AN ASSESSMENT OF URBAN WATER SUPPLY AND SANITATION: THE CASE OF AMBO TOWN, OROMIA REGION

By

Chala Deyessa Fita

Advisor

Alok Tiwari (Ph. D.)

DEPARTMENT OF PUBLIC ADMINISTRATION AND MANAGEMENT

SCHOOL OF BUSINESS AND PUBLIC ADMINISTRATION

COLLEGE OF BUSINESS, ECONOMIC AND INFORMATICS

SCHOOL OF GRADUATE STUDIES

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Approved by board of examiners	**signature**
_____	_____
Chairman, graduate committee	
_____	_____
Advisor	
_____	_____
Examiner	
_____	_____

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Acronyms

ATWSSSE	Ambo Town Water Supply and Sewerage Services Enterprise
AWDR	African Water Development Report
EcoSan	Ecological Sanitation
FDRE	Federal Democratic Republic of Ethiopia
GDN	Global Development Network
HEWs	Health Extension Works
L/p/D	Liter per Person per Day
MDG	Millennium Development Goal
MoH	Ministry of Health
MoWR	Ministry of Water Resources
NGOs	Non Government Organizations
OWRMB	Oromiya Water Resource Management Bureau
ODA	Overseas Development Assistance
UAP	Universal Access Program
UNICEF	United Nations Children's Emergency Fund
UN-HABITAT	United Nations Human Settlements Program
UNPPR	United Nations Population Prospects Report
USAID/E	United States Agency for International Development/Ethiopia
UNDP	United Nation Development Program
WHO	World Health Organization
WRI	World Resources Institute
WSS	Water Supply and Sanitation
WUP	Water Utilization Perspectives

ABSTRACT

The effort of this research is to access the status of household drinking water supply and sanitation services in Ambo town. The major factors attributed to lower accessibility are shortage of water supply, high cost of piped water connection, length of process during connection and frequent interruption. The town has no sewerage system; no adequate and safe waste disposal sites. Further the municipality has no waste collection and disposal trucks. As result liquid wastes are released to rivers, ditches and on open spaces. These acts have seriously contributed to health, socioeconomic and environmental pollution. Community participation in water supply and sanitation is inadequate due to the weakness of offices or authorities particularly municipality in coordinating and promoting active community participation.

CHAPTER ONE

1. INTRODUCTION

Provision of quality urban infrastructure system has become a major concern in many developed and developing countries. Contrary to this, the quality aspect of providing water has been downplayed by the focus put on access provision to this infrastructure. This is mostly the case of water supply provision and other basic infrastructure. The low quality of urban infrastructure such as water supply and sanitation may be detrimental to the environment leading unhealthy living conditions. The performance of one infrastructure may affect the other due to their interconnection such as water supply and sanitation are highly interrelated. Hence, understanding this integration and interrelation provide a better consideration on the importance of providing quality infrastructure (Salendu, 2010).

Water supply and sanitation are among two of the most important sectors of development. Development of community water supply and sanitation results in to improved social and economic conditions and improved health (Davis et al.1993 in Telmo, 2002).

Hence, half a century efforts of WHO- UNICEF and other international organizations to improve water and sanitation conditions around the world have contributed to global awareness, the establishment of international programs and the strengthening of national institutions. In 1990s this afforded improved water supply for more than 800 million people and sanitation for around 750 million people (WHO/UNICEF, 2000).

Despite the intensive efforts of many institutions at the national and international levels, approximately 1.3 billion people in the developing world lack access to adequate quantity of clean water and nearly 3 billion people are without adequate means of waste disposal. It is estimated that 10,000 people die every day from water and sanitation related diseases while thousands suffer from a range of water and sanitation related illnesses. The impact of inadequate water and sanitation services falls primarily on the poor. Badly served by the formal sector, the poor make their own, often inadequate, arrangements to meet basic survival needs. Many fetch

water from long distances or end up paying high prices to water vendors for very small quantity of water (Bosch et al, 2001).

According to WHO-UNICEF (2000), access to safe water and sanitary means of waste disposal is universal needs and indeed basic human rights. Besides, they are essential elements of human development and poverty alleviation and constitute an indispensable component of primary health care. Hence, provision of adequate sanitation services, safe water supply, and hygiene education represents an effective health intervention that reduces the mortality caused by diarrhoeal disease by an average of 65% and the related morbidity by 26%. To contrary, inadequate sanitation, poor hygiene and unclean water result not only in more sickness and death, but also in higher health costs, lower productivity, lower school enrollment and retention rates of girls and perhaps most importantly the denial of the rights of people to live with dignity.

The MDGs put particular emphasis on the importance of improved coverage of water and sanitation supply and have a global target to reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation by the year 2015. Achieving the targets will entail various challenges and pose a continuous uphill struggle for many countries in Africa. As a result of rapid growth in urbanization with increased rural urban migration and informal settlements, population growth, and growing poverty, African governments will need to be able to provide access to safe water to 210 million and sanitation to 211 million additional urban residents over the next 15 years. It is also estimated that almost 300 million Africans will be living in slums and informal settlements by the year 2020. This implies that investments in water supply and sanitation would require injections that if governments are to maintain current levels of water supply and sanitation provision, under the projected growth scenario, access to these services should increase by 10 million a year for a 10-year period (UNESCO,2005).

2. Statement of the problem

The availability of water sources throughout the world is becoming depleted by the rate at which populations are increasing, especially in developing countries. This has brought into focus the urgent need for planned action to manage water resources effectively for sustainable development (Khatri and Vairavamoorthy, 2007).

According to Brocklehurst (2004), in the last 50 years, the world's urban population has increased fourfold, and now around 50% of the world's population lives in urban centers. While urban populations grew rapidly, expansion of water supply and sanitation services did not. Spending on water supply and sanitation has not kept pace with growth, and there are dramatic differences in infrastructure expenditure between cities in low and high income countries. As a result, it is estimated that between 30% and 60% of the urban population in most nations is not being adequately served. By 2025, urbanization in Africa will have progressed from about 32 to 50 % with the urban population increasing from 300 million to 700 million (WUP, 2003). If current trends prevail, majority of urban dwellers will be living with poverty in unplanned or informal settlements without access basic services such as water and sanitation affecting public health adversely (Nyarko .et al.2006).

Getachew (2002) stated that, water supply and sanitation situation in Ethiopia is very poor, as most of the population does not have access to safe and adequate water supply and sanitation facilities. As a result three-fourth of the health problems in Ethiopia is due to communicable diseases attributable to unsafe or inadequate water supply and improper waste management particularly excreta. Diarrhoeal diseases caused by improper management of water and sanitation are among the major causes of infant and child morbidity and mortality. To the contrary, water and sanitation programs have a direct bearing on the prevalence of diarrhoeal diseases in the population. The combination of safe water supply, sanitation facilities and hygienic practices demonstrated a high potential in contributing to a remarkable decrease in the prevalence of a child and maternal morbidity and mortality

The estimated water service level of Ethiopia in terms of coverage, quantity, quality, and reliability is among the lowest in the world. Sanitation facilities are also in worst condition. Due to unreliability of safe and unassailability of safe and sufficient water supply and adequate sanitation facilities the estimated service level could be in much less situation. These combine effect of the poor water supply and sanitation facilities in the country have high impact on the economic development of the country and the living condition of the towns' communities (OWRMB, 2009).

Earlier studies conducted on water supply and sanitation both at international and national levels focused mainly on rural areas and big cities. But in small and medium towns like Ambo, not adequate research yet carried out. Furthermore, Ambo is one of the tertiary level towns in the country with rapid urbanization, high population growth; high investment flow due to its investment potential and proximity to the capital city of the country Addis Ababa. It is also serving as an administrative, commercial and transport centre of the Western Showa Zone. On the other hand, the provision of urban infrastructure like water and sanitation are clearly observed as critical challenges in the town. These situations necessitated research work to look at the issues in the area closely and deeply in order to give clear description of the problems from various urban dwellers and administrators point of view.

3. Objective

In order to assess the problems of urban water supply and sanitation in Ambo town, the researcher has following general and specific objectives.

3.1. General objective

The major objective of this study is to assess the urban household water supply and sanitation problem in Ambo town and come up with the possible problem solving recommendations.

3.2. Specific objectives

- To document water supply and sanitation situation in Ambo town.
- To assess the perception of urban dweller toward water supply and sanitation in relation to cost, time, accessibility and availability.
- To trace out the major constraints in providing water and sanitation services to the urban dwellers.
- To examine the consequences of inadequate urban water supply and sanitation services in Ambo town.
- To forward possible policy recommendations associated with water supply and sanitation problem in Ambo town.

4. Research questions

In order to achieve the above mentioned research objectives and seek answers for the stated problems, the following major research questions were designed.

- What is the current status of urban water supply and sanitations services in the Ambo town?
- Do the urban dwellers have proper access to safe water and adequate sanitation service?
- What are the major challenges in the provision of water and sanitation services in Ambo town?
- What are the impact of inadequate water supply and sanitation on the life of urban dweller?
- What measures should be taken to insure sustainable water supply and sanitation services in Ambo town?

5. Research aim

Urban water supply and sanitation are the major challenge in entire world. Therefore, the overall purpose of this research is to assess the issues in Ambo town, where urban dwellers have no adequate access to clean drinking water and sanitation service at present and finally to forward the possible suggestion to the concerned body.

6. Methodology

The primary objective of this research is to assess Ambo town water supply and sanitation situations concerning to coverage, accessibility, affordability, sources of water, cause and consequence of water and sanitation services inaccessibility on the life of the urban dwellers. In order to achieve these objectives as well as analysis and explain the research scenario, descriptive survey research method was adopted. Descriptive questions such as “what”, “how and when” more are appropriate and help to harness the detailed and deep insights and understandings of the topic under study. Besides, both qualitative and quantitative approaches were also used to assess and understand different factor that affect water supply and sanitation facilities.

6.1. Sources of data

All the necessary data required for the study were obtained from both primary and secondary sources by using multiple tools of data collection. Primary sources of data were interview with selected sample households and officials and key informant officials from different offices and bureaus.

Secondary sources of data were data that help to review the overall water and sanitation services in the study area. Relevant documents concerning issues of accessibility, quantity, quality, distribution problems and its consequences, and implication of water and sanitation services in the people life both in urban and rural areas of the country were the major sources of secondary data. Furthermore, data bases of health office in the town showing incidents of water and sanitation related illness were used for discussion. These data which were collected from different sources such as interviews, observations and documentations were triangulated to ensure the accuracy and validity of the finding.

6.2. Data collection techniques

The major data collection techniques of the study were structured and semi structured interviews, and personal observation.

6.2.1. Structured and semi structured interviews: Interview were conducted with the selected sample households and officials. Semi structured interview was selected due to its flexibility which enables the researcher to ask respondents' opinion on current levels of water supply and sanitation service delivery like how they access to clean drinking water and sanitation, how much they pay, at what distance they can get water and other related questions. It also gives opportunities' to the respondents' to express their feelings, ideas and opinions more about the problems at hand. Two enumerators who speak the local language were employed for data collection and three day training was given to them on how to collect the data.

6.2.2. Key informants: Key informant interview was conducted with people from different offices with different responsibility, knowledge and experience about the town's water and sanitation coverage, the balance between demand and supply of water and sanitation in the town,

major challenge faced in the provision of these services, level of community awareness and participation in the provision of these services. These key informants were purposively selected from different offices believing that they have deep and relevant information about the issues from their official responsibilities and continue involvement in the issues.

6.2.3. Personal observation: since the issue at hand is highly linked with the day to day life of the people, participatory observation enabled the researcher to observe and discuss with the respondents on the issue. Besides, participatory observation also has the advantage of becoming part of the respondents and observes how they fetch water and exercise sanitation and asking clarification on their actions.

6.3. Sampling methods

The sample for the study was taken from the dwellers of Ambo Town. Thus, according to the 2009 census conducted by Ambo Town Administration, the town has 67,514 population or 15,223 households living in three kebeles; from this, 152 households were taken as sample for the study based on the researcher's own judgment that the selected sample size represents the remaining households.

Once the sample size was determined, households from each kebele were selected by systematic random sampling method. The sample households were selected in proportion to the number of households in each kebele's. The list of households from each kebele was used as sampling frame.

Table 1.1 Sampling method and sample households' selection from each kebele.

No	List of kebeles	Total households per kebele	Sample households from each kebele	Method of selection
1	01	7904	79	Systematic random sampling
2	02	5345	53	Systematic random sampling
3	03	1974	20	Systematic random sampling
Total	**3**	**15223**	**1 52**	

Key informants were selected from different offices such as; Ambo Town Water Supply and Sewerage Service Enterprise, Ambo Town Water Management Board, Ambo Town Municipality, Ambo Town health office. These key informants were selected using non probabilistic purposive sampling method (table 1.2).

Table1. 2 Selections of key informants from different offices

No	**Offices from where the key informants were selected**	**No. of selected key informants**	**Method of section**
1	Ambo Town Water Supply and Sewerage Service Enterprise	2	Purposive
2	Ambo Town Water Management Board	1	Purposive
3	Ambo Town Municipality	2	Purposive
4	Ambo Town Health office	2	Purposive
	Total	**7**	

As indicated in table 1.2, the data was also gathered from key informants officials of different offices such as; Ambo Town Water Supply and Sewerage Service Enterprise, Ambo Town Water Management Board, Ambo Town Municipality, Ambo Town health office. These key informants were selected using non probabilistic purposive sampling method.

6.4. Data analysis and presentation

As stated above, the study analyzed both qualitative and quantitative data to give clear understanding about the problem. Therefore, qualitative data was analyzed and presented through description, narrating and interpreting the situations deeply and contextually so that the urban water supply and sanitation situations were revealed. Similarly quantitative data were analyzed and presented using tables, frequency and percentages to give clear understanding of the issue quantitatively.

7. Scope of the study

Inaccessibility of urban infrastructures like housing, transportation, telecommunication, power, water and sanitation are the common problems in all over the world particularly in developing countries like Ethiopia. However, it is difficult to cover all the problems at once in all the areas. Thus, this research mainly focused on urban water supply and sanitation problems at household level in Ambo town. Ambo was selected due its fast growing nature and there were no adequate research so far conducted on water and sanitation in the area. Further, since I was born in the area of the study, I have personally observed many water and sanitation problems in the town.

Besides, sanitation is also a broad term, which includes solid waste management and liquid waste management. However, this study focused on sewer and latrine services of the household. Furthermore, the study also emphasized on the administrative issues like accessibility, affordability, distribution problems, the cause and the consequence of inadequate water supply, sewer and toilet on the urban communities and their perceptions. It does not include the technical aspects of water supply and sanitations which are outside of the researcher objective.

8. Significance of the study

The provision of clean drinking water and urban sanitation are the main problems in whole world predominantly in poor countries like Ethiopia. Hence, the study result shows that the existing water supply and sanitation situation of the urban dwellers by investigating the sources of water, levels of sanitation services, causes of water and sanitation inaccessibility and their impacts on the livelihood of the people and environment. It provides insight to policy makers, NGOs, community based organizations and other stakeholders who are concerned with urban water supply and sanitation problems.

The paper will also add to the literature of urban water supply and sanitation issue, which are currently the global challenge. It also serves as the base line for other researchers who will be interested in the area.

9. Limitation of the study

In the process of collecting primary data, the households were reluctant to provide the necessary data. Some respondents have reservation to express their opinion as could not duly understand the long term outcome of the study and this limited the thorough collection of the required data. It was very difficult to make interviews with some officials as they always made appointment to give information and not available on the appointment.

Concerning to documents and secondary data in all the three visited offices ATWSSSE, municipality and health office there were no adequate documents, which were relevant to this study. The data were fragmented and very difficult to access and get the necessary information. There was no clear explanation on the existing data. Reference books for the study were also rarely available and this influenced study to some extent to review the literatures. Shortage of time and finance were also major challenges to accomplish this paper.

10. Organization of the paper

Generally, the study has four chapters. The first chapter consists; the introduction of the paper, statement of the problems, objectives of the study, research question, methodology, scope and significances of the study. The second chapter of the study explored existing water supply and sanitation services in general and developing countries like Ethiopian particularly. This chapter also included water supply and sanitation policy of the Ethiopian Government and institutional arrangements in the sector. The third chapter is data analysis and presentation. Chapter four is the conclusions and recommendations.

To sum up, provision of adequate and quality urban infrastructure is the main concern all over the world. Especially water supply and sanitation are an important sector of development. Therefore, many years efforts of international and national organizations to improve water supply and sanitation around the world have contributed to global awareness, the establishment of international programs and strengthening of national institutions. Despite the intensive efforts of those organizations, millions of people in the world particularly in developing nations lack access to safe water and adequate means of waste disposal. Thousands of people die every day

from water and sanitation born diseases and thousands suffer from a range of water and sanitation related illness.

Similarly, water supply and sanitation in Ethiopia is very poor, most of the people do not have access to safe water and adequate sanitation facilities. Three-fourth of the health problems is due to communicable diseases attributable to inadequate safe water supply and improper waste management's.

Coming to the local level, Ambo town is one of the tertiary towns in the country and characterized by rapid urbanization and high population growth .the the provision of urban infrastructures like water and sanitation is inadequate. Hence, this paper aimed to access water supply and sanitation services in the town. To achieve the objective of the paper descriptive survey research method was used.

The sources of data for the study were remarry and secondary data. Primary data was collected through interviews, key informant and personal observation from urban households, officials and different documents whereas secondary data was collected from different published and unpublished sources. The sample for the study was selected from the residents' of Ambo town using systematic sampling methods. Hence, 152 households were selected for in-depth interview.

CHAPTER TWO

2. Literature Review

This chapter deals with the theoretical overview of water supply and sanitation. It assesses water and sanitation accessibility, the relationship between water, sanitation and health, benefits and impacts of improper urban water supply and sanitation facility, different challenges in urban water supply and sanitation, major technological options for sanitation. It also assesses the Ethiopian government's water supply and sanitation policy, institutional arrangements and responsibilities at different level.

2.1. Overview of water supply and sanitation

The survival and well being of a nation depends upon sustainable development and for this, water supply and sanitation which are ingredients of a healthy and productive life, are essential requirements. For the poor people residing in urban slums and rural areas, to achieve a better economic growth rate and higher productivity, priority has to be given to the health of these people, for which provision of public utilities like water supply and sanitation is necessary (Pathak, Rajola and Rajnish, 2002). Provision of safe and sufficient drinking water with adequate sanitation service in urban areas is an important investment which safeguards health and safety of the people living in urban areas, and protection, conservation and promotion of the environment, especially in developing countries.

It is belied that the benefits of environmental protection, such as clean water, air and suitable sanitation facilities should be available to all, but in reality a disproportionate burden of protecting the environment is borne by the poor, especially the urban poor. An increasing awareness about the environment since 1970's has led to significant budgetary allocations for the water and sanitation sector. The 1980s were declared the United Nations International Drinking Water Supply and Sanitation Decade during, which the international community set an ambitious target of achieving 100% coverage in water supply and sanitation by 1990 (Pathak, Rajola and Rajnish, 2002).

Unfortunately, progress over the decade could not keep up with the population growth. Subsequently, significant investments have been made in that sector, yet progress in sanitation has been limited, resulting in consistently lowers coverage for sanitation in comparison to water supply. According to the WHO-UNICEF (2006), 2.5 billion people are without access to improved sanitation (corresponding to a global access rate of 62%) and one billion people in rural areas still practice open defecation. In terms of drinking water, 87% of the world's population uses drinking water from improved sources as of 2006 (54% piped connection in their dwelling, plot or yard, and 33% other improved drinking water sources). This translates into 5.7 billion people worldwide who are now using drinking water from an improved source, an increase of 1.6 billion since 1990. Although a number of developing countries are on track to meet the Millennium Development Goal of 77% rate of coverage, large parts of sub-Saharan Africa and Southern Asia are not, meaning that the world as a whole is not on track to meet the MDG sanitation target (WHO-UNICEF, 2006).

In developing world, one third population does not have access to safe drinking water and sanitation. In these nations, more than 80% of diseases and one third of deaths are caused by the consumption of contaminated water (Palamuleni, 2002 cited in Mengistu, 2008). For example at present more than 35 million Ethiopians are deprived the dignity of adequate sanitation facilities to safely contain and dispose of human faeces (UNICEF, 2008) and half of 80 million population of Ethiopia is suffering from unnecessary water related diseases, Khartoum's sewage covers 5% of the urban area. Trends indicate that most countries are on track to meet the MDG drinking water target (89%), except sub-Saharan Africa, where coverage is still lower in comparison to other regions (GDN, 2009).

Inaccessibility of safe water and adequate sanitation facility strengthens the cycle of disease, poverty and weakness; therefore water and sanitation programs are instrumental in efforts to rescue people from poverty. In other word, provision of water and sanitation should be indispensable parts of the Poverty Reduction Strategies applied by developing countries. In the developing world today poor access to safe water and adequate sanitation continues to be a threat to human health. Expanding access to basic water supply and sanitation, integrated with hygiene education can reduce the burden of water-related diseases significantly by improving the lives of

a large part of the world's population. Since provision of sanitation breaks the vicious cycle of poverty and initiates a virtuous cycle of economic well-being, it should be a vital ingredient in the poverty alleviation programs (Pathak, Rajola and Rajnish, 2002).

2.2. Urban water supply

Safe drinking water is the birthright of all humankind as much a birthright as clean air (Rao 2002) while access to clean water can be considered as one of the basic needs and rights of a human being. Health of people and dignified life is based on access to clean water (Korkeakoski, 2006).

Alaci and Alehegn (2009) stated that, water is important in a number of ways; these include domestic and productive uses. Domestic water use takes the form of drinking, washing, cooking and sanitation, while productive water uses includes those for agriculture, Beer brewing, brick making etc. Safe drinking water matched with improved sanitation contributes to the overall well being of people; it has significant bearing on infant mortality rate, longevity and productivity. However, the majority of the world's population in both rural and urban settlements does not have access to safe drinking water. According to WHO (2006) only 16% of people in sub-Saharan Africa had access to drinking water through a household connection (an indoor tap or a tap in the yard). Not only their poor access to readily accessible drinking water, even when water is available in these small towns there are risks of contamination due to several factors like inappropriate waste disposal and lack of water supply infrastructure such as pipe line for water (Mengistu, 2008).

According to Water Utility Partnership (Africa, 2003), the primary goal of all water supply utilities is to provide customers with a 'private' connection to the piped water supply network. For many public officials, policy makers and politicians a household or yard connection (hereafter referred to as a private connection) is considered the most satisfactory way to meet the following key objectives;

- Public health objectives: by ensuring better quality and access.
- Commercial objectives: by facilitating cost recovery and revenue generation.
- Social objectives: by improving access for the poorest and enhancing security and safety.

- Environmental objectives: by enabling better demand management and water conservation.

2.2.1. Sources of water

According to Sijbemsa, (1989) and UN-HABITAT (2003), water sources fall into three general categories.

Rainwater: Rainwater refers to rain that is collected or harvested from surfaces (by roof or ground catchment) and stored in a container, tank or cistern until used. Rain water is the purest water in nature but it tends to become impure as it passes through the atmosphere. It picks up suspended impurities from the atmosphere such as dust, soot and microorganisms and gases such as carbon dioxide, nitrogen, oxygen and ammonia.

Surface water: Surface water originates from rain water. It is the main source of water supply in many areas. It includes rivers, tanks, lakes, manmade reservoirs and sea water. Surface water is prone to contamination from human and animal sources. As such it is never safe for human consumption unless subjected to sanitary protection and purification before use.

Groundwater: Groundwater is water used by humans comes mainly from land such as wells, springs, etc. It tends to be of higher microbiological quality (having undergone natural soil filtration). However, it is relatively difficult to extract. More technology and energy is needed (compared with other water sources) to bring water from within the earth up to the surface.

UN-HABITAT (2006) stated that, water service provision options are standpipes, yard and house connections.

Household connection: Household connection, is a water service pipe connected within house plumbing to one or more taps (e.g. in the kitchen and bathroom) or tap placed in the yard or plot outside the house.

Public tap or standpipe: Public tap or standpipe is a public water point from which people can collect water. Many low-income households that are unable to afford a household connection are relying on public water points.

Domestic reseller: Increasingly, households with a private connection are selling water to their neighbors.

Intermediate service providers: this includes private providers or community based organizations delivering water in unserved areas.

2.2.2. Water accessibility

The concept of accessibility is the framework for the research discussion. To understand the best location, define accessibility and this is probably the most complex and important of all tasks facing those concerned with the provision of any social service. The task is a two dimensioned problem organizing a limited set of resources in a way, which is efficient, yet equitable. In real terms, it ultimately declines to the basic dilemma of having to rationalize supply of services yet ensuring improved accessibility of these services to the consumer (Adeyemo 1989). Accessibility therefore connotes physical availability of a service or facility. It establishes the extent to which factors like distance, time and cost have decayed. Optimum accessibility in the case of water means effectively over coming access indicators of distance, time and affordability (Alaci and Alehegn, 2009).

Accessibility must be seen within the context of the ease with which people can obtain the services of a facility and function. Accessibility increases with decreasing constraint both physical and social. According to Adeyemo and Afolabi (2005), accessibility is the balance between the demand for and the supply of consumer services over a geographic space and narrowing or bridging the gap between geographic spaces is the all significance of transport. Access to essential resources and services has come to be recognized as positively related to development such that inaccessibility or lack of access is cited as lack of development or symptom of underdevelopment (Ayeni, 1987 and Moseley, 1979 cited in Alaci, 2004). To the extents that improved access to essential services has become an accepted part of the rubrics or measure of development and standard of living (Alaci and Alehegn 2009).

According to (UN-HABITAT 2003), access to safe water is the share of the population with reasonable access to an adequate amount of safe water. Safe water includes treated surface water and untreated but uncontaminated water such as from springs sanitary wells and boreholes. In urban areas the water source may be a public fountain or a stand pipe not more than 200 meters

away from households. An adequate amount of water is that which is needed to satisfy metabolic, hygienic and domestic requirements usually about, 20 litters of safe water per person per day. This minimum quantity however vary depending on whether it's an urban location or rural and whether warm or hot climate. Perhaps this is why the African Water Development Report (2006) described basic human water need to be 20 to 50 liters of uncontaminated water daily.

UNICEF (2006) stated that, population using improved sources of drinking water are those with any of the following types of water supply: piped water (into dwelling yard or plot), public tap or standpipe, tube well or borehole, protected well, protected spring and rain water collection while unimproved sources are unprotected dug well ,unprotected spring ,surface water (river, dam, lake, pond, stream, canal, irrigation channel), vendor-provided water (cart with small tank or drum, tanker truck),bottled water, tanker truck provided water.

2.2.3. Water accessibility indicators

According to WHO (2004), they are basic indicators for measuring water accessibility These indicators show four paramount levels of water accessibility that include optimal access, intermediate access, basic access and no access. These are indicative of the level of water availability, which is a measure of the quantity available for use. Basically, they reflect the extent to which accessibility challenges such as time, distance and affordability are formidable or otherwise.

Table 2.1 WHO water accessibility indicator

Travel distance to collect water	**WHO standard**	**Average time spent to collect water**	**WHO standard**
Water supply through taps continuously	(Optimal access)	Water supplied through multiple taps Continuously	Optimal access
< 100m	Water supplied through multiple taps continuously	Within 5 minute	Intermediate access
101-200m	Between 100 and 1000m	5-30 minutes	Basic access
201-500m			

5001-1000m	(Basic access)	30 minute-2hours	No access
		2-4hours	
1.2-2km(1.5km)	More than 1000m (No access)	>4 hours	
>2km(3km)			

Source: WHO, (2004)

2.2.3.1. Affordability: The affordability of water has a significant influence on the use of water and selection of water sources. Households with the lowest levels of access to safe water supply frequently pay more for their water than households connected to a piped water system. The high cost of water may force households to use small quantities of water and alternative sources of poorer quality that represent a greater risk too (Public Health Protection, 2000). Private access to tap water is the cheapest for the consumer. Dependence on a shared standpipe increases prices almost four times. Private water delivery through tanker service (or sachet or bottled water) is the most expensive and tanker water delivery costs many times the tap water price. Thus, the consumers paying the most for water are the ones with the lowest income (Alaci and Alehegn, 2009).

2.2.3.2. Time and distance travel to fetch water: Time and distance traveled to fetch water are also key indicators of water accessibility. To most communities of Africa, long distance travel to fetch water is common. Hence, they spend much time and money. According to WHO (2004) standards if households travel more than 200 meters far away from house in urban, there is no access. Distance travel to fetch water is also one of the indicators of water accessibility. WHO standards in relation to time, more than 30 minutes no access 5 minutes - 30 minutes basic access and within 5 minutes intermediate access

2.3. Urban sanitation

World Health Organization (WHO) defines sanitation as group of methods to collect human excreta and urine as well as community waste waters in a hygienic way where human and community health is not altered. The main objective of sanitation is to decrease the spreading of diseases by adequate waste water excreta and other waste treatment, proper handling of water and food and by restricting the occurrence of causes of diseases (Korkeakoski, 2006).

Sanitation is a system to increase and maintain healthy life and environment. Adequate sanitation systems include both facilities and behaviors that form a hygienic environment and reduce people's exposure to disease-causing organisms (Bruijne, Geurts and Appleton, 2007)

Korkeakoski (2006) also stated that, the purpose of sanitation is assuring people enough clean water for washing and drinking. Typically, health and hygiene education is connected to sanitation in order to make people recognize where health problems originate and how to better sanitation by their own actions. Essential part of sanitation is building and maintenance education on sewerage systems, wash up and toilet facilities

> *A household is considered to have adequate access to sanitation if a waste disposal system, either in the form of a private toilet or a public toilet (i.e. latrines at markets, bus terminals and lorry parks, patient and staff latrines at health facilities, teacher and pupil latrines at schools) shared with a reasonable number of people, is available to household members (UN-HABITAT2006).*

In other word, safe waste disposal through the provision of latrines is a major priority as it creates the first barrier to direct and indirect excreta-related diseases. In the field, water supply and hygiene education, which would include sufficient water supply and soap; latrine maintenance; and the actual training and education, are important complements to latrine construction (Steve, 2004).

Meinzinger, Oldenburg and Otterpohl (2008) stated that, the majority of the existing toilets in urban areas of Ethiopia are simple pit latrines, which face a variety of problems like pit collapsing and flooding. Also the need for digging of new pits once the old one is filled is considered a drawback of this conventional technique. The use of septic tanks is impeded by factors like the lack of desludging facilities (e.g. vacuum trucks) and missing sludge management concepts.

Centralized sewerage systems are usually not within reach of the municipalities due to the high costs for sewers and treatment facilities. For example, the sewerage system in Addis Ababa caters only for about 3% of the city's population. In addition, many Ethiopian cities face

difficulties in implementing a water-based sanitation system (i.e. water-flushed toilets) as a result of water shortages and inappropriate water supply systems.

According to (WHO. 2002), access to sanitation includes safety and privacy in the use of these services. Coverage is the proportion of people using improved sanitation facilities such as public sewer connection, septic system connection, pour flush latrine, simple pit latrine and ventilated improved pit latrine.

In addition to health, sanitation improvements have to meet the perceived needs of the intended users among which;

Convenience: Women in particular dislike having to walk long distances to relieve themselves.

Comfort: People dislike the smell of excreta and public toilets in densely populated communities are generally appalling.

Safety: Defecation sites are dangerous places for women and children.

Status: Families are ashamed when they cannot offer guests proper toilet facilities.

2.3.1. Available technology options for sanitation

Neto and Tropp (2000) stated that, there are numerous technical options for waste management, many of which, if properly designed, constructed, operated and maintained will provide adequate and safe service as well as health benefits. It is necessary to choose technically, economically and financially feasible options for sustainable waste management. Equally important is the involvement of all stakeholders playing a role in sanitation development, including users (or customers), community organizations, authorities and entrepreneurs. In particular, it is essential to involve women in the design and selection of domestic sanitation facilities.

Franceys et al. 1992; Mara, 1996b; UN-HABITAT, 2006; and WHO, 2010 also stated that, sanitation systems can be divided into two principal categories; i.e. onsite and offsite.

2.3.1.1. Onsite sanitation

On-site sanitation is the main form of excreta disposal in most sub-Saharan African cities and will remain the most appropriate level of service for the urban poor in the medium term. Despite heavy public investment in sewerage systems in most primary and some secondary cities,

typically only 10-15% of the urban population benefit from access to the sewer network. According to Water Utility Partnership (Africa, 2003; Ahmed and Nalubega, 2001 and Mara, 1996b)**,** onsite sanitation include SanPlat' latrines, ventilated improved pit (VIP) latrines, pour-flush (PF) toilets, and ecological sanitation ('EcoSan') toilets. In these systems, wastes are stored at the point of disposal and usually undergo some degree of decomposition on site. Onsite systems either require periodic emptying or construction of new facilities once they fill up.

2.3.1.2. Offsite sanitation

Offsite systems are forms of sewerage where part or all of the excreta are transported away from the household for treatment or disposal at a central point. Sewerage may be conventional (typically, connected to flush toilets and household greywater, and in many cases stormwater) or modified where only liquid matter is piped away (small-bore sewerage) or where sewerage works on a non-constant flow principle (shallow sewers) and does not take stormwater (WHO,2010). In order to minimize environmental pollution and disease transmission it is important that the sewage is properly treated and not allowed to flow untreated into rivers or other water bodies (WRI, 1998).

It is important to note that there is no single appropriate technology for all circumstances and all socio-economic segments of a community, town or city. The more costly or, apparently, convenient technologies may not provide the greatest health benefit or may be unsustainable from an economic or technological point of view (Franceys et al. 1992).

On the other hand, Sewers are not just limited to pipes below ground. Open channels may also be used. These may be unlined, pitched with stone or lined with concrete. Where the lining is not water tight, the channel can act as an infiltration trench. This may be acceptable for surface run-off, but is not recommended for conveyance of foul sewage. Surface run-off can flood the channel, causing pollution, which is a greater risk to health than the indirect route of infiltration to groundwater. Where open channels are used for foul sewage and no alternative is possible,

they should be routed away from populated areas and have raised sides to limit the ingress of rainwater (WHO, 2010).

Sanitation is a challenging issue of today's world especially in poor countries where inadequate resources and awareness of community. Thus, it would be decent to launch community teaching and expanding community driven programs, encouraging local institutions such as; civil society organizations, community based organizations and private investors on the sector.
In general, to win the battle against poor sanitation in developing countries like Ethiopia, several programs has to applied otherwise sanitation is a rampant threat of health in these countries.

2.4. Impacts of water and sanitation inaccessibility

Although water and sanitation are the primary needs of human being, unimproved water and sanitation services have many negative impacts on people livelihood. Among which; health, socio-economic, environmental degradation and poor educational performance are the major.

2.4.1. Health impacts

The improvement of water and sanitation in developing countries is largely driven by the need to reduce the incidence and prevalence of infectious disease caused by pathogenic micro organisms.

The majority of pathogens that affect humans are derived from faeces and transmitted by the faecal-oral route. Pathogen transmission may occur through a variety of routes including food, water, poor personal hygiene and flies (Ahmed and Nalubega, 2001).

According to USAID/E Statement of Work (SOW) for the Millennium Water Alliance (MWA) Water, Sanitation & Hygiene (WASH) program evaluation, "approximately 3.1% of deaths worldwide are attributed to unsafe water, sanitation and hygiene practices. Africa carries the heaviest burden, with 4 to 8% of all disease in Africa being related to poor water, sanitation and hygiene. In Ethiopia, water and sanitation related diarrhea accounts for approximately 20% of all deaths in children under the age of five, taking the lives of close to 100,000 children annually. Thirty two percent of this diarrhea could be prevented by improving sanitation interventions such as pit latrines, septic tanks and composting toilets" USAID/E (2008).

According to FDRE (2005) Demographic and Health survey, only 8% of Ethiopian households have water on their premises and only 38% have a toilet. In addition, poor water and sanitation is the source for many other health problems including chronic intestinal parasites that attribute to high prevalence of malnutrition, anemia, diarrhea, cholera, malaria, schistosomiasis, trachoma, intestinal helminthes retarded growth.

2.4.2. Socio-economic impacts

Poor access to water supply and sanitation limits opportunities to escape poverty and exacerbates the problems of vulnerable and marginalized groups especially those affected by HIV/AIDS and other diseases (Alaci and Alehegn, 2009).

According to Ethiopian Ministry of Health (2005), the well known negative synergy of diarrhoeal disease, malnutrition and opportunistic infections are known to have short-term health impacts and long term debilitating effects. In the long term, child development is impaired resulting in growth retardation and diminished learning abilities. It is estimated that 4 in 10 children will not realise their educational potential which ultimately inhibits socio-economic development. In addition there is a potential productive time lost to illness caring for the sick and attending clinics. There are also the financial costs of treatment for medicines and clinic attendance.

2.4.3. Environmental degradation impacts

Besides being pollutants of surface waters (necessitating higher treatment costs), faeces and urine are a potential (under-exploited) source of compost and fertilizer which could help address decreasing soil fertility and reduce the high cost (both financial and environmental) of chemical fertilizers. They can also be used to produce biogas (a renewable energy source) which as well as safely containing excreta could contribute to reducing deforestation which is a key

environmental issue. Biogas digesters can also be 'fed' with organic solid waste in urban areas as an efficient treatment and use of 'waste' (MoH, 2005).

2.4.4. Poor educational performance

According to the Federal Democratic Republic of Ethiopia National Hygiene and Sanitation Strategy of (MoH,2005), Ministry of Health 2005 as well as the diminished learning abilities mentioned above, it is widely believed that a significant number of school days are lost due to diarrhoea. This mainly affects girls who end up staying at home to care for siblings. Worm infestations, anaemia and vitamin A loss have been shown to decrease learning abilities among 4 in 10 girls. Lack of separate, private, secure, hygienic latrines, particularly in adolescence (during menstruation) is associated with a high dropout rate of girls.

2.5. Benefits of access to clean dirking water and sanitation

According to UNICEF (1999), there are a number of potential benefits to improved access to water supply, in addition to the reduction of disease. That is reasons why many communities give for placing a high priority on improved water supply usually relate to benefits beyond health. These benefits are of particular importance to women. A closer, cleaner source of water can produce immediate and far-reaching improvements on women's lives.

2.5.1. Convenience

Most people, when identifying improved access to water as a priority, are thinking of convenience. Everybody wants water as close as possible to their home, simply because it is more convenient. As such, convenience is as important a consideration as health benefits. In some societies and situations, convenience is also related to the security of women: water closer to home can minimize the chances of abduction or assault.

2.5.2. Time saved

Women and girls can spend many hours a day collecting water from distant sources and thus the time saved by having a safe water source closer to the household can be very significant. The time saved is used for much needed leisure or, possibly (but not necessarily) activities relating to improved child care, or economic production. Less time spent fetching water is one less possible excuse for not allowing girls to attend school or in some extreme cases, even to marry.

40 billion hours lost each year in Africa. Estimates indicate that three hours per household per day are being lost to water hauling by those rural households in Africa which do not have access to a minimum level of service such as a hand dug well or a hand pump-equipped borehole. Some 258 million people lack access to improved water in rural areas of Africa today; these people comprise about 37 million households. At three hours per day, 365 days a year: 40,515 million (40 billion) hours are lost annually to this necessary but unproductive chore, largely undertaken by women and girls. This time could otherwise be used for activities such as child care, education and agricultural production (UNICEF, 1999).

2.5.3. Energy saved

Studies have shown that women who walk long distances to collect water can burn as much as 600calories of energy or more per day, which may be one third of their nutritional intake. Closer sources of water can thus improve the nutritional status of women and children (and hence health and wellbeing) (UNICEF, 1999).

2.5.4. Prevention of injuries

When girls are forced to carry heavy loads of water over large distances, there is a danger of lasting spinal column and pelvis injury and deformations. Closer water sources minimize this (UNICEF, 1999).

2.6. Challenges in urban water supply and sanitation

In the provision of adequate clean water and sanitation facilities to urban dwellers, the world faced many challenges, which are related to capacity of the nations, (i.e. technological knowhow and institutional), inadequate finance, rapid urbanization and declining of global water resource.

2.6.1. Lack of capacity

According to Wallace et al (2008), capacity is a flexible concept and encompasses the public sector, academia; community based organizations and the private sectors, and ranges from the individual to institutions to society as a whole. Capacity can be described in terms of the human,

technological, infrastructural, institutional and managerial resources required at all levels from the individual through to national governance. Not only does capacity have to be built within each of these levels, but it has to be institutionalized and local communities need to be empowered to use it effectively. Additionally, capacity building incorporates the followings.

I. The capacity to engage, educate and train; including community awareness building, adult training and formal education; so as to provide sufficient numbers of competent human resources to develop and apply enabling systems within the local environment.

II. The capacity to measure and understand aquatic systems through monitoring, applied research, technology development and forecasting, so that reliable data are used for analysis and decision making.

III. The capacity to develop policies and programs and to legislate, regulate and achieve compliance through effective governmental, non governmental and private sector institutions and through efficient enforcement and community acceptance, particularly for rural areas.

IV. The capacity to identify and provide appropriate and affordable water technologies, infrastructure services and products through sustained research, investment and management.

2.6.1.1. Technological capacity

Innovative technologies are essential to overcome barriers to water and sanitation service provision**.** Technological capacity includes the development and application of new technologies, the technical skills needed to effectively construct, operate and manage a technical solution; the translation of information regarding technologies to promote informed decision-making when implementing a technical solution; the availability and accessibility of spare parts (Sijbesma, 1989). However, technology providers need a better understanding of local conditions and policies.

2.6.1.2. Institutional capacity

There is a need for institutions that bring together many disciplines, such as the natural sciences, public health, engineering and the social sciences. Integration and interaction between institutions and different sectors of the population, at decision-making, executive and

participative levels is required to plan and execute actions in a coordinated way. This integration is the basis for multi spectral approaches to ensure that planned goals are achieved and actions converge to solve environmental, water and health problems (Wallace et al, 2008).

2.6.2. Inadequate financing

Historically, water and sanitation has suffered from severe under financing. This results from inadequate internal financial capacity in the poor countries to achieve water and sanitation goals; poor political decisions for allocation of development aid; an overall reduction over time in development aid; and the limited cost recovery potential in poverty stricken regions (Wallace et al, 2008).

For example, according to the 2005 Water Supply and Sanitation Millennium Development Goal-Needs Assessment Report by the government of Ethiopia estimates the investment requirements for water at US$297 million per year for the next ten years (2006-2015). Per capita investment for water in urban and rural areas is US$105 and US$41 respectively while investment for sanitation in urban and rural areas is US$271 and US$9 respectively. Total government allocation and commitment for WSS over the next seven years has been projected at US$12 million (US$5.4 million for rural, and US$6.6 million for urban). Given the cost recovery policy for capital, operations and maintenances costs, community investment is projected at US$16 million over the next ten years. Projected ODA is US$75 million per year for the next ten years, based on commitments from a variety of donors. Still, this leaves a financing gap of US$197 million per year.

In addition, poor targeting of aid and a multiplicity of actors and structures compound the financial shortfall. Prioritization of spending plays a key role, with many developing countries investing only a small fraction of money into water compared with military spending. For instance, military spending in Ethiopia is 10 times greater than that spent on water and sanitation and in Pakistan the discrepancy is even greater 47 times (UNDP, 2006). Wallace et al (2008) also stated that, to ensure that resources for safe water and sanitation are used effectively at the local level, the local capacities to design, finance and manage improved service delivery must be greatly enhanced. To this end, the Camdessus Panel and others have urged that corruption,

managerial capacity, sustainable cost recovery and legal and contractual aspects of safe water and sanitation management within developing countries be addressed.

2.6.3. Population growth and urbanization

Population growth and rapid urbanization will create a severe scarcity of water as well as tremendous impact on the natural environment. According to UNPP (2006), in less developed countries, urban population will grow from 1.9 billion in 2000 to 3.9 billion in 2030, averaging 2.3% per year.

Besides having less or not invested in urban infrastructure, Africa is urbanizing faster than any other region. Between 1990 and 2025, the total urban population is expected to grow from 300 to 700 million; and by 2020, it is expected that over 50% of the population in African countries will reside in urban areas. According to Cleophace (2007), in order to meet the established millennium development goal of 'halving the unsaved population by 2015'; urban Africa will require 80% increase in the numbers of people served. This objective would require, on average, about 6,000 to 8,000 new connections every day. Political commitment to these goals, backed by resources and action is essential if utilities are to prevent a widening of the gap between 'saved' and 'unsaved' households.

According to the 1994 Ethiopia population census report showed, the total urban population was 7,323,122 (13.7% of the total population), after ten years (i.e. 2004) the total urban population increased to 17,588,735 (32.89%) and by the year 2015 urban population is going to increase by 22,925,177 (32.26%) Ethiopia Central Statistical Authority (1994, 2004 and 2015 projection). In order to meet the future water demand, cities will need to tap their water supply either from a deep ground or surface sources situating a far distance away from the urban area (Khatri andVairavamoorthy, 2007).

2.6.4. Increasing global water scarcity

UN-HABITAT (2006) stated that, not only is the numbers of those requiring better water supplies very large, water itself is becoming scarcer. The number of people living in water-

stressed and water scarce over the world is estimated to increase approximately six fold from 1995 to 2025 to reach 2.8 billion.

2.7. Water supply and sanitation policy in Ethiopia

The water supply and sanitation policy began in Ethiopia in the mid of 1980s.At that time the general policy of the government was to provide water and sanitation through its own public water sector institution with the supply side approach . In this regard in order to strength the government owned institutions, the military government (since 1975) nationalized the private sector driller and their equipment first absorbed by Ethiopian Water Works Construction Agency (EWWCA), which was later used to set up the autonomous Water Well Drilling Agency (WWDA). The whole water sector was generally envisaged as a supplier of "free" services which failed to consider the scarce nature of water resource in the country. Tariff and cost recovery also could not get full attention due to the socialist economic policy implemented in the country (MoWR, 2002).

In the same way the sanitation part of the Water Resource Management policy sets the general framework along which sanitation is provided with the objective of enhancing the well-being and productivity of the people through the provision of adequate and reliable sanitation services. The new sanitation strategy focuses in public sector subsidies on promotion and public facilities rather than subsidizing at the household level. This is an example of a cost conscious and well conceived use of limited public resources in the areas where they are likely to do best.

The policy recognizes the inseparable nature of water supply and sanitation and requests the promotion of both an integrated and sustainable framework. Therefore, according to this policy, all water supply institutional setups have legal right to implement the integrated water supply and sanitation policy. In addition to these since the establishment of a Ministry for a water sector in 1995/96, a strategic and participatory approach has been introduced by bringing into place key sector reform initiatives. The National Water Resources Management Policy also requires urban centers to cover their investment , operation and maintenance costs, while rural WSS is required to cover operation and maintenance costs, with some cost sharing (up to 10 percent) for initial investment cost. The National Sanitation Strategy calls for a shift towards funding 'sanitation

promotion and leveraging resources', and away from subsidy for hardware, and gives priority to low-cost, pro-poor solutions. Importantly, the financial requirements to achieve WSS targets are premised on the capacity to implement the approaches outlined in policy (MoWR, 2003).

2.7.1. Water sector policy and goals

The overall goals of the Federal Water Resources Management Policy (1999) and the Water Sector Strategy (2001) are to promote national efforts towards efficient, equitable and optimum utilization of the available water resources of Ethiopia in order to achieve significant socioeconomic development on a sustainable basis. Some of the major principles of the policy are devolving ownership to lower tiers and enhancing management autonomy to the lowest possible level, promoting involvement of all stakeholders, including the private sector; moving towards full cost recovery for urban water supply systems and recovery of operational and maintenance costs for rural schemes; and, enhancing urban water supply through autonomous bodies.

A five-year Water Sector Development Program (WSDP) is in place. The Universal Access Program (UAP) for Water Supply and Sanitation Services (2006-2012) was developed by the Ministry of Water Resources in consultation with the regions. It is expected to achieve 100 percent sanitation and 98 percent drinking water supply in the rural area at the end of the plan year (2012). At the end of the planned year the total of 50.9 million new people are expected to get drinking water and 66.9 million new people to get sanitation facility. In terms of the urban areas the coverage is expected to increase from 80 percent water supply and 51 percent sanitation to 100 percent at the end of the planned year for both water supply and sanitation. The government has planned to provide the stated water supply through 1181 deep wall, 224 shallow well, 1143 streams and 1468 harassing rivers (UAP, 2005).

2.7.2. Institutional arrangements for water service delivery in Ethiopia

According to Federal Water Resources Management Policy (1999) and the Water Sector Strategy (2001), the following institutions, and institutional arrangements, are responsible for the governmental delivery of water supply services.

2.7.2.1. Ministry of Water Resources

Ministry of Water Resources (MoWR) is responsible for formulating national water policy, strategy and action plans, and for establishing national standards pertaining to water quality, water infrastructure and other relevant standards. The ministry is responsible for supervising and following up on the implementation of policy and strategy instruments as well as overall sector standards. In addition to its regulatory function, the ministry provides technical support to Regional Water Bureaus Federal Water Resources Management Policy (1999).

2.7.2.2. Regional Water Resource Development Bureau

Regional water bureau at the regional level is an executive organ responsible for the preparation of regional policies and regulations, the implementation of federal policies, strategies and action plans through adapting them to the specific conditions of the region, study, design, supervision and regulation of water supply projects, build the capacity of zonal and woreda water offices, set water tariffs, construction of schemes (spring developments, small and large gravity schemes, motorized schemes, boreholes and shallow wells), contract out to the private sector. In addition, water bureaus exercise regulatory duties delegated to them by the ministry.

The planning and management of town water supply and sewerage services are the responsibility of Town Water Boards who are expected to contract out operation and maintenance services to Town Water Utility Operators under performance or service contracts. Addis Ababa Water Supply and Sewerage Authority (AAWSA) has the responsibility for management of water and sewerage services in Addis Ababa (MoWR 1999).

Water Board: Parallel to the federal government, the Oromia Regional Government established Urban Water Supply and Sanitation Service Enterprise town water board's by proclamation no 78/2004.

The Major Objectives of the Enterprise: Provides adequate potable water supply and sewerage services to the dwellers in and around specific a town; administer it is self on the bases of cost recover principle and the decision and guidelines of a board that could be establish to lead and regulate the enterprise; establishes the system that assesses to boost the effort being made to provide water supply and sewerage services including waste disposal in its work areas (Proclamation no 78/2004, article, 4).

Power and Duties of the Enterprise: Provides potable and adequate water supply to the dwellers in and around the town; it shall ensure that the water supplied is to the standard of the World Health Organization. To meet the water supply demand of the town, it shall distribution lines and generally shall undertake water related works such as maintenance, rehabilitation and expansion under its jurisdiction. It can partially contract out some of its works to maximize efficiency. It can check individual water tanks are clean and sanitarily properly kept; it can incorporation with other concerned organs go to the extent of closing down poorly handled individual water tanks. It shall avail potable water to the community and it shall dispose liquid wastes and sewages. It shall use service charges it collected only for the development water works. It shall enter an agreement; shall procure or sell fixed and consumable assets; it shall poses' properties; it can sue or sued (Proclamation no 78/2004, article, 5).

Organizations and Accountability of Enterprises: The Enterprises have a board, a general manager and the staff required for the performance of its duties and the enterprise is accountable to the board (Proclamation no 78/2004, article, 6).

Sources' of Fund for the Enterprise are: Water sales and charges from services of waste water works, loan, donations and grants both in cash and kind, fund assigned by the administration of the town and any other source of fund. Further the regional government may grant necessary support for the establishment and expansion of water supply services by assessing their capacity (Proclamation no 78/2004, article, 20).

2.7.2.3. Zonal Water Resources Development Offices

Zonal Water Resources Development Offices are the supporting arms of the Water Bureaus and are mandated to give capacity building and technical support to Woreda Water Offices and Town Water Supply Offices. In addition, they are responsible for coordinating activities, consolidating plans and reports of woredas and relaying requests from regional water bureaus and/or woreda water offices. In general, Zonal Water Offices are the links between Regional Bureaus and woreda Water Offices (MoW, 1999).

2.7.2.4. Woreda Water Resources Development Offices

Woreda water resources development offices are responsible for the monitoring of construction done by regional bureau or private contractors contracted by the bureau, investigation, design and implementation of small scale water supply schemes, whilst study and design of big schemes are undertaken by bureaus of water. Moreover, woreda level offices are responsible for providing technical support to town water supply offices, in towns where municipalities are not established. Woreda water offices are supported by a woreda water supply sanitation and hygiene team consisting of representatives of sector offices of health, education, women, and agriculture. Such teams are responsible for planning and implementation of water and sanitation activities (MoW, 1999).

2.7.3. Sanitation policy and goals

The sanitation policy of Ethiopia will be focus on improving the health of people 'using local resources more effectively' to increase latrine access and use, and to encourage attitudinal change leading to sanitation and hygiene behavior transformation

The sanitation vision for Ethiopia: 100% adoption of improved (household and institutional) sanitation and hygiene by each community contributing to better health, a safer, cleaner environment, and the socio-economic development of the country. Improving sanitation and hygiene is recognized by the government of Ethiopia as an important precursor to poverty eradication. Although there is some variance in emphasis and approach, sector policies converge around overall environmental health goals which emphasize sanitation and hygiene promotion as key interventions to prevent disease, protect the environment and enhance socio-economic development (MoH,2005).

Objectives' of the policy: To protect and promote the health of the population and assure a friendly and healthy environment by controlling the environmental factors which are the direct and indirect cause for the spread of environmental health-related disease, To increase access to sustainable sanitation services.

Households: All households have access to and to use a sanitary latrine.

Institutions: Appropriate latrines with urinals and hand washing facilities are installed at schools, health posts, markets and public places.

Communal latrines: Where space is limited in peri urban and urban slum areas, appropriate communal latrines are made available under community or private sector management.

Liquid waste management: Effective liquid waste management systems are in place for promoting re-use and recycling. In particular this covers organic matter, and exploring and promoting biogas or ecological sanitation options.

Safe Water: All drinking water supplies are routinely monitored for chemical and bacterial pollutants.

2.7.4. Institutional arrangements for sanitation service delivery in Ethiopia

Following the decentralization policy of the Ethiopia Government, sanitation and hygiene mandate has been given to different levels of governments.

2.7.4.1 Ministry of Health

At federal level the Ministry of Health, through its Hygiene and Environmental Health Department (HEHD), has the primary responsibility for sanitation and hygiene promotion in the country. The instruments governing sanitation in the country are the Health policy, the Environmental Health policy the National Water Resources Management policy, and the recently developed Sanitation Strategy (MoH, 2005).

The major responsibilities of the MoH are finalize and enact the sanitation and hygiene promotion strategy and guidelines through a consultative process; develop the advocacy campaign by raising the sanitation profile, lobbying for earmarked funds and seeking influential sanitation champions; support the testing and development of appropriate Information Education Communication (IEC) materials (e.g. PHAST approaches); liaise closely with training institutions to ensure consensus on the sanitation strategy, the inclusion of 'best practice' in the curriculum, and the equipping of extension staff with appropriate tools; source funds from donors and the private sector promote the sector wide approach; support research, development and dissemination; and collect, develop and disseminate examples of legal and regulatory documents (bylaws) (MoH,2005).

2.7.4.2. National Coordinating Forum

Membership will be drawn from the Ministries of Health, Water Resources, Education and Agriculture as well as the EPA, NGOs, Academic Institutions, private sector sanitary suppliers and donors. As a coordinating and advisory body, the main general responsibilities of the National Coordinating Forum are; implementing policy overview and co-ordination, monitoring and evaluation of national sanitation strategy; facilitating inter sectoral convergence and broad-based stakeholder participation; set standards for sanitary facilities and water including quality monitoring; build up extensive sanitation network; develop impact monitoring systems and assessments; disseminate information and, ensure national meetings rotate between regions(MoH,2005).

2.7.4.3. Regional Health Bureaus

The regional health bureaus will be the principal drivers of sanitation and hygiene promotion through their existing institutional mandates. They will work in tandem with water and education bureaus to ensure integrated planning and coordinated complementary activities. Their work will focus on strengthening woreda capacity and commitment through the following approaches.

Woreda mobilization: The region will mobilize woreda administrations to take responsibility for 100% adoption of improved sanitation and hygiene in their respective woredas.

Woreda advocacy: The region will develop a convincing advocacy package reflecting examples of best practice (emphasizing the methods used) using attractive mixed media for presentation to woreda administrators. This process will be ongoing with examples of best practice continually documented and disseminated.

Capacity building: Human resource assessment and development will be required supporting inter-woreda exchange visits. In addition, regular supportive supervision to woredas to monitor progress against performance contractual agreements will be needed.

Research, monitoring, evaluation and feedback: The region will implement research, development and dissemination of cost effective software and hardware options to facilitate choice and application of appropriate technology such as EcoSan and biogas.

2.7.4.4. Woreda Health desks:

At woreda level, administrator is the key body to spearhead sanitation and hygiene promotion throughout the woreda and to ensure targets set are achieved. The health desk will take the lead but work closely with water, education and rural development desks.

The Key responsibilities of Woreda Health desks are integrated woreda sanitation and hygiene promotion planning and budgeting; planning and implementation arrangements for sanitation and hygiene promotion with kebeles including schools and other institutions; sanitation and hygiene promotion campaigns; budget and resource mobilization; the development of appropriate and sustainable methods (testing a variety of mixed media) to promote enduring individual and collective behaviour, and ultimately social change; community contract management for school and institutional latrine construction; the enactment and enforcement of bylaws for sanitation and hygiene (including water quality); the provision of a sustainable system for supportive supervision and monitoring of sanitation and hygiene promoters. This includes sanitarians, health extension workers and contact women (MoH, 2005).

2.7.4.5. Woreda/Zonal Sanitation and Hygiene Coordinating Forum

The Woreda Coordinating Forum is led by the woreda administrator. Membership is primarily drawn from the Health, Water, Education, Rural Development and Agriculture desks but could also co-opt Women's Affairs, women's associations, the youth and prominent persons such as Kebele administrators, NGOs, learning institutions and HEWs. The main responsibilities of the Woreda Co-ordinating Forumare to oversee and monitor hygiene and sanitation promotion throughout the woreda and ensure coordinated and linked development (MoH, 2005).

2.7.4.6. Local Contractors: NGOs, community based organizations (CBOs) or the private sector could be identified at the woreda or zonal levels to carry out sanitation and hygiene assessments with the community, leading to institutional latrine construction through technical support. Tasks could also include pit digging, slab production, toilet construction (including institutional and public toilets), soap making and the distribution of sanitary products such as soap, taps, jerry cans and pans. Beside, the private sector has been playing the role of consultants, contractors, suppliers of equipment and spare parts in the water sector (MoH, 2005).

2.7.4.7. Woreda Support Groups and Local Service Provider: In the RWSSH Program there will be a role for designated organizations to support the woredas. This role will be to effectively formalize the existing roles of NGOs and local consultants (MoH, 2005).

These days urban water supply and sanitation is become a challenging issue throughout the world specially in developing countries where millions of people have not access to safe drinking water and adequate sanitation facility. As a result, many research have been done both at international and national levels to alleviate the problems. However, the problem is still a rampant threat of the world. Some of the research emphasized at international level, while others at national level without considering the local situations. Furthermore, they are many research, which conducted on water and sanitation separately particularly in rural areas. In all case they have been contributed a lot but some of them are dated and need new research for the current situation. Therefore, this research will tire to look at the issue of water and sanitation together in the context of the local situations beyond what has been done before.

In brief, the survival and well-being of a nation depends upon sustainable development and for this, water supply and sanitation is the basic element. Unfortunately, progress over the decade could not keep up with the population growth. Subsequently, inaccessibility of safe water and adequate sanitation facility strengthens the cycle of disease, poverty and weakness all over the world particularly in developing countries, poor access to safe water and adequate sanitation continues to be a threat to human health. Not only poor access to drinking water, even when water is available in these small towns there are risks of contamination due to several factors like; inappropriate defecation, poor waste disposal and lack of water supply infrastructure such as pipe line for water. Therefore, expanding access to basic water supply and sanitation, integrated with hygiene education can reduce the burden of water-related diseases significantly, by improving the lives of a large part of the world's population.

There are numerous technical options for waste management's. However, it is necessary to choose technically, economically and financially feasible options for sustainable excreta management. Water is important in a number of ways; these include domestic and productive uses. Domestic water use takes the form of drinking, washing, cooking and sanitation, while

productive water uses includes those for agriculture, beer brewing, brick making etc. Water accessibility can be seen within the context of the ease with which people can obtain the services of a facility and function. It increases with decreasing constraint both physical and social.

Likewise water supply and sanitation policy began in Ethiopia in the mid of 1980s. At that time the general policy of the government was to provide water and sanitation through its own public water sector institution with the supply side approach. Further in 1995/6, Ministry for water sector was established and participatory approach was adopted. Provision of water and sanitation was decentralized to regions and woredas. Besides in 2004, Oromia Regional State established Urban Water Supply and Sewerage Service Enterprise, which is managed by town water board. The board has many duties and responsibilities to management the enterprise.

CHAPTER THREE

3. Data analysis and presentation

3.1. Back ground of the study area

Ambo town is located in western of the Oromia Regional state and it is the Zonal town of West Shoa Zone. It is located at a distance of 112 km from Addis Ababa on the main road that leads to western region of Ethiopia. Ambo town was established in 1889 and covers of 8587 hectares of land. It is one of the oldest towns in Ethiopia. The name Ambo came from a lake, which has salt in it. The development of Ambo town is related with the hot spring called “Ambo Tsebel” (Ambo Town municipality, 2009). The name of the town was changed to Hagere Hiwot during the Hailesellase regime and gained its original name in 1974 when the Derge came to power. The town is one of the few favored towns of its time as it had municipal administration and master plan in 1931. Owning its strategic location, it has been serving as administration, transportation

and commercial center of West Shoa Zone. Ambo town has three kebeles and now the town is expanding outwardly and included certain farmers' kebeles such as Awwaro and Illamu Mujja in the east direction, Sankalle Farisi in the west, Gosu Qora in the south and Liban kisose in the north direction (Ambo Town Municipality, 2009).

According to 2009 census conducted by Ambo town municipality, the town is generally characterized by rapid population growth with a growth rate of 4.3%. The average family size of the town is 3.8. Geographical location of Ambo town is $08^0$59'N latitude and $37^0$51'E longitude. The average elevation of the town is 2090 meters above sea level and it varies from 2060 meters to 2140 meters above sea level. The town and its surrounding have mean annual precipitation of 912 millimeter and the mean annual temperature of the town is about 17.6 centigrade. The town is an administrative capital for West Shoa Zone. It provides township plan prepared by the national urban planning institution. The master plan covers different aspects such as development plans road network plans, utility service plans, drainage and land use plan etc (Ambo Town Municipality, 2009).

The landscape of the town area and its surrounding is relatively gently sloped and slightly undulating plain. This is North West-South East trending parallel faults which partly pass through the sandstone. On the down block which is trending North West-South East limestone out-crops are within the town. Some kilometers north of the town exist along east-west reaming normal faculty that threw the Alelu and Debis plain by over 200 meters. The main asphalt road that divides the town in to North and South is 6 kilometers. The other asphalt road has length of 2 kilometers stretching from the center of the town to Ambo Institute of Plant Protection Research Center on the road to Wonchi Lake or Waliso town (Ambo Town municipality, 2009).

The urban government model of Ambo town is a council mayor system whereby the city council has the final authority on urban issues whereas the highest executive powers are vested up on the mayor and the mayor committee (Ambo Town Municipality, 2009).

3.2. Characteristics of sample households

Out of 152 interviewed sample households, 88 (57.9 percent) and 64 (42.1 percent) are male headed and female headed households respectively. The average age for these household heads ranges form the elder (89 years old) to the younger (18 years old). The average households' family size of the respondents was 5.25 ranging from the lower of one person to the highest family size of 12 people.

Table 3.1 Educational status of sample households heads

No	Educational level	Frequency	Percentage
1	Illiterate	17	11.18
2	Elementary	57	37.5
3	High school	39	25.66
4	Diploma	30	19.74
5	BA/BSc degree and above	9	5.92
	Total	**152**	**100**

Source: Sampled household survey, January, 2011

As the above table 3.1 shows, 57 (37.5 percent) of the sample households have an elementary education, which is grade one to eight formal education in both traditional and modern schooling at earlier ages. The second large group 39 (25.66 percent) are grade nine to twelve or high school education. Those households who are diploma holders (including 10+1, 10+2 and 10+3) and illiterate are 30 (19.74 percent) and 17 (11.18 percent) respectively while the rest 9 (5.92 percent) of the sample households are university degree holders and above.

Table 3.2 Marital status of sample households heads

No	Marital status	Frequency	Percentage
1	Married	122	80.26
2	Single	9	5.92
3	Divorced	11	7.24
4	Widow	10	6.58

	Total	**152**	**100**

Source: Sampled household survey, January, 2011

Regarding to the marital status of interviewed sample households, out of 152 heads of households in sample population, 122 (80. 26 percent) are married, 9 (5.92 percent) never got married leaving the rest 11 (7.24 percent) and 10 (6.58 percent) are divorced and widow respectively.

Table 3.3 Employment status of the sample households heads

No	Employment status	Frequency	Percentage
1	Employed	135	88.8
2	Unemployed	17	11.2
	Total	**152**	**100**

Source: Sampled household survey, January, 2011

According to the study result shown in table 3.3, 135 (88.8 percent) of the interviewed households are employed while 17 (11.2 percent) are unemployed. Those who are employed include employees of different government and nongovernment institutions, pensioners, daily laborers and business persons. The unemployed households reported that they are dependent up on help from relatives, income from farm land in the rural areas and other activities which are not sustainable sources of income.

Table 3.4 House ownership of sample households

No	House ownership	Frequency	Percentage
1	Private	87	57.24
2	Rent from kebele	35	23.03
	Rent from private	30	19.73
	Total	**152**	**100**

Source: Sampled household survey, January, 2011

Regarding house ownership, 87 (57.24 percent) of sample households live in their own residences and the rest 35 (23.03 percent) and 30 (19.73 percent) households live in rent house from kebele administration and private respectively.

Table 3.5 Income categories of the sample households

No	Monthly income in birr	Frequency	Percentage
1	<300	31	20.39
2	301-600	63	41.45
3	600-900	24	15.79
4	901-1200	11	7.24
5	1201-1500	9	5.92
6	151-1800	6	3.95
7	Above 1801	3	1.97
8	No response	5	3.29
	Total	**152**	**100**

Source: Sampled household survey, January, 2011

Household income is the most determinant factors of individual living standard in general and consumption in particular. The above table shows monthly income size for sample households. Accordingly the average monthly income of the sample households is 602.15 birr per month, which ranges from 95 birr to 3184 birr. On the other hand, when this average income is divided to the average family size of the sample households monthly and daily income is 114.7 birr and 3.84 birr respectively, which is below 0.25 US dollars per day per person.

As shown in table 3.5, out of 152 interviewed households, about 94 (61.84 percent) earn less than or equal to 600 birr per month, which is equivalent to 0.25 US dollar per day per family (as the average family size is 5.25). Those who earn between 601 birr to 900 birr per month constitute 24 (15.78 percent) of the households, while the rest 26 (17.11 percent), 3 (1.97 percent) and 5 (3.28 percent) households earn between 901 birr and 1800 birr, above 1800 birr and no response respectively.

3.3. Water supply in Ambo town

Water supply for Ambo town was started in 1960 during the government of Hailesillase for the king residence by channel. After 1962, the town was visited by a foreigner man and the man had promised to change the water supply system to pipe line and the pumper was brought from England and Italy. The first pipeline was laid for Ambo Ethiopian Hotel and Ambo College of Agriculture Institute in 1962(ATWSSSE, 2009).

The existing water sources for Ambo town are Huluka River intake wire and two boreholes where the former is the main water supply source of the town. The location of water intake where it is tapped is south east of the town. It is there that water is tapped. The unclean water is purified in the purifier and the settled out of the water with the help of aluminum. The remaining particles are sieved out by filter. Then water is led to the pumping station to be forced to the two treatment plants which are located in kebele 02 along the Addis Ababa Ambo road. Here water is treated and then led to reservoir. From the reservoir, pure water is distributed to users by distribution networks. There are two water treatment plants in the town one of which is not currently functioning due to long year service (Ambo Town Municipality, 2009).

The river intake system was constructed in between 1977-1980 and started giving service in 1981 to serve for the design period of ten years and for 25,000 populations. Twenty two years later in 2003, borehole I was drilled by town water office to increase water supply of the town. Besides, another borehole II was drilled in 2008 (ATWSSSE, 2009).

The annual water production capacity of the three sources, Huluka River, borehole I and borehole II are 453,970m^3, 151,110m^3 and 137,970m^3 respectively. But Huluka River alone has potential to generate 82,730,589m^3 per year, which is more than 111 times the total water currently produced in Ambo town from the three sources stated above and 182 times what it currently producing. In other word, only 0.55 percent of the total producing potential of the river is used currently (ATWSSSE, 2009).

3.3.1. Water distribution

Water distribution is one of the most important tasks of any water service institution, which involves a high amount of investment. Distribution work starts from the point of water production, where water is produced and made ready to be used. Then, through large networks,

water is distributed to end users. As matter of fact, the town has a total of 42 kilometers length network, which includes both primary and secondary distribution pipe line and 21 public taps, which are distributed throughout the town and managed by user villages. Thus, currently the enterprise has 5428 connected customers, which are private, government and business (ATWSSSE, 2010).

Table 3.6 Types of customers by connection and progresses

No	**Types of customers**	**Years**			
		2007	**2008**	**2009**	**2010**
1	Private	3844	4204	4599	5088
2	Government	172	172	174	160
3	Business	94	94	94	180
	Total	**4110**	**4470**	**4867**	**5428**

Source: ATWSSSE, 2010

As shown in table 3.6, the number of private connection is slightly increasing from year to year; yet the number of households who have no connection is more than three times the connected one.

In other word, there are only 5088 households who have private connection of the total of 15223 urban households constituting 33.42 percent.

3.3.2. Water coverage

Urban water supply coverage is the most important concern in water supply system and also major issue in the achievement of MDGs. Hence, the Ethiopian Government has been working to attain water coverage as pre the MDGs. Accordingly, the Ethiopian Government MDGs report of 2010 indicated that national water coverage is 91.5% and 65.85% in urban and rural respectively. Parallel to the federal government, Oromia Water Resource Management Bureau has been working to reach the MDGs water coverage and the progress of urban potable water supply coverage in the region for the last five years is shown as follows.

Table 3.7 Oromia Water Resource Management Bureau five years urban water coverage

Description	Years				
	2006	2007	2008	2009	2010
Total urban population	3,562,162	3,370,040	3,552,062	3,687,215	3,856,827
Urban population served with potable water	2,963,185	3,058,196	3,140,148	3,188,520	3,246,838
Urban potable water coverage (%)	**83.2**	**90.7**	**88.6**	**86.5**	**84.2**

Source: OWRMB, 2010

As table 3.7 shows, the number of urban potable water supply coverage in the region has been decreasing in the last three years even if the number of urban population served with potable water is slightly increasing each year. This implies that the rate of population growth is greater than the rate of water supply. On the other hand, the 2010 Ethiopian MDGs report indicated that national urban potable water supply coverage reached 91.5 percent. Further, UN-HABITAT (2008) before three years reported that, Ambo town water coverage reached 70 percent basing Water Supply Authority of the town. Although all these reports and documents indicated that urban water supply coverage reached more than 80 percent except the UN-HABITAT.

The situation in Ambo town is not match with these reports. According to the information obtained from assessment of different documents in ATWSSSE and from interview conducted with general manager of ATWSSSE, the current actual water supply coverage of the town is 40.9 percent.

This shows that, the water supply coverage of Ambo town is too low, which is below half of both the national and the regional reports. In other word, about 59.1 percent of urban water supply coverage of Ambo town still remains to attain the Ethiopia Government Universal Access Program of 2005, which will be achieved by 2012.

Table 3.8 Daily water demand and supply projection of Ambo town (2011-2018) in m^3/d

Description	Years

	2011	2012	2013	2014	2015	2016	2017	2018
Demand in m^3/d	4074	4204	4342	4483	4632	4788	4949	5118
Supply in m^3/d	1666.29	1666.29	1666.29	1666.29	1666.29	1666.29	1666.29	1666.29
Difference	2407.71	2537.71	2675.71	2861.71	2965.71	3121.71	382.71	3451.71
% of achieved demand	**40.9**	**40**	**38**	**37**	**36**	**35**	**34**	**33**

Source: ATWSSSE, 2009

The current daily supply met only 40.9% of the total town's daily demand, which is too low compared with the water demand of the town and declining from year to year as shown in the above table 3.8. The projection is calculated based on the existing water production in the town.

In line with this, the general manager of WSSSE stated that, water supply coverage of the town is inadequate and has becoming a serious problem. Thus, this year (2011) ATWSSSE planned to drill one borehole, which will be completed at the end of this year (2011) and expected to generate 74,520m^3 per year. Then, the coverage may rise at least to 50 percent. However, this does not guarantee everlasting mean the solution for Ambo town's water supply problem, it is rather to minimize the short term severe.

Bringing long term solution of water supply problem in the town is beyond the capacity of ATWSSSE; as there are financial, material and technical constraints. The manager also stated that, Ambo town is naturally rich in both ground and surface water resources but the problem is how this water reaches the people. Hence, he added that the enterprise has made many discussions with Oromia Water Resource Management Bureau and the bureau conducted a prefeasibility study in the town in 2009 to start a big water project. Thus, if the project implemented as per the prefeasibility study, he hoped that the current and long run water supply problems of the town would be solved. But, he unconfidently remarked that no specific date when the project will be started.

3.3.4. Water sources of sample households

On the whole, people get water from two main sources. Such as, piped system and/or non-piped systems. Piped water supply is the safest and reliable sources of water while non piped systems are unprotected and unsafe, which include rivers, lakes hand dug wells and other unprotected sources. Hence, as Ambo town is an old and fast growing town, the residents have been supplied with piped water by ATWSSSE. ATWSSSE is the only producer and supplier of pipe water system to urban dwellers. Therefore, households in the study area get piped water through different connection system as shown in the following table.

Table 3.9 Households sources of water

No	Water supply systems	Frequency	Percentage
1	Private yard connection	89	58.55
4	Public tap	28	18.42
5	From water vendor (VEN)	35	23.02
	Total	**152**	**100**

Source: Sampled household survey, January, 2011

From the total 152 interviewed sample households, about 89 (58.55 present) have private yard connection, 35 (23.02 percent) get water from private seller and the remaining 28 (18.42 present) collect water from public tap. In other word, about 63 (41.44 percent) of the sample households do not have private connection and depended on private seller and public tab for their water sources. Furthermore, according to the information from 63 (41.44 percent) households who are using water from public tap and vender or private seller, these sources are used mainly due to the lack of finance, shortage of water supply in the town, too complicated procedures set by TWSSSE to get private connection and unavailability of public tap at nearby. Furthermore, since distribution line is not available at nearby, installation, material and connection tasks involve much higher costs depending on the location of house from the existing water network. The cost ranges from minimum of 650 birr to a maximum 1000 birr per family household on average, which the poor cannot afford. Alongside the criteria set by ATWSSSE, which are compulsory to get connection, are discouraging the household to get private water connection.

Besides, 63 (41.44 percent) of the sample households who collect water from private seller and public tap, were also asked about the distance of public tap from their homes. Accordingly, 37 (58.73 percent) reported that public tap is more than 800 meters far away from their homes, which is more than four times the 200 meters recommended by WHO. 14 (22.22 percent) said that public is found between 500 meters to 800 meters from their homes while the rest 7 (11.11 percent) and 5 (7.94 percent) said that public tap is found between 200 meters to 500 meters and less than 200 meters from their home respectively. From this, one can understand how much it is difficult for households to collect water from these distances. As a result they buy and consume water little by little at relatively high cost from a nearby vendor.

In line with this, the discussion made with general manager of ATWSSSE indicated that, the households' demand for private connation is very high and increasing from time to time in the town. But the water supply falls short of the community demand due to its shortage at production and unavailability of distribution lines in many areas. Further, leave alone for new connection; the existing water distribution lines lack enough power for the already connected households to enjoy full water supply service. Wastage of water due to old water supply system is also aggravating the water problems in the town.

The water connection procedure is the following. The application is received by the head of the customer service section and routed through experts of technical staff, finance and customer service, and head of sections.

1. The applicant has to either provide evidence of housing ownership letter of recommendation from kebele government house administering agency.
2. In case the house is illegal, the individual willingness to disconnection from the system at any time is required to accept the application for connection.
3. Collection of permission and estimation fee and material requirements specification form will be opened.
4. If the connection fee is not paid within 30 days after the customer has been informed of the requested connections payment, the customer is asked to pay again the estimation fee.

5. The technical team estimates the materials requirement for connection and enters on material requirement specification from.
6. The accounts section staff transfers details form the material requirement specification form to a water connection estimation form.
7. The connection fee encompasses 40% service fee, 25% transits, water material deposited excavation, etc.
8. The service fee (40%) based on the higher of the actual cost of materials purchased by the customer or the price Town water supply and sanitation service enterprise (TWSSSE) would have changed.
9. After the collection of the total amount the customer services section will connect the customer.

The connection fees are onetime expenses that should be incurred in order to get private water connection either at the house or in the yard. But the complexity of the procedure on average takes 28 days for an individual to get connection and this costs 550 birr (interview with general manager of ATWSSSE basing a research done by the enterprise). However, after the implementation of business processing and reengineering stated, the problems have been getting improved to some extent. To solve these problems from its root, the enterprise is discussing with water board and municipality.

In addition to taking long time, these procedures expose the households to other cost. For instance, as under criteria number one providing of evidence of house ownership letter. If the household is not paid house rent for private or rent for kebele house, he or she has to pay first the rent to get the letter. Due to this fact, many people find it difficult to go through all these procedures to get connection. Consequently, they depend on public tap and vendors for their water sources and pay more costs per jarican (water container used for both fetching and storing, which contains 5 litters to 20 litters).

3.3.5. Water demand of the sample households

In different urban areas, especially where shortage of water supply and high frequency of interruption take place, water is not only a basic need but also a source of income. It is used as

input to petty trades such as sale of Farso and other local alcoholic drinks (traditional home processed bear) to generate income.

Table 3.10 Purpose of water for sample households

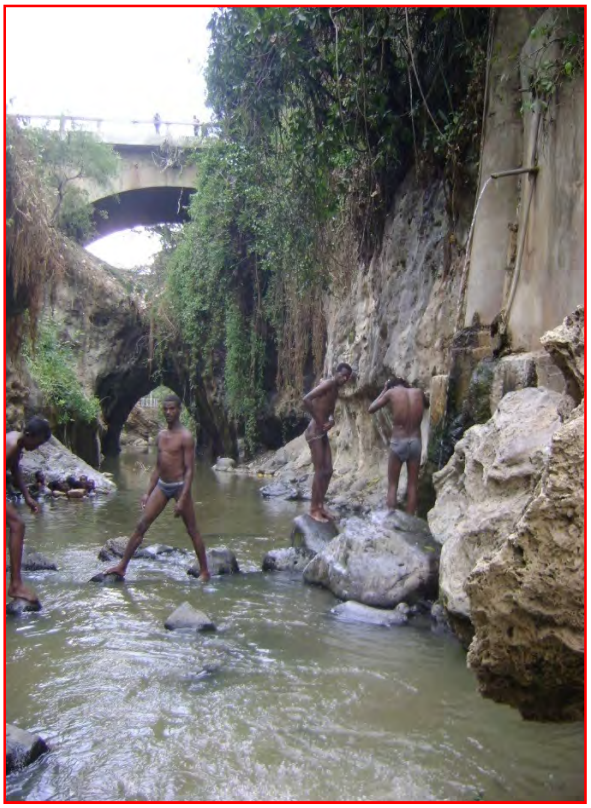
No	Purpose of water	Frequency	Percentage
1	Domestic	134	88.2
2	Commercial	0	0.0
3	Both domestic and commercial	18	11.8
	Total	**152**	**100**

Source: Sampled household survey, January, 2011

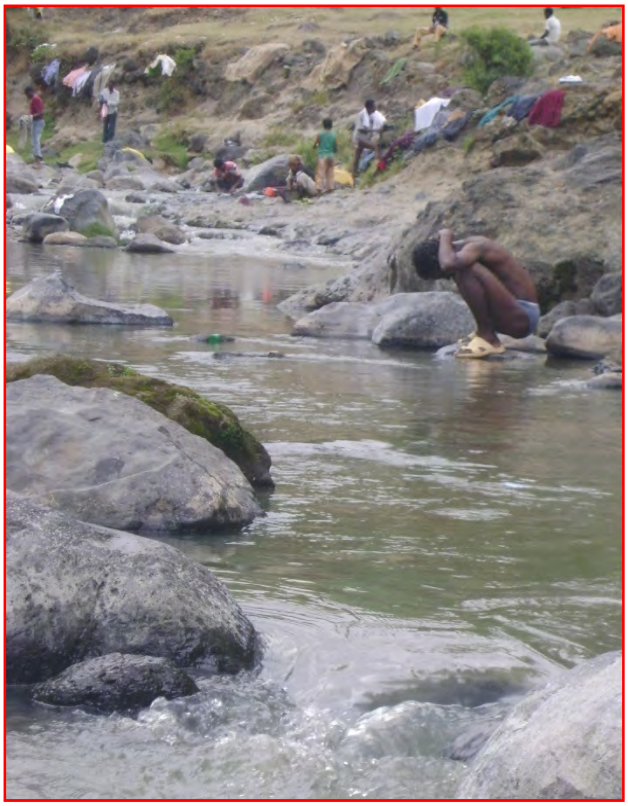
The study result shows that, water is needed by large number 134 (88.2 percent) of the interviewed households for domestic use; this includes water for drinking, cooking, bathing, cleaning and gardening while the rest 18 (11.8 percent) use for both commercial and domestic purpose; which include, making of Farso , and Areke to generate income. The respondents also reported that, they do not always use piped water (for both domestic and commercial purposes). They sometimes fetch from the rivers and also use rain water harvested during the rainy season for washing and cleaning. This is to safe water and minimizes its expenditures.

Concerning bathing room, out of 152 interviewed households, only 7 (4.6 present) households own bathroom whereas the largest portion of the households 145 (95.4 percent) have no bathroom.Based on the 145 household who have no bath room, 140 (96.55 percent) take bathing in safa. The second large number, 3 (2.06 percent) use river for bathing and the rest, 2 (1.38 percent) get bathing service at vender (i.e. Ambo Tsebel) by paying 7.50 birr per person per hour.

In addition to the information from the interviewed sample households, during field observation many young people were taking bath in Huluka River especially during the weekend.



Figure, 3.1 People bathing in Huluka River.



Figure, 3.2 People washing &bathing in Huluka River.

With respect to bathing facility, the respondents were also asked their rate of taking bath. Accordingly, 128 (84.2 percent) take bath once per week, 16 (10.5 percent) take twice per week whereas the remaining, 5 (3.29 percent) and 3 (1.97 percent) take bath 3 times per week and everyday respectively.

3.3.6. Water accessibility

Water accessibility is an adequate amount of water, which is needed to satisfy metabolic, hygienic and domestic requirements at least 20 litters of safe water per person per day (UN-HABITAT, 2003). In urban areas the water source may be a public fountain or a stand pipe at least 20 liters of safe water per person per day and not more than 200 meters away from residence (WHO 2004). In addition to adequacy, affordability of water also has significant influence on the use of water and selection of water sources. Households with the lowest levels of access to safe water supply frequently pay more for their water than these households

connected to a piped water system. Beside high water cost forces households to use small quantities of water and alternative sources of poorer quality that represent a greater risk to health (Public Health Protection, 2000).

Furthermore, high costs of water may reduce the volumes of water used by households, which in turn may influence hygiene practices and increase risks of disease transmission. Many alternative water sources (notably vendors) also involve costs, and these costs should be included in evaluations of affordability. In addition to recurrent costs, the costs for initial acquisition of a connection should also be considered when evaluating affordability (WHO, 2008).

In relation to this, the Oromia National State proclamation number 78/2004 article (5) sub article (1) indicated that, water enterprise provides potable and adequate water supply to the urban dwellers in and around the town and ensures that the water supplied is to the standard of the WHO, which is 20 litters of safe water per person per day within 200 meters. In line with this, the situation of potable water accessibility in Ambo town is discussed as follows. As per the information obtained from the discussion with the general manager of ATWSSSE and assessment of different documents, water accessibility standards were not well applied in the town. This is due to shortage of water supply and inadequate distribution lines throughout the town, which is a cause of high cost of connection.

Table 3.11 Average water consumption levels of the sample households

No	Sources of water	Frequency	percentage	Average family size	Total water collected per day per litter	Average consumption l/p/d
1	Private yard connection	89	58.55	464	4895	10.55
2	Public tap	28	18.42	149	1330	8.93

3	From vendors	35	23.03	185	1205	6.51
	Total	**152**	**100**	**798**	**7430**	**9.31**

Source: Sampled household survey, January, 2011

The results in the above table indicate that, water consumption of the sample household is varying from one water source to other water source. Accordingly, the average litters per person per day consumption of households from private yard connection, public tap and vendor sellers are 10.55, 8.93 and 6.51 respectively.

moreover, the overall average water consumption of the sample households is 9.31litters per person per day, which is less than half of the 20 l/p/d what is recommended by the WHO and UAP. This implies that the amount of safe water consumption of households in the study area is very low as per the international and national standard. On the other hand, inaccessibility of safe water in the town may force the community to use other unprotected sources of water and this has big socio economic problems or impacts on their livelihood. Therefore, big efforts should be made by ATWSSSE and the regional government to increase potable water accessibility in the town to get the advantages of potable water accessibility as well as to meet the MDGs.

3.3.7. Water tariff

Water tariff is also the major determinant of water accessibility. Basically there are two types of water tariffs, which are connection tariff and usage tariff. Connection tariff includes installation, material and connection tasks while usage tariff depends up on the amount of water used with additional meter. The usage tariff is a mixed system i.e. uniform tariff rate for public tap and blocked tariff with progressive rate tied to consumption for service connection (ATWSSSE, 2010).

Table 3.12 Water consumption tariff

No	Consumption block (m^3) per month	Tariff in birr per month
1	1-3	3.00
2	4-7	3.50
3	8-10	3.95

4	>2	4.5o
5	Public fountain	2.50

Source ATWSSSE, 2010

According to ATWSSSE (2009), in addition to water consumption tariff, individual pay water meter rent with the monthly water bill. The water meter rent is set progressively depending on the size of the water meter. The following table shows the existing monthly water meter rent.

Table 3.13 Existing water meter rent per month

No	Monthly payment in birr	Water meter (WM) size
1	2	½
2	3	¾
3	10	1
4	15	1 ½
5	20	2

Source: ATWSSSE, 2010

Further, the general manager of ATSSSE stated that the water tariff stated above was set by OWRMB and sent to Ambo Town Water Office in 2005 as regulation. Since then, the tariff structure or rate has been applied in the town for more than five years without any amendments. Hence, it is difficult to accurately know the affordability of water tariff by the community without deep assessment. In general, due to increasing cost of material, the community cannot easily afford especially the connection cost. On the other hand, the Oromia Regional State proclamation number 78/2004 article (14) sub article (2) stated that, the town water board has the power to appraise water tariff and pass it to the concerned body for approval. However, the town's water board has not made any amendments on water tariff rates since it was established in 2004 by the Oromia Regional State proclamation 78/2004. The OWRMB has also not either supported the board to discharge its responsibilities as per the proclamation or made follow up what the board is doing.

Table 3.14 Monthly payments for water service by households from different sources

No	Monthly tariff in birr	Private yard connection		Water from vendors		Water from public fountain	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1	<20	39	43.82	1	2.86	10	35.71
2	21-40	25	28.09	2	5.71	15	53.57
3	41-60	18	20.22	5	14.29	3	10.71
4	61-80	7	7.6	12	34.28	-	-
5	81-100	-	-	11	31.42	-	-
6	101-120	-	-	3	8.57	-	-
7	>120	-	-	1	2.86	-	-
	Total	**89**	**100**	**35**	**100**	**28**	**100**

Source: Sampled household survey, January, 2011

The monthly water expenditure of the interviewed households is different for different water sources as shown on the above table 3.14, out of 89 households who have private yard connection, the largest number, 39 (43.28 percent) pay less than 20 birr per month for water consumption, 25 (28.09 percent) pay between 21 birr and 40 birr, while the remaining 18 (20.22 percent) and 7 (7.6 percent) pay 41 birr to 60 birr and 61 birr to 80 birr respectively.

When we see the water consumption expenditure of these households who get water from vendors, the largest portion 12 (34.28 percent) of the 35 households pay 61 birr to 80 birr per month, 11 (31.42 percent) pay 81 birr to100 birr, 5 (14.29 percent) pay 41 birr to 60 birr, 2 (5.71 percent) pay 21 birr to 40 birr and the rest 1 (2.86 percent) and 1 (2.86 percent) pay less than 20 birr and above 121 birr respectively. With the same token, out of 28 households those who use public tap for water source, 15 (53.57 percent) pay 21 birr to 40 birr per month, and the remaining 10 (35.71 percent) and 3 (10.71 percent) pay less than 20 birr and 41 birr to 60 birr per month respectively.

From this one can easily compare how the water consumption expenditure of the sample households is differing from one water source to another. In other words, the water consumption cost to those households who buy water from vendors is very high when compared with those who have private yard connection and public tap users. Meanwhile, the amount of water

consumption levels of these households i.e. those who buy from vendors is also too low as is evidence from table 3.11.

This implies that, households who have no yard connection face many problems. On the one hand, they pay high cost for water consumption; on the other hand, their water consumption level is low. Therefore, to minimize the existing problem, ATWSSSE should increase its water supply capacity and expand distribution lines and help the people get the line at nearby with low cost. Besides, for low income and slum areas, providing private connection on credit basis for the urban dweller or introducing alternative technologies, which will enable them to have access to water connection. Installing additional public tap whose tariff setting is meant for low income people will also narrow the gap. According to the information from some households who use public tap, the opening hours is not convenient but vary from place to place. In some areas service is available only for two hours per day, which is 6:00am to 8:00am in the morning and in other areas for three hours i.e. from 6:00am to 8:00am in the morning and from 5:00pm to 6:00pm in the afternoon.

3.3.8. Water interruptions

Interruptions to drinking-water supply either through intermittent sources or resulting from engineering inefficiencies are a major determinant of the access to and quality of drinking-water. Daily or weekly discontinuity results in low supply pressure and a consequent risk of in-pipe recontamination. Other consequences include reduced availability and lower volume use, which adversely affect hygiene. Households' water storage may be necessary, and this may lead to an increase in the risk of contamination during such storage and associated handling. Seasonal discontinuity often forces users to obtain water from inferior and distant sources. Hence, in addition to the obvious reduction in quality and quantity, time is wasted in water collection (WHO, 2008).

Water interruption in Ambo town is becoming a big challenge for the last ten years and affecting the life of the residents in many ways.

Table 3.15 Frequency of water interruptions

No	Frequency of interruption	Frequency	Percentage
1	Once every day	19	12.5
2	Two to three times per week	74	48.7
3	Once a week	9	5.9
4	Once in two weeks	7	5.3
5	Once a month	16	10.53
6	Once in two months	6	3.95
7	No interruption	3	2
8	Other	18	11.84
	Total	**152**	**100**

Source: Sampled household survey, January, 2011

The frequency of water interruption shown in table 3.15 confirms how the water interruption problem is serious in the study area. Out of 152 interviewed households, the largest portion 74 (48.7 percent) has claimed that water interruption occurred two to three times per week. The next large number 19 (12.5 percent) have experienced daily water interruption, 18 (11.84 percent) are other households who have no access to water all the day time. Subsequently 16 (10.53 percent) households who have faced monthly water interruption and these people are those who have been leaving in the center of the town and connected to the primary line. Next to this, 9 (5.9 percent) households stated that water interruption occurred once a weak. Besides 7 (5.3 percents) of the respondent said that water interruption occurs once in two weeks. And only 3 (2 percents) reported there was no water interruption except when the tube is washed.

Further, 147 (96.71 percent) of the respondents stated that, there is no any notice from WSSSE for interruption and 5 (3.3 percent) reported that notice is given in advance. The worst situation is that there is no rotation or shift for interruption i.e. when residents in some area receive water service continuously for more than a month, those residing in some other areas are ignored such service for about a month and above. This shows that there is no equal water distribution among the residents of the town. Hence, although it is difficult to solve the problem at once, it is better

to give notice in advance and make the interruption by shift or rotation rather than serving some areas continuously while other suffer from continuous water interruption.

In addition to the frequency of water interruption, the longer duration of interruption aggravated the severity of water problems from time to time in Ambo town. Out of 152 interviewed sample households, 22 (14.47 percent) reported that, on average, there was no water connection continuously for three and above days per week, which is at least 12 days per month 144 days per year or four month and two weeks per year. 68 (44.73 percent) respondents said that, there was no connection continuously for one to two days every week which also implies no water for four to eight days per month, 17 (11.18 percent) indicated that, water is interrupted for one full day every week. 14 (9.21 percent) said that there is no water for one day every two weeks. The remaining group 15 (9.88 percent), 9 (5.92 percent) and 7 (4.61 percent) stated that there is no water for one day per month, one day in two months and did not remember respectively.

Further the households were also asked about the reasons for continuous water supply interruption, out of whom 124 (81.58 percent) could not clearly know the reasons, 28 (18.24 percent) gave different reasons like old water supply system, shortage of water supply and poor maintenance.

In line with this, the information from the interview with the general manager of ATWSSSE and the deputy of Ambo health office also indicated that, in addition to the above stated water supply problems, continuous water interruption is also another chief problem in the town. They stated attributed interruption problems to the following major factors.

1. Topography of the Town: Topography of the land highly determines the flow of piped water, that is, the flow pressure is high at lower altitude low pressure at higher latitude. Hence, the topography of Ambo town is gently sloped and undulated while at some areas it is higher sloped and mountain area also seen in the town (characterized by plain, gentle slope or higher slope and undulated plains) and this has deferent impact on the pressures of water to reach all areas. Consequently, when some areas get water for more than a month without interruption other areas like Teltelle area do not get water supply all the day time.

2. Too old water supply system: The water distribution system of Ambo was constructed before 30 years in between 1977-1980 when the number of urban population was 25,000. Hence, due to its long years' service, the system frequently breaks down and takes much more time and cost of maintenance.

3. Nature of the soil: The soil of Ambo town and its area is black with cracking character in the dry season and immersive in the rainy season and this breaks the old water supply system and water flows outside. Sometimes, it is difficult to even find where the system breaks.

4. Shortage of water power due to the unbalance of the demanded and produced water in the town.

5. Due to electric power interruption: The water supply system is electrical and no reserve generator. Hence, in case of power interruption so is the water supply.

Although water interruption occurred in most urban areas of the world, the frequency and the duration of interruption vary from nation to nation and place to place within a nation. Therefore, people use different methods to overcome water shortage problem during interruption such as storage, buying from vendors and other unprotected sources.

Likewise, the interviewed sample households confirm this fac. If the interruption is not in the whole town they buy by travelling two to three kilometers, which takes more than 6 hours for round trip and queue in the water point and pay between 0.75 birr to 1.5 birr per 20 litters of jarican. Otherwise they collect from rivers such as Huluka, Alaltu and Teltelle, which are much polluted and not safe for drinking. In the way, they sometimes faces various problems such as sexual harassment, loss of property like mobile phone, robbers get into their home when women and girls move along distance in the night and late evening to fetch water

Table 3. 16 Sample households' alternative sources of water during interruptions

No	Alternative sources	Frequency	Percentage
1	Storage	6	3.95
2	From uninterrupted areas	119	78.29
3	Unprotected sources	23	15.13
4	Others	4	2.63
	Total	**152**	**100**

Source: Sampled household survey, January, 2011

As indicated in table 3.16, 119 (78.29 percent) of the interviewed households buy from uninterrupted areas, 23 (15.13 percent) use unprotected sources, 6 (3.95 percent) have storage at their home. Although, it is sensible to use storage to overcome water shortage during interception, only 6 (3.94 percent) of the 152 interviewed households have storage, which has the capacity to carry 20 litters to 200 litters. While the large number 146 (96.35 percent) households reported that, they did not have water storage due to its high cost to buy as 20 litters capacity container costs 15 birr.

3.3.9.Water quality

Water quality is in the heart of community health and it can be checked through pathological test, colour, taste and odor. Hence, the sample households were asked their perception about the taste, colour and odor pathological or sample test is not included in the study as it needs laboratory examination. The taste quality from users' perception; about 127 (83.55 percent) indicated good water taste and the remaining 26 (16.44 percent) said that water has strong taste like salt and chlorine. Regarding the color of water, good quality water is usually colorless. Hence, from the total of 152 interviewed households, 113 (74.34 percent) said that it is colorless while the rest 39 (25.65 percent) reported that, the water color was from brownish to muddy during rainy season and when water appears after long interruption period it form such color. Concerning the odor, 121 (79.6 percent) households reported that, good odor and the rest 31 (20.39 percent) said that, the odor of water is sometimes like rusty iron and muddy during rainy season and when water interruption is restored. In addition to the households' perception, the interview conducted with the deputy of Ambo town health office also indicated that the

pathological test of the water was done in 2009 at Paster Hospital, Addis Ababa and the result is potable. In Ambo town, Huluka River, Teltelle and Alaltu are the major alternative sources of water for both domestic and commercial purposes during interruption period. Where Huluka River is referred to as the main source of piped water by wire intake as well as the flow river used for different purposes. However, these rivers are polluted from different sources like solid wastes dumped to rivers from households, commercial areas and hotels, detaching on the bank of the rivers connecting septic tanks latrine effluent pipes directly to the river courses, and washing of clothes along the rivers courses and bathing, which discharge detergents to the rivers are some of the major pollutant of water. Especially Huluka River, which passes through the center of the town, is the more used by the people and the more polluted water in the area.

Figure, 3.3 Liquid wastes flow in to Huluka river from private compound and toilet.

Figure, 3.4 Waste flow in to Huluka river from private toilets.

3.4.Sanitation

Sanitation is one of the most indispensable facilities in human life when accessed to and using those facilities enhance quality of health, social well-being and economic productivity and

ensure all rounded development. In contrast, inadequate sanitation has a negative impact on households, communities, environments and countries.

According to (WHO, 2002), access to sanitation services includes safety and privacy in the use of these services. Sanitation coverage is the proportion of people using improved sanitation facilities public sewer connection, septic system connection, pour flush latrine, ventilated improved pit latrine, simple pit latrine. However, the sanitation situation in Ambo town has been deteriorating from time to time. Factors such as lack of toilet facilities, inadequate water supply, high water interruption, lack of sewerage system, inadequate clearing/suction services, poor abattoir services are the major deteriorating of sanitation.

3.4.1. Latrine facility

Latrine is a basic infrastructure for community health care, and reducing contamination and pollution water in particular and thereby creating a healthy environment in general. Hence, pit latrine provision in Ambo town summarized in the following table.

Table 3.17 Latrine service in Ambo town

Years	**Latrines**			**Total number of urban households**	**Coverage**
	Total	Improved	unimproved		
2007	4171	NA*	NA*	13993	29.8
2008	4808	NA*	NA*	14595	32.94
2009	6456	NA*	NA*	15223	42.42
2010	**8654**	**4170**	**4484**	**16561**	**Total 52.25**
					Improved (25.18)

NA* = not available

Source: Ambo town health office 2010

As indicated in table 3.17, the number of latrines and the percentage of coverage have been slightly increasing from year to year, but there is no data that shows the number of improved and unimproved latrines except in the year 2010. Moreover, the information obtained from different documents in the town's health office and interview conducted with two expertise of the office indicated that, sanitation coverage is calculated simply by dividing the total number of latrine to

the total number of urban households' without considering the number of improved and unimproved latrines. And this does not show the accurate urban sanitation coverage.

According to the regional sanitation policy, improved sanitation coverage is calculated from the number of improved latrines but not from the total number of latrine in the area. Therefore, the current accurate improved sanitation coverage in Ambo town is 25.18 percent but not 52.25 percent. Table 3.17 shows further that, in the past two years (i.e. 2009 and 2010) progress in the number of latrines was better than the previous years (i.e. 2007 and 2008). This is due to the fact that, more than 1500 condominium houses were constructed in the town and assumed that each room has a toilet. However, almost all those houses have not been handed over to the community and this implies that the toilets in all the condominium houses have not started giving service.

Table 3.18 Latrine facilities by sample households

No	Types of latrine	Frequency	Percentage
1	Ventilated improved pit latrine	23	15.13
2	Simple pit latrine	22	14.47
3	Unimproved pit latrine	79	51.97
4	Other	28	18.42
	Total	**152**	**100**

Source: Sampled household survey, January, 2011

Out of 152 interviewed households, 23 (15.13 percent) have ventilated improved pit (VIP) latrine, 22 (14.47 percent) have pit latrine where the pit was well covered by a slab, the majority 79 (51.97 percent) use unimproved pit latrines, the rest 28 (18.42 percent) are others, out of which 5 (3.2 percent) of the total sample households use communal latrine while 23 (15.13 percent) have no latrine. According to the information from interviewed households who use unimproved latrine, the latrines were hand dug from soil and may either collapse or sink during summer season because of heavy rain. Some of the latrines have no coverage at all where some are covered with old plastic sheeting. Moreover, those who have no latrine at all, defecate in bush, on the side of the river in the open space particularly children.

Figure, 3.5 People defected near the river.

Figure, 3.6 Solid waste dumped near the river

I am 74 years old and living in kebele's house I don't have toilet in my garden since five years because on one hand I do not have money to construct toilet from stone to use for a long time, on the anther hand there is no adequate space in my garden for hand dug pit, which cannot serve more than a year. The garden has already full of hand dug pit toilet and there is no communal toilet around my residence. Thus, I do not have any option and I use the side of Huluka River during the night time as my primary toilet. More over I feel ashamed when relatives visits me my home and ask for toilet. Sometimes I ask one of my neighbors for their cooperation.

The provision of public and communal latrine to urban dwellers is a basic element for sanitation services. According to the information obtained from mayor of the town, there are only 8 blocks of communal latrines, which have 37 sits or holes, in different places in the town. But when this is compared to the total land area of the town, which is 8587 hectares, approximately one block communal latrine per 1000 hectares of land. Hence, it is difficult to say that community has communal latrine. Further, out of 152 interviewed households, 143 (94.08 percent) reported that, there is no common toilets in their village where only small number of households 9 (5.92 percent) claimed that communal latrines available in their village. However, these latrines are not

appropriately functioning due to long years' service and lack of appropriate management both by users and municipality.

Regarding convenience of the existing communal latrine, the respondents stated that, there is no separation for male and female, no proper location (some were located in the center of the village) and no timely cleaning. All these make the communal toilet facility very poor in the town. Besides the households response almost all the latrines visited during field survey had not been properly functioning due to lack of concern for treatment. The superstructures of some latrines were worn-out; some are full of sludge and have very bad smell, males and females are waiting for a latrine in a queue, which is not convenient and it is also not safe for children and elders.

Figure,3.8 Dirty public toilet & Farso house near the toilet.

Therefore, policy makers have to consider the sanitation problem in the town and provide genuine communal latrines especially in the slum and low income groups. In connection with this, cleaning of pit latrine is also one of the main concerns of sanitation in urban areas of developing countries like Ethiopia where there is no adequate sewerage system and onsite sanitation technology is used as primary

However, pit latrine cleaning is a severe problem in Ambo town especially for the last three years. According to the information from 45 interviewed households who have pit latrine 16

(35.56 percent) said pit cleaning takes between two to three months, 9 (20 percent) said one to two months, 4 (8.89 percent) said less than a month, 6 (13.33 percent) said more than three months and 7 (15.55) are not exactly now and not yet cleaned their latrine. On average takes between two to three months after the individual registered and pay cleaning cost to the municipality.

Figure,3. 9 Dirty public toilets in town center

Fgure,3.10 Private toilet released to open space by plastic tube

As a result, sometimes the pits overflow releasing hard small disturbing the neighbors especially during the rainy season and the families suffer from toilet problems and are forced to use other alternatives like in open space, which adversely pollutes the environment. In addition, delaines of cleaning time is followed by an increasing in the cost of cleaning service by charging 400 birr to 500 birr per load depending on the distance of the latrine from the main road. Further, some households reported that, some employees of the municipality sometimes negotiate with the driver of the truck and the truck does not take full load of sludge from the pit if additional money is not given to them. The truck takes half of what its carrying capacity by double trip and asks the price of two loads.

The discussion made with the mayor also indicated that, pit latrine cleaning has problem in the town. The municipality has a liquid wastes collecting and disposal truck, which was bought fifteen years before and it is too old and lacking spare parts in the market to render service beginning of 2009. Besides, the discussion also pointed out that, since 2009 liquid waste collecting truck has been coming from Addis Ababa on contract basis made with private owners and is not always available on time. This creates a serious problem in the town. On one hand, the truck arrives in when many people, at least 30 households, have already got registered to clean their latrine. Unfortunately, the latrine of many people may not be full at the sometime and it is found necessary to wait until many households get registered. On the other hand, the cost of cleaning is also relatively higher than what the municipality truck charges as the truck is privately owned for profit and is brought from the distant.

3.4.2.Waste water and sewerage system

Generally, there is no sewerage system in Ambo town to collect sewer. Hence, liquid wastes are discharged in open space and directly into Huluka River. In the some way, waste water from washing ditch, bathing, sometimes wastes from latrines are discharged into Huluka River and in open space. Besides, sludge of latrine collected by truck is also directly discharged or dumped in the farmers' plot, which is not more than 3 kilometers away from the town, without any treatment to the environment. Similarly, almost all drainage system of Ambo town is open channel except 3 Kilometers length closed channel along the main road. All of the draining systems are found along the roads. Most of the drainage systems were blocked by soil and sedimentation caused by garbage's. The majority of drainage systems is very old and is not timely maintained for proper functioning. As a result, rain water could not be accommodated by drainage. According to the information from interviewed households, some of the drainages were built in 1977 when Ambo Institute of Plant Protection Research Center was built and due to many years service and inadequate maintenance, they are not well functioning. Sometimes heavy flooding during the rainy season hit some areas of the town and may cause unexpected castatrophic economic loss and disturb social life. For example in 2009 more than 26 houses in Arada area were hit by heavy flood and many resources were destroyed.

Figure,3.11 Drainage destroyed by overflow

Figure,3.12 Drainage closed by solid waste

3.5. Impacts of water and sanitation inaccessibility

Inaccessibility of improved drinking water and sanitation facilities influences everybody's health, education, life expectancy, well-being and social development. This includes the risk of exposure to pathogens and hazardous substances that could affect public health at all points of the sanitation system from the toilet through the collection and treatment system to the point of reuse or disposal.

3.5.1. Health impact

Access to safe drinking water and sanitation is important as a health and development issue at national, regional and local levels. In some regions, it has been shown that investments in water supply and sanitation can yield a net economic benefit, since the reductions in adverse health effects and health care costs outweigh the costs of undertaking the interventions. Experience has also shown that interventions in improving access to safe water favour the poor in particular, whether in rural or urban areas, and can be an effective part of poverty alleviation strategies (WHO, 2008)

Although the Ethiopian Government is working to insure health of the people through improved sanitation and water supply facilities, which are also the central part of MDGs. However, the population of Ambo town has many water and sanitation born health problems.

Thus, out of 152 interviewed households, 98 (64.47 percent) reported that, on average two people get sick three times per year especially children are highly suffered from disease. Like typhoid, typhus, malaria, Ameba, Guardia are the main. The remaining 54 (35.52 percent) reported that they have not encountered any water and sanitation born diseases.

According to respondents judgment these diseases might be caught when they use river water for drinking especially during long period water supply interruption is occurred and inappropriate sanitation facilities like open defecation, inappropriate waste management in the town. In summer season many of the hand dug pits are collapsed and become the reproduction places for mosquito and other related creatures which can aggravate the health problems in Ambo town. 113 (74.34 percent) of the respondents complained that there is no adequate follow up and orientation by the municipality and health office where and how the households dig and use latrine. 39 (25.66 percent) claimed that some follow up exist through kebele administration and health extension workers. Most latrines and kitchens are separated by wall or adjacent to each other and many disease causing organisms can easily get access to kitchen from latrine.

The interview conducted with the deputy of Ambo town health office remarked that water and sanitation related diseases are the major problems in town. Further the data collected from Ambo town health office, showed that the majority of the top ten diseases in the town for the last five years were related to water and sanitation problem. The severity of these diseases are increasing from year to year in the town and these include typhoid, typhus, malaria, Ameba, Guardia are the major among the many (Appendix II).Therefore, to alleviate the problems, both the community and the government office like health office, municipality and ATWSSSE should work hard together to ensure the health of urban dwellers.

3.5.2. Socio-economic impact

The respondents also said that, in addition to sickness and absence from work cost of treatment is also a big burden to them. Particularly when two or more families get sick two to three times per year.

Table 3. 19 Cost of medication for water and sanitation born diseases

No	Cost per person in birr	Frequency	Percentage
1	< 100	5	5.1
2	100-200	16	16.33
3	200-300	28	28.57
4	300-400	23	23.47
5	400-500	18	18.37
6	>500	8	8.16
	Total	**98**	**100**

Source: Sampled household survey, January, 2011

From the 98 respondents who get health problem, 28 (28. 57 percent) paid 200 birr to 300 birr per person for medication, followed by 23 (23.47 percent) who paid 300 birr to 400 birr per person, 5 (5.1 percent) paid less than 100 birr while the rest 26 (26.43 percent) paid greater or equal to 400 birr. From this it is easy to understand that how much it is burden wise to the households especially with low income group when two or more family members get sick two or more times per year. In addition to the problems mentioned above, inconvenience of water and sanitation facility is also another social problem in the study area. Everybody wants water and sanitation facilities as close to their home as possible and live in clean and safe environment. But as stated by the interviewed households, due to frequent water interruption, odor of the latrine, women are ashamed to use communal latrine during the day time. As such, convenience is as important a consideration as health benefits.

3.5.3. Environmental degradation

Inaccessibility of potable water and sanitation facilities is the cause of high environmental pollution in the study area. According to the discussion made with the sample households and

personal observation during field survey, almost all solid and liquid wastes were directly dumped into Huluka River, which is used as primary sources of water in the downstream; along the roads; on the open field. Besides, the sludge or liquid wastes collected from pit latrines are directly dumped to the farmers' plot of land without any treatments thereafter polluting the environment especially during the rainy season and become the reproduction places for mosquito and other disease transmitting vectors.

3.6. Challenges in urban water supply and sanitation

Urban water supply and sanitation services are the two most important infrastructures among the many and require high investment to meet the demand of rapid urbanization. Hence, as per the interview made with different officials, such as general managers of ATWSSSE, Secretary of Ambo Town Water Board, two expertise from health office and two persons from municipality, some progresses have been made in the provision of water and sanitation in the town from time to time.

However, there is still a big gap between the supplies and demands of these services. This is due to inadequate finance, inadequate man power, weak coordination among the offices, failure to implementing the policies effectively as it was written on the paper, lack of other institutions, which involve in the provision of water and sanitation service, rapid population growth, failure to mobilize the community and let them actively participate in service provisions, were the major challenges in the study area.

3.6.1. Inadequate finance

ATWSSSE was established in 2004 by Oromia National State proclamation number 78/2004 article (20) sub article (1). The proclamation states that enterprise administers itself by its own fund based on the principle of cost recover. Similarly article (20) sub article (2) states that, the sources of finance for the enterprise are sales of water and charges from waste water disposal, loan, donations and grants both in cash and in kind, fund assigned by town administration of the town.

The general managers of ATWSSSE reported that, the enterprise has been getting its revenues only from the sales of water even though the proclamation stated many sources of incomes. Waste water disposal is carried out by the municipality as before the formulation of proclamation and not by ATWSSSE and no income from the area. Yet, no fund has been assigned by town administration to the enterprise and no donations and grants given to the enterprise.

Therefore, sales of water is the sole source of income for the enterprise and this is inadequate to provide new water sources and sewerage system rather than covering maintenance cost and salary of the employees.

Table 3. 20 Plan and actual budget of ATWSSSE (2006-2011)

Budget	**Years**					
	2006	2007	2008	2009	2010	2011
Planned	938,758	2,371,508	2,554,198	2,177,7243	3,125,069	3,359,715
Actual	708,243	1,730,350.10	1,753,211.40	1,705,570.23	2,494,114	-

Source: ATWSSSE, 2010

With this budget, the enterprise could not supply adequate water for the highly increasing demands. In the same way, the interviewed conducted with two employees of the municipality and health officer indicated that, shortage of finance is a big obstacle to provide urban infrastructures. But there is no adequate data that shows the amount of budget allocated for water and sanitation facility in these two offices.

3.6.2. Inadequate manpower

In all the three offices (ATWSSSE, Municipality and health office), there is inadequate manpower especially since the implementation of BPR many workers were displaced from their position and many posts in these offices are unfilled. According to the information from human resource department of the municipality, the new structure requires 92 professional workers (i.e. diploma holders and above) and out of which 23 (25 percent) positions are still unfilled. In the case of ATWSSSE and health office, there were no accurate data that show the number of unfilled positions but the interviewed officials claimed that, some positions were yet unfilled.

In general, skilled manpower is vital for the success of any organizational goals. Therefore, the offices should communicate with the region where currently recruitment takes place to get the required manpower for their vacant position so as to serve the community efficiently and effectively.

3.6.3. Population growth and urbanization

High urban population growth and urbanization is becoming a worldwide challenge to proved urban infrastructure particularly in the developing world like Ethiopia. In the same way, the rate at which urban infrastructure is provided and urban population growing is in Ambo town do not matched.

According to Ambo town administration census of 2009, the population of the town was 27,363 in 1994, 50,262 in 2007, and 67,514 in 2009 and predicted to be 83,839 and 104,112 by 2014 and 2019 respectively. This implies that unless immediate balancing measures are taken in the provision of urban infrastructures, especially water and sanitation to meet the demands of rapidly growing population, the situation may be found worsening from time to time if keep on going at prevailing rate. Hence, policy makers should give due attention to the issues and develop strategies on how the rate of service provision should be increased to cope up with high population growth and urbanization rate.

3.6.4. Weak sector coordination

Integration is the basis for multi sectoral approaches to ensure that planned goals are achieved and actions converge to solve environmental, water and health problems (Wallace et al, 2008). Memorandum of Understanding (MOU, 2005) signed by the Ministries of Health, Water, and Education has provided the foundation for implementation of the National WASH Program in an integrated and coordinated manner. However, integration and coordination among sectors and departments within the office in Ambo town is not strong enough to provide urban infrastructural facilities.

The health office is more responsible to provides technical supports like test of water pathology, selection of toilet site, checking waste management system and taking the necessary action to

assure healthy environment. However, according to the information from health office expertise, sometimes the municipality does not take the necessary action when the people violet the law and this discourage them to identify and bring the people.

Some higher officials also favor the rich or business men than the poor when they pollute the environment while everybody is equal before the law and this affects the life of the poor. For instance, some hotels directly connect their toilet to the river, dump liquid wastes to the closed channels along the main road and directly flow to Huluka River, which is used as alternative sources of water for urban people and primary sources for people living on the downstream. But sufficient measures have not been taken to stop the practices.

Concerning policy implementation, according to Oromia National State proclamation number 78/2004, water board has many powers to work on potable water supply and sewerage services to the town. But no tangible work has been done by the board to ensure the provision of these services. The board simply makes monthly meetings. Regarding the participation of other institution in the provision of water and sanitation, only WHO has worked on sanitation in corporation with municipality and health office and built six blocks of common toilets, which have twenty seven sites, in some slum and market areas. Moreover, WHO arranged different forum to the community on sanitation and gave trainings before it left the town in 2008.

3.7. Community participation

Community participation is the core element in the provision of urban infrastructures, especially in water and sanitation, by contributing to the construction activities through provision of in-kind (labor and material) and cash. What is more, community participation should not be limited to resource contribution it also encompasses the involvement of both women and men in the management and decision making like planning, selecting the location of water points and toilet facilities, monitoring, etc. Afterwards, the community develops a sense of post-implementation ownership and takes management responsibility.

According to the information from interviewed households, 117 (76.97 percent) reported that, community participation in the provision of water and sanitation infrastructure is meager in the

study area. This is attributed to the weakness of government offices, primarily municipality, health office and ATWSSSE to promote and mobilize full community participation both in resource contribution and idea sharing in the provision of water and sanitation facilities. They also complained that kebele health committee is exists only by name. There is no adequate discussion with large community on urban infrastructure provision issue and become customary that such kind of open discussion is made every five years at the eve of the national election. They also complain that kebele health committee exists only by name. After the election passed, no one remember what promised until the next five years election. But the remaining 35 (23.03 percent) said that, there is practice of community participation especially in resource contribution like money and labour.

The respondents also indicated that there was no sufficient advice and technical support for the urban dwellers to protect their environment clean. Even sometimes when the community organized themselves by hider and asks for some technical and material supports, the municipality does not respond accordingly. Similarly, the interview conducted in the three offices (municipality, health office and ATWSSSE) indicated that, community participation in the provision of urban infrastructure in the town is not satisfactory. And this is due to the failure of the concerned authorities and offices, to make open discussion on the problems until the grass root level to create awareness and sense of ownership in the community.

The deputy manager of Ambo town health office stated that, awareness creation is the first step in the sanitation service promotion and it is the mandate of health office through health extension workers and in corporation with other offices like municipality and TWSSSE. Thus, before WHO left the town, it had been giving financial supports and had coordinated with health office and made discussions to household level and called on different meetings to create awareness on sanitation and how the community could participate in the sanitation promotion. However, since the WHO left the town in 2008, the discussion with community at large to the grass root level has become weaker and weaker. The town health office has been working and discussing with kebele administrators goti representatives and kebele health committee.

Besides, urban health extension workers have been working with community and have been supervised by expertise from health office and the report is written monthly to the health office. According to the health extension program, one expertise supervises five health extension workers but in Ambo town, one expertise supervises twenty health extension workers, which is four times what the health extension program allows. And this is too difficult to closely control the performance of each and every worker and to know the extent at which they reach every household.

Therefore, it is not easy to know whether the community has got clear understanding or not on the issue based merely on monthly reports and discussions with kebele administrators, goti representative and kebele health committees. Having this the health office has planned and assigned budget to reach the community to the grass root level in coordination with health extension workers and the implementation would begin in the near future.

Apart from the so far discussed problems related to the existing water and sanitation problem of the sample households, their overall level of satisfaction was assessed in the part. Out of 152 interviewed households about 143 (94.08 percent) reported that the existing service was not satisfactory where 9 (5.92 percent) households did not have problem with services.

According to the households' opinions, the followings are major reasons for their dissatisfaction. Frequent water interruption and its adverse effects on their lives; shortage of water supply; high cost and complicated procedures to get private water connection; adverse effects of water and sanitation services on their health and economy; poor sanitation services, like lack of communal latrines in slum areas; high cost and delaines of pit latrine emptying; no proper liquid and solid wastes disposal management; lack of transparency i.e. ignoring properly listening to the voice of the people. Most of the time things are seen from political point of view and people would prefer silence to express their feelings. Sometimes the position in the office is perceived as opportunity rather than as responsibility to serve the people.

CHAPTER FOUR

4. Conclusions and Recommendations of the finding

4.1. Conclusions

This study is aimed to assess the existing situation of water supply and sanitation service in Ambo town. Particularly, it intended in assessing the coverage, accessibility, factors affecting water and sanitation service provision and impacts of water and sanitation in accessibility on the urban dwellers.

Water supply for Ambo town was started in 1960. The first pipeline was laid for Ambo Ethiopian Hotel and Ambo college of Agriculture Institute in 1962. The current water sources of the town are Huluka River in take wire and two boreholes. The total water produced from these three sources is 743,050m^3 per year. But Huluka River alone has the potential to produce 82,730,589m^3 per year, which is more than 111 times the total water currently produced in the town from the three sources.

The town has a total of 42 kilometers length water supply networks, which includes both primary and secondary distribution pipe lines and 21 public taps, which are distributed in the town and managed by the users' villages. Concerning water connection, only 33.42 percent of the total urban households have private connection. The remaining 66.58 percent of the urban dwellers collect water from public tap and/or vendors. According to study result, households who have no

yard connection depend on public taps and vendors for water source. These sources are used due to lack of money, shortage of water supply and unavailability of distribution lines in the nearby and too complicated procedures set by TWSSSE to get connection.

Potable water supply coverage to urban dwellers is the main concern of government in these days and also major issue in the achievement of MDGs. Hence, Ethiopian Government 2010 MDGs report stated that national urban water coverage was 91.5 percent. In the same year, Oromia Water Resource Management Bureau reported that, regional urban water coverage reached 84.2 percent. However, the study result indicated that, the existing water supply coverage of Ambo town is 40.9 percent, which is below half of both the national and regional reports.

With regarding to water accessibility, the Oromia National State proclamation number 78/2004 article (5) sub article (1) stated that, the enterprise provides potable and adequate water supply to the urban dwellers in and around the town and ensures that the water supplied is to the standard of the WHO. However, the study result indicated that, the average water consumption of the sample households is 9.13 liters per person per day, which is less than half of the 20 l/p/d what is recommended by the WHO.

Water cost is also the major determinant of water accessibility and two types of water tariffs in Ambo town, which are connection tariff and usage tariff. But this works only for those who have private connection and those who get water from public tap. Nevertheless, those who neither have private connection nor public tap are paying high cost to buy water in small amount from private sellers. Again, the distance between public tap and household residence is also another problem in the town. In some area public tap is farther than 600 meters and this takes more than an hour for the round trip and queue in the tap to get 20 litters of water.

Repeated water interruption is also affecting the residents in Ambo town; when some area received water services continuously for more than a month, the other areas do not get water service continuously for a month and above. The major causes of water interruption are topography of the town, too old water supply system, nature of the soil, shortage of water power and electric power cut. On the other hand, the sanitation of Ambo town has been deteriorating

from time to time, which is caused by inadequacy of latrines facilities and its management , inadequate water supply, high water interruption, lack of sewerage system, in adequate cleaning/suction services, poor abattoir services.

The current improved sanitation coverage of the town is 25.18 percent. The majority of the latrines were hand dug which easily collapse or sink during heavy rains. There are no adequate communal latrines in the town. People defecate in open spaces, in the bush etc. Emptying of pit latrine is also a big problem in the town where charging 400 birr to 500 birr per load. There is no sewerage system in the town to collect sewer. Hence, liquid wastes are discharged on open space and directly into Huluka River. Almost all the drainage systems are open channel and found along the roads. Most of the drainage systems were blocked by soil and sedimentation caused by garbage's. Municipality dumps wastes in open space in the farmers' plot of land without any post disposal treatment and this adversely pollute the environment and health of the people living in and around the area. Generally, water and sanitation inaccessibility has much health, socioeconomic and environmental impacts in Ambo town.

Provision of urban infrastructure has become challenging in today's world, especially in developing countries. Similarly, the study result identified the major constraints of water supply and sanitation in Ambo town. These include, inadequate finance, inadequate manpower, weak coordination among the offices, failure to implementing the policies effectively as it was written on the paper, lack of other institutions that involve in the provision of water and sanitation service, rapid population growth, failure to mobilize the community and make them active participants in service provisions.

Community participation is a vital concern in the provision of infrastructure. However, the study indicated that, community participation is insufficient due weakness of higher officials to coordinate and mobilize the people for development activities. In line with this, the study result also indicated 94.08 percent of the sample households were not satisfied with the existing water and sanitation service.

4.2.Recommendations

The study result indicated that, the current levels of potable water supply and improved sanitation coverage and accessibility in Ambo town is very low in any standards. Hence, of all others ATWSSSE should increase water production and expand the distribution line to bring the system near to the households' residences. And this enables the people to get connection at nearby and fair cost. The criteria set by the enterprise to get private water connection should be revised and the resident gets water without exposed to extra cost and wastage of time. ATWSSSE better to install additional public tap and follow up the maintenance and operation of the tap. The community should also care for the tap and arrange the service time according to their interest to avoid inconvenience. The enterprise has to manage the wastages of scarce water due to old system by replacing with new and cost effective technology. Although, water service is considered as self financing, new strategies need to be designed to subsidize or provide water supply on credit to the low income groups.

On the other hand, article (20) sub article (3) of this proclamation stated that, the regional government grants the necessary supports for the establishment and expansion of water services by accessing the capacity of the enterprise. However, no support has so far been given to ATWSSSE to ensure water supply services except water project feasibility study conducted in 2009. Therefore, the regional government should provide the necessary supports (financial, materials and technical) to the enterprise to serve the people and alleviate the present and long term water crises in the town.

The current water tariff applied in the town was set by Oromia Water Resource Management Bureau before WSSSE was established in 2004 by proclamation 78/4004. However, after WSSSE was established, the power to review the waster service tariff submitted to it by enterprise and pass it over to the regional water bureau for approval was given to town water but both the enterprise and the board have not done any assessment on water tariff. Therefore, water tariff should be assessed and the necessary adjustments to be made in accordance with the existing socioeconomic situation of the households. Setting of water tariffs should be transparent, so that consumers can appreciate water utilities' challenges (including their costs in providing water).

In addition to services tariff review, the board has powers and duties in managing the enterprise. However, according to the study result there is no significant work done by water board in the town. Hence the board has to play its duties and responsibilities according to the proclamation.

Regarding to water interruption, although it takes time to avoid interruption it has to be minimized through maintaining and replacing the old system by cost effective technology. Water interruption has to be scheduled so that everybody gets water supply by shift at a fair time gap rather than serving some area continuously while other area stay without water service at all. This measure would minimize the inequitable distribution of scarce water supply among the residents of the town. The enterprise should give notice in advance for water interruption so that the community stores water. Quality of water in terms of taste, colour and odor has some problems according to the users' perception and it has to improved, but the user's perception alone does not enough to explain the qualities of drinking water and this needs further research and laboratorical test.

Sanitation of Ambo town is very poor as there is no sewerage system, inadequate communal latrines in slum areas and even in the center of the town where high concentration of kebele houses is found. Liquid wastes were simply dumped directly into rivers, ditch and in open spaces and this act pollutes the rivers and environment, which causes high negative health and socioeconomic impacts on the community. There is no liquid waste collecting truck in the town as a result of which pit latrine cleaning takes long time and high cost. The municipality is weak in law enforcements especially on the sanitation.

Therefore, to improve sanitation the municipality had better to build communal latrines in slum areas and areas where many poor people live in kebele houses through community mobilization strategy. Health and hygiene education should be connected to sanitation in order to make people be aware of where health problems originate and how to improve sanitation by their own actions. The municipality should buy liquid waste collecting truck even if there is no budget, by arranging some fund raising mechanisms and inviting businessmen, community at large, NGOs and other stakeholders in and around the town. The municipality should select appropriate liquid waste disposal sites especially the sludge from latrines to keep health of the people and

environment. The municipality had better to coordinate with town health office and town health extension workers to raises community awareness on sanitation and closely follows up how they exercise.
Further, the community also actively involved in environmental protection especially sanitation rather than expecting everything from the government.

In addition to providing alternative, sanitation facilities and awareness creation, the municipality should effectively enforce the law and take the necessary actions on those who deliberately pollute the environment. Almost all house and hotels along the Hluka River connected their latrine to the river, which is used by the community at the down for many purposes. But there was no satisfactory action taken by the municipality even though many communities complain the issue repeatedly. Many of the drainage systems of the town are very old and do not function properly. Hence the municipality has to improve the drainage through maintaining the old ones and building additional drainage in slum and market areas.

Community participation should be encouraged in all aspects like resource contribution, decision making and post implementation management. The officials at different levels should listen to the voice of the community and understand their interest rather than selling their ideas to the people. Community need assessments should be conducted by preparing different forums and this help to understand their opinions on how to solve water supply and sanitation problems; how to work together; what they can contribute etc. Further, making oral discussion alone is not a guarantee for the community. They should be able to see practically the result of their contribution and this help to encourages their future participation.

The municipality has to design strategies for a coordinated and organized intervention between different stakeholders such as the government, NGOs, community based organizations, charity and religious organizations and community at large to curtail the pervasiveness of poor water supply, sanitation and hygiene problems and their consequences

According to the study result, the data management system in all the three offices namely; municipality, water supply and sewerage service enterprise and health office were too poor.

There was no adequate data that show the performance of the office. There were no clear standards to measure the quality and quantity of service provision. Most of the time they simply depend on number than on how then come. For instance, the current actual percentage of improved sanitation coverage in the town is 25.18 percent but as per the health office calculation, which dividing the total latrines to the total households without distinguishing improved and unimproved, the coverage is 52.25 percent which is far from reality. And this over estimating of the achievement has negative impact on the future budget allocation in the area, socioeconomic of the people and environment. The municipality should encourage and conduct different researches on urban infrastructures to identify the problems and develop strategies which enable to solve the problems.

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Appendix

Appendix I

Questionnaire

This questionnaire is prepared as an instrument to conduct an academic research for the fulfillment of Masters of Art Degree (M A) in Addis Ababa University Faculty of Business and Economics Department of Public Administration and Management. The main objective of the research is to assess water supply and sanitation service in Ambo Town. Therefore the information you will provide is very important for the research. Furthermore, the information you give will be used for only the academic research.

Thanks in advance for your cooperation.

I. Questions answered by sample Households.

a. Personal profile of the respondent

Age_____ Sex_____Levelsofeducation_____Familysize

Marital status _____ house ownership _____Occupational status _____ monthly income _____

b. Detail questions about water and sanitations facility.

1. Do you have access to improved water and sanitation service?
2. What is/are the source/s of water for you?
3. What is your average daily water consumption?
4. Do you use the same source of water throughout the year?
5. For what purpose you need water?
6. Do you have private toilet at your home? If yes what type? If no where do you extract your waste?
7. Is there any public toilet in your village? If yes, are they comfort, convenience and safe to use?
8. Do you have bath room in your home? If no where you take bath?
9. How and where do you dispose liquid waste?
10. What round trip distance and time you spend to fetch water?
11. Is there any other water source in your village except the one provided by the municipality?
12. Is there any water supply interruption in your village?
13. If your answer for Q11 is yes, what are the frequency and the average duration of water interruption?
14. Based on Q12 above, what do you think the reason for the interruption and where do you get water during the interruption?

15. Do you think that, the source of water and sanitation facilities you are currently using good quality?
16. Have you and your family been faced any water and sanitation related problems?
17. If your answer Q14 is yes, what is/are they?
18. If you don't have private connection/yard so far, what do think the reason?
19. How do you explain the overall water and sanitation facility of your village?

Questions answered by Officials.

Personal information

Age _____ sex _____ your responsibility or position in the organization _____years of experience in the office_____

II. Questions answered by Ambo Town Water Supply and Sewerage Service Enterprise

1. What is the status of water and sewerage facilities in Ambo Town?
2. How about accessibility, adequacy and affordability of water to the urban dwellers?
3. How do you measure household's water service accessibility adequacy and affordability?
4. What is/are the source/s of water to urban dwellers in the Ambo Town? is /are it they enough to meet the current and future water demand of the town?
5. What strategy is set by your office to provide improved water and sanitation facilities to the urban dwellers?
6. What are the prerequisites an individual fulfilling to have private connections?
7. Do you think that these prerequisites limit the individuals to have private connection?
8. If your answer for Q7 is yes, what do you think the solutions?
9. What are the challenges in providing improved water services to the urban dwellers?

10. What measures should be taken to overcome the problems?
11. Is there any water related problems on the life of the urban dwellers and the environment?
11. If your answer for Q11 is yes, what are they and what should be done to solve the problems?
12. Is there water shortage/interruption in your town?
13. If your answer for Q13 is yes, how often and how long? What do you think the causes of interruption and what solution do you have on the time?
14. Have you ever encountered any claim related to water and sanitation from urban dwellers?
15. Is there any other institution (NGO, civil society organization, community organization etc) and local community, which participate in water and sewerage provision activities in Ambo Town?
16. If your answer for Q16 is yes, what are their participations?
17. In general, how do you rate the overall water and sanitation facilities in Ambo town

III. Questions answered by Health Officials

1. What is the status of sanitation facilities in Ambo Town?
2. How about sanitation and water accessibility to the urban dwellers?
3. How do you measure household's water service accessibility adequacy and affordability?
4. Is there any water and sanitation related problems on the life of the urban dwellers and the environment
5. If your answer for Q4 is yes, what are they and what should be done to solve the problems?

6. What are the challenges in providing improved water services to the urban dwellers?
7. What measures should be taken to overcome the challenges?
8. Is there any other institution (NGO, civil society organization, community organization etc) and local community, which participate in water and sewerage provision activities in Ambo Town?
9. In general, how do you rate the overall water and sanitation facilities in Ambo Town?

IV. Questions answered by Municipality officials

1. What is the status of water supply and sanitation facilities in Ambo Town?
2. What are the challenges in providing improved water services to the urban dwellers?
3. What measures should be taken to overcome these challenges?
4. What strategy is set by your office to provide improved water and sanitation facilities to the urban dwellers as municipality?
5. Is there any other institution (NGO, civil society organization, community organization etc) and local community, which participate in water and sewerage provision activities in Ambo Town?
6. In general, how do you rate the overall water and sanitation facilities in Ambo Town?

Thanks once again!!

Appendix II

TOP TEN DISEASES IN AMBO TOWN (2006-2010)

2006	2007	2008
1.DIARRHA DISEASES 2. GUSTRIC 3. URTI 4. EYE DISEASES 5. RHEUMATOID PARASITE 6. MALARIA 7. ACUTE FEBRIL ILLINESS	1. UTI 2. HELMITHS 3. TONSILITIS 4. GASTRIC 5. SKINDISEAS 6. AMOEBIASIS 7. RHEUMATOID PARASITE 8. STRONGLOIDIASIS 9. MALARIA 10. EYE DISEASES	1. OTHER HELMINTHES 2. ALLOTHER DISASES OF GERITO URINARY 3. HYPERTRIPY OF TONSIL 4. BRANCHO PHEUMONIA 5. GESTRIC 6. TYPHIOD FEVER 7. MUSCULARRHEUMATISUM 8. INFECTION OF SKIN 9. AMBOEBIASIS 10. UNSPCIFIED MALARIA
2009	**2010**	
1. OTHER HELMINTHES 2. TYPHOID FEVER 3. ALLOTHER DISASES OF GERITO URINARY 4. GESTRIC 5. BRANCHO PHEUMONIA 6. HYPERTRIPY OF TONSIL 7. INFECTION OF SKIN AND SUBCUTANEOUS TISSUE 8. MUSCULARRHEUMATISUM 9. UNSPCIFIED MALARIA 10. UNSPECIFIED TYPHAUS	1. ACUTWE UPPER RESPIRATORY TRAC INFACTION 2. URINARY TRIC INFECTION 3. MALARIA 4. OTHER PARASITIC DISEASES 5. DIARREAL DISEASE 6. TYPHIOD FEVER 7. PENEUMIORIA 8. DYSPERIA 9. TRAUCOMA 10. ACUTE BRONCHITIS	