2	Paying service fee in time		
23.3	Labor contribution during operation and Maintenance		
23.4	Participation in discussion on water scheme issues		

Code: 1.yes 2. No

6. Have Zonal/woreda water office given you some sorts of support on their initiatives?

1. yes 2. No

7	what are the assistance given to you?	Yes	No
7.1	Training		
7.2	Spare parts		
7.3	Financial support for maintenance		
7.4	Professional assistance		

Code*1.yes 2.No

8. Have you got any assistance in capacity building from NGOs? 1. Yes 2. No

9. If yes, what are benefits you have got?

Annex 4: Qualitative Methods

V. Focus Group Discussion

Name of respondent_____

Sex_____Age_____

1. Did the villagers participate in the construction of the improved source?
2. What are the compositions of WATSAN committee members?

F____ M_____

2. What are the numbers of WATSAN committee members who can read and write?
3. What is the frequency of scheme break down in a year?
4. What are the major problems for not maintaining the non-functional schemes?
5. What do you suggest to improve the operation of improved source?
6. Have the user community trained before hand over?
7. Have the community understood and agreed about the type of technology used during planning?
8. Have the scheme management setup based on communities' tradition and cultural rules?
9. How is the water fee payment kept?
10. Do the community regularly informed on how the money is kept and spent?
11. For what purpose do you use the improved water supply?
12. Is there any changes in your livelihood after you started to use improved water supply?
12. Do you use the improved water supply for income generation activities?
13. How do you evaluate your expenditure for water after you started to use the water supply?
14. What are the benefits of the improved water source compared to the old ones?
15. Do you obtain drinking water from your present source with less effort than the former Source?
16. Do a water committee have a regular basis of reporting systems to the concerned body?

VI. Key informants interview

1. Did you initiate community to participate in the provision of water supply in their respective
village?
2. Is there any change in community lively hood as a result of using improved water supply?
3. Have the user community used improved schemes for production activities?
4. What are the impacts of improved water supply compared to unimproved one?
5. Are people making payments and is it sufficient to cover operation and Maintenance?
6. Who is responsible for maintenance of the break down schemes?
   Hand pumps_____
   On spot springs_____
   Motorized schemes_____
   Piped systems_____
7. Is there effective community and agency rules and regulations regarding fee collection, management and responsible use?
8. How is your water office managing community participation in general and women participation in particular?
9. Is there any spare part shops in your woreda for maintenance of water scheme?
10. Do local community have the necessary knowledge skills to undertake maintenance tasks and repairs, do they know who to contact in the event of major breakdowns?
11. Do you think water committee able to operate the improved source?
12. Is there a trend of using preventive maintenance in rural water supply in your woreda?
13. Do you have any criteria in selecting a location for source of water supply?
14. What roles have played by NGOs in strengthen the capacity of WATSAN committee members and user community?
15. What are the major problems for break-down /interruption of service of the water supply schemes in the Woreda?
16. What do you suggest to solve the problems of non-functionality of the schemes to provide sufficient water supply in your woreda?
17. How can sustainability of rural water supply will be improved?
18. Do you have appropriate institutional structure in the provision of rural water supply?

VII. Observation checklists

1. Name of Kebele Administration_____
2. Technology type_____
3. Present status_____
4. Water committee 1. Functioning 2. Not functioning
5. Scheme protection_____
6. Fee collection_____
7. Maintenance and operation_____
8. What are the other facilities at water point_____
9. Pressure of user communities_____

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

Declared by:

Lechissa Edossa
Candidate

Confirmed by:

Tesfaye Tafesse
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